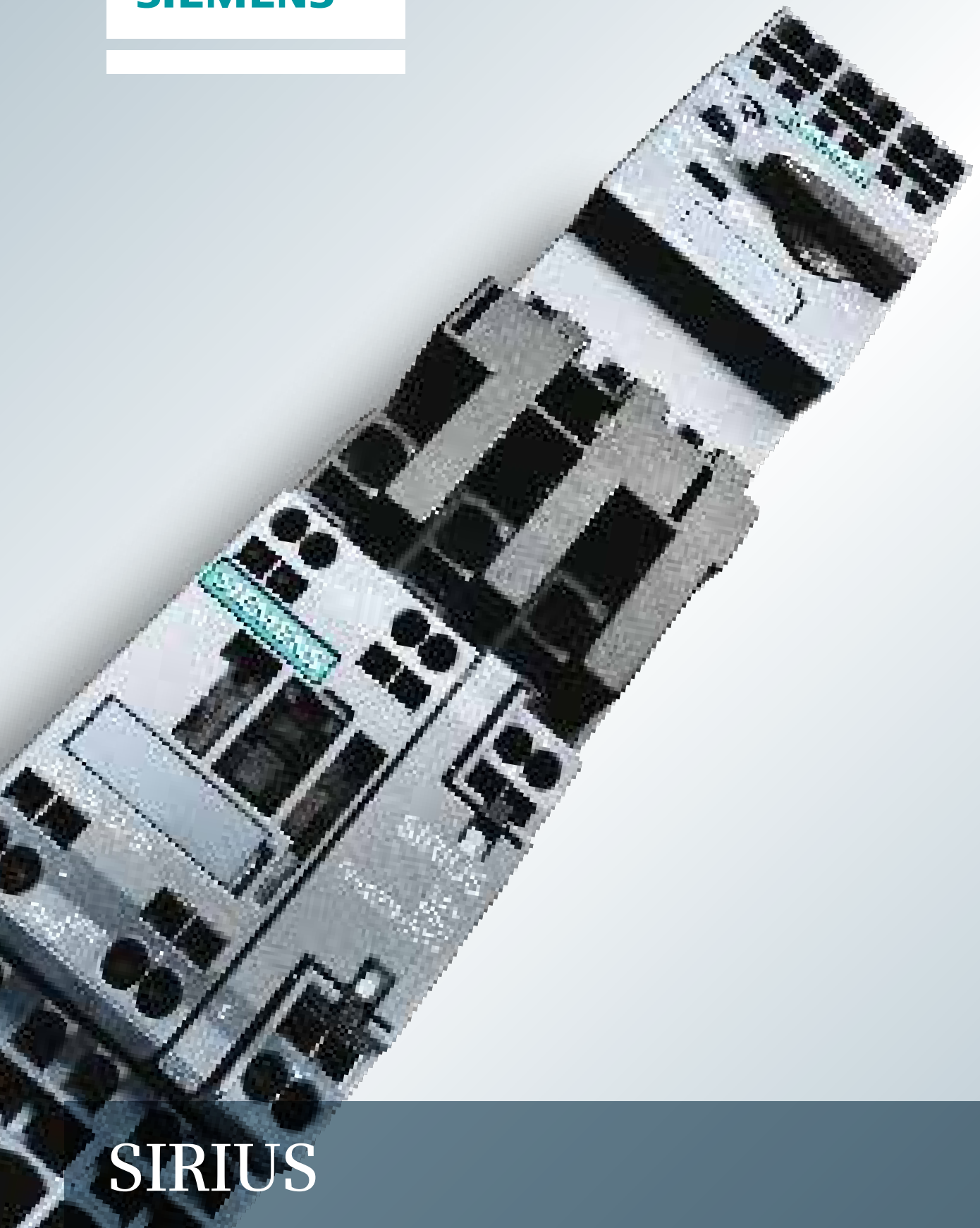


SIEMENS



SIRIUS

Datasheet 2012

Answers for industry.



Introduction

Contactors and Contactor Assemblies

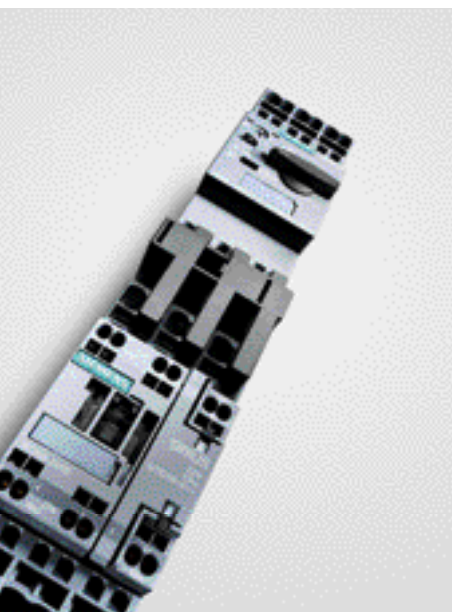
SIRIUS 3RW Soft Starter

Protection Equipment

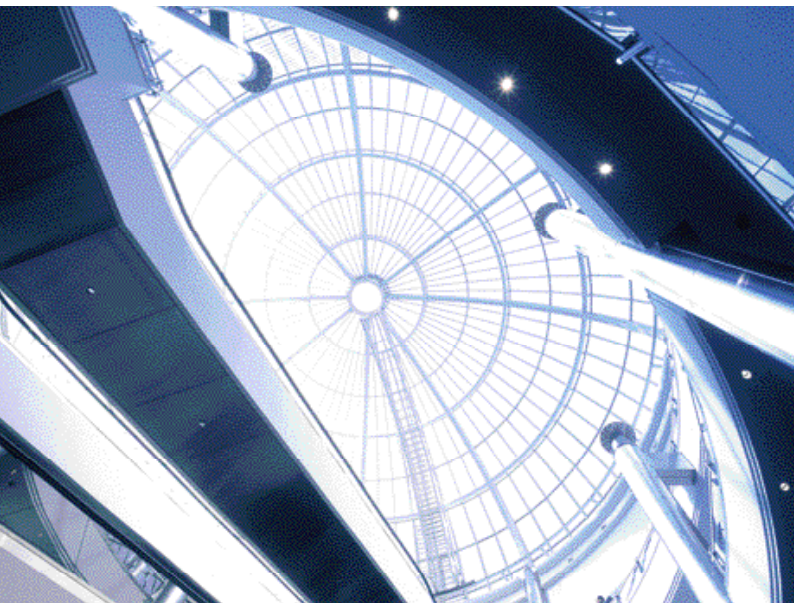
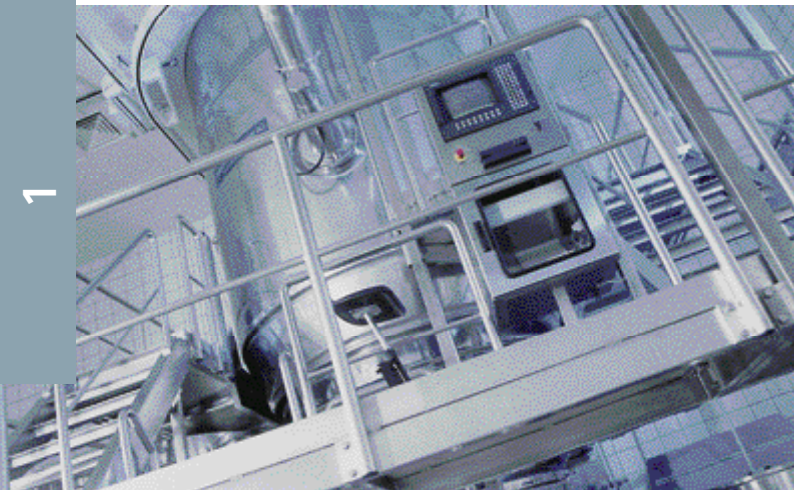
Load Feeders and Motor Starters for Use in the Control Cabinet

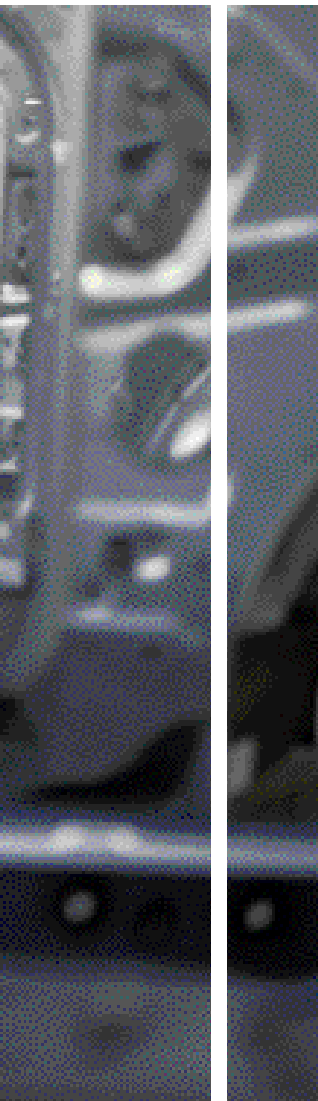
Monitoring and Control Devices

Introduction



1/2	Answers for Industry.
1/4	Energy efficiency – Benefits for the environment and for your competitiveness.
1/6	Industrial controls. The basis for advanced solutions.





Answers for industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60 %.

Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.

Energy efficiency - benefits for the environment and for your competitiveness.

With its energy-efficient solutions and green technologies, the Siemens environmental portfolio offers a threefold benefit: for our customers, improving their bottom line through lower energy costs and higher productivity; for future generations, helping to maintain and improve the environment and living conditions; and for Siemens itself, tapping into attractive markets and securing the company's future.

A wide range of environmental technologies and energy-efficient solutions

Siemens has been supplying products and solutions for environmental protection and climate control since its earliest beginnings. To name but one example, it was back in 1873 that Werner von Siemens developed a technology for avoiding ash emissions from chimneys.

Today, we have the Siemens environmental portfolio in which we bundle those technologies which have been shown to help our customers with pollution control. These include the following:

Products and systems which are far more energy-efficient than comparable solutions, such as gas and steam turbines for solar power, low-energy light bulbs, and intelligent building services engineering

Systems which use renewable sources of energy and their components, such as wind power plants and steam turbines for solar power

Environmental technologies which we harness for the provision of clean water and purer air

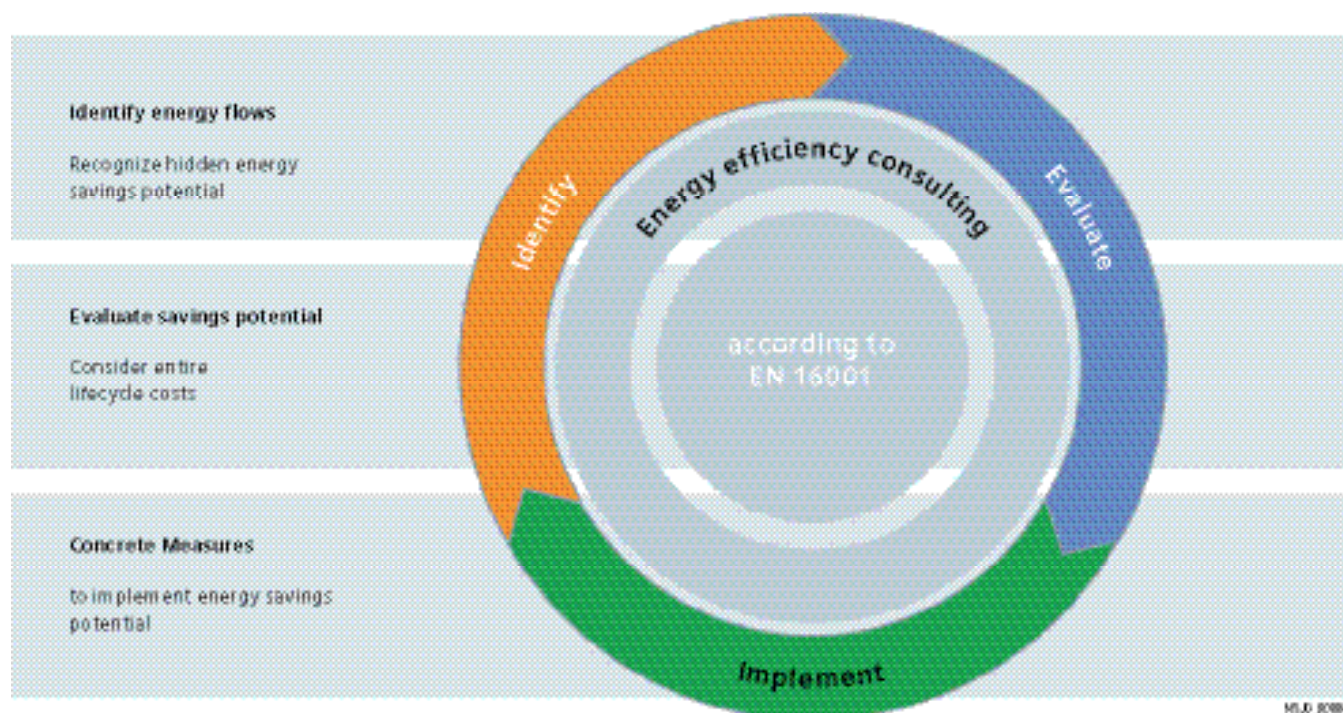
The Siemens environmental portfolio covers the entire energy conversion chain – from efficient power generation and energy distribution right through to usage – and green technologies.



SIRIUS industrial controls

The industrial control components are fine-tuned to minimize power loss and thus provide both passive and active support in implementing efficient systems and applications.

The components of SIRIUS Innovations perform at extremely low levels of inherent loss. The new generation heralded a further significant reduction of 10 % on average. This means that not only is it possible to save on energy costs but also to reduce the amount of waste heat in the control cabinet. This then translates to a higher packing density in the control cabinet and a reduction in the required cooling efficiency.



SIRIUS reduces power loss

Our most energy-efficient contactors are fitted with an electronic coil control. This reduces the power loss by up to 92 %.

Our soft starters use intelligent, integrated current bypass circuits. The power loss is thereby reduced by 92 % during operation.

Overload relays are fitted with an electronic release instead of a bimetal trip unit and boast not only a wider setting range but also a reduction of up to 98 % in no-load loss.

In comparison with conventional feeders, the power loss in the compact feeder has been reduced by up to 80 %. This is due to the combination of the most efficient technologies in one unit.

Energy management

Energy management can be instrumental in increasing plant productivity and thus bringing about a significant improvement to the competitive ability of a company – in all sectors of industry.

As a continuous process, a sophisticated concept will deliver a consistent reduction in energy consumption. Our energy management strategy is based on three phases: "Identify", "Evaluate" and "Implement".

Compatible hardware and software record the energy flux in the system, generating visual displays and analyzing the flows. The data thus obtained can be taken to make an initial evaluation of the potential savings and also form the basis for an intelligent and efficient energy management system.

Communication-capable SIRIUS switching and protection devices deliver measured energy data

The communication-capable SIRIUS switching and protection devices can deliver energy values continually, without any additional installation expense and input, e. g. to a higher-level energy management system, and thus offer the required transparency in energy consumption.

Innovative Siemens technology – answers for a green society!

We lead the field in terms of innovation and sustainable added value in industrial control engineering.

Industrial controls.

The basis for innovative solutions.

High demands are made in the field of industrial controls:

Users want cost-effective solutions which can be easily integrated in control cabinets, distribution boards and distributed systems and which can communicate perfectly with each other.

Our response to their demands are SIRIUS industrial controls.



SIRIUS industrial controls

The SIRIUS range has everything you need for switching, protecting and starting loads. Products for monitoring, control, detection, commanding, signaling and power supply round off the spectrum of industrial controls.

Building control cabinets should be quick, easy, flexible and space-saving. But how can all these requirements be met simultaneously? The answer lies in the unique SIRIUS modular system up to 250 kW / 400 V, where you will find everything that you need for switching, protecting and starting motors and industrial systems.

Furthermore, all components of the SIRIUS modular system are characterized by a space-saving design and high flexibility and are optimally coordinated with each other. Configuring, installing, wiring and maintenance are extremely easy and time-saving to perform.

Regardless of whether you want to build up your own load feeders with motor starter protectors/circuit breakers or overload relays, contactors or soft starters, or decide instead in favor of preassembled feeders: SIRIUS has the right product for every application.

Continuous further development and regular innovations ensure that our customers are optimally equipped with SIRIUS and benefit from efficient solutions – today and tomorrow.

Systematic further development – SIRIUS Innovations

SIRIUS has long been synonymous world-wide with industrial controls and has been a trendsetter in this field from the very beginning. The SIRIUS modular system with its components for the switching, starting, protection and monitoring of motors and industrial systems stands for the fast, flexible and space-saving construction of control cabinets.

With its latest innovations for the main and control circuit, the new SIRIUS modular system has underlined its leading position once again.

The consistent further development of SIRIUS takes even better account of current market requirements, particularly the call for fewer variants, greater flexibility and reduced cost and time. The advantages for you are: higher productivity and cost efficiency in your company.

Clicking replaces wiring

In the portfolio of the SIRIUS modular system you can trust on finding perfectly coordinated and flexibly combinable components which now are even easier to install: plug in place, connect, click and that's it! Complicated wiring is a thing of the past, as are wiring errors. For you this means a significant reduction of time and cost.

Innovative through and through

The SIRIUS modular system in sizes S00 and S0 up to 40 A has been completely revised – with respect to the main and control circuit. As the result, the innovative basic components such as motor starter protectors and contactors provide a host of advantages to optimize your plant, today and in the future. Often the innovation is to be found in the details. For example, more power in the same design and the bundling of functions in basic devices for notable space savings.

At the same time the innovations enable the greatest flexibility. Be it direct starting, reverse starting or wye-delta starting for customer assembly, as a tested combination or an "all-in-one" solution complete with the compact starter, for soft starting or for frequent switching: the SIRIUS modular system offers the perfect answer.



Another aspect at the focus of the new developments was the enhancement of plant availability. In future, SIRIUS components from the modular system can also be used at minimum expense to monitor the application. Selective plant monitoring then becomes utterly simple – with current monitoring relays integrated directly in the load feeder or configured from the controller via the load feeder connection to AS-Interface or IO-Link.

These innovations are the perfect low-end supplement to today's S2-S12 modular system up to 250 kW / 400 V and offer many new options for the construction of control cabinets.

More efficiency in control cabinet installation

The highlights of the new SIRIUS modular system are particularly numerous with regard to assembly and handling, application monitoring, connection to the controller, and customer support throughout the plant's lifecycle.

All these innovations add up to the many different possibilities of the new SIRIUS modular system as a whole – for the highest efficiency in control cabinet installation.

SIRIUS Safety Integrated

Combined with Totally Integrated Automation and Safety Integrated, our product portfolio can be bundled to create optimized systems. All in all, Siemens provides innovative controls with modern features, such as integrated communication and safety technology that work to your advantage: the basis for ground-breaking integrated solutions.

Safety Integrated by Siemens is the consistent implementation of safety technology in accordance with the concept of Totally Integrated Automation. Direct integration of safety-related functions in our standard products and the consistent integration of safety concepts in the standard automation environment offer many advantages for machine manufacturers and system operators.

Our SIRIUS Safety Integrated controls are a central element of the Siemens Safety Integrated concept. Whether for failsafe sensing, instructing and reporting, monitoring and evaluating or starting and reliable shutting down – our SIRIUS Safety Integrated controls are expert at performing safety tasks in your plant.

SIRIUS Safety Integrated uses failsafe communication using standard field bus systems, e. g. ASIsafe via AS-Interface and PROFIsafe via PROFIBUS, to solve even networked safety tasks of greater complexity. This opens the door for flexible safety solutions for compact machines or large-scale plants and for verification of compliance with the Machinery Directive up to SIL 3 / PL e with the Safety Evaluation Tool.

The free, TÜV-approved online tool is a rapid and reliable aid for the evaluation of machine safety functions. The result is a report conforming to the relevant machine documentation standards.

Notes

Controls – Contactors and Contactor Assemblies

2

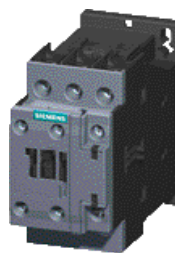


2/2	Introduction		<u>Contactors for Switching DC voltage</u>
	Power Contactors for Switching Motors	2/117	3TC contactors, 1- and 2-pole, 32 ... 400 A
2/5	General data		Contactor Relays
2/11	SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW new	2/121	SIRIUS 3RH2 contactor relays, 4-pole new
2/30	SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW	2/130	SIRIUS 3RH24 latched contactor relays, 4-pole new
2/50	SIRIUS 3RT12 vacuum contactors, 3-pole, 110 ... 250 kW	2/131	SIRIUS 3RH21 coupling relays for switching auxiliary circuits, 4-pole new
2/55	3TF6 vacuum contactors, 3-pole, 335 ... 450 kW		Coupling Contactors
	Contactor Assemblies <u>3RA23, 3RA13, 3RA24, 3RA14</u> <u>Contactor Assemblies</u>	2/133	SIRIUS 3RT20 coupling contactors (interface), 3-pole, 3 ... 15 kW new
2/61	SIRIUS 3RA23 reversing contactor assemblies new		Function Modules for Mounting onto SIRIUS 3RT2 Contactors new
2/69	SIRIUS 3RA13 reversing contactor assemblies	2/137	Introduction
2/75	SIRIUS 3RA24 contactor assemblies for wye-delta starting new	2/138	SIRIUS function modules
2/84	SIRIUS 3RA14 contactor assemblies for wye-delta starting	2/142	SIRIUS function modules for IO-Link
	Contactors for Special Applications	2/147	SIRIUS function modules for AS-Interface
2/91	SIRIUS 3RT14 contactors for resistive loads (AC-1), 3-pole, 140 ... 690 A		Accessories and Spare Parts <u>For 3RT2, 3RH2 Contactors and Contactor Relays</u> new
2/98	SIRIUS 3RT23 contactors for resistive loads (AC-1), 4-pole, 4 NO, 18 ... 50 A new	2/151	Accessories for 3RT2, 3RH2 contactors and contactor relays
2/102	SIRIUS 3RT13 contactors for resistive loads (AC-1), 4-pole, 4 NO, 60 ... 140 A	2/168	Spare parts for 3RT2 contactors <u>For 3RT1, 3RH1 Contactors and Contactor Relays</u>
2/105	3TK1 contactors for resistive loads (AC-1), 4-pole, 4 NO, 200 ... 1000 A	2/169	Accessories for 3RT1, 3RH1 contactors and contactor relays
2/108	SIRIUS 3RT25 contactors, 4-pole, 2 NO + 2 NC, 4 ... 11 kW	2/186	Spare parts for 3RT1 contactors <u>For 3T Contactors and Contactor Relays</u>
2/112	SIRIUS 3RT15 contactors, 4-pole, 2 NO + 2 NC, 18.5 kW	2/188	Accessories for 3TC, 3TF6 contactors
2/114	SIRIUS 3RT16 capacitor contactors, 12.5 ... 50 kvar	2/191	Spare parts for 3TC, 3TF, 3TK contactors

Controls — Contactors and Contactor Assemblies

Introduction

Overview



Size		S00				S0					
Type		3RT20 1				3RT20 2					
3RT20 contactors											
Type		3RT20 15	3RT20 16	3RT20 17	3RT20 18	3RT20 23	3RT20 24	3RT20 25	3RT20 26	3RT20 27	3RT20 28
AC, DC operation											
Type		—				—					
AC-3											
I _e /AC-3/415 V	A	7	9	12	16	9	12	16	25	32	38/40
415 V	kW	3	4	5.5	7.5	4	5.5	7.5	11	15	18.5
230 V	kW	2.2	3	3	4	3	3	4	5.5	7.5	7.5
500 V	kW	3.5	4.5	5.5	7.5	4.5	7.5	10	11	18.5	18.5
690 V	kW	4	5.5	5.5	7.5	5.5	7.5	11	11	18.5	18.5
1000 V	kW	—	—	—	—	—	—	—	—	—	—
AC-4 (for I _a = 6 × I _e)											
415 V	kW	3	4	4	5.5	4	5.5	7.5	7.5	11	11
415 V (200 000 operating cycles)	kW	1.15	2	2	2.5	2	2.6	3.5	4.4	6	6
AC-1 (40 °C, ≤ 690 V)											
I _e	3RT20 A	18	22	22	22	40	40	40	50	50	50
Accessories for contactors											
Auxiliary switch blocks	On front	3RH29 11		(P. 2/157)		3RH29 11		(P. 2/157)			
	Lateral	3RH29 11		(P. 2/161)		3RH29 21		(P. 2/161)			
Timing relay blocks		3RA28 1.		(P. 2/140)		3RA28 1.		(P. 2/140)			
Function modules		3RA27 1.-. AA00		(P. 2/68, 2/83)		3RA27 1.-. AA00		(P. 2/68, 2/83)			
Surge suppressors		3RT29 16		(P. 2/164)		3RT29 26		(P. 2/164)			
3RU2 and 3RB3 overload relays (Protection Equipment → Overload Relays)											
3RU21, thermal, CLASS 10		3RU21 16 0.11 ... 16 A (Chap. 4)				3RU21 26 1.8 ... 40 A (Chap. 4)					
3RB30/31, solid-state, CLASS 5, 10, 20 and 30		3RB30 16 0.1 ... 16 A (Chap. 4) 3RB31 13				3RB30 26 0.1 ... 40 A (Chap. 4) 3RB31 23					
3RV20 motor protection circuit breakers (Protection Equipment → Motor Protection Circuit Breakers)											
Type		3RV20 11 0.11 ... 16 A (Chap. 4)				3RV20 21 11 ... 40 A (Chap. 4)					
Link modules		3RA29 11 (p. 2/64) (Chap. 4)				3RA29 21 (Chap. 4)					
3RA23 reversing contactor assemblies											
Complete units	Type	3RA23 15	3RA23 16	3RA23 17	3RA23 18	—	3RA23 24	3RA23 25	3RA23 26	3RA23 27	3RA23 28
415 V	kW	3	4	5.5	7.5	—	5.5	7.5	11	15	18.5
Assembly kits/wiring modules		3RA29 13-2AA.		(p. 2/67)		—	3RA29 23-2AA.		(p. 2/67)		
Function modules		3RA27 1.-. BA00		(p. 2/68)		—	3RA27 1.-. BA0		(p. 2/68)		
3RA24 contactor assemblies for wye-delta starting											
Complete units	Type	3RA24 15	3RA24 16	3RA24 17	(p. 2/79)	3RA24 23		3RA24 25	3RA24 26	(p. 2/81)	
415 V	kW	5.5	7.5	11		11		15/18.5	22		
Assembly kits/wiring modules		3RA29 13-2BB.		(p. 2/82)		3RA29 23-2BB.		(p. 2/82)			
Function modules		3RA27 1.-. CA00		(p. 2/83)		3RA27 1.-. CA00		(p. 2/83)			



Size Type		S2 3RT10 3			S3 3RT1. 4			S6 3RT1. 5		
3RT10 contactors										
Type		3RT10 34	3RT10 35	3RT10 36	3RT10 44	3RT10 45	3RT10 46	3RT10 54	3RT10 55	3RT10 56
AC, DC operation		(p. 2/45, 2/46)			(p. 2/45, 2/46)			(p. 2/47)		
Type		—			—			—		
AC-3										
I _e /AC-3/415 V	A	32	40	50	65	80	95	115	150	185
415 V	kW	15	18.5	22	30	37	45	55	75	90
230 V	kW	7.5	11	15	18.5	22	22	37	45	55
500 V	kW	18.5	22	30	37	45	55	75	90	110
690 V	3RT10/12 kW	18.5	22	22	45	55	55	110	132	160
1000 V	3RT10/12 kW	—	—	—	30	37	37	75	90	90
AC-4 (for I _a = 6 × I _e)										
415 V	3RT10/12 kW	15	18.5	22	30	37	45	55	75	90
415 V (200 000 operating cycles)	kW	8.2	9.5	12.6	15.1	17.9	22	29	38	45
AC-1 (40 °C, ≤ 690 V)										
I _e	3RT10/12 A	50	60	60	100	120	120	160	185	215
3RT14 AC-1 contactors										
Type		—			3RT14 46 (p. 2/96)			3RT14 56 (p. 2/97)		
I _e /AC-1/40 °C/≤ 690 V	A	—			140			275		
Accessories for contactors										
Auxiliary switch blocks	On front Lateral	3RH19 21 (p. 2/176) 3RH19 21 (p. 2/177)								
Terminal covers		3RT19 36-4EA2 (p. 2/181)			3RT19 46-4EA1/2 (p. 2/181)			3RT19 56-4EA1/2/3 (p. 2/181)		
Box terminal blocks		—			—			3RT19 55/56-4G (p. 2/181)		
Surge suppressors		3RT19 26/36 (p. 2/179)						3RT19 56-1C (RC element) (p. 2/179)		
3RU1 and 3RB2 overload relays (Protection Equipment —> Overload Relays)										
3RU11, thermal, CLASS 10		3RU11 36 5.5 ... 50 A (Chap. 4)			3RU11 46 18 ... 100 A (Chap. 4)			—		
3RB20/21, solid-state, CLASS 5, 10, 20 and 30		3RB20 36 6 ... 50 A (Chap. 4) 3RB21 36			3RB20 46 12.5 ... 100 A (Chap. 4) 3RB21 46			3RB20 56 50 ... 200 A (Chap. 4) 3RB21 56		
3RB22/23, solid-state, CLASS 5, 10, 20 and 30		3RB2. 83 + 3RB29 06 (Chap. 4) 10 ... 100 A						3RB2. 83 + 3RB29 56 (Chap. 4) 20 ... 200 A		
3RV10 motor protection circuit breakers (Protection Equipment —> Motor Protection Circuit Breakers)										
Type		3RV10 31 22 ... 50 A (Chap. 4)			3RV10 41 45 ... 100 A (Chap. 4)			—		
Link modules		3RA19 31 (Chap. 4)			3RA19 41 (Chap. 4)			—		
3RA13 reversing contactor assemblies										
Complete units	Type	3RA13 34 (p. 2/170)	3RA13 35	3RA13 36	3RA13 44 (p. 2/71)	3RA13 45	3RA13 46	—		
415 V	kW	15	18.5	22	30	37	45	55	75	90
Assembly kits/wiring modules		3RA19 33-2A (p. 2/73)			3RA19 43-2A (p. 2/73)			3RA19 53-2A (p. 2/73)		
Mechanical interlocks		3RA19 24-1A/-2B (p. 2/72)						3RA19 54-2A (p. 2/72)		
3RA14 contactor assemblies for wye-delta starting										
Complete units	Type	3RA14 34 (p. 2/87)	3RA14 35 (p. 2/88)	3RA14 36	3RA14 44 (p. 2/89)	3RA14 45	—			
415 V	kW	22/30	37	45	55	75	—			
Assembly kits/wiring modules		3RA19 33-2B/-2C (p. 2/90)			3RA19 43-2B/-2C (p. 2/90)			3RA19 53-2B (p. 2/90)		

Controls — Contactors and Contactor Assemblies

Introduction

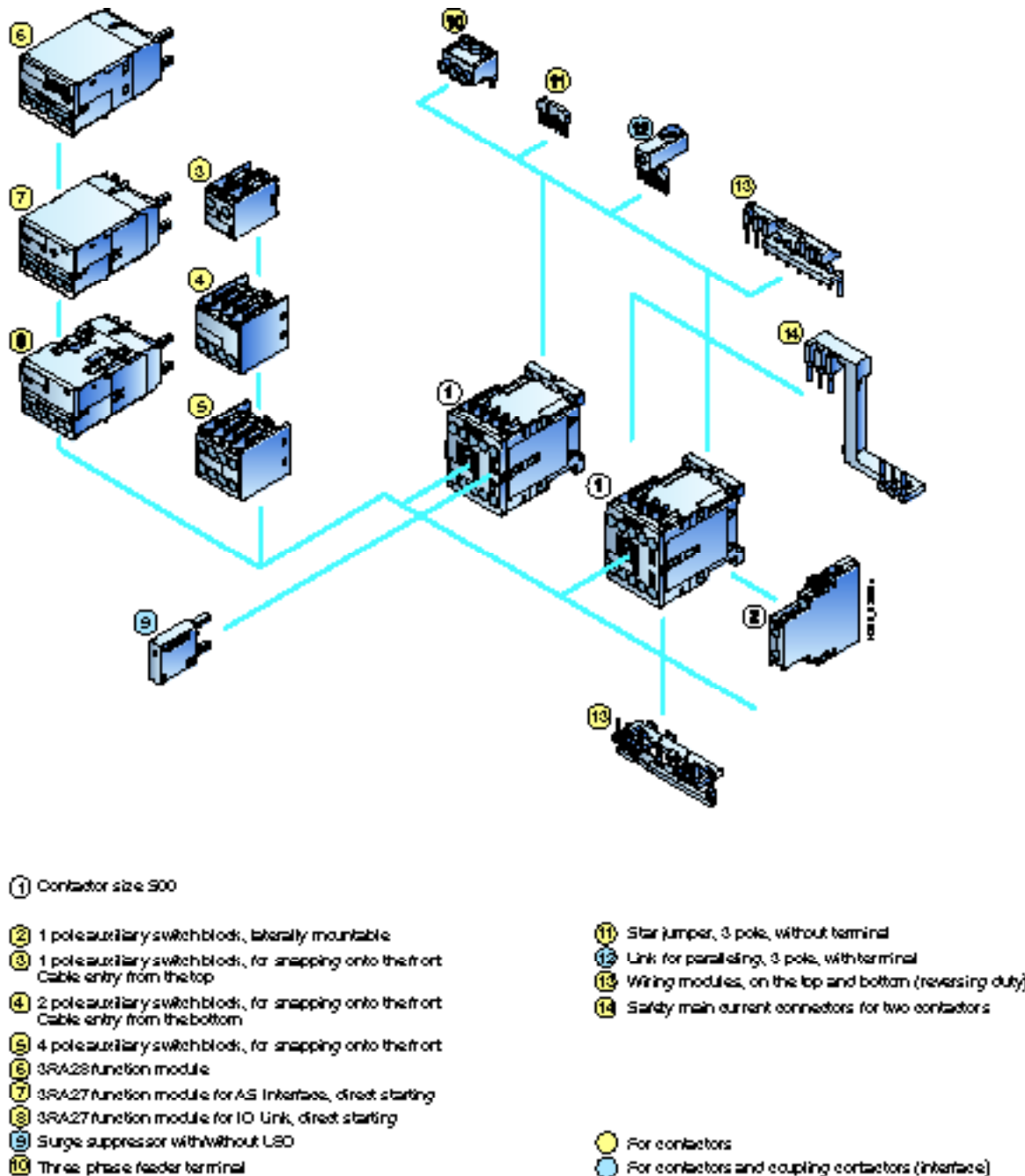


Size		S10			S12		14	
Type		3RT1. 6			3RT1. 7		3TF6	
3RT10 contactors · 3RT12 and 3TF68/69 vacuum contactors								
Type		3RT10 64	3RT10 65	3RT10 66	3RT10 75	3RT10 76	—	
AC, DC operation		(p. 2/47)			(p. 2/47)			
Type		3RT12 64	3RT12 65	3RT12 66	3RT12 75	3RT12 76	3TF68	3TF69
		(p. 2/54)			(p. 2/54)		(p. 2/60)	
AC-3								
I _e /AC-3/415 V	A	225	265	300	400	500	630	820
415 V	kW	110	132	160	200	250	335	450
230 V	kW	55	75	90	132	160	200	260
500 V	kW	160	160	200	250	355	434	600
690 V	3RT10/12 kW	200	250	250	400	400/500	600	800
1000 V	3RT10/12 kW	90/315	132/355	132/400	250/560	250/710	600	800
AC-4 (for I _a = 6 × I _e)								
415 V	kW	110	132	160	200	250	355	400
415 V	3RT10/12 kW	54/78	66/93	71/112	84/140	98/161	168	191
(200 000 operating cycles)								
AC-1 (40 °C, ≤ 690 V)								
I _e	3RT10/12 A	275/330	330	330	430/610	610	700	910
3RT14 AC-1 contactors								
Type		3RT14 66	(p. 2/97)		3RT14 76	(p. 2/97)	—	
I _e /AC-1/40 °C≤ 690 V	A	400			690		—	
Accessories for contactors								
Auxiliary switch blocks	On front Lateral	3RH19 21 3RH19 21	(p. 2/176) (p. 2/177)				— 3TY7 561	(p. 2/189)
Terminal covers		3RT19 66-4EA1/2/3	(p. 2/181)				3TX7 686/696	(p. 2/189)
Box terminal blocks		3RT19 66-4G	(p. 2/181)				—	
Surge suppressors		3RT19 56-1C (RC element)	(p. 2/179)				3TX7 572	(p. 2/188)
3RU1 and 3RB2 overload relays (Protection Equipment —> Overload Relays)								
3RU11, thermal, CLASS 10		—			—		—	
3RB20/21, solid-state, CLASS 5, 10, 20 and 30		3RB20 66 3RB21 66	55 ... 630 A	(Chap. 4)	3RB20 66 3RB21 66	160 ... 630 A (Chap. 4)	3RB20 66 3RB21 66	160 ... 630 A (Chap. 4)
3RB22/23, solid-state, CLASS 5, 10, 20 and 30		3RB2. 83 + 3RB29 66	(Chap. 4)					
			63 ... 630 A					
3RV10 motor protection circuit breakers (Protection Equipment —> Motor Protection Circuit Breakers)								
Type		—			—		—	
Link modules		—			—		—	
3RA13 reversing contactor assemblies								
Complete units	Type	—			—			
415 V	kW	110	132	160	200	250	335	
Assembly kits/wiring modules		3RA19 63-2A	(p. 2/73)		3RA19 73-2A	(p. 2/73)	3TX7 680-1A	
Mechanical interlocks		3RA19 54-2A					3TX7 686-1A	
3RA14 contactor assemblies for wye-delta starting								
Complete units	Type	—			—			
415 V	kW	—			—		630	
Assembly kits/wiring modules		3RA19 63-2B	(p. 2/90)		3RA19 73-2B	(p. 2/90)	3TX7 680-1B	

Overview

The SIRIUS modular system with its components for the switching, starting, protection and monitoring of motors and industrial systems stands for the fast, flexible and space-saving construction of control cabinets.

*3RT2 contactors and coupling relays
Size 500 with mountable accessories*



For accessories see pages 2/151 to 2/168.

For contactor assemblies see pages 2/61 to 2/64.

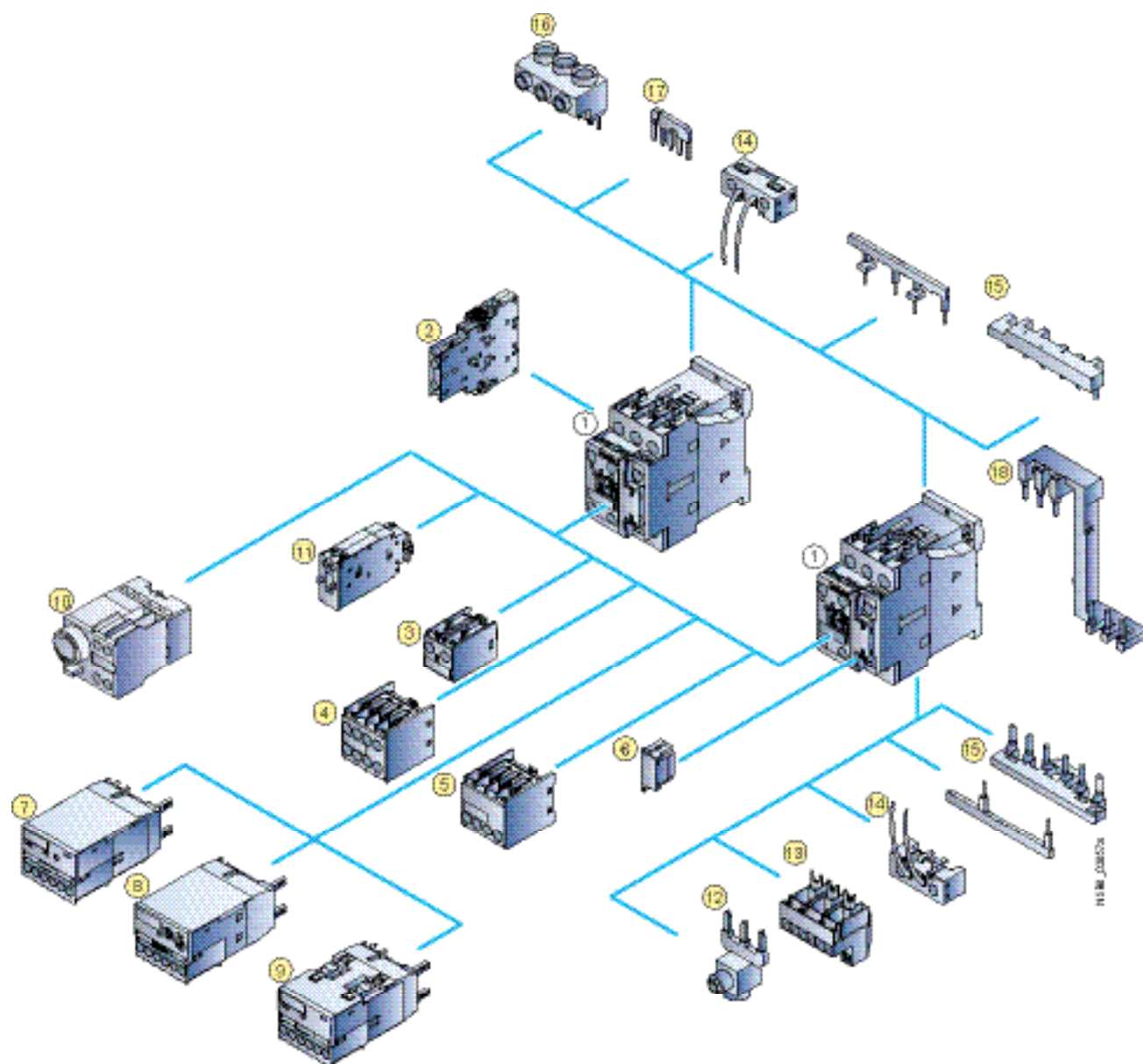
For assembly kit for reversing contactor assemblies (mech. interlocking, wiring modules) see page 2/67.

For mountable overload relays see
"Protection Equipment —> Overload Relays".

Power Contactors for Switching Motors

General data

3RT2 contactors and coupling relays
Size S0 with mountable accessories



① Contactor size S0

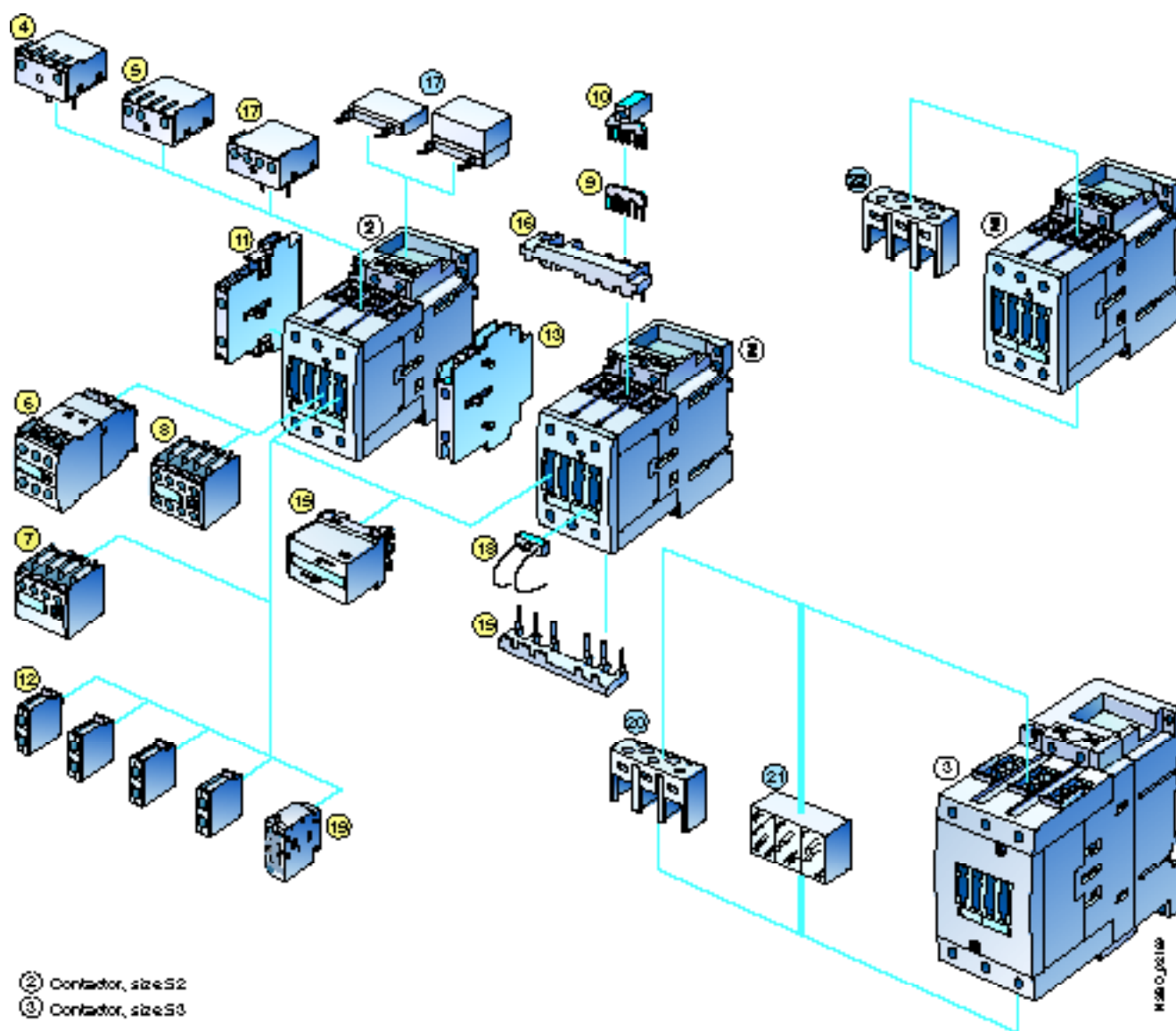
- ② 1-pole auxiliary switch block, laterally mountable
- ③ 1-pole auxiliary switch block, for snapping onto the front. Cable entry from the top
- ④ 4-pole auxiliary switch block, for snapping onto the front
- ⑤ 2-pole auxiliary switch block, for snapping onto the front. Cable entry from the bottom
- ⑥ Surge suppressor with/without LED
- ⑦ 3RA27 function module for AS-Interface, direct starting
- ⑧ 3RA28 function module
- ⑨ 3RA27 function module for IO-Link, direct starting
- ⑩ Pneumatic delay block

- ⑪ Mechanical latching block
- ⑫ Link for paralleling, 3-pole, with terminal
- ⑬ Connection module (adapter and plug) for contactors with screw-type connection
- ⑭ Coil terminal module, on the top and bottom
- ⑮ Wiring modules, on the top and bottom (reversing duty)
- ⑯ Three-phase feeder terminal
- ⑰ Link for paralleling (star jumper), 3-pole, without connection terminal
- ⑱ Safety main current connectors for two contactors

For accessories see pages 2/151 to 2/168.

3RT1 contactors

Sizes S2 and S3 with mountable accessories



② Contactor, size S2

③ Contactor, size S3

For sizes S2 and S3:

- ④ Solid state time delay block, ON delay
- ⑤ Solid state time delay block, OFF delay
- ⑥ Auxiliary switch block, solid state time delay (ON or OFF delay or wye delta function)
- ⑦ 2 pole auxiliary switch block, cable entry from above
- ⑧ 4 pole auxiliary switch block (terminal designations according to DIN EN 50,012 or DIN EN 50,005)
- ⑨ Link for paralleling (star jumper), 3 pole, without terminal
- ⑩ Link for paralleling, 3 pole, with terminal
- ⑪ 2 pole auxiliary switch block, laterally mountable left or right (terminal designations according to DIN EN 50012 or DIN EN 50005)
- ⑫ Single pole auxiliary switch block (up to 4 can be snapped on)
- ⑬ Mechanical interlock, laterally mountable
- ⑭ Mechanical interlock, mountable to the front
- ⑮ Wiring connectors on the top and bottom (reversing duty)

- ⑯ Surge suppressors (page 2/175) (varistor, RC element, diode assembly), can be mounted on the top or bottom
- ⑰ Mechanical latching interface for mounting directly onto contactor coil
- ⑱ LED module for indicating contactor operation

Only for size S2:

- ⑲ Mechanical latching

Only for sizes S2 and S3:

- ⑳ Terminal cover for box terminal

Only for size S3:

- ㉑ Terminal cover for cable lug and bar connection

● Accessories identical for sizes S2 and S3

● Accessories differ according to size

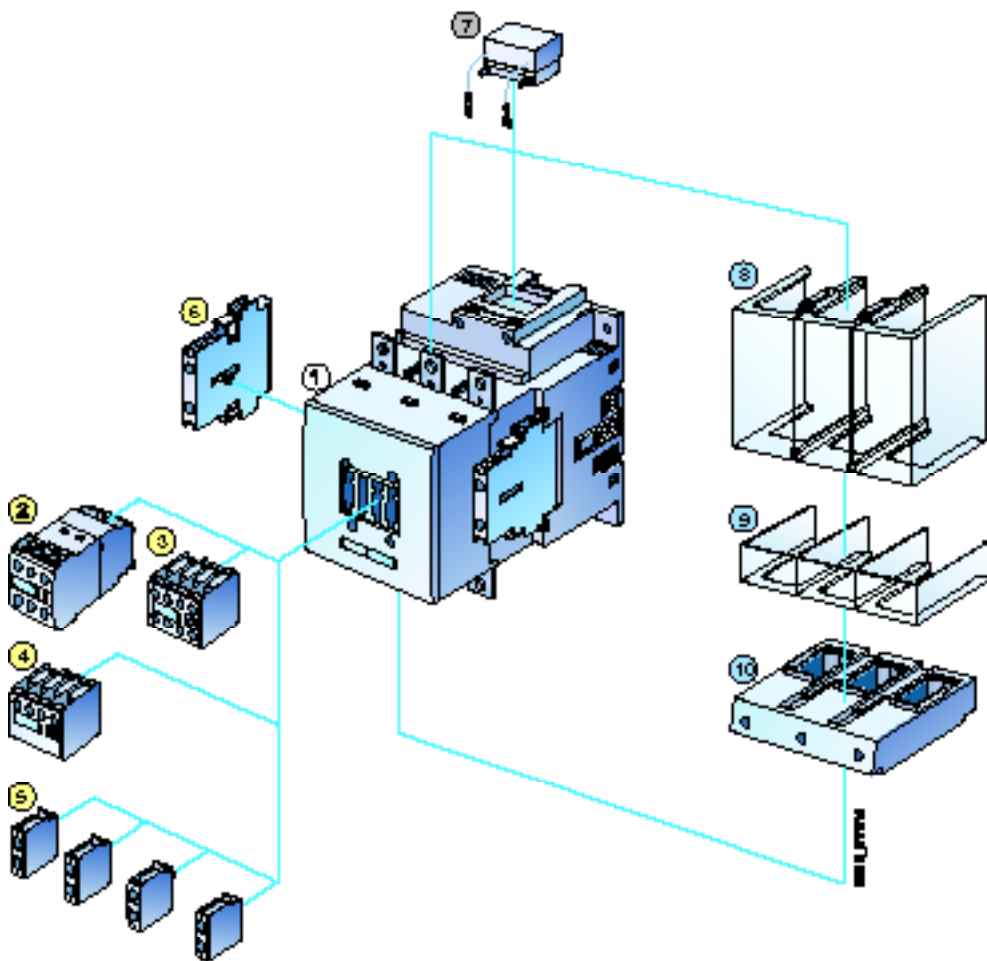
Power Contactors for Switching Motors

General data

3RT1 contactors

Sizes S6 to S12 with mountable accessories

(illustration for basic unit)



(1) 3RT10 and 3RT14 air break contactors, sizes S6, S10 and S12

(2) Auxiliary switch block, solid state time delay (ON or OFF delay or wye delta function)

(3) 4 pole auxiliary switch block (terminal designations according to EN 50012 or EN 50006)

(4) 2 pole auxiliary switch block, cable entry from above

(5) Single pole auxiliary switch blocks (up to 4 can be snapped on)

(6) 2 pole auxiliary switch block, laterally mountable (left or right) (terminal designations according to EN 50012 or EN 50006) (identical for S0 to S12)

(7) Surge suppressor (RCD element), for plugging into top of withdrawable coil

(8) Terminal cover for cable lug and busbar connection, different for sizes S6 and S10/S12

(9) Terminal cover for box terminal, different for sizes S6 and S10/S12

(10) Box terminal block, different for sizes S6 and S10/S12

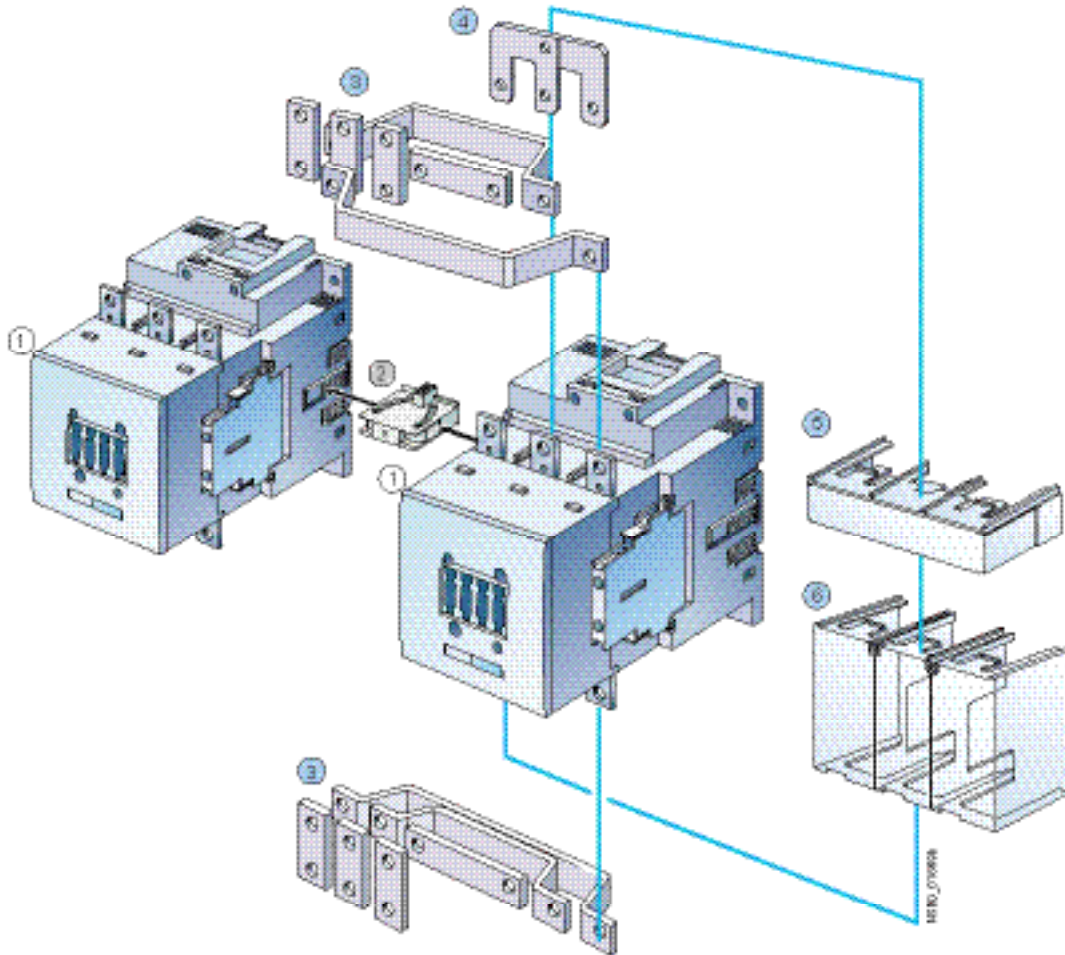
Yellow circle: Accessories identical for sizes S0 to S12

Grey circle: Accessories identical for sizes S6 to S12

Blue circle: Accessories differ according to size

For mountable overload relays see
"Protection Equipment —> Overload Relays".

3RA1 contactor assemblies, 3RT1 contactors
Sizes S6, S10 and S12 with accessories



① 3RT10 and 3RT14 air-break contactor, sizes S6, S10 and S12 or vacuum contactor 3RT12, sizes S10 and S12

② Mechanical interlock, laterally mountable

③ Wiring modules on the top and bottom 3RA19

④ Link for parallelizing (star jumper), 3-pole, with through-hole 3RT19 56-4BA31

⑤ Terminal cover for box terminal, differs according to sizes S6 and S10/S12

⑥ Terminal cover for cable lug and busbar connection, differs according to sizes S6 and S10/S12

● Accessories identical for sizes S6 to S12

● Accessories differ according to size

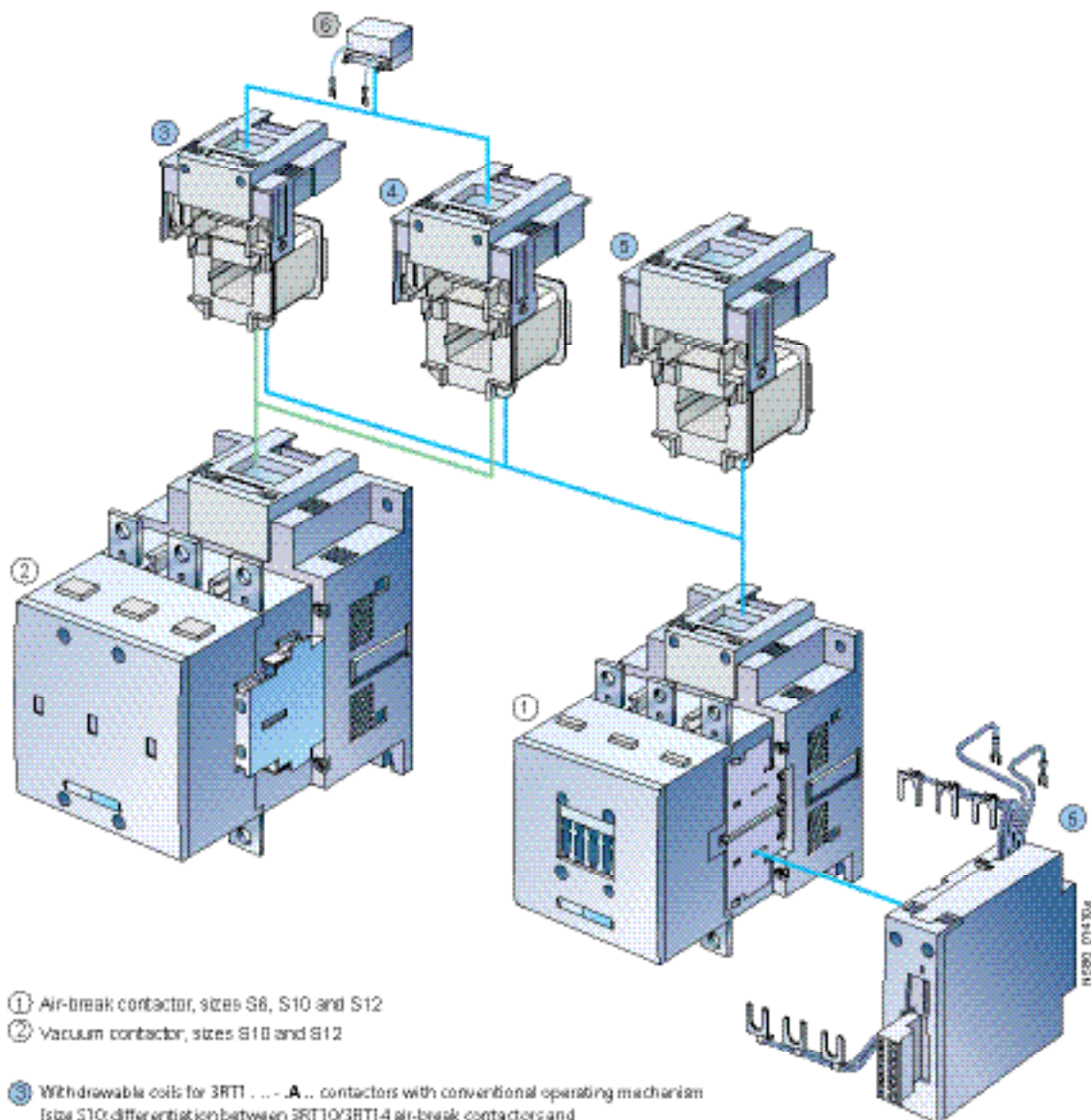
For mountable overload relays see
 "Protection Equipment —> Overload Relays".

Power Contactors for Switching Motors

General data

3RT1 contactors

Sizes S6 to S12 with accessories



① Air-break contactor, sizes S8, S10 and S12

② Vacuum contactor, sizes S10 and S12

③ Withdrawable coils for 3RT1 ...-A... contactors with conventional operating mechanism
[size S10: differentiation between 3RT10/3RT14 air-break contactors and 3RT12 vacuum contactors]
[size S12: the same for air-break and vacuum contactors]

④ Withdrawable coils for 3RT1 ...-N... contactors with solid-state operating mechanism.
[size S10: differentiation between 3RT10/3RT14 air-break contactors and 3RT12 vacuum contactors]
[size S12: the same for air-break and vacuum contactors]

⑤ Withdrawable coils and laterally mountable module (plug-on) for 3RT1 ...-P... and 3RT1 ...-Q... air-break contactors with solid-state operating mechanism and remaining lifetime indicator

⑥ Surge suppressor (RC element) (page 2/179), plug-mountable on withdrawable coils
• 3RT1 ...-A... with conventional operating mechanism
• 3RT1 ...-N... with solid-state operating mechanism.

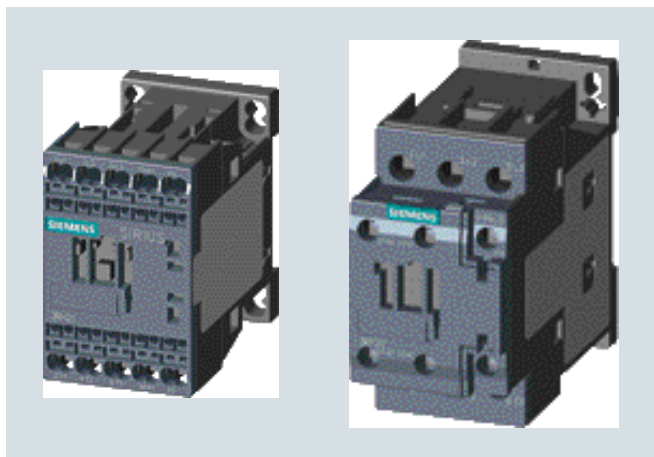
● Identical for sizes S6 to S12

● Different according to size

For mountable overload relays see
"Protection Equipment —> Overload Relays".

Overview

Sizes S00 and S0, up to 18.5 kW



Contactor size S00 with spring-type terminals and contactor size S0 with screw terminals

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1,
IEC 60947-5-1, EN 60947-5-1 (auxiliary switches)

The 3RT2 contactors are climate-proof and are suitable and tested for use worldwide.

If the devices are used in ambient conditions which deviate from common industrial conditions (EN 60721-3-3 "Stationary Use, Weather-Protected"), information must be obtained about possible restrictions with regard to the reliability and endurance of the device and possible protective measures. In this case contact our Technical Assistance.

3RT2 contactors are finger-safe according to EN 50274.

Auxiliary contact complement

Size S00 contactors have an auxiliary contact integrated in the basic unit. The basic units size S0 contain two integrated auxiliary contacts (1 NO + 1 NC).

All basic units (except coupling contactors) can be extended with auxiliary switch blocks. For size S0 and higher, complete units with 2 NO + 2 NC are available (terminal designation according to EN 50012); the auxiliary switch block can be removed.

- Additional auxiliary switches with a maximum of four auxiliary contacts can be mounted. The combination of a 2-pole auxiliary switch for mounting on the front and an auxiliary switch for mounting on the side is not permitted.
- Of the maximum number of auxiliary contacts (integrated plus mountable) possible on the device, no more than four NC contacts are permitted for both sizes.

Contact reliability

If voltages ≤ 110 V and currents ≤ 100 mA are to be switched, the auxiliary contacts of the 3RT2 contactor or 3RH21 contactor relay should be used as they guarantee a high level of contact reliability.

These auxiliary contacts are suitable for solid-state circuits with currents ≥ 1 mA at a voltage ≥ 17 V.

Connection methods

The 3RT2 contactors are available with screw terminals or spring-type terminals.

Short-circuit protection of the contactors

For more information about short-circuit protection of contactors without overload relay, see "Technical specifications" on pages 2/16 and 2/23. For short-circuit protection of the contactors with overload relay see "Overload Relays".

To assemble fuseless motor feeders you must select combinations of motor starter protector and contactor.

Motor protection

3RU21 thermal overload relays or 3RB30 solid-state overload relays can be fitted to the 3RT2 contactors for protection against overload. The overload relays must be ordered separately (see "Overload Relays").

Ratings of induction motors

The quoted rating (in kW) refers to the output power on the motor shaft (according to the nameplate).

Control supply voltage

All contactors are available with AC or DC operation. Available in addition on the contactors size S0 is a UC operating mechanism which can be operated with AC (45 to 70 Hz) as well as with DC.

Surge suppression

3RT2 contactors can be retrofitted with RC elements, varistors, suppressor diodes or diode assemblies (assembly of diode and Zener diode for short break times) for damping opening surges in the coil.

The surge suppressors are plugged onto the front of size S00 contactors. Space is provided for them next to a snap-on auxiliary switch block.

The surge suppressors can be plugged onto the front of size S0 contactors.

Note:

The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times; diode assembly 2 to 6 times, varistor and suppressor diode +2 to 5 ms).

S00 and S0 contactors with communication interface

The S00 and S0 contactors with communication interface are essential for mounting the SIRIUS function modules for connection to the control system through IO-Link or AS-Interface.

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
	□□□	□	□	□	□	-	□	□	□	□	-	□	□	□
SIRIUS power contactors	3 RT													
Innovations		2												
Device type (e. g. 0 = 3-pole motor contactor, 3 = 4-pole AC-1 contactor)			□											
Contactor size (1 = S00, 2 = S0)				□										
Power dependent on size (e. g. 27 = 15 kW)					□									
Connection type (1 = screw, 2 = spring)							□							
Operating range / solenoid coil circuit (e. g. A = AC standard / without)								□						
Rated control supply voltage (e. g. P0 = 230 V, 50 Hz)									□	□				
Auxiliary switches (e. g. S0: 0 = 1 NO + 1 NC integrated)											□			
Special version												□	□	□
Example	3 RT	2	0	2	7	-	1	A	P	0	0			

Note: The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Accessories

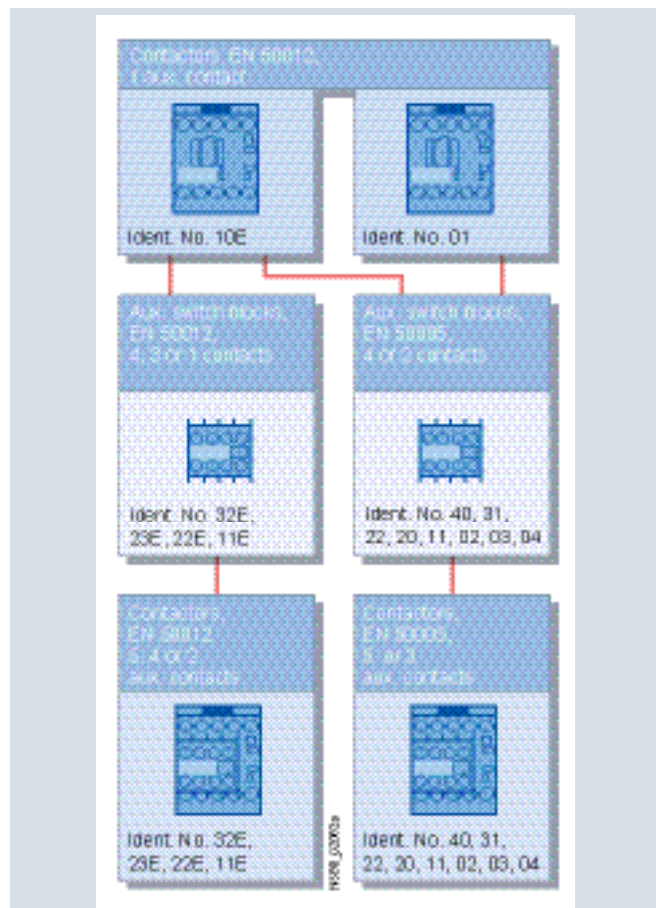
Auxiliary switch blocks

Various auxiliary switch blocks can be added to the 3RT2 basic units depending on the application:

Size S00, 3RT20 1. contactors

Terminal designations according to EN 50012 or EN 50005

Size S00 contactors have an auxiliary contact (NO or NC) integrated in the basic unit.



Contactor, size S00, with 4-pole auxiliary switch block

Contactors with one NO contact as auxiliary contact with screw or spring-type terminals, identification number 10, can be expanded into contactors with 2, 3, 4 and 5 auxiliary contacts according to EN 50012 using auxiliary switch blocks. The identification numbers according to

EN 50012, e. g. 11, apply to the basic device plus mounted auxiliary switch.

All contactors of size S00 with one auxiliary contact (identification numbers 10 or 01) and the contactors with 4 main contacts can be expanded into contactors with 2 to 5 auxiliary contacts using auxiliary switch blocks with the identification numbers 40 to 04 (in the case of contactors with 4 main contacts: 1 to 4 auxiliary contacts) according to EN 50005.

Of the auxiliary contacts (integrated plus mountable) possible on the device, no more than four NC contacts are permitted.

Single- or 2-pole auxiliary switch blocks with connection options from above or below enable easy and clearly arranged wiring especially for the installation of network access junctions. These auxiliary switch blocks are offered only with screw terminals.

If the installation space is limited in depth, 2-pole auxiliary switch blocks (screw or spring-type terminals) can be attached laterally for use on the right or on the left.

The solid-state compatible 3RH29 1. -1NF . . auxiliary switch blocks for contactors of size S00 include 2 enclosed contacts. They are suitable in particular for switching small voltages and currents (hard gold-plated contacts) and for operation in dusty atmospheres. The NC auxiliary contacts are not mirror contacts.

All the previously mentioned auxiliary switch variants can be snap-fitted onto the front of the contactor. The auxiliary switch block has a centrally positioned release lever for disassembly.

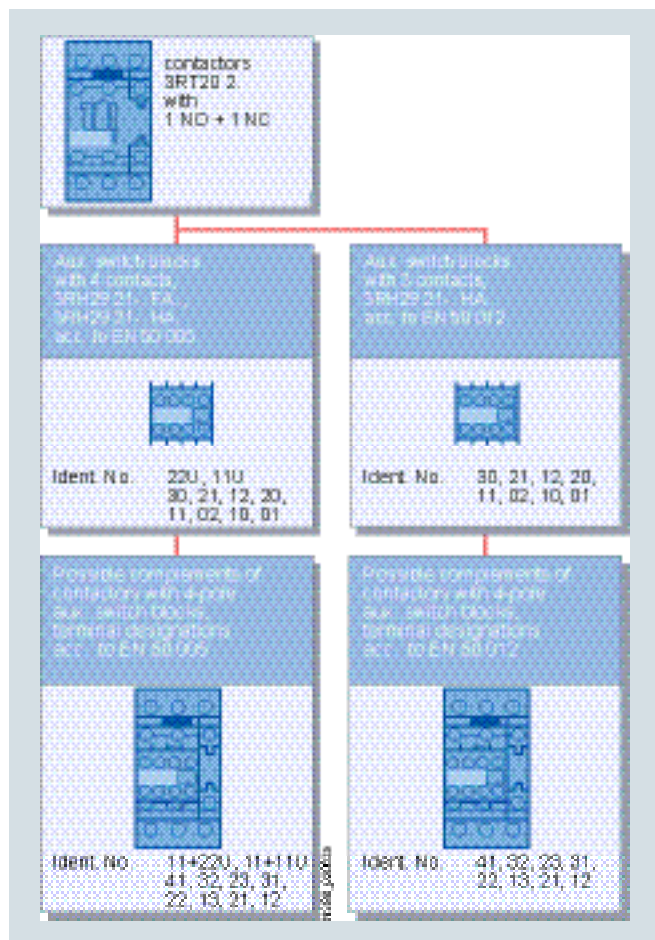
Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Size S0, 3RT20 2 . contactors

Terminal designations according to EN 50005 or EN 50012.

Size S0 contactors have 2 auxiliary contacts (1 NO and 1 NC) integrated in the basic unit.



Contactor, size S0, with 4-pole auxiliary switch block

A diverse range of auxiliary switch blocks is available for various applications.

One 4-pole auxiliary switch block (screw or spring-type terminals) can be snapped onto the front of the contactors. When the contactors are switched on, the NC contacts are opened first and then the NO contacts are closed.

Also available are 1- or 2-pole auxiliary switch blocks (screw terminals) for cable entry from above or below in the design of a quad block (feeder auxiliary switch).

If the installation space is limited in depth, 2-pole auxiliary switch blocks (screw or spring-type terminals) can be attached laterally for use on the right or on the left.

The auxiliary switch blocks attached to the front can be disassembled with the help of a centrally arranged release lever; the laterally attached auxiliary switch blocks are easy to remove by pressing on the checkered surfaces.

The terminal designation of the individual auxiliary switch blocks corresponds to EN 50005 or EN 50012, that of the complete contactor with auxiliary switch block 2 NO + 2 NC corresponds to EN 50012.

The laterally mountable auxiliary switch blocks according to EN 50012 can be used only when no 4-pole auxiliary switch blocks are snapped onto the front. As 2 auxiliary contacts 1 NO + 1 NC are already integrated in the basic device, mounting according to EN 50012 is permitted only on the right of the device.

The front 1- or 2-pole auxiliary switch blocks with connection option from below or above have fixed location identifiers. These auxiliary switch blocks are available only with screw terminals.

If the 4-pole and solid-state compatible auxiliary switch blocks are used, the location identifiers on the basic device must be noted.

Two enclosed contacts are available with the 3RH29 11-.NF11 solid-state compatible auxiliary switch block, which can be attached to the front. The 3RH29 21-2DE11 laterally mountable, solid-state compatible auxiliary switch block likewise contains 2 enclosed contacts (1 NO + 1 NC). The enclosed contacts are suitable in particular for switching small voltages and currents (hard gold-plated contacts) and for operation in dusty atmospheres. The front NC auxiliary contacts are not mirror contacts.

A maximum of 4 auxiliary contacts can be attached; the auxiliary switch blocks used can be of any version. Of the auxiliary contacts (integrated plus mountable) possible on the device, no more than four NC contacts are permitted.

For 4-pole contactors see 3RT23 and 3RT25.

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Technical specifications

Contactor	Type Size	3RT2 S00 and S0
Rated data of the auxiliary contacts		
Acc. to IEC 60947-5-1/EN 60947-5-1 The data apply to integrated auxiliary contacts and contacts in the auxiliary switch blocks for contactor sizes S00 to S0 ¹⁾		
Rated insulation voltage U_i (pollution degree 3)	V	690
Conventional thermal current I_{th} = Rated operational current I_e/AC-12	A	10
AC load		
Rated operational current I_e/AC-15/AC-14		
• For rated operational voltage U_e		
24 V	A	10 ¹⁾
110 V	A	10 ¹⁾
125 V	A	10 ¹⁾
220 V	A	10 ¹⁾
230 V	A	10 ¹⁾
380 V	A	3
415 V	A	3
500 V	A	2
660 V	A	1
690 V	A	1
DC load		
Rated operational current I_e/DC-12		
• For rated operational voltage U_e		
24 V	A	6
60 V	A	6
110 V	A	3
125 V	A	2
220 V	A	1
440 V	A	0.3
600 V	A	0.15
Rated operational current I_e/DC-13		
• For rated operational voltage U_e		
24 V	A	6
60 V	A	2
110 V	A	1
125 V	A	0.9
220 V	A	0.3
440 V	A	0.14
600 V	A	0.1
Contact reliability at 17 V, 1 mA Acc. to EN 60947-5-4		Frequency of contact faults < 10 ⁻⁸ i. e. <1 fault per 100 million operating cycles

Endurance of the auxiliary contacts

It is assumed that the operating mechanisms are switched randomly, i. e. not synchronized with the phase angle of the supply system.

The contact endurance is mainly dependent on the breaking current.

The characteristic curves apply to:

- Integrated auxiliary contacts on 3RT20
- 3RH29 11, 3RH29 21 auxiliary switch blocks¹⁾

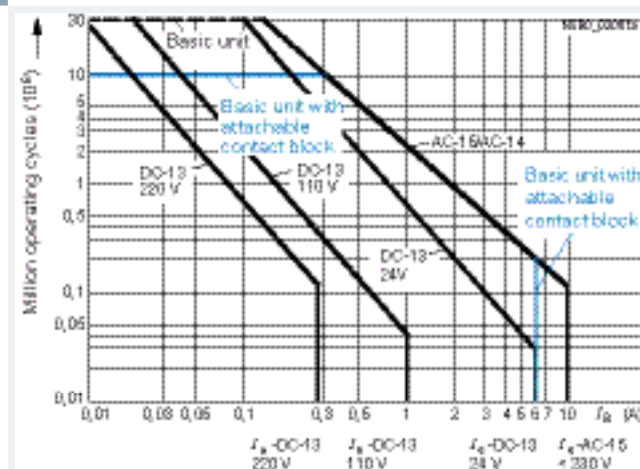


Diagram legend: |
I_a = Breaking current
I_e = Rated operational current

1) Integrated auxiliary contacts in size S0 and auxiliary switches for snapping onto the front and for mounting onto the side in size S00 and S0: I_e = 6 A for AC-15/AC-14.

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors,
3-pole, 3 ... 18.5 kW

Contactor	Type	3RT2
	Size	S00 and S0

Endurance of the main contacts

The characteristic curves show the contact endurance of the contactors when switching resistive and inductive AC loads (AC-1/AC-3) depending on the breaking current and rated operational voltage. It is assumed that the operating mechanisms are switched randomly, i. e. not synchronized with the phase angle of the supply system.

The rated operational current I_e complies with utilization category AC-4 (breaking six times the rated operational current) and is intended for a contact endurance of at least 200 000 operating cycles.

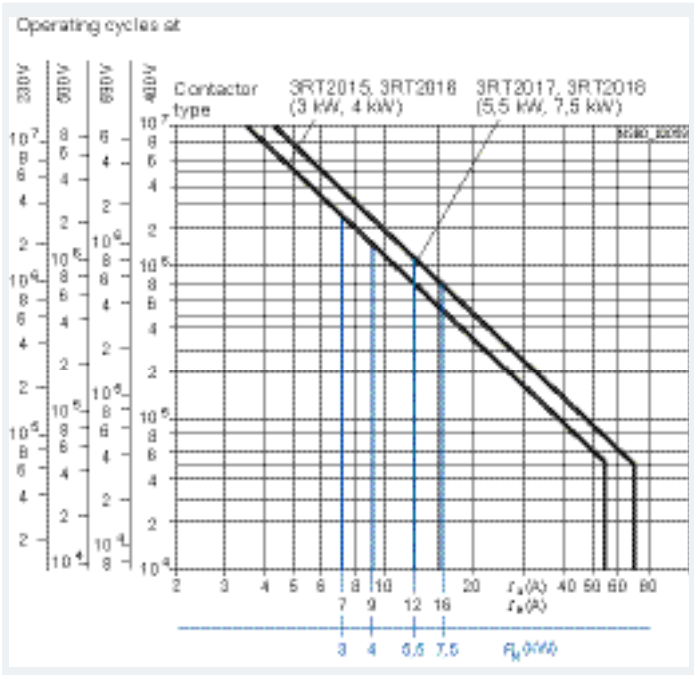
If a shorter endurance is sufficient, the rated operational current I_e /AC-4 can be increased.

If the contacts are used for **mixed operation**, i. e. normal switching (breaking the rated operational current according to utilization category AC-3) in combination with intermittent inching (breaking several times the rated operational current according to utilization category AC-4), the contact endurance can be calculated approximately from the following equation: Characters in the equation:

$$X = \frac{A}{1 + \frac{C}{100} \left(\frac{A}{B} - 1 \right)}$$

- X Contact endurance for mixed operation in operating cycles
- A Contact endurance for normal operation ($I_a = I_e$) in operating cycles
- B Contact endurance for inching ($I_a = \text{multiple of } I_e$) in operating cycles
- C Inching operations as a percentage of total switching operations

Size S00



Size S0

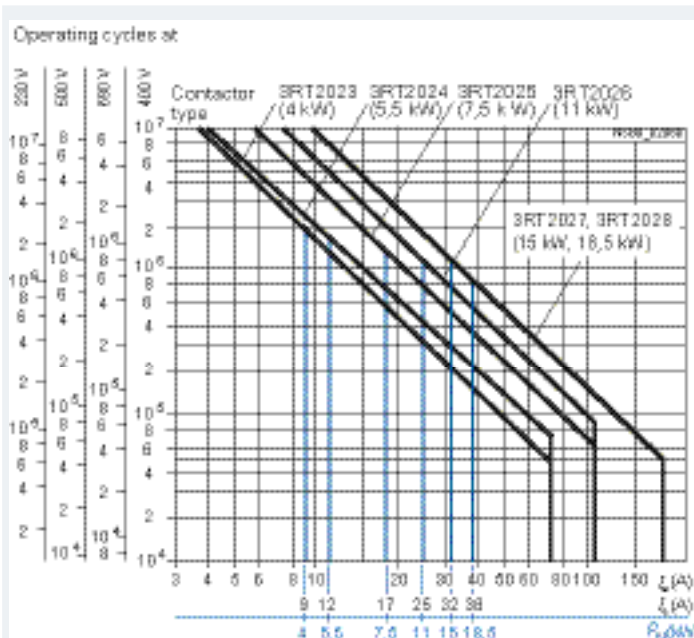


Diagram legend:

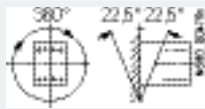
P_N = Rated power for squirrel-cage motors at 415 V

I_a = Breaking current

I_e = Rated operational current

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Type Size		3RT20 1 5, 3RT20 16 S00	3RT20 1 7, 3RT20 18 S00
Dimensions (W x H x D) ¹⁾		45 x 57.5 x 73 / 45 x 70 x 73	
• With mounted auxiliary switch block		45 x 57.5 x 116 / 45 x 70 x 121	
• With mounted function block		45 x 57.5 x 142 / 45 x 70 x 142	
General data			
Permissible mounting positions			
Mechanical endurance			
• Basic unit	Operating cycles	30 million	
• Basic unit with snap-on auxiliary switch block	Operating cycles	10 million	
• Solid-state compatible auxiliary switch block	Operat. cycles	5 million	
Electrical endurance		2)	
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}	kV	6	
Protective separation between the coil and the main contacts acc. to EN 60947-1, Appendix N	V	415	
Mirror contacts			
A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.			
• 3RT20 1 ., 3RT23 1 . (removable auxiliary switch block)		Yes, this applies to both the basic unit as well as to between the basic unit and the mounted auxiliary switch block acc. to EN 60947-4-1, Appendix F	
• 3RT20 1 ., 3RT23 1 . (permanently mounted auxiliary switch block)		Yes, acc. to EN 60947-4-1, Appendix F	
• 3RH29 19- . NF . . solid-state compatible auxiliary switch blocks have no mirror contacts.			
Ambient temperature			
• During operation	°C	-25 ... +60	
• During storage	°C	-55 ... +80	
Degree of protection acc. to EN 60947-1, Appendix C		IP20, coil assembly IP40	
Touch protection acc. to EN 50274		Finger-safe	
Shock resistance rectangular pulse			
• AC operation	g/ms	6.7/5 and 4.2/10	7.3/5 and 4.7/10
• DC operation	g/ms	6.7/5 and 4.2/10	7.3/5 and 4.7/10
Shock resistance sine pulse			
• AC operation	g/ms	10.5/5 and 6.6/10	11.4/5 and 7.3/10
• DC operation	g/ms	10.5/5 and 6.6/10	11.4/5 and 7.3/10
Conductor cross-sections		3)	
Short-circuit protection for contactors without overload relays		For short-circuit protection for contactors with overload relays see "Protection Equipment → Overload Relays"	
Main circuit			
• Fuse links, operational class gG : NH 3NA, DIAZED 5SB, NEOZED 5SE acc. to IEC 60947-4-1/ EN 60947-4-1			
- Type of coordination "1"	A	35	50
- Type of coordination "2"	A	20	25
- Weld-free ⁴⁾	A	10	10
• Miniature circuit breakers (up to 230 V) with C characteristic Short-circuit current 1 kA, type of coordination "1"	A	10	10
Auxiliary circuit			
• Fuse links, operational class gG : DIAZED 5SB, NEOZED 5SE (weld-free protection for $I_k \geq 1$ kA)	A	10	
• Miniature circuit breakers up to 230 V with C characteristic Short-circuit current $I_k < 400$ A	A	6	

1) Dimensions for devices with screw terminals / spring-type terminals.

2) For endurance of the main contacts see page 2/15.

3) For conductor cross-sections see page 2/18.

4) Test conditions according to IEC 60947-4-1.

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Contactor	Type Size	3RT20 1 5, 3RT20 1 6 S00	3RT20 1 7, 3RT20 1 8 S00
Control circuit			
Coil operating range			
• AC operation	50 Hz 60 Hz	0.8 ... 1.1 x U_s 0.85 ... 1.1 x U_s	
• DC operation	Up to 50 °C Up to 60 °C	0.8 ... 1.1 x U_s 0.85 ... 1.1 x U_s	
Power consumption of the solenoid coils (when coil is cold and 1.0 x U_s)			
• AC operation, 50/60 Hz, standard version			
- Closing	VA	27/24.3	37/33
- P.f.		0.8/0.75	0.8/0.75
- Closed	VA	4.2/3.3	5.7/4.4
- P.f.		0.25/0.25	0.25/0.25
• DC operation (closing = closed)	W	4	4
Operating times¹⁾			
Total break time = Opening delay + Arcing time			
• AC operation for 0.8 ... 1.1 x U_s	Closing delay ms Opening delay ms	9 ... 35 3.5 ... 14	8 ... 33 4 ... 15
• DC operation for 0.85 ... 1.1 x U_s	Closing delay ms Opening delay ms	30 ... 100 7 ... 13	30 ... 100 7 ... 13
• Arcing time	ms	10 ... 15	10 ... 15
Operating times for 1.0 x U_s¹⁾			
• AC operation	Closing delay ms Opening delay ms	9.5 ... 24 4 ... 14	9 ... 22 4.5 ... 15
• DC operation	Closing delay ms Opening delay ms	35 ... 50 7 ... 12	35 ... 50 7 ... 12

1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times; diode assembly 2 to 6 times, varistor +2 to 5 ms).

Contactor	Type Size	3RT20 15 S00	3RT20 16 S00	3RT20 17 S00	3RT20 18 S00
Main circuit					
AC capacity					
Utilization category AC-1					
Switching resistive loads					
• Rated operational current I_e	At 40 °C up to 690 V A At 60 °C up to 690 V A	18 16	22 20	22 20	22 20
• Rated power for AC loads ¹⁾ P.f.= 0.95 (at 60 °C)	415 V kW	11	13	13	13
• Minimum conductor cross-section for loads with I_e	At 40 °C mm ² At 60 °C mm ²	2.5 2.5	2.5 2.5	2.5 2.5	2.5 2.5
Utilization categories AC-2 and AC-3					
• Rated operational currents I_e	Up to 415 V A 440 V A 500 V A 690 V A	7 7 6 4.9	9 9 7.7 6.7	12 11 9.2 6.7	16 15 12.4 8.8
• Rated power for slipring or squirrel-cage motors at 50 and 60 Hz	At 230 V kW 415 V kW 500 V kW 690 V kW	2.2 3 3.5 4	3 4 4.5 5.5	3 5.5 5.5 5.5	4 7.5 7.5 7.5
Thermal load capacity	10 s current ²⁾ A	56	72	96	128

1) Industrial furnaces and electric heaters with resistance heating, etc. (increased power consumption on heating up has been taken into account).

2) According to IEC 60947-4-1.

For rated values for various start-up conditions
see "Protection Equipment" → "Overload Relays".

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Contactor	Type Size	3RT20 15 S00	3RT20 16 S00	3RT20 17 S00	3RT20 18 S00
Main circuit					
AC capacity					
Power loss per conducting path	At $I_d/AC-3$ W	0.42	0.7	1.24	2.2
Utilization category AC-4 (for $I_a = 6 \times I_e$) ¹⁾					
• Rated operational current I_e	Up to 415 V A	6.5	8.5	8.5	11.5
• Rated power for squirrel-cage motors with 50 Hz and 60 Hz	Up to 415 V kW	3	4	4	5.5
• The following applies to a contact endurance of about 200 000 operating cycles:					
- Rated operational currents I_e	Up to 415 V A	2.6	4.1	4.1	5.5
	690 V A	1.8	3.3	3.3	4.4
- Rated power for squirrel-cage motors with 50 Hz and 60 Hz	At 230 V kW	0.67	1.1	1.1	1.5
	415 V kW	1.15	2	2	2.5
	500 V kW	1.45	2	2	3
	690 V kW	1.15	2.5	2.5	3.5
Switching frequency					
Switching frequency z in operating cycles/hour					
• Contactors without overload relay	No-load switching frequency AC	h ⁻¹	10 000		
	No-load switching frequency DC	h ⁻¹	10 000		
Dependence of the switching frequency z' on the operational current I' and operational voltage U': $U': z' = z \cdot (I_e/I') \cdot (400 V/U')^{1.5} \cdot 1/h$	Rated operation				
	AC-1 (AC/DC)	h ⁻¹	1 000		
	AC-2 (AC/DC)	h ⁻¹	750		
	AC-3 (AC/DC)	h ⁻¹	750		
	AC-4 (AC/DC)	h ⁻¹	250		
• Contactors with overload relays (mean value)		h ⁻¹	15		

1) The data only apply to 3RT25 16 and 3RT25 17 (2 NO + 2 NC) up to a rated operational voltage of 415 V.

Contactor	Type Size	3RT20 15 S00	3RT20 16 S00	3RT20 17 S00	3RT20 18 S00
Conductor cross-sections					
Main conductors and auxiliary conductors (1 or 2 conductors can be connected)		 Screw terminals			
• Solid	mm ²	2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾ according to IEC 60947; max. 2 x (0.5 ... 4)			
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾			
• AWG cables, solid or stranded	AWG	2 x (20 ... 16) ¹⁾ ; 2 x (18 ... 14) ¹⁾ ; 2 x 12			
• Terminal screw		M3 (for standard screwdriver size 2 and Pozidriv 2)			
• Tightening torque	Nm	0.8 ... 1.2 (7 ... 10.3 lb.in)			
Main conductors, auxiliary conductors and coil terminals (1 or 2 conductors can be connected)		 Spring-type terminals			
• Operating devices	mm	3.0 x 0.5; 3.5 x 0.5			
• Solid	mm ²	2 x (0.5 ... 4)			
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 2.5)			
• Finely stranded without end sleeve	mm ²	2 x (0.5 ... 2.5)			
• AWG cables, solid or stranded	AWG	1 x (20 ... 12)			
Auxiliary conductors for front and laterally mounted auxiliary switches (1 or 2 conductors can be connected)					
• Operating devices	mm	3.0 x 0.5; 3.5 x 0.5			
• Solid	mm ²	2 x (0.5 ... 2.5)			
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5)			
• Finely stranded without end sleeve	mm ²	2 x (0.5 ... 1.5)			
• AWG cables, solid or stranded	AWG	2 x (20 ... 14)			

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified.

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SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Type Size			3RT20 23 S0	3RT20 24 S0	3RT20 25 S0	3RT20 26 S0	3RT20 27 S0	3RT20 28 S0
Dimensions (W x H x D) for AC operation ¹⁾		mm	45 x 85 x 97 / 45 x 101.5 x 97					
• With mounted auxiliary switch block		mm	45 x 85 x 141 / 45 x 101.5 x 144					
• With mounted function block			45 x 85 x 166 / 45 x 101.5 x 166					
Dimensions (W x H x D) for DC operation ¹⁾		mm	45 x 85 x 107 / 45 x 101.5 x 107					
• With mounted auxiliary switch block		mm	45 x 85 x 151 / 45 x 101.5 x 154					
• With mounted function block			45 x 85 x 176 / 45 x 101.5 x 176					
General data								
Permissible mounting positions								
The contactors are designed for operation on a vertical mounting surface.								
Mechanical endurance								
• Basic unit	Operating cycles	10 million						
• Basic unit with snap-on auxiliary switch block	Operating cycles	10 million						
• Solid-state compatible auxiliary switch block	Operat. cycles	5 million						
Electrical endurance		2)						
Rated insulation voltage U_i (pollution degree 3)	V	690						
Rated impulse withstand voltage U_{imp}	kV	6						
Protective separation between the coil and the main contacts (acc. to EN 60947-1, Appendix N)	V	415						
Mirror contacts								
A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.								
• 3RT20 2 . , 3RT23 2 . (removable auxiliary switch block)			Yes, acc. to EN 60947-4-1, Appendix F					
• 3RT20 2 . , 3RT23 2 . (permanently mounted auxiliary switch block)			Yes, acc. to EN 60947-4-1, Appendix F					
Permissible ambient temperature								
• During operation	°C	-25 ... +60						
• During storage	°C	-55 ... +80						
Degree of protection acc. to EN 60947-1, Appendix C			IP20, coil assembly IP20					
Touch protection acc.to EN 50274			Finger-safe					
Shock resistance rectangular pulse								
• AC operation	g/ms	7.5/5 and 4.7/10				8.3/5 and 5.310		
• DC operation	g/ms	>10/5 and 7.5/10				>10/5 and 7.5/10		
Shock resistance sine pulse								
• AC operation	g/ms	11.8/5 and 7.4/10				13.5/5 and 8.3/10		
• DC operation	g/ms	>15/5 and >10/10				>15/5 and >10/10		
Conductor cross-sections			3)					
Short-circuit protection for contactors without overload relays								
Main circuit			For short-circuit protection for contactors with overload relays see "Protection Equipment —> Overload Relays".					
• Fuse links, operational class gG : Type NH 3NA, DIAZED 5SB, NEOZED 5SE acc. to IEC 60947-4-1/ EN 60947-4-1								
- Type of coordination "1"	A	63			100	125		
- Type of coordination "2"	A	25			35	50		
- Weld-free ⁴⁾	A	10			16	16		
• Miniature circuit breakers with C characteristic (short-circuit current 3 kA, type of coordination "1")	A	25			32	40		
Auxiliary circuit								
• Fuse links, operational class gG : DIAZED 5SB, NEOZED 5SE (weld-free protection for $I_k \geq 1$ kA)	A	10						
• Miniature circuit breaker with C characteristic (short-circuit current $I_k < 400$ A)	A	10						

1) Dimensions for devices with screw terminals / spring-type terminals.

2) For endurance of the main contacts see page 2/15.

3) For conductor cross-sections see page 2/18.

4) Test conditions according to IEC 60947-4-1.

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SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Contactor	Type	3RT20 23 ... 3RT20 25	3RT20 26 ... 3RT20 28	3RT20 2. -.NB3	3RT20 2. -.NF3..	3RT20 2. -.NP3
	Size	S0	S0	S0	S0	S0
Control circuit						
Coil operating range	AC/DC	0.8 ... 1.1 x U _s		0.7 ... 1.3 x U _s		
Power consumption of the solenoid coils (when coil is cold and 1.0 x U _s)						
• AC operation, 50 Hz, standard version						
- Closing	VA	65	77	6.5	13.6	16.1
- P.f.		0.82	0.82	0.98	0.98	0.98
- Closed	VA	7.6	9.8	1.26	1.91	3.41
- P.f.		0.25	0.25	0.25	0.25	0.25
• AC operation, 50/60 Hz, standard version						
- Closing	VA	68/67	81/79	6.5/5.7	13.6/13.2	16.1/15.9
- P.f.		0.72/0.74	0.72/0.74	0.98/0.96	0.98/0.99	0.99/0.99
- Closed	VA	7.9/6.5	10.5/8.5	1.26/1.30	1.91/1.90	3.41/3.58
- P.f.		0.25/0.28	0.25/0.28	0.78/0.8	0.61/0.61	0.36/0.45
• DC operation (closing = closed)	W	5.9/5.9	5.9/5.9	6.7/0.8	13.2/1.56	15/1.83
Operating times for 0.8 ... 1.1 x U _s ¹⁾						
Total break time = Opening delay + Arcing time						
• AC operation						
- Closing delay	ms	9 ... 38	8 ... 40	60 ... 80	50 ... 70	60 ... 80
- Opening delay	ms	4 ... 16	4 ... 16	30 ... 45	35 ... 45	35 ... 45
• DC operation						
- Closing delay	ms	50 ... 170	50 ... 170	60 ... 75	50 ... 70	50 ... 75
- Opening delay	ms	15 ... 17.5	15 ... 17.5	30 ... 45	35 ... 45	40 ... 50
• Arcing time	ms	10	10	10	10	10
Operating times for 1.0 x U _s ¹⁾						
• AC operation						
- Closing delay	ms	10 ... 18	10 ... 17	65 ... 80	50 ... 70	60 ... 80
- Opening delay	ms	4 ... 16	4 ... 16	30 ... 45	35 ... 45	30 ... 50
• DC operation						
- Closing delay	ms	55 ... 80	55 ... 80	60 ... 80	56 ... 70	60 ... 80
- Opening delay	ms	16 ... 17	16 ... 17	30 ... 45	35 ... 45	30 ... 50

1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (varistor +2 ms to 5 ms, diode assembly: 2 to 6 times).

Power Contactors for Switching Motors

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3-pole, 3 ... 18.5 kW**

Contactor	Type	3RT20 23	3RT20 24	3RT20 25	3RT20 26	3RT20 27	3RT20 28
	Size	S0	S0	S0	S0	S0	S0
Main circuit							
AC capacity							
Utilization category AC-1, switching resistive loads							
• Rated operational current I_e	At 40 °C up to 690 V A	40				50	
	At 60 °C up to 690 V A	35				42	
• Rated power for AC loads ¹⁾ P.f. = 0.95 (at 60 °C)	415 V kW	23				28	
• Minimum conductor cross-section for loads with I_e	At 40 °C mm ²	10				10	
	At 60 °C mm ²	10				10	
Utilization categories AC-2 and AC-3							
• Rated operational currents I_e	Up to 415 V A	9	12	17	25	32	38
	440 V A	9	12	17	22	32	35
	500 V A	6.8	12.4	17	18	32	32
	690 V A	6.7	9	13	13	21	21
• Rated power for slipring or squirrel-cage motors at 50 and 60 Hz	At 110 V kW	1.1	1.5	2.2	3	4	4
	230 V kW	3	3	4	5.5	7.5	7.5
	415 V kW	4	5.5	7.5	11	15	18.5
	500 V kW	4	7.5	10	11	18.5	18.5
	660 V/690 V kW	5.5	7.5	11	11	18.5	18.5
Thermal load capacity	10 s current ²⁾ A	80	110	150	200	260	300
Power loss per conducting path	At I_e /AC-3 W	0.4	0.5	0.9	1.6	2.7	3.8
Utilization category AC-4 (for $I_a = 6 \times I_e$)							
• Rated operational current I_e	Up to 415 V A	8.5	12.5	15.5	15.5	22	
• Rated power for squirrel-cage motors with 50 Hz and 60 Hz	At 415 V kW	4	5.5	7.5	7.5	11	
• The following applies to a contact endurance of about 200†000 operating cycles:							
- Rated operational currents I_e	Up to 415 V A	4.1	5.5	7.7	9	12	
	690 V A	3.3	5.5	7.7	9	12	
- Rated power for squirrel-cage motors with 50 Hz and 60 Hz	At 110 V kW	0.5	0.73	1	1.2	1.6	
	230 V kW	1.1	1.5	2	2.5	3.4	
	415 V kW	2	2.6	3.5	4.4	6	
	500 V kW	2	3.3	4.6	5.6	7.5	
	690 V kW	2.5	4.6	6	7.7	10..3	
Switching frequency							
Switching frequency z in operating cycles/hour							
• Contactors without overload relays	No-load switching frequency AC	h ⁻¹	5 000				
	No-load switching frequency DC	h ⁻¹	1 500				
Dependence of the switching frequency z' on the operational current I' and operational voltage	AC-1 (AC/DC)	h ⁻¹	1000				
	AC-2 (AC/DC)	h ⁻¹	1000		750		
	AC-3 (AC/DC)	h ⁻¹	1000		750		
	AC-4 (AC/DC)	h ⁻¹	300		250		
U': z' = z · (I _e /I') · (400 V/U') ^{1.5} · 1/h							
• Contactors with overload relays (mean value)		h ⁻¹	15				

1) Industrial furnaces and electric heaters with resistance heating, etc.
(increased power consumption on heating up has been taken into account).

2) According to IEC 60947-4-1.
For rated values for various start-up conditions see
"Protection Equipment" → "Overload Relays".

Power Contactors for Switching Motors

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Contactor	Type	3RT20 23	3RT20 24	3RT20 25	3RT20 26	3RT20 27	3RT20 28
	Size	S0	S0	S0	S0	S0	S0
Conductor cross-sections (1 or 2 conductors connectable)							
Main conductors		 Screw terminals					
Conductor cross-section							
• Solid	mm ²	2 x (1 ... 2.5) ¹⁾ ; 2 x (2.5 ... 10) ¹⁾ according to IEC 60947					
• Finely stranded with end sleeve	mm ²	2 x (1 ... 2.5) ¹⁾ ; 2 x (2.5 ... 6) ¹⁾ ; 1 x 10					
• AWG cables, solid or stranded	AWG	2 x (16 ... 12); 2 x (14 ... 8)					
• Terminal screws		M4 (Pozidriv size 2)					
- Tightening torque	Nm	2 ... 2.5 (18 ... 22 lb.in)					
Auxiliary conductors							
• Solid	mm ²	2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾ according to IEC 60947					
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾					
• Solid or stranded AWG (2 x)	AWG	2 x (20 ... 16) ¹⁾ ; 2 x (18 ... 14) ¹⁾ ; 1 x 12					
• Terminal screws		M3					
- Tightening torque	Nm	0.8 ... 1.2 (7 ... 10.3 lb.in)					
Main conductors		 Spring-type terminals					
• Operating devices	mm	3.0 x 0.5; 3.5 x 0.5					
• Solid	mm ²	2 x (1 ... 10)					
• Finely stranded with end sleeve	mm ²	2 x (1 ... 6)					
• Finely stranded without end sleeve	mm ²	2 x (1 ... 6)					
• AWG cables, solid or stranded	AWG	2 x (18 ... 8)					
Auxiliary conductors							
• Operating devices		3.0 x 0.5; 3.5 x 0.5					
• Solid	mm ²	2 x (0.5 ... 2.5)					
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5)					
• Finely stranded without end sleeve	mm ²	2 x (0.5 ... 1.5)					
• AWG cables, solid or stranded	AWG	2 x (20 ... 14)					

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified.

Contactor	Size	S00 Screw or spring-type terminals Integrated or snap-on auxiliary switch block	S0 Screw or spring-type terminals 1- and 4-pole snap-on auxiliary switch block	Screw or spring-type terminals Laterally mountable auxiliary switch block
Ⓢ and Ⓜ rating of the auxiliary contacts				
Rated voltage	V AC	600	600	600
Switching capacity		A 600, Q 600	A 600, Q 600	A 300, Q 300
Uninterrupted current	At 240 V AC A	10	10	10

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**SIRIUS 3RT20 contactors,
3-pole, 3 ... 18.5 kW**

Contactor	Type	3RT20 15	3RT20 16	3RT20 17	3RT20 18
	Size	S00	S00	S00	S00
☞ and ☞ rating					
Rated insulation voltage	V AC	600			
Uninterrupted current, at 40 °C, open and enclosed	A	20			
Maximum horsepower ratings (☞ and ☞ approved values)					
• Rated power for induction motors at 60 Hz	At 200 V hp 230 V hp 460 V hp 575 V hp	1.5 2 3 5	2 3 5 7.5	3 3 7.5 10	3 5 10 10
Short-circuit protection (contactor or overload relay)	At 600 V kA	5	5	5	5
• Fuse CLASS J	A 40	40	40	40	
• Circuit breakers with overload protection acc. to UL 489	A	50	50	50	50
• Combination motor controllers type E acc.to UL 508		— ³⁾	— ³⁾	— ³⁾	— ³⁾
NEMA/EEMAC ratings					
NEMA/EEMAC size	hp	—		0	
• Uninterrupted current					
- Open	A	—		18	
- Enclosed	A	—		18	
• Rated power for induction motors at 60 Hz	At 200 V hp 230 V hp 460 V hp 575 V hp	— — — —		3 3 5 5	
Overload relays					
• Type		3RU21 1 / 3RB30 1			
• Setting range	A	0.11 ... 16 / 0.1 ... 16			

Contactor	Type	3RT20 23	3RT20 24	3RT20 25	3RT20 26	3RT20 27	3RT20 28
	Size	S0	S0	S0	S0	S0	S0
☞ and ☞ rating							
Rated insulation voltage	V AC	600					600
Uninterrupted current, at 40 °C, open and enclosed	A	35					42
Maximum horsepower ratings (☞ and ☞ approved values)							
• Rated power for induction motors at 60 Hz	At 200 V hp 230 V hp 460 V hp 575 V hp	2 3 5 7.5	3 3 7.5 10	5 5 10 15	7.5 7.5 15 20	10 10 20 25	10 10 25 25
Short-circuit protection (contactor or overload relay)	At 600 V kA	5	5	5	5	5	5
• Fuse CLASS J ²⁾	A	45	45	45	70	110	110
• Circuit breakers with overload protection acc. to UL 489	A	70	70	70	100	100	100
• Combination motor controllers type E acc. to UL 508	At 480 V Type A kA	3RV20 2 — —					
	At 600 V Type A kA	3RV20 2 — —					
NEMA/EEMAC ratings							
NEMA/EEMAC size	hp	—				1	
• Uninterrupted current							
- Open	A	—				27	
- Enclosed	A	—				27	
• Rated power for induction motors at 60 Hz	At 200 V hp 230 V hp 460 V hp 575 V hp	— — — —				7.5 7.5 10 10	
Overload relays							
• Type		3RU21 2 / 3RB30 2					
• Setting range	A	1.8 ... 40 / 0.1 ... 40					

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

Selection and ordering data

AC operation



3RT20 1...1A . . .



3RT20 1...2A . . .

Rated data			Auxiliary contacts		Rated control supply voltage	Screw terminals	Spring-type terminals
AC-2 and AC-3, T_u : Up to 60 °C					U_s at 50/60 Hz		
Operational current I_e up to 415 V	Rating of induction motors at 50 Hz and 415 V	Operational current I_e up to 690 V	Ident. No.	Version		Order No.	Order No.
A	kW	A		NO NC	V AC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00¹⁾

Terminal designations according to EN 50012

7	3	18	10	1	—	24 110 230	3RT20 15-1AB01 3RT20 15-1AF01 3RT20 15-1AP01	3RT20 15-2AB01 3RT20 15-2AF01 3RT20 15-2AP01
			01	—	1	24 110 230	3RT20 15-1AB02 3RT20 15-1AF02 3RT20 15-1AP02	3RT20 15-2AB02 3RT20 15-2AF02 3RT20 15-2AP02
9	4	22	10	1	—	24 110 230	3RT20 16-1AB01 3RT20 16-1AF01 3RT20 16-1AP01	3RT20 16-2AB01 3RT20 16-2AF01 3RT20 16-2AP01
			01	—	1	24 110 230	3RT20 16-1AB02 3RT20 16-1AF02 3RT20 16-1AP02	3RT20 16-2AB02 3RT20 16-2AF02 3RT20 16-2AP02
12	5.5	22	10	1	—	24 110 230	3RT20 17-1AB01 3RT20 17-1AF01 3RT20 17-1AP01	3RT20 17-2AB01 3RT20 17-2AF01 3RT20 17-2AP01
			01	—	1	24 110 230	3RT20 17-1AB02 3RT20 17-1AF02 3RT20 17-1AP02	3RT20 17-2AB02 3RT20 17-2AF02 3RT20 17-2AP02
16	7.5	22	10	1	—	24 110 230	3RT20 18-1AB01 3RT20 18-1AF01 3RT20 18-1AP01	3RT20 18-2AB01 3RT20 18-2AF01 3RT20 18-2AP01
			01	—	1	24 110 230	3RT20 18-1AB02 3RT20 18-1AF02 3RT20 18-1AP02	3RT20 18-2AB02 3RT20 18-2AF02 3RT20 18-2AP02

Other voltages on request.

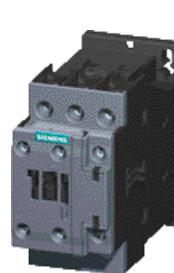
For accessories, see page 2/151.

1) For size S00: Coil operating range
at 50 Hz: 0.8 ... 1.1 × U_N ,
at 60 Hz: 0.85 ... 1.1 × U_N .

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors,
3-pole, 3 ... 18.5 kW

AC operation



3RT20 2.-1A.00



3RT20 2.-2A.00

Rated data			Auxiliary contacts		Rated control supply voltage U_s at 50/60 Hz	Screw terminals	Spring-type terminals
AC-2 and AC-3, T_u : Up to 60 °C		AC-1, T_u : 40 °C	Ident. No.	Version		Order No.	Order No.
Operational current I_e up to 415 V	Rating of induction motors at 50 Hz and 415 V	Operational current I_e up to 690 V					
A	kW	A	NO	NC	V AC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S0

Terminal designations according to EN 50012

9	4	40	11	1	1	24 110 230	3RT20 23-1AC20 3RT20 23-1AG20 3RT20 23-1AL20	3RT20 23-2AC20 3RT20 23-2AG20 3RT20 23-2AL20
12	5.5	40	11	1	1	24 110 230	3RT20 24-1AC20 3RT20 24-1AG20 3RT20 24-1AL20	3RT20 24-2AC20 3RT20 24-2AG20 3RT20 24-2AL20
16	7.5	40	11	1	1	24 110 230	3RT20 25-1AC20 3RT20 25-1AG20 3RT20 25-1AL20	3RT20 25-2AC20 3RT20 25-2AG20 3RT20 25-2AL20
25	11	40	11	1	1	24 110 230	3RT20 26-1AC20 3RT20 26-1AG20 3RT20 26-1AL20	3RT20 26-2AC20 3RT20 26-2AG20 3RT20 26-2AL20
32	15	50	11	1	1	24 110 230	3RT20 27-1AC20 3RT20 27-1AG20 3RT20 27-1AL20	3RT20 27-2AC20 3RT20 27-2AG20 3RT20 27-2AL20
38	18.5	50	11	1	1	24 110 230	3RT20 28-1AC20 3RT20 28-1AG20 3RT20 28-1AL20	3RT20 28-2AC20 3RT20 28-2AG20 3RT20 28-2AL20
40 ¹⁾	18.5	50	11	1	1	24 110 230	3RT20 28-1AC20-0JA0 3RT20 28-1AG20-0JA0 3RT20 28-1AL20-0JA0	— — —

Other voltages on request.

For accessories, see page 2/151.

For spare parts, see page 2/168.

1) T_u : upto 50°C

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

DC operation



3RT20 1...1B...



3RT20 1...2B...



3RT20 1...1BB4...OCCO



3RT20 1...2BB4...OCCO

Rated data			Auxiliary contacts		Rated control supply voltage U_s	Screw terminals	Spring-type terminals
AC-2 and AC-3, T_u : Up to 60 °C		AC-1, T_u : 40 °C	Ident. No.	Version		Order No.	Order No.
Operational current I_e up to 415 V	Rating of induction motors at 50 Hz and 415 V	Operational current I_e up to 690 V					
A	kW	A	NO	NC	V DC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00

Terminal designations according to EN 50012

7	3	18	10	1	—	24 220	3RT20 15-1BB41 3RT20 15-1BM41	3RT20 15-2BB41 3RT20 15-2BM41
			01	—	1	24 220	3RT20 15-1BB42 3RT20 15-1BM42	3RT20 15-2BB42 3RT20 15-2BM42
9	4	22	10	1	—	24 220	3RT20 16-1BB41 3RT20 16-1BM41	3RT20 16-2BB41 3RT20 16-2BM41
			01	—	1	24 220	3RT20 16-1BB42 3RT20 16-1BM42	3RT20 16-2BB42 3RT20 16-2BM42
12	5.5	22	10	1	—	24 220	3RT20 17-1BB41 3RT20 17-1BM41	3RT20 17-2BB41 3RT20 17-2BM41
			01	—	1	24 220	3RT20 17-1BB42 3RT20 17-1BM42	3RT20 17-2BB42 3RT20 17-2BM42
16	7.5	22	10	1	—	24 220	3RT20 18-1BB41 3RT20 18-1BM41	3RT20 18-2BB41 3RT20 18-2BM41
			01	—	1	24 220	3RT20 18-1BB42 3RT20 18-1BM42	3RT20 18-2BB42 3RT20 18-2BM42

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00

Contactors with communications interface

Terminal designations according to EN 50012

7	3	18	10	1	—	24	3RT20 15-1BB41-OCCO	3RT20 15-2BB41-OCCO
			01	—	1	24	3RT20 15-1BB42-OCCO	3RT20 15-2BB42-OCCO
9	4	22	10	1	—	24	3RT20 16-1BB41-OCCO	3RT20 16-2BB41-OCCO
			01	—	1	24	3RT20 16-1BB42-OCCO	3RT20 16-2BB42-OCCO
12	5.5	22	10	1	—	24	3RT20 17-1BB41-OCCO	3RT20 17-2BB41-OCCO
			01	—	1	24	3RT20 17-1BB42-OCCO	3RT20 17-2BB42-OCCO
16	7.5	22	10	1	—	24	3RT20 18-1BB41-OCCO	3RT20 18-2BB41-OCCO
			01	—	1	24	3RT20 18-1BB42-OCCO	3RT20 18-2BB42-OCCO

Other voltages on request.

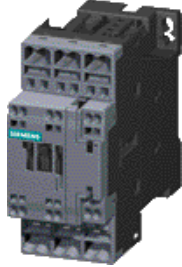
Power Contactors for Switching Motors

**SIRIUS 3RT20 contactors,
3-pole, 3 ... 18.5 kW**

DC operation



3RT20 2.-1B.40



3RT20 2.-2B.40



3RT20 2.-1BB40-0CC0



3RT20 2.-2BB40-0CC0

Rated data			Auxiliary contacts		Rated control supply voltage U_c	Screw terminals 	Spring-type terminals 
AC-2 and AC-3, T_u : Up to 60 °C		AC-1, T_u : 40 °C	Ident. No.	Version		Order No.	Order No.
Operational current I_e up to 415 V	Rating of induction motors at 50 Hz and 415 V	Operational current I_e up to 690 V		 			
A	kW	A		NO NC	V DC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S0

Terminal designations according to EN 50012

9	4	40	11	1	1	24	3RT20 23-1BB40	3RT20 23-2BB40
12	5.5	40	11	1	1	24 220	3RT20 24-1BB40 3RT20 24-1BM40	3RT20 24-2BB40 3RT20 24-2BM40
16	7.5	40	11	1	1	24 220	3RT20 25-1BB40 3RT20 25-1BM40	3RT20 25-2BB40 3RT20 25-2BM40
25	11	40	11	1	1	24 220	3RT20 26-1BB40 3RT20 26-1BM40	3RT20 26-2BB40 3RT20 26-2BM40
32	15	50	11	1	1	24 220	3RT20 27-1BB40 3RT20 27-1BM40	3RT20 27-2BB40 3RT20 27-2BM40
38	18.5	50	11	1	1	24 220	3RT20 28-1BB40 3RT20 28-1BM40	3RT20 28-2BB40 3RT20 28-2BM40
40 ¹⁾	18.5	50	11	1	1	24 220	3RT20 28-1BB40-0JA0 3RT20 28-1BB40-0JA0	— —

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S0

Contactors with communication interface

Terminal designations according to EN 50012

9	4	40	11	1	1	24	3RT20 23-1BB40-0CC0	3RT20 23-2BB40-0CC0
12	5.5	40	11	1	1	24	3RT20 24-1BB40-0CC0	3RT20 24-2BB40-0CC0
16	7.5	40	11	1	1	24	3RT20 25-1BB40-0CC0	3RT20 25-2BB40-0CC0
25	11	40	11	1	1	24	3RT20 26-1BB40-0CC0	3RT20 26-2BB40-0CC0
32	15	50	11	1	1	24	3RT20 27-1BB40-0CC0	3RT20 27-2BB40-0CC0
38	18.5	50	11	1	1	24	3RT20 28-1BB40-0CC0	3RT20 28-2BB40-0CC0

Other voltages on request.

For accessories, see page 2/151.

1) T_u : upto 50°C

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors, 3-pole, 3 ... 18.5 kW

UC operation · AC or DC operation

Extended operating range of the solenoid coils $0.7 \dots 1.3 \times U_s$

Integrated coil circuit



3RT20 2.-1N.30



3RT20 2.-2N.30

Rated data			Auxiliary contacts		Rated control supply voltage U_s	Screw terminals	Spring-type terminals
AC-2 and AC-3, T_u : Up to 60 °C		AC-1, T_u : 40 °C	Ident. No.	Version		Order No.	Order No.
Operational current I_e up to 415 V	Rating of induction motors at 50 Hz and 415 V	Operational current I_e up to 690 V					
A	kW	A	NO	NC	V AC/DC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S0¹⁾

With integrated coil circuit (varistor)

Terminal designations according to EN 50012

12	5.5	40	11	1	1	21 ... 28 95 ... 130 200 ... 280 ¹⁾	3RT20 24-1NB30 3RT20 24-1NF30 3RT20 24-1NP30	3RT20 24-2NB30 3RT20 24-2NF30 3RT20 24-2NP30
16	7.5	40	11	1	1	21 ... 28 95 ... 130 200 ... 280 ¹⁾	3RT20 25-1NB30 3RT20 25-1NF30 3RT20 25-1NP30	3RT20 25-2NB30 3RT20 25-2NF30 3RT20 25-2NP30
25	11	40	11	1	1	21 ... 28 95 ... 130 200 ... 280 ¹⁾	3RT20 26-1NB30 3RT20 26-1NF30 3RT20 26-1NP30	3RT20 26-2NB30 3RT20 26-2NF30 3RT20 26-2NP30
32	15	50	11	1	1	21 ... 28 95 ... 130 200 ... 280 ¹⁾	3RT20 27-1NB30 3RT20 27-1NF30 3RT20 27-1NP30	3RT20 27-2NB30 3RT20 27-2NF30 3RT20 27-2NP30
38	18.5	50	11	1	1	21 ... 28 95 ... 130 200 ... 280 ¹⁾	3RT20 28-1NB30 3RT20 28-1NF30 3RT20 28-1NP30	3RT20 28-2NB30 3RT20 28-2NF30 3RT20 28-2NP30

1) At 280 V: upper limit = $1.1 \times U_s$.

Power Contactors for Switching Motors

SIRIUS 3RT20 contactors,
3-pole, 3 ... 18.5 kW

Options

Rated control supply voltages

(the 10th and 11th position of the order number must be changed)

Rated control supply voltage U_s	Contactor type	3RT20 1	3RT20 2 ⁵⁾	3RT23 1, ⁵⁾ 3RT25 1 ⁵⁾	3RT23 2, ⁵⁾ 3RT25 2 ⁵⁾
	Size	S00	S0	S00	S0

Sizes S00 ... S0

AC operation¹⁾

Solenoid coils for 50 Hz

(exception: Size S00: 50 and 60 Hz²⁾)

24 V AC	B0	B0	B0	B0
42 V AC	D0	D0	D0	—
48 V AC	H0	H0	H0	—
110 V AC	F0	F0	F0	F0
230 V AC	P0	P0	P0	P0
400 V AC	V0	V0	V0	V0

Solenoid coils for 50 and 60 Hz²⁾

24 V AC	B0	C2	B0	C2
42 V AC	D0	D2	D0	D2
48 V AC	H0	H2	H0	H2
110 V AC	F0	G2	F0	G2
220 V AC	N2	N2	N2	N2
230 V AC	P0	L2	P0	L2
240 V AC	P2	P2	P2	P2

DC operation¹⁾

12 V DC	A4	—	A4	—
24 V DC	B4	B4	B4	B4
42 V DC	D4	D4	D4	D4
48 V DC	W4	W4	W4	—
60 V DC	E4	E4	—	—
110 V DC	F4	F4	F4	F4
125 V DC	G4	G4	G4	G4
220 V DC	M4	M4	M4	M4
230 V DC	P4	P4	P4	—

Examples

AC operation	3RT20 23-1AP00 3RT20 23-1AG20	Contactor with screw terminals; with solenoid coil for 50 Hz for rated control supply voltage 230 V AC. Contactor with screw terminals; with solenoid coil for 50/60 Hz for rated control supply voltage 110 V AC.
DC operation	3RT20 25-2BB40 3RT20 25-2BG40	Contactor with spring-type terminals; for rated control supply voltage 24 V DC. Contactor with spring-type terminals; for rated control supply voltage 125 V DC.

Rated control supply voltage	Contactor type	—	3RT2. 2.-N
$U_{s \min} \dots U_{s \max}^{3)}$	Size	S00	S0

Size S0

UC operation (AC 45 to 70 Hz, DC)

21 ... 28 V AC/DC	—	B3
95 ... 130 V AC/DC	—	F3
200 ... 280 V AC/DC ⁴⁾	—	P3

1) For deviating coil voltages and coil operating ranges of sizes S00 and S0, the 24 V DC SITOP Power power supply unit with wide range input (93 to 264 V AC; 30 to 264 V DC) can be used for coil excitation.

2) Coil operating range
at 50 Hz: $0.8 \dots 1.1 \times U_s$
at 60 Hz: $0.85 \dots 1.1 \times U_s$.

3) Coil operating range: $0.7 \times U_{s \min} \dots 1.3 \times U_{s \max}$.

4) At 280 V: upper limit = $1.1 \times U_s$.

5) Wideband coil voltages available.
For ordering and technical details, contact nearest sales office.

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Overview

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1,
IEC 60947-5-1, EN 60947-5-1 (auxiliary switches)

The 3RT1 contactors are climate-proof. They are finger-safe according to EN 50274.

Contact reliability

If voltages ≤ 110 V and currents ≤ 100 mA are to be switched, the auxiliary contacts of the 3RT1 contactor or 3RH11 contactor relay should be used as they guarantee a high level of contact reliability.

These auxiliary contacts are particularly suitable for solid-state circuits with currents ≥ 1 mA at a voltage ≥ 17 V.

Short-circuit protection of the contactors

For more information about short-circuit protection of contactors without overload relay, see "Technical specifications". For short-circuit protection of the contactors with overload relay see "Overload Relays".

To assemble fuseless motor feeders you must select combinations of motor starter protector and contactor as explained in "Fuseless Load Feeders".

Motor protection

3RU11 thermal overload relays or 3RB20/3RB21 solid-state overload relays can be fitted to the 3RT1 contactors for protection against overload. The overload relays must be ordered separately.

Ratings of induction motors

The quoted rating (in kW) refers to the output power on the motor shaft (according to the nameplate).

Surge suppression

3RT1 contactors can be retrofitted with RC elements, varistors, diodes or diode assemblies (assembly of diode and Zener diode for short break times) for damping opening surges in the coil.

Note:

The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times; diode assembly 2 to 6 times, varistor +2 to 5 ms).

Sizes S00 and S0, up to 11 kW

The 3RT1 devices in these sizes can be found in SIRIUS datasheet 2009.

Sizes S2 and S3, up to 45 kW

Auxiliary contact complement

The basic units of sizes S2 and S3 are delivered only with the main contacts and can be extended with auxiliary switch blocks.

Surge suppression

For size S2 and S3 contactors, varistors and RC elements can be snapped on either on the top or directly below the coil terminals. Diode assemblies are available in 2 different versions on account of their polarity. Depending on the application they can be connected either only at the bottom (assembly with motor starter protector) or only at the top (assembly with overload relay).

The plug-in direction of the diodes and diode assemblies is specified by coding.

Exceptions:

3RT19 26-1T . 00 and 3RT19 36-1T . 00,
in this case the plug-in direction is marked with "+" and "-".

Sizes S6 to S12, > 45 to 250 kW

- 3RT10, contactors for switching motors,
- 3RT12, vacuum contactors for switching motors,
- 3RT14, contactors for AC-1 applications.

Operating mechanism types

Two types of solenoid operation are available:

- Conventional operating mechanism
- Solid-state operating mechanism (with 3 performance levels)

Control supply voltage

The contactors have a UC operating mechanism which can be operated with AC (40 to 60 Hz) as well as with DC.

Withdrawable coils

For simple coil replacement, e. g. if the application is replaced, the solenoid coil can be pulled out upwards after the release mechanism has been actuated and can be replaced by any other coil of the same size.

Auxiliary contact complement

Contactor sizes S6 to S12 are supplied with mounted auxiliary switch blocks.

- 3RT10 and 3RT14 contactors:
Auxiliary contacts mounted laterally and on front
- 3RT12 vacuum contactors:
Auxiliary contacts mounted laterally

Contactors with conventional operating mechanism

Version 3RT1 . . . - . A:

The solenoid coil is switched directly on and off with the control supply voltage U_s by way of terminals A1/A2.

Multi-voltage range for the control supply voltage U_s :

Only one coil covers several close-lying control supply voltages which are used worldwide, e. g. 110–115–120–127 V AC/DC or 220–230–240 V AC/DC. Allowance is made in addition for an operating range of 0.8 times the lower ($U_{s\min}$) and 1.1 times the upper ($U_{s\max}$) rated control supply voltage within which the contactor switches reliably and no thermal overload occurs.

Contactors with solid-state operating mechanism

The solenoid coil is supplied selectively with the power required for reliable switching and holding by upstream control electronics.

- **Wide voltage range for the control supply voltage U_s :**
Compared with the conventional operating mechanism, the solid-state operating mechanism covers an even broader range of control supply voltages used worldwide within one coil variant. For example, the coil for 200 to 277 V AC/DC ($U_{s\min}$ to $U_{s\max}$) covers the voltages 200-208-220-230-240-254-277 V used worldwide.
- **Extended operating range 0.7 to 1.25 x U_s :**
The wide range for the rated control supply voltage and the additionally allowed coil operating range of $0.8 \times U_{s\min}$ to $1.1 \times U_{s\max}$ results in an extended coil operating range of at least 0.7 to $1.25 \times U_s$, within which the contactors will operate reliably, for the most common control supply voltages of 24, 110 and 230 V.

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

- Bridging temporary voltage dips:
Control voltage failures dipping to 0 V (at A1/A2) are bridged for up to approx. 25 ms to avoid unintentional tripping.
- Defined ON and OFF thresholds:
For voltages above $0.8 \times U_{s \min}$ the electronics will reliably switch the contactor ON, and for voltages below the value $0.5 \times U_{s \min}$ it is reliably switched OFF. The hysteresis in the switching thresholds prevents the main contacts from chattering as well as increased wear or welding when operated in weak, unstable networks. This also prevents thermal overloading of the contactor coil if the voltage applied is too low (contactor does not close properly and is continuously operated with overexcitation).
- Low control power consumption when closing and in the closed state.

Electromagnetic compatibility (EMC)

The contactors with solid-state operating mechanism conform to the requirements for operation in industrial plants:

- Interference immunity
 - Burst (IEC 61000-4-4): 4 kV
 - Surge (IEC 61000-4-5): 4 kV
 - Electrostatic discharge, ESD (IEC 61000-4-2): 8/15 kV
 - Electromagnetic field (IEC 61000-4-3): 10 V/m
- Emitted interference
 - Limit value class A according to EN 55011

Note:

In connection with converters, the control cables must be routed separately from the load cables to the converter.

Indication of remaining lifetime (RLT)

Main contactor contacts are working parts which therefore must be replaced in good time when the end of their service life has been reached. The degree of contact erosion and thus the electrical endurance (= number of operating cycles) depends on the loading, utilization category, operating mode, etc. Up to now, routine checks/visual inspections by the maintenance personnel were needed in order to gain an insight into the state of the main contacts. The remaining lifetime indication function now takes over this task. It does not count the number of operating cycles – which does not provide information about contact erosion – but instead electronically identifies, evaluates and stores the actual progress of erosion of each one of the three main contacts, and outputs a warning when specified limits are reached. The stored data are not lost even if the control supply voltage for A1/A2 fails. After replacement of the main contacts, measurement the remaining lifetime must be reset using the "RESET" button (hold down RESET button for about 2 seconds using a pen or similar tool).

Advantages:

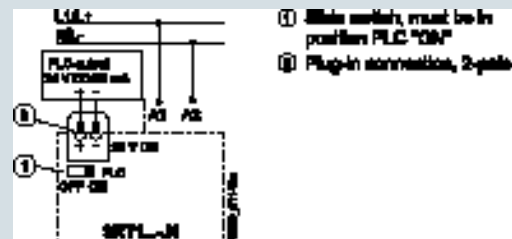
- Signaling through relay contact or AS-i when remaining lifetime is 20 %, i. e. contact material wear is 80 %.

- Additional visual indication of various levels of erosion by means of LEDs on the laterally mounted solid-state module when remaining lifetime is 60 % (green), 40 % (orange) and 20 % (red).
- Early warning to replace contacts
- Optimum utilization of contact material
- Visual inspection of the condition of contacts no longer necessary
- Reduction of ongoing operating costs
- Optimum planning of maintenance measures
- Avoidance of unforeseen plant downtimes

Version 3RT1 N: for 24 V DC PLC output

2 control options:

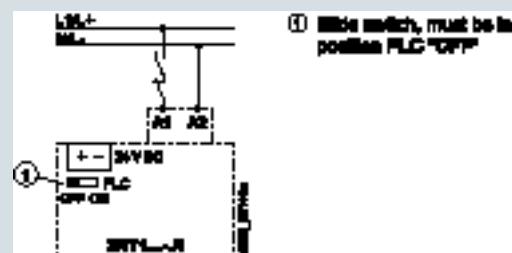
- Control without a coupling link directly through a 24 V DC / ≥ 30 mA PLC output (EN 61131-2). Connection by means of 2-pole plug-in connection. The screwless spring-type connection is part of the scope of supply. The control supply voltage which supplies the solenoid operating mechanism must be connected to A1/A2.



Note:

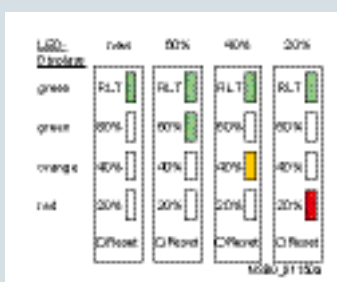
Before start-up, the slide switch for PLC operation must be moved to the "PLC ON" position (setting ex works: "PLC OFF").

- Conventional control by applying the control supply voltage at A1/A2 through a switching contact.



Note:

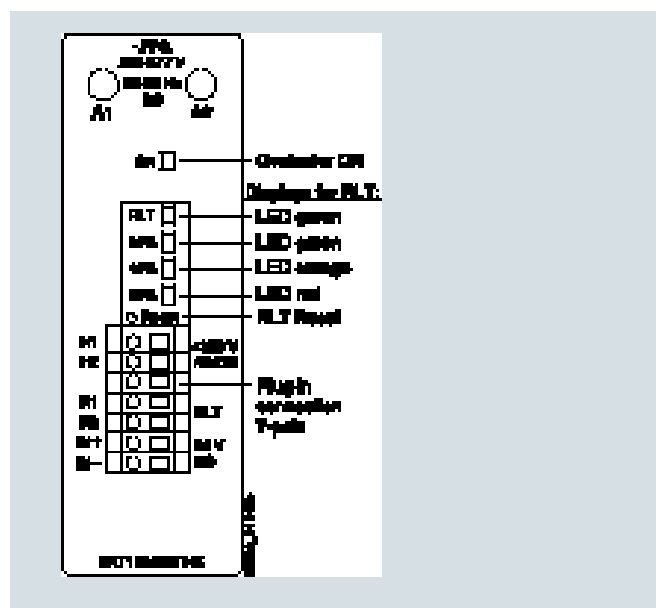
The slide switch must be in the "PLC OFF" position (= setting ex works).



Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Version 3RT1...-P: for 24 V DC PLC output or PLC relay output, with remaining lifetime indicator (RLT).

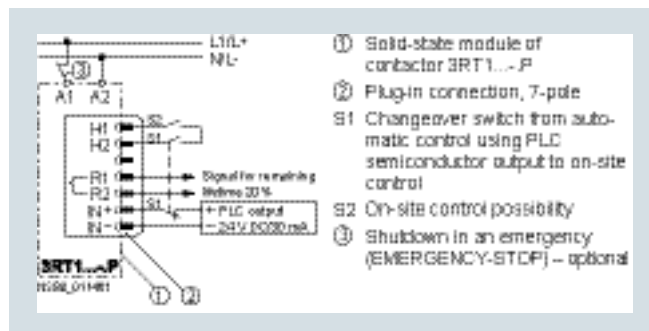


To supply the solenoid and the remaining lifetime indicator with power, the control supply voltage U_c must be connected to terminals A1/A2 of the laterally mounted solid-state module. The control inputs of the contactor are connected to a 7-pole plug-in connection; the screwless spring-type connection is part of the scope of supply.

- The "Remaining Lifetime RLT" status signal is available at terminals R1/R2 through a floating relay contact (hard gold-plated, enclosed) and can be input to SIMOCODE, PLC or other devices for processing, for example. Permissible current-carrying capacity of the R1/R2 relay output:
 - I_e /AC-15/24 to 230 V: 3 A
 - I_e /DC-13/24 V: 1 A
- LED indications
The following states are indicated by means of LEDs on the laterally mounted solid-state module:
 - Contactor ON (energized state): green LED ("ON")
 - Indication of remaining lifetime

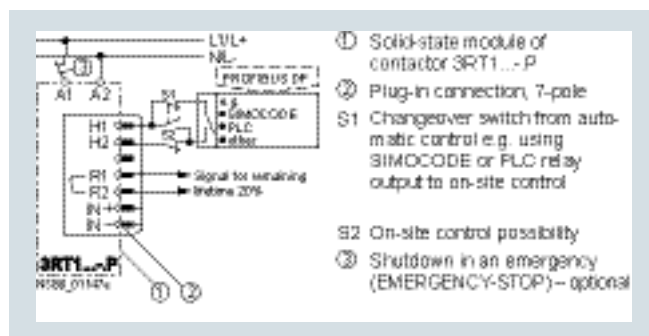
2 control options:

- Contactor control without a coupling link directly through a 24 V DC ≥ 30 mA PLC output (EN 61131-2) by way of terminals IN+/IN-.



Possibility of switching from automatic control to local control by way of terminals H1/H2, i. e. automatic control through PLC or SIMOCODE/PROFIBUS DP can be deactivated e. g. at start-up or in the event of a fault and the contactor can be controlled manually.

- Contactor control through relay outputs at connections H1/ H2, e. g. by
 - PLC or
 - SIMOCODE.



Contact loading: U_c /approx. 5 mA.

When operated through SIMOCODE, a communication link to PROFIBUS DP is also provided.

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
SIRIUS power contactors	3	R	T											
1st generation			1											
Device type (e. g. 0 = 3-pole motor contactor, 3 = 4-pole AC-1 contactor)														
Size of the contactor (3 = S2, 4 = S3, 5 = S6, etc.)														
Power dependent on size (e. g. 45 = 37 kW)														
Connection type (1 = screw, 2 = spring-type)														
Operating range / solenoid coil circuit (e. g. A = AC standard / without)														
Rated control supply voltage (e. g. P0 = 230 V, 50 Hz)														
Auxiliary switches (e. g. S3: 0 = without auxiliary switches)														
Special version														
Example	3	R	T	1	0	4	5	-	1	A	P	0	0	

Note: The Order No. scheme is presented here merely for information purposes and for better understanding of the logic

behind the order numbers. For your orders, please use the order numbers quote in the catalog and in the Industry Mall.

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors,
3-pole, 15 ... 250 kW

Technical specifications

Endurance of the main contacts

The characteristic curves show the contact endurance of the contactors when switching resistive and inductive AC loads (AC-1/AC-3) depending on the breaking current and rated operational voltage. It is assumed that the operating mechanisms are switched randomly, i. e. not synchronized with the phase angle of the supply system.

The rated operational current I_e complies with utilization category AC-4 (breaking six times the rated operational current) and is intended for a contact endurance of at least 200 000 operating cycles.

If a shorter endurance is sufficient, the rated operational current I_e /AC-4 can be increased. I_e

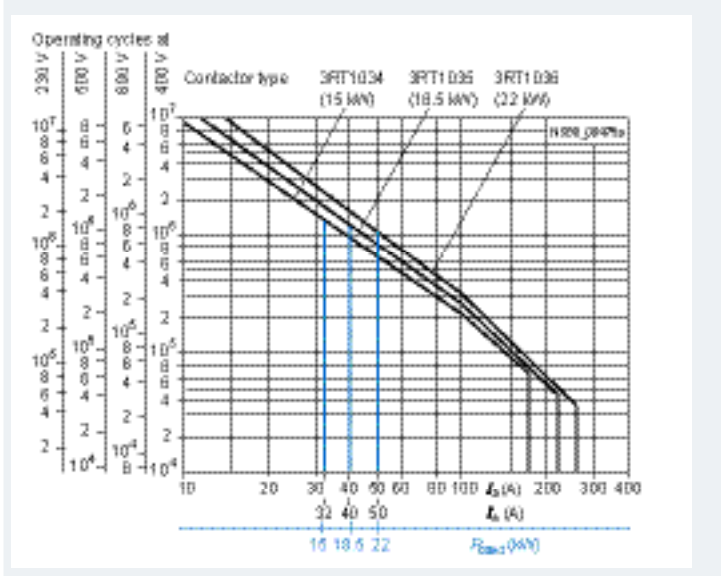
If the contacts are used for **mixed operation**, i. e. normal switching (breaking the rated operational current according to utilization category AC-3) in combination with intermittent inching (breaking several times the rated operational current according to utilization category AC-4), the contact endurance can be calculated approximately from the following equation:

$$X = \frac{A}{1 + \frac{C}{100} \left(\frac{A}{B} - 1 \right)}$$

Characters in the equation:

- X Contact endurance for mixed operation in operating cycles
- A Contact endurance for normal operation ($I_a = I_e$) in operating cycles
- B Contact endurance for inching ($I_a = \text{multiple of } I_e$) in operating cycles
- C Inching operations as a percentage of total switching operations

Size S2



Size S3

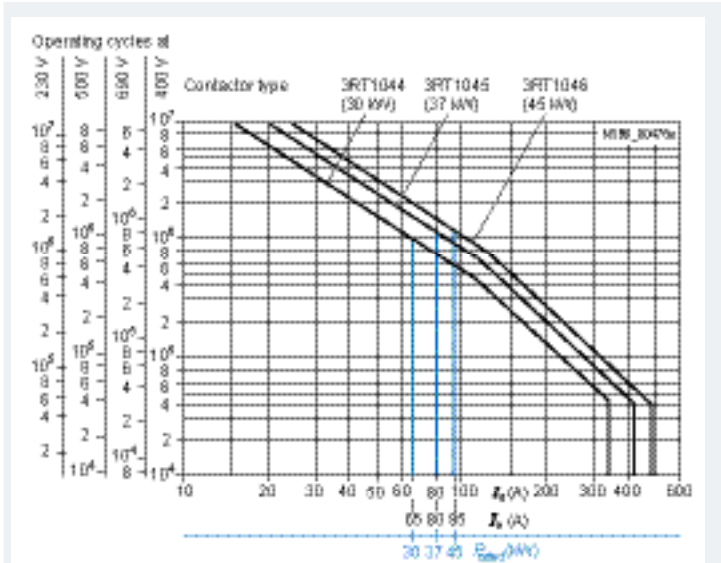


Diagram legend:

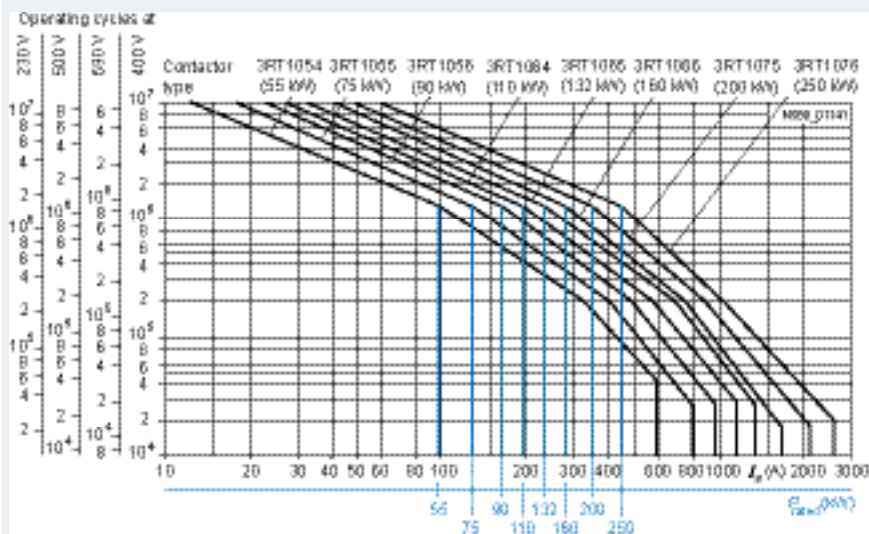
- P_N = Rated power for squirrel-cage motors at 415 V
- I_a = Breaking current
- I_e = Rated operational current

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Endurance of the main contacts

Sizes S6 to S12



3RT12 vacuum contactors · Sizes S10 and S12

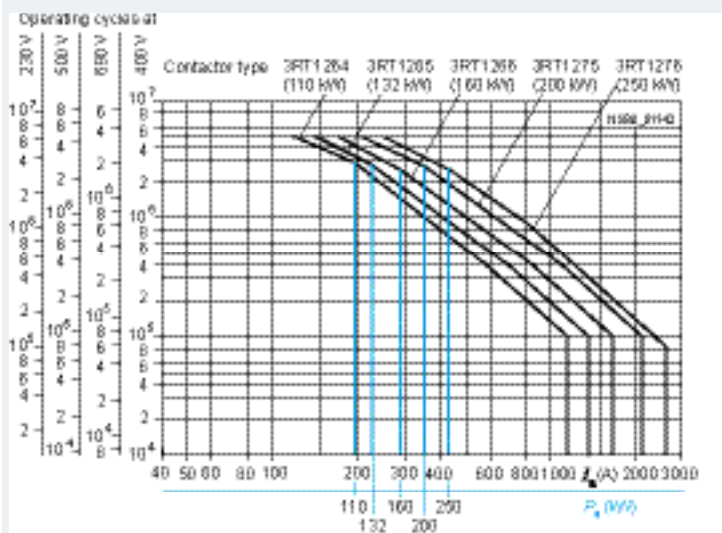


Diagram legend:

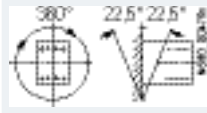
P_N = Rated power for squirrel-cage motors at 415 V

I_b = Breaking current

I_e = Rated operational current

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Type		3RT10 34	3RT10 35	3RT10 36	3RT10 44	3RT10 45	3RT10 46
Size		S2			S3		
Dimensions (W x H x D)		55 x 112 x 110			70 x 146 x 134		
• With mounted auxiliary switch block		55 x 112 x 159			70 x 146 x 183		
General data							
Permissible mounting positions The contactors are designed for operation on a vertical mounting surface.							
Mechanical endurance							
• Basic units	Operating cycles	10 million					
• Basic units with snap-on auxiliary switch block	Operating cycles	10 million					
• Solid-state compatible auxiliary switch blocks	Operating cycles	5 million					
Electrical endurance		1)					
Rated insulation voltage U_i (pollution degree 3)	V	690			1000		
Rated impulse withstand voltage U_{imp}	kV	6			6		
Protective separation between the coil and the main contacts acc. to EN 60947-1, Appendix N	V	415			690		
Mirror contacts A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.							
• With removable auxiliary switch block		Yes, acc. to EN 60947-4-1, Appendix F					
Permissible ambient temperature							
• During operation	°C	-25 ... +60					
• During storage	°C	-55 ... +80					
Degree of protection acc. to EN 60947-1, Appendix C		IP20 (terminal compartment IP00), AC coil assembly IP40, DC coil assembly IP30					
Touch protection acc.to EN 50274		Finger-safe					
Shock resistance (AC and DC operation)							
• Rectangular pulse	g/ms	10/5 and 5/10			6.8/5 and 4/10		
• Sine pulse	g/ms	15/5 and 8/10			10.6/5 and 6.2/10		
Conductor cross-sections		2)					
Short-circuit protection for contactors without overload relays							
For short-circuit protection for contactors with overload relays see “Protection Equipment” —> “Overload Relays”.							
Main circuit Fuse links gG, type NH 3NA, DIAZED 5SB, NEOZED 5SE according to IEC 60947-4-1/ EN 60947-4-1							
• Type of coordination “1”	A	125	125	160	250	250	
• Type of coordination “2”	A	63	63	80	125	160	
• Weld-free ³⁾	A	16	16	50	63	100	
Auxiliary circuit							
• Fuse links gG, type DIAZED 5SB, NEOZED 5SE (weld-free protection at $I_k \geq 1$ kA)	A	10					
• Miniature circuit breakers with C characteristic (short-circuit current $I_k \leq 400$ A)	A	10					

1) For endurance of the main contacts see page 2/33.

2) For conductor cross-sections see page 2/38.

3) Test conditions acc. to IEC 60947-4-1.

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Contactor	Type Size	3RT10 34 S2	3RT10 35 S2	3RT10 36 S2	3RT10 44 S3	3RT10 45 S3	3RT10 46 S3
Control circuit							
Coil operating range	AC/DC	0.8 ... 1.1 x U_s					
Power consumption of the solenoid coils (when coil is cold and 1.0 x U_s)							
• AC operation, 50 Hz, standard version							
- Closing	VA	104	145		218	270	
- P.f.		0.78	0.79		0.61	0.68	
- Closed	VA	9.7	12.5		21	22	
- P.f.		0.42	0.36		0.26	0.27	
• AC operation, 50/60 Hz, standard version							
- Closing	VA	127/113	170/155		247/211	298/274	
- P.f.		0.73/0.69	0.76/0.72		0.62/0.57	0.70/0.62	
- Closed	VA	11.3/9.5	15/11.8		25/18	27/20	
- P.f.		0.41/0.42	0.35/0.38		0.27/0.3	0.29/0.31	
• DC operation							
- Closing = Closed	W	13.3	13.3		15	15	
Operating times for 0.8 ... 1.1 x $U_s^{1)}$							
Total break time = Opening delay + Arcing time							
• AC operation							
- Closing delay	ms	11 ... 30	10 ... 24		16 ... 57	17 ... 90	
- Opening delay	ms	7 ... 10	7 ... 10		10 ... 19	10 ... 25	
• DC operation							
- Closing delay	ms	50 ... 95	60 ... 100		90 ... 230	90 ... 230	
- Opening delay	ms	20 ... 30	20 ... 25		14 ... 20	14 ... 20	
• Arcing time							
	ms	10	10		10 ... 15	10 ... 15	
Operating times for 1.0 x $U_s^{1)}$							
• AC operation							
- Closing delay		13 ... 22	12 ... 20		18 ... 34	18 ... 30	
- Opening delay		7 ... 10	7 ... 10		11 ... 18	11 ... 23	
• DC operation							
- Closing delay		60 ... 75	70 ... 85		100 ... 120	100 ... 120	
- Opening delay	ms	20 ... 30	20 ... 25		16 ... 20	16 ... 20	

1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (varistor +2 ms to 5 ms, diode assembly: 2 to 6 times).

Power Contactors for Switching Motors

**SIRIUS 3RT10 contactors,
3-pole, 15 ... 250 kW**

Contactor	Type Size	3RT10 34 S2	3RT10 35 S2	3RT10 36 S2	3RT10 44 S3	3RT10 45 S3	3RT10 46 S3
Main circuit							
AC capacity							
Utilization category AC-1 Switching resistive loads							
• Rated operational currents I_e							
- At 40 °C up to 690 V	A	50	60	60	100	120	120
- At 60 °C up to 690 V	A	45	55	55	90	100	100
• Rated power for AC loads ¹⁾ with p.f.= 0.95 (at 60 °C)							
- At 415 V	kW	31	38	38	59	66	66
• Minimum conductor cross-section for loads with I_e							
- At 40 °C	mm ²	16	16	16	35	50	50
- At 60 °C	mm ²	10	16	16	35	35	35
Utilization categories AC-2 and AC-3							
• Rated operational currents I_e							
- Up to 500 V	A	32	40	50	65	80	95
- At 690 V	A	20	24	24	47	58	58
• Rated power of slipring or squirrel-cage motors at 50 and 60 Hz							
- At 230 V	kW	7.5	11	15	18.5	22	22
- At 415 V	kW	15	18.5	22	30	37	45
- At 500 V	kW	18.5	22	30	37	45	55
- At 690 V	kW	18.5	22	22	45	55	55
Thermal current-carrying capacity, 10 s current²⁾	A	320	400	400	600	760	760
Power loss per conducting path at I_e/AC-3	W	1.8	2.6	5	4.6	7.7	10.8
Utilization category AC-4 (for $I_a = 6 \times I_e$)							
• Rated operational current I_e							
- Up to 415 V	A	29	35	41	55	66	80
• Rated power for squirrel-cage motors with 50 Hz and 60 Hz							
- At 415 V	kW	15	18.5	22	30	37	45
The following applies to a contact endurance of about 200 000 operating cycles:							
• Rated operational currents I_e							
- Up to 415 V	A	15.6	18.5	24	28	34	42
- Up to 690 V	A	15.6	18.5	24	28	34	42
• Rated power for squirrel-cage motors with 50 Hz and 60 Hz							
- At 230 V	kW	4.7	5.4	7.3	8.7	10.4	12
- At 415 V	kW	8.2	9.5	12.6	15.1	17.9	22
- At 500 V	kW	9.8	11.8	15.8	18.4	22.4	27
- At 690 V	kW	13	15.5	21.8	25.4	30.9	38
Switching frequency							
Switching frequency z in operating cycles/hour							
Contactors without overload relays							
• No-load switching frequency AC	h ⁻¹	5000			5000		
• No-load switching frequency DC	h ⁻¹	1500			1000		
• Dependence of the switching frequency z' on the operational current I' and operational voltage U': $z' = z \cdot (I_e/I') \cdot (400 V/U')^{1.5} \cdot 1/h$							
- AC-1	h ⁻¹	1200	1200	1000	1000	900	900
- AC-2	h ⁻¹	750	600	400	400	400	350
- AC-3	h ⁻¹	1000	1000	800	1000	1000	850
- AC-4	h ⁻¹	250	300	300	300	300	250
Contactors with overload relays							
• Mean value	h ⁻¹	15					

1) Industrial furnaces and electric heaters with resistance heating, etc.
(increased power consumption on heating up has been taken into account).

2) According to IEC 60947-4-1.

For rated values for various start-up conditions
see "Protection Equipment" —> "Overload Relays".

Power Contactors for Switching Motors

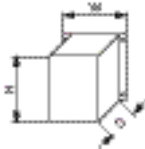
SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Contactor	Type Size	3RT10 3 . S2	3RT10 4 . S3	
Conductor cross-sections (1 or 2 conductors connectable)				
Main conductors: (1 or 2 conductors can be connected)		 Screw terminals		
Box terminals				
Front clamping point connected				
	• Finely stranded with end sleeve	mm²	0.75 ... 25	2.5 ... 35
	• Finely stranded without end sleeve	mm²	0.75 ... 25	4 ... 50
	• Stranded	mm²	0.75 ... 35	4 ... 70
	• Solid	mm²	0.75 ... 16	2.5 ... 16
	• Ribbon cable conductors (number x width x thickness)	mm	6 x 9 x 0.8	6 x 9 x 0.8
	• AWG cables, solid or stranded	AWG	18 ... 2	10 ... 2/0
Rear clamping point connected				
	• Finely stranded with end sleeve	mm²	0.75 ... 25	2.5 ... 50
	• Finely stranded without end sleeve	mm²	0.75 ... 25	10 ... 50
	• Stranded	mm²	0.75 ... 35	10 ... 70
	• Solid	mm²	0.75 ... 16	2.5 ... 16
	• Ribbon cable conductors (number x width x thickness)	mm	6 x 9 x 0.8	6 x 9 x 0.8
	• AWG cables, solid or stranded	AWG	18 ... 2	10 ... 2/0
Both clamping points connected				
	• Finely stranded with end sleeve	mm²	2 x (0.75 ... 16)	2 x (2.5 ... 35)
	• Finely stranded without end sleeve	mm²	2 x (0.75 ... 16)	2 x (4 ... 35)
	• Stranded	mm²	2 x (0.75 ... 25)	2 x (4 ... 50)
	• Solid	mm²	2 x (0.75 ... 16)	2 x (2.5 ... 16)
	• Ribbon cable conductors (number x width x thickness)	mm	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)
	• AWG cables, solid or stranded	AWG	2 x (18 ... 2)	2 x (10 ... 1/0)
Terminal screw		M6 (Pozidriv 2)	M6 (hexagon socket, A/F 4)	
- Tightening torque		Nm	3 ... 4.5 (27 ... 40 lb.in)	4 ... 6 (36 ... 53 lb.in)
Auxiliary conductors:				
• Solid	mm²	2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾ according to IEC 60947; max. 2 x (0.75 ... 4)		
• Finely stranded with end sleeve	mm²	2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾		
• AWG cables, solid or stranded	AWG	2 x (20 ... 16) ¹⁾ ; 2 x (18 ... 14) ¹⁾ ; 1 x 12		
• Terminal screw		M3		
- Tightening torque	Nm	0.8 ... 1.2 (7 ... 10.3 lb.in)		

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Type		3RT10 54	3RT10 55, 3RT10 56	3RT10 64, 3RT10 65, 3RT10 66	3RT10 75	3RT10 76
Size		S6		S10	S12	
Dimensions (W x H x D)		120 x 172 x 170		145 x 210 x 202	160 x 214 x 225	
• With mounted auxiliary switch block		120 x 172 x 217		145 x 210 x 251	160 x 214 x 271	
General data						
Permissible mounting positions						
The contactors are designed for operation on a vertical mounting surface.						
Mechanical endurance	Operating cycles	10 million				
Electrical endurance		1)				
Rated insulation voltage U_i (pollution degree 3)	V	1000				
Rated impulse withstand voltage U_{imp}	kV	8				
Protective separation between the coil and the main contacts acc. to EN 60947-1, Appendix N	V	690				
Mirror contacts		Yes, acc. to EN 60947-4-1, Appendix F				
A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.						
Permissible ambient temperature						
• During operation	°C	-25 ... +60				
• During operation, with AS-Interface interface	°C	-25 ... +55				
• During storage	°C	-55 ... +80				
Degree of protection acc. to EN 60947-1, Appendix C		IP00/open, coil assembly IP20				
Touch protection acc.to EN 50274		Finger-safe with cover				
Shock resistance						
• Rectangular pulse	g/ms	8.5/5 and 4.2/10				
• Sine pulse	g/ms	13.4/5 and 6.5/10				
Conductor cross-sections		2)				
Electromagnetic compatibility (EMC)		3)				
Short-circuit protection						
For short-circuit protection for contactors with overload relays see "Protection Equipment" —> "Overload Relays" .						
Main circuit						
Fuse links gG, type NH 3NA, DIAZED 5SB, NEOZED 5SE according to IEC 60947-4-1/ EN 60947-4-1						
• Type of coordination "1"	A	355	355	500	630	630
• Type of coordination "2"	A	315	315	400	500	500
• Weld-free ⁴⁾	A	80	160	250	250	315
Auxiliary circuit						
• With fuse links gG, type DIAZED 5SB, NEOZED 5SE (weld-free protection at $I_k \geq 1$ kA)	A	10				
• Or with miniature circuit breakers with C characteristic ($I_n < 400$ A)						

1) For endurance of the main contacts see page 2/34.

2) For conductor cross-sections see page 2/42.

3) For electromagnetic compatibility (EMC) see page 2/31.

4) Test conditions according to IEC 60947-4-1.

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Contactor	Type Size	3RT10 5 . S6	3RT10 6 . S10	3RT10 7 . S12
Control circuit				
Operating range of the solenoid AC/DC (UC)		$0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$		
Power consumption of the solenoid (when coil is cool and rated range $U_{s \min} \dots U_{s \max}$)				
Conventional operating mechanism				
• AC operation				
- Closing at $U_{s \min}$	VA/p.f.	250/0.9	490/0.9	700/0.9
- Closing at $U_{s \max}$	VA/p.f.	300/0.9	590/0.9	830/0.9
- Closed at $U_{s \min}$	VA/p.f.	4.8/0.8	5.6/0.9	7.6/0.9
- Closed at $U_{s \max}$	VA/p.f.	5.8/0.8	6.7/0.9	9.2/0.9
• DC operation				
- Closing at $U_{s \min}$	W	300	540	770
- Closing at $U_{s \max}$	W	360	650	920
- Closed at $U_{s \min}$	W	4.3	6.1	8.5
- Closed at $U_{s \max}$	W	5.2	7.4	10
Solid-state operating mechanism				
• AC operation				
- Closing at $U_{s \min}$	VA/p.f.	190/0.8	400/0.8	560/0.8
- Closing at $U_{s \max}$	VA/p.f.	280/0.8	530/0.8	750/0.8
- Closed at $U_{s \min}$	VA/p.f.	3.5/0.5	4/0.5	5.4/0.8
- Closed at $U_{s \max}$	VA/p.f.	4.4/0.4	5/0.4	7/0.8
• DC operation				
- Closing at $U_{s \min}$	W	250	440	600
- Closing at $U_{s \max}$	W	320	580	800
- Closed at $U_{s \min}$	W	2.3	3.2	4
- Closed at $U_{s \max}$	W	2.8	3.8	5
PLC control input acc. to EN 61131-2		Type 2		
• Rated voltage	V DC	24		
• Operating range	V DC	17 ... 30		
• Power consumption	mA	≤ 30		
Operating times (Total break time = Opening delay + Arcing time)				
Conventional operating mechanism				
• For $0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$				
- Closing delay	ms	20 ... 95	30 ... 95	45 ... 100
- Opening delay	ms	40 ... 60	40 ... 80	60 ... 100
• For $U_{s \min} \dots U_{s \max}$				
- Closing delay	ms	25 ... 50	35 ... 50	50 ... 70
- Opening delay	ms	40 ... 60	50 ... 80	70 ... 100
Solid-state operating mechanism, actuated via A1/A2				
• For $0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$				
- Closing delay	ms	95 ... 135	105 ... 145	120 ... 150
- Opening delay	ms	80 ... 90	80 ... 100	80 ... 100
• For $U_{s \min} \dots U_{s \max}$				
- Closing delay	ms	100 ... 120	110 ... 130	125 ... 150
- Opening delay	ms	80 ... 90	80 ... 100	80 ... 100
Solid-state operating mechanism, actuated via PLC input				
• For $0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$				
- Closing delay	ms	35 ... 75	45 ... 80	60 ... 90
- Opening delay	ms	80 ... 90	80 ... 100	80 ... 100
• For $U_{s \min} \dots U_{s \max}$				
- Closing delay	ms	40 ... 60	50 ... 65	65 ... 80
- Opening delay	ms	80 ... 90	80 ... 100	80 ... 100
• Arcing time		ms	10 ... 15	10 ... 15

Power Contactors for Switching Motors

**SIRIUS 3RT10 contactors,
3-pole, 15 ... 250 kW**

Contactor	Type Size	3RT10 54 S6	3RT10 55 S6	3RT10 56 S6	3RT10 64 S10	3RT10 65 S10	3RT10 66 S10	3RT10 75 S12	3RT10 76 S12
Main circuit									
AC capacity									
Utilization category AC-1									
Switching resistive loads									
• Rated operational currents I_e									
- At 40 °C up to 690 V	A	160	185	215	275	330		430	610
- At 60 °C up to 690 V	A	140	160	185	250	300		400	550
- At 60 °C up to 1000 V	A	80	90	100	100	150		200	200
• Rated power for AC loads ¹⁾ with p.f.= 0.95 (at 60 °C)									
- At 415 V	kW	92	105	121	164	197		263	362
• Minimum conductor cross-section for loads with I_e									
- At 40 °C	mm ²	70	95	95	150	185		2 x 150	2 x 185
- At 60 °C	mm ²	50	70	95	120	185		240	2 x 185
Utilization categories AC-2 and AC-3									
• Rated operational currents I_e									
- Up to 500 V	A	115	150	185	225	265	300	400	500
- At 690 V	A	115	150	170	225	265	280	400	450
- At 1000 V	A	53	65	65	68	95	95	180	180
• Rated power for slipring or squirrel-cage motors at 50 and 60 Hz									
- At 230 V	kW	37	50	61	73	85	97	132	164
- At 415 V	kW	64	84	104	128	151	171	231	291
- At 500 V	kW	81	105	132	160	189	215	291	363
- At 690 V	kW	113	146	167	223	265	280	400	453
- At 1000 V	kW	75	90	90	90	132	132	250	250
Thermal current-carrying capacity, 10 s current²⁾	A	1100	1300	1480	1800	2400	2400	3200	4000
Power loss per main current path at I_e/AC-3/500 V	W	7	9	13	17	18	22	35	55
Utilization category AC-4 (for $I_a = 6 \times I_e$)									
• Rated operational current I_e									
- Up to 415 V	A	97	132	160	195	230	280	350	430
• Rated power for squirrel-cage motors with 50 Hz and 60 Hz									
- At 415 V	kW	55	75	90	110	132	160	200	250
The following applies to a contact endurance of about 200 000 operating cycles:									
• Rated operational currents I_e									
- Up to 500 V	A	54	68	81	96	117	125	150	175
- Up to 690 V	A	48	57	65	85	105	115	135	150
- Up to 1000 V	A	34	38	42	42	57	57	80	80
• Rated power for squirrel-cage motors with 50 Hz and 60 Hz									
- At 230 V	kW	16	20	25	30	37	40	48	56
- At 415 V	kW	29	38	45	54	66	71	85	98
- At 500 V	kW	37	47	57	67	82	87	105	123
- At 690 V	kW	48	55	65	82	102	112	133	148
- At 1000 V	kW	49	55	60	59	80	80	113	113
Switching frequency									
Switching frequency z in operating cycles/hour									
Contactors without overload relays									
• No-load switching frequency	h ⁻¹	2 000							
• Dependence of the switching frequency z' on the operational current I' and operational voltage U': $z' = z \cdot (I_e/I') \cdot (400 V/U)^{1.5} \cdot 1/h$									
- AC-1	h ⁻¹	800	800		750	800	750	700	500
- AC-2	h ⁻¹	400	300		250	300	250	200	170
- AC-3	h ⁻¹	1 000	750		500	700	500	500	420
- AC-4	h ⁻¹	130	130		130	130	130	130	130
Contactors with overload relays									
• Mean value	h ⁻¹	60							

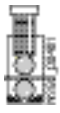
1) Industrial furnaces and electric heaters with resistance heating, etc.
(increased power consumption on heating up has been taken into account).

2) According to IEC 60947-4-1.

For rated values for various start-up conditions
see "Protection Equipment" → "Overload Relays".

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Contactor	Type Size	3RT10 5 . S6	3RT10 6 . S10	3RT10 7 . S12
Conductor cross-sections				
Main conductors: (1 or 2 conductors can be connected)		 Screw terminals		
Box terminals		3RT19 55-4G (55 kW) box terminals	3RT19 56-4G box terminals	3RT19 66-4G box terminals
 Front clamping point connected	• Finely stranded with end sleeve	mm ² 10 ... 70	10 ... 120	70 ... 240
	• Finely stranded without end sleeve	mm ² 16 ... 70	16 ... 120	70 ... 240
	• Stranded	mm ² 16 ... 70	16 ... 120	95 ... 300
	• Ribbon cable conductors (number x width x thickness)	mm Min. 3 x 9 x 0.8, max. 6 x 15.5 x 0.8	Min. 3 x 9 x 0.8, max. 10 x 15.5 x 0.8	3/0 ... 600 kcmil
	• AWG cables, solid or stranded	AWG 6 ... 2/0	6 ... 250 kcmil	Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5
 Rear clamping point connected	• Finely stranded with end sleeve	mm ² 10 ... 70	10 ... 120	120 ... 185
	• Finely stranded without end sleeve	mm ² 16 ... 70	16 ... 120	120 ... 185
	• Stranded	mm ² 16 ... 70	16 ... 120	120 ... 240
	• Ribbon cable conductors (number x width x thickness)	mm Min. 3 x 9 x 0.8, max. 6 x 15.5 x 0.8	Min. 3 x 9 x 0.8, max. 10 x 15.5 x 0.8	250 ... 500 kcmil
	• AWG cables, solid or stranded	AWG 6 ... 2/0	6 ... 250 kcmil	Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5
 Both clamping points connected	• Finely stranded with end sleeve	mm ² Max. 1 x 50, 1 x 70	Max. 1 x 95, 1 x 120	Min. 2 x 50, max. 2 x 185
	• Finely stranded without end sleeve	mm ² Max. 1 x 50, 1 x 70	Max. 1 x 95, 1 x 120	Min. 2 x 50, max. 2 x 185
	• Stranded	mm ² Max. 2 x 70	Max. 2 x 120	Min. 2 x 70, max. 2 x 240
	• Ribbon cable conductors (number x width x thickness)	mm Max. 2 x (6 x 15.5 x 0.8)	Max. 2 x (10 x 15.5 x 0.8)	Min. 2 x 2/0, max. 2 x 500 kcmil
	• AWG cables, solid or stranded	AWG Max. 2 x 1/0	Max. 2 x 3/0	Max. 2 x (20 x 24 x 0.5)
	• Terminal screw	M10 (hexagon socket, A/F 4)	M10 (hexagon socket, A/F 4)	M12 (hexagon socket, A/F 5)
	- Tightening torque	Nm 10 ... 12 (90 ... 110 lb.in)	10 ... 12 (90 ... 110 lb.in)	20 ... 22 (180 ... 195 lb.in)
Auxiliary conductors:				
	• Solid	mm ² 2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾ according to IEC 60947; max. 2 x (0.75 ... 4)		
	• Finely stranded with end sleeve	mm ² 2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾		
	• AWG cables, solid or stranded	AWG 2 x (18 ... 14)		
	• Terminal screw	M3 (PZ 2)		
	- Tightening torque	Nm 0.8 ... 1.2 (7 ... 10.3 lb.in)		

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Contactor	Type Size	3RT10 34 S2	3RT10 35 S2	3RT10 36 S2	3RT10 44 S3	3RT10 45 S3	3RT10 46 S3
☞ and ☞ rating							
Rated insulation voltage	V AC	600			600		
Uninterrupted current, at 40 °C, open and enclosed	A	45	55	50	90	105	105
Maximum horsepower ratings (☞ and ☞ approved values)							
• Rated power for induction motors at 60 Hz							
- At 200 V	hp	10	10	15	20	25	30
- At 230 V	hp	10	15	15	25	30	30
- At 460 V	hp	25	30	40	50	60	75
- At 575 V	hp	30	40	50	60	75	100
Short-circuit protection							
• At 600 V (contactor or overload relay)	kA	5	5	5	10	10	10
• CLASS RK5 fuse	A	125	150	200	250	300	350
• Circuit breakers with overload protection acc. to UL 489	A	125	150	200	250	300	400
• Combination motor controllers type E acc. to UL 508							
- At 480 V	Type	3RV10 3			3RV10 4		
	A	32	40	50	63	75	100
	kA	65	65	65	65	65	65
- At 600 V	Type	3RV10 4			3RV10 4		
	A	32	40	50	63	75	75
	kA	25	25	25	30	30	30
NEMA/EEMAC ratings							
NEMA/EEMAC size	hp	—			2	—	
• Uninterrupted current							
- Open	A	—			45	—	
- Enclosed	A	—			45	—	
• Rated power for induction motors at 60 Hz							
- At 200 V	hp	—			10	—	
- At 230 V	hp	—			15	—	
- At 460 V	hp	—			25	—	
- At 575 V	hp	—			25	—	
Overload relays	Type	3RU11 3			3RU11 4		
• Setting range	A	5.5 ... 50			18 ... 100		

Contactor	Size	S2 to S12 Screw terminals Snap-on auxiliary switch block (1- and 4-pole)	S2 to S12 Screw terminals Laterally mountable auxiliary switch block
☞ and ☞ rating of the auxiliary contacts			
Rated voltage	V AC	600	
Switching capacity		A 600, Q 600	
• Uninterrupted current at 240 V AC	A	10	

Power Contactors for Switching Motors

SIRIUS 3RT10 contactors, 3-pole, 15 ... 250 kW

Contactor	Type Size	3RT10 54 S6	3RT10 55 S6	3RT10 56 S6	3RT10 64 S10	3RT10 65 S10	3RT10 66 S10
☞ and ☞ rating							
Rated insulation voltage	V AC	600			600		
Uninterrupted current , at 40 °C, open and enclosed	A	140	195	195	250	330	330
Maximum horsepower ratings (☞- and ☞ approved values)							
• Rated power for induction motors at 60 Hz							
- At 200 V	hp	40	50	60	60	75	100
- At 230 V	hp	50	60	75	75	100	125
- At 460 V	hp	100	125	150	150	200	250
- At 575 V	hp	125	150	200	200	250	300
Short-circuit protection							
• At 600 V		kA	10	10	10	18	18
• CLASS RK5/L fuse		A	450	500	500	700	800
• Circuit breakers with overload protection acc. to UL 489		A	350	450	500	700	800
NEMA/EEMAC ratings							
NEMA/EEMAC size	hp	—	4	—	—	—	5
• Uninterrupted current							
- Open	A	—	150	—	—	—	300
- Enclosed	A	—	135	—	—	—	270
• Rated power for induction motors at 60 Hz							
- At 200 V	hp	—	40	—	—	—	75
- At 230 V	hp	—	50	—	—	—	100
- At 460 V	hp	—	100	—	—	—	200
- At 575 V	hp	—	100	—	—	—	200
Overload relays	Type	3RB20 56			3RB20 66		

Contactor	Type Size	3RT10 75 S12	3RT10 76 S12
☞ and ☞ rating			
Rated insulation voltage	V AC	600	
Uninterrupted current, at 40 °C, open and enclosed	A	400	540
Maximum horsepower ratings (☞- and ☞ approved values)			
• Rated power for induction motors at 60 Hz			
- At 200 V	hp	125	150
- At 230 V	hp	150	200
- At 460 V	hp	300	400
- At 575 V	hp	400	500
Short-circuit protection			
• At 600 V	kA	18	30
• CLASS RK5/L fuse	A	1000	1200
• Circuit breakers with overload protection acc. to UL 489	A	900	900
NEMA/EEMAC ratings			
NEMA/EEMAC size	hp	—	6
• Uninterrupted current			
- Open	A	—	600
- Enclosed	A	—	540
• Rated power for induction motors at 60 Hz			
- At 200 V	hp	—	150
- At 230 V	hp	—	200
- At 460 V	hp	—	400
- At 575 V	hp	—	400
Overload relays	Type	3RB20 66	

Power Contactors for Switching Motors

3RT10 contactors, 3-pole, 15 ... 250 kW

Selection and ordering data

AC operation



3RT10 3 . -1A . 00



3RT10 4 . -1A . 00

Rated data			Auxiliary contacts		Rated control supply voltage U_s at 50/60 Hz	Screw terminals
AC-2 and AC-3, T_u : Up to 60 °C			AC-1, T_u : 40 °C			
Operational current I_e up to 500 V	Rating of induction motors at 50 Hz and 415 V	Operational current I_e up to 690 V	Ident. No.	Version		Order No.
				 		
A	kW	A	NO	NC	V AC	

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S2

32	15	50	—	—	—	24 110 230	3RT10 34-1AC20 3RT10 34-1AG20 3RT10 34-1AL20
40	18.5	60	—	—	—	24 110 230	3RT10 35-1AC20 3RT10 35-1AG20 3RT10 35-1AL20
50	22	60	—	—	—	24 110 230	3RT10 36-1AC20 3RT10 36-1AG20 3RT10 36-1AL20

For screw and snap-on mounting onto 35 mm and 75 mm standard mounting rail

Size S3

65	30	100	—	—	—	24 110 230	3RT10 44-1AC20-8K 3RT10 44-1AG20-8K 3RT10 44-1AL20-8K
80	37	120	—	—	—	24 110 230	3RT10 45-1AC20-8K 3RT10 45-1AG20-8K 3RT10 45-1AL20-8K
95	45	120	—	—	—	24 110 230	3RT10 46-1AC20-8K 3RT10 46-1AG20-8K 3RT10 46-1AL20-8K

Other voltages on request.

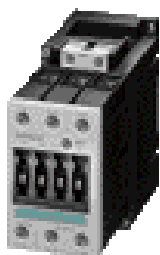
For accessories, see page 2/176.

For spare parts, see page 2/183.

Power Contactors for Switching Motors

3RT10 contactors, 3-pole, 15 ... 250 kW

DC operation · DC solenoid system



3RT10 3 . -1B . 40



3RT10 4 . -1B . 40

Rated data			Auxiliary contacts		Rated control supply voltage U_s	Screw terminals	
AC-2 and AC-3, T_u : Up to 60 °C		AC-1, T_u : 40 °C	Ident. No.	Version		Order No.	
Operational current I_e up to 500 V	Rating of induction motors at 50 Hz and 415 V	Operational current I_e up to 690 V					
A	kW	A	NO	NC		V DC	
For screw and snap-on mounting onto 35 mm standard mounting rail							
Size S2							
32	15	50	—	—	—	24 220	3RT10 34-1BB40 3RT10 34-1BM40
40	18.5	60	—	—	—	24 220	3RT10 35-1BB40 3RT10 35-1BM40
50	22	60	—	—	—	24 220	3RT10 36-1BB40 3RT10 36-1BM40
For screw and snap-on mounting onto 35 mm and 75 mm standard mounting rail							
Size S3							
65	30	100	—	—	—	24 220	3RT10 44-1BB40 3RT10 44-1BM40
80	37	120	—	—	—	24 220	3RT10 45-1BB40 3RT10 45-1BM40
95	45	120	—	—	—	24 220	3RT10 46-1BB40 3RT10 46-1BM40

Other voltages on request.

For accessories, see page 2/176.

For spare parts, see page 2/183.

Power Contactors for Switching Motors

3RT10 contactors, 3-pole, 15 ... 250 kW

Contactors without coils

AC/DC operation (40 Hz to 60 Hz, DC)

Conventional operating mechanism / Solid-state operating mechanism for 24 V DC PLC output



Size		Rated data					Auxiliary contacts, lateral		Screw terminals	
		AC-2 and AC-3, T_u : Up to 60 °C								
		Rating of induction motors at 50 Hz and					Version		Order No.	
		Operational current I_e up to 500 V	230 V	415 V	500 V	690 V	Operational current I_e up to 690 V			
		A	kW	kW	kW	kW	A	NO	NC	V AC/DC
S6	115	37	55	75	110	160	160	2	2	3RT10 54-6LA06-8K
	150	45	75	90	132	185	185	2	2	3RT10 55-6LA06-8K
	185	55	90	110	160	215	215	2	2	3RT10 56-6LA06-8K
S10	225	55	110	160	200	275	275	2	2	3RT10 64-6LA06-8K
	265	75	132	160	250	330	330	2	2	3RT10 65-6LA06-8K
	300	90	160	200	250	330	330	2	2	3RT10 66-6LA06-8K
S12	400	132	200	250	400	430	430	2	2	3RT10 75-6LA06-8K
	500	160	250	355	400	610	610	2	2	3RT10 76-6LA06-8K

For coils, see table below

For other accessories see page 2/176

For spare parts see page 2/183

For contactors		Rated control supply voltage U_s	Screw terminals			Rated control supply voltage U_s	Screw terminals
Size	Type		Order No.	Type			Order No.
Withdrawable coils							
<i>Conventional operating mechanism</i>				<i>Solid-state operating mechanism</i>		For 24V DC PLC output	
S6	3RT10 5	110...127V AC/DC	3RT19 55-5AB31	3RT10 5	96...127V AC/DC	3RT19 55-5NF31	
	3RT14 5	220...240V AC/DC	3RT19 55-5AF31	3RT14 5	200...277V AC/DC	3RT19 55-5NP41	
			3RT19 55-5AP31				
S10	3RT10 6	110...127V AC/DC	3RT19 65-5AB31	3RT10 6	96...127V AC/DC	3RT19 55-5NF31	
	3RT14 6	220...240V AC/DC	3RT19 65-5AF31	3RT14 6	200...277V AC/DC	3RT19 55-5NP31	
			3RT19 65-5AP31				
			3RT19 66-5AB31				
	3RT12 6	110...127V AC/DC	3RT19 66-5AF31	3RT12 6	96...127V AC/DC	3RT19 66-5NF31	
	vacuum contactors	220...240V AC/DC	3RT19 66-5AP31	vacuum contactors	200...277V AC/DC	3RT19 66-5NP31	
S12	3RT10 7	110...127V AC/DC	3RT19 75-5AB31	3RT14 7	96...127V AC/DC	3RT19 75-5NF31	
	3RT14 7	220...240V AC/DC	3RT19 75-5AF31	3RT12 7	200...277V AC/DC	3RT19 75-5NP31	
			3RT19 75-5AP31				
	3RT12 7 vacuum contactors			vacuum contactors			

For 24 V DC PLC output/PLC relay output, with remaining lifetime indicator (RLT)

(Withdrawable coil with lateral solid-state module)

S6	3RT10 5	96...127V AC/DC	3RT19 55-5PF31
	3RT14 5	200...277V AC/DC	3RT19 55-5PP31
S10	3RT10 6	96...127V AC/DC	3RT19 65-5PF31
	3RT14 6	200...277V AC/DC	3RT19 65-5PP31
S12	3RT10 7	96...127V AC/DC	3RT19 75-5PF31
	3RT14 7	200...277V AC/DC	3RT19 75-5PP31

Power Contactors for Switching Motors

3RT10 contactors, 3-pole, 15 ... 250 kW

AC/DC operation (40 Hz to 60 Hz, DC)

Auxiliary and control conductors: screw terminals

Withdrawable coils

Integrated coil circuit (Varistor)

Main conductors: busbar connections

Remaining lifetime indicator (RLT)



3RT10 56-6P . .

Size	Rated data						Auxiliary contacts, lateral		Rated control supply voltage U_i	Screw terminals 	
	AC-2 and AC-3, T_u : Up to 60 °C					AC-1, T_u : 40 °C	Version			Order No.	
	Operational current I_e up to	Rating of induction motors at 50 Hz and				Operational current I_e up to					
	500 V	230 V	415 V	500 V	690 V	690 V			V AC/DC		
Solid-state operating mechanism for 24 V DC PLC output/PLC relay output, with remaining lifetime indicator (RLT)											
S6	115	37	55	75	110	160	1	1	96 ... 127 200 ... 277	3RT10 54-6PF35 3RT10 54-6PP35	
	150	45	75	90	132	185	1	1	96 ... 127 200 ... 277	3RT10 55-6PF35 3RT10 55-6PP35	
	185	55	90	110	160	215	1	1	96 ... 127 200 ... 277	3RT10 56-6PF35 3RT10 56-6PP35	
S10	225	55	110	160	200	275	1	1	96 ... 127 200 ... 277	3RT10 64-6PF35 3RT10 64-6PP35	
	265	75	132	160	250	330	1	1	96 ... 127 200 ... 277	3RT10 65-6PF35 3RT10 65-6PP35	
	300	90	160	200	250	330	1	1	96 ... 127 200 ... 277	3RT10 66-6PF35 3RT10 66-6PP35	
S12	400	132	200	250	400	430	1	1	96 ... 127 200 ... 277	3RT10 75-6PF35 3RT10 75-6PP35	
	500	160	250	355	400	610	1	1	96 ... 127 200 ... 277	3RT10 76-6PF35 3RT10 76-6PP35	

For accessories see page 2/176.

For spare parts see page 2/183.

Power Contactors for Switching Motors

3RT10 contactors, 3-pole, 15 ... 250 kW

Options

Rated control supply voltages (the 10th and 11th position of the order number must be changed)

Rated control supply voltage U_s	Contactor type	3RT10 3, ³⁾ 3RT10 4 ³⁾	3RT14 4	3RT13 3, ³⁾ 3RT13 4, ³⁾ 3RT15 3	3RT16 17, 3RT16 27, 3RT16 47
	Size	S2, S3	S3	S2, S3	S00, S0, S3

Sizes S2 and S3

AC operation

Solenoid coils for 50 Hz¹⁾

24 V AC	B0	B0	B0	B0
42 V AC	D0	D0	—	—
48 V AC	H0	H0	—	—
110 V AC	F0	F0	F0	F0
230 V AC	P0	P0	P0	P0
240 V AC	U0	U0	U0	U0
400 V AC	V0	V0	V0	V0

Solenoid coils for 50 and 60 Hz¹⁾

24 V AC	C2	C2	C2	C2
42 V AC	D2	D2	D2	—
48 V AC	H2	H2	H2	—
110 V AC	G2	G2	G2	G2
220 V AC	N2	N2	N2	N2
230 V AC	L2	L2	L2	L2
240 V AC	P2	P2	P2	P2

DC operation

12 V DC	—	—	—	—
24 V DC	B4	B4	B4	—
42 V DC	D4	D4	D4	—
48 V DC	W4	W4	—	—
60 V DC	E4	E4	—	—
110 V DC	F4	F4	F4	—
125 V DC	G4	G4	G4	—
220 V DC	M4	M4	M4	—
230 V DC	P4	P4	—	—

Examples

AC operating mechanism	3RT10 34-1AP00	Contactor with screw terminals; with solenoid coil for 50 Hz for rated control supply voltage 230 V AC.
	3RT10 34-1AG20	Contactor with screw terminals; with solenoid coil for 50/60 Hz for rated control supply voltage 110 V AC.
DC operating mechanism	3RT10 34-3BB40	Contactor with spring-type terminals; for rated control supply voltage 24 V DC.
	3RT10 34-3BG40	Contactor with spring-type terminals; for rated control supply voltage 125 V DC.

Rated control supply voltage U_s	Contactor type	3RT1 . 5 . - . A 3RT1 . 6 . - . A 3RT1 . 7 . - . A	Rated control supply voltage U_s	Contactor type	3RT1 . 5 . - . N 3RT1 . 6 . - . N 3RT1 . 7 . - . N	3RT1 . 5 . - . P/Q 3RT1 . 6 . - . P/Q 3RT1 . 7 . - . P/Q
$U_{s \min} \dots U_{s \max}^{5)}$	Size	S6, S10, S12	$U_{s \min} \dots U_{s \max}^{2)}$	Size	S6, S10, S12	S6, S10, S12

Sizes S6 to S12

UC operation (AC 40 ... 60 Hz, DC)

Conventional operating mechanism

23 ... 26 V AC/DC	B3
42 ... 48 V AC/DC	D3
110 ... 127 V AC/DC	F3
200 ... 220 V AC/DC	M3
220 ... 240 V AC/DC	P3
240 ... 277 V AC/DC	U3
380 ... 420 V AC/DC	V3
440 ... 480 V AC/DC	R3
500 ... 550 V AC/DC	S3
575 ... 600 V AC/DC	T3

Solid-state operating mechanism

21 ... 27.3 V AC/DC	B3	—
96 ... 127 V AC/DC	F3	F3
200 ... 277 V AC/DC	P3	P3

- Coil operating range:
at 50 Hz: 0.8 to $1.1 \times U_s$
at 60 Hz: 0.85 to $1.1 \times U_s$.
- Operating range:
 $0.8 \times U_{s \min}$ to $1.1 \times U_{s \max}$.
- Wideband coil voltages available.
For ordering and technical details, contact nearest sales office.

Power Contactors for Switching Motors

SIRIUS 3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Overview

UC operation

The contactors can be operated with AC (40 to 60 Hz) as well as with DC.

Two types of solenoid operation are available:

- Conventional operating mechanism, version 3RT12 **A**
- Solid-state operating mechanism, version 3RT12 **N**

Withdrawable coils

For simple coil replacement, e. g. if the application is replaced, the solenoid coil can be pulled out upwards after the release mechanism has been actuated and can be replaced by any other coil of the same size.

Vacuum interrupters

In contrast with the 3RT10 contactors – the main contacts operate in air under atmospheric conditions – the contact gaps

of the 3RT12 vacuum contactors are contained in hermetically enclosed vacuum contact tubes. Neither arcs nor arcing gases are produced. The particular benefit of 3RT12 vacuum contactors, however, is that their electrical endurance is at least twice as long as that of 3RT10 contactors. They are therefore particularly well suited to frequent switching in jogging/mixed operation, e. g. in crane control systems.

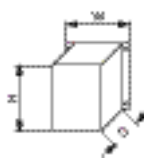
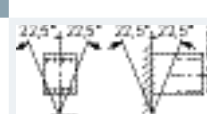
Note:

Vacuum contactors are basically unsuitable for switching DC voltage.

Auxiliary contact complement

The contactors can be fitted with up to 8 lateral auxiliary contacts (identical auxiliary switch blocks from S2 to S12). Of these, no more than 4 are permitted to be NC contacts.

Technical specifications

Type					
Size					
Dimensions (W x H x D)		mm	3RT12 64 S10	3RT12 65 S12	3RT12 66
			145 x 210 x 206		3RT12 75
					3RT12 76
					160 x 214 x 225
General data					
Permissible mounting positions					
The contactors are designed for operation on a vertical mounting surface.					
Mechanical endurance	Operating cycles		10 million		
Electrical endurance			1)		
Rated insulation voltage U_i (pollution degree 3)	V		1000		
Rated impulse withstand voltage U_{imp}	kV		8		
Protective separation between the coil and the main contacts acc. to EN 60947-1, Appendix N	V		690		
Mirror contacts			Yes, acc. to EN 60947-4-1, Appendix F		
A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.					
Permissible ambient temperature					
• During operation	°C		-25 ... +60/+55 with AS-Interface		
• During storage	°C		-55 ... +80		
Degree of protection acc. to EN 60947-1, Appendix C			IP00/open, coil assembly IP20		
Touch protection acc.to EN 50274			Finger-safe with cover		
Shock resistance					
• Rectangular pulse	g/ms		8.5/5 and 4.2/10		
• Sine pulse	g/ms		13.4/5 and 6.5/10		
Conductor cross-sections			2)		
Electromagnetic compatibility (EMC)			3)		
Short-circuit protection					
Main circuit					
with fuse links gG, NH 3NA, DIAZED 5SB, NEOZED 5SE according to IEC 60947-4-1/ EN 60947-4-1					
• Type of coordination "1"	A		500		800
• Type of coordination "2"	A		500		800
• Weld-free ¹⁾	A		400		500
Auxiliary circuit					
• With fuse links gG, DIAZED 5SB, NEOZED 5SE (weld-free protection at $I_k \geq 1$ kA)	A		10		
• Or with miniature circuit breakers with C characteristic (short-circuit current $I < 400$ A)					

1) For endurance of the main contacts see page 2/34.

2) For conductor cross-sections see page 2/53.

3) For electromagnetic compatibility (EMC) see page 2/31.

4) Test conditions according to IEC 60947-4-1.

Power Contactors for Switching Motors

SIRIUS 3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactors	Type	3RT12 64	3RT12 65	3RT12 66	3RT12 75	3RT12 76
	Size	S10	S10	S10	S12	S12
Control circuit						
Operating range of the solenoid AC/DC (UC)		$0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$				
Power consumption of the solenoid (when coil is cool and rated range $U_{s \min} \dots U_{s \max}$)						
Conventional operating mechanisms						
• AC operation						
- Closing at $U_{s \min}$	VA/p.f.	530/0.9			700/0.9	
- Closing at $U_{s \max}$	VA/p.f.	630/0.9			830/0.9	
- Closed at $U_{s \min}$	VA/p.f.	6.1/0.9			7.6/0.9	
- Closed at $U_{s \max}$	VA/p.f.	7.4/0.9			9.2/0.9	
• DC operation						
- Closing at $U_{s \min}$	W	580			770	
- Closing at $U_{s \max}$	W	700			920	
- Closed at $U_{s \min}$	W	6.8			8.5	
- Closed at $U_{s \max}$	W	8.2			10	
Solid-state operating mechanism						
• AC operation						
- Closing at $U_{s \min}$	VA/p.f.	420/0.8			560/0.8	
- Closing at $U_{s \max}$	VA/p.f.	570/0.8			750/0.8	
- Closed at $U_{s \min}$	VA/p.f.	4.3/0.8			5.4/0.8	
- Closed at $U_{s \max}$	VA/p.f.	5.6/0.8			7/0.8	
• DC operation						
- Closing at $U_{s \min}$	W	460			600	
- Closing at $U_{s \max}$	W	630			800	
- Closed at $U_{s \min}$	W	3.4			4	
- Closed at $U_{s \max}$	W	4.2			5	
Operating times (Total break time = Opening delay + Arcing time)						
Conventional operating mechanisms						
• For $0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$						
- Closing delay	ms	30 ... 95			45 ... 100	
- Opening delay	ms	40 ... 80			60 ... 100	
• For $U_{s \min} \dots U_{s \max}$						
- Closing delay	ms	35 ... 50			50 ... 70	
- Opening delay	ms	50 ... 80			70 ... 100	
• Arcing time						
	ms	10 ... 15			10 ... 15	

Power Contactors for Switching Motors

SIRIUS 3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size	3RT12 64 S10	3RT12 65 S10	3RT12 66 S10	3RT12 75 S12	3RT12 76 S12
Main circuit						
AC capacity						
Utilization category AC-1 Switching resistive loads						
• Rated operational currents I_e						
- At 40 °C up to 1000 V	A	330			610	
- At 60 °C up to 1000 V	A	300			550	
• Rated power for AC loads ¹⁾ with p.f. = 0.95 (at 60 °C)						
- At 415 V	kW	197			362	
• Minimum conductor cross-section for loads with I_e						
- At 40 °C	mm ²	185			2 x 185	
- At 60 °C	mm ²	185			2 x 185	
Utilization categories AC-2 and AC-3						
• Rated operational currents I_e						
- Up to 1000 V	A	225	265	300	400	500
• Rated power for slipring or squirrel-cage motors at 50 and 60 Hz						
- At 230 V	kW	73	85	97	132	164
- At 415 V	kW	128	151	171	231	291
- At 500 V	kW	160	189	215	291	363
- At 690 V	kW	223	265	288	400	507
- At 1000 V	kW	320	378	428	578	728
Thermal load capacity 10 sec current²⁾	A	1800	2120	2400	3200	4000
Power loss per conducting path at I_e/AC-3	W	9	12	14	21	32
Utilization category AC-4 (for $I_a = 6 \times I_e$)						
• Rated operational current I_e						
- Up to 690 V	A	195	230	280	350	430
• Rated power for squirrel-cage motors with 50 Hz and 60 Hz						
- At 415 V	kW	110	132	160	200	250
The following applies to a contact endurance of about 200 000 operating cycles:						
• Rated operational currents I_e						
- Up to 690 V	A	97	115	140	175	215
- Up to 1000 V	A	68	81	98	123	151
• Rated power for squirrel-cage motors with 50 Hz and 60 Hz						
- At 230 V	kW	30	37	45	56	70
- At 415 V	kW	55	65	79	98	122
- At 500 V	kW	68	81	98	124	153
- At 690 V	kW	94	112	138	172	212
- At 1000 V	kW	95	114	140	183	217
Switching frequency						
Switching frequency z in operating cycles/hour						
Contactors without overload relays						
• No-load switching frequency	h ⁻¹	2 000				
• Dependence of the switching frequency z' on the operational current I' and operational voltage U': $z' = z \cdot (I_e/I') \cdot (400 V/U)^{1.5} \cdot 1/h$						
- AC-1	h ⁻¹	800	750		700	
- AC-2	h ⁻¹	300	250		250	
- AC-3	h ⁻¹	750	750		750	
- AC-4	h ⁻¹	250	250		250	
Contactors with overload relays						
• Mean value	h ⁻¹	60				

- 1) Industrial furnaces and electric heaters with resistance heating, etc.
(increased power consumption on heating up has been taken into account).
- 2) According to IEC 60947-4-1.
For rated values for various start-up conditions see
"Protection Equipment" → "Overload Relays".

Power Contactors for Switching Motors

SIRIUS 3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Contactor	Type Size	3RT12 6 . S10	3RT12 7 . S12
Conductor cross-sections			
Main conductors:		 Screw terminals	
Box terminals		3RT19 66-4G box terminals	
Front clamping point connected			
	• Finely stranded with end sleeve	mm ²	70 ... 240
	• Finely stranded without end sleeve	mm ²	70 ... 240
	• Stranded	mm ²	95 ... 300
	• AWG cables, solid or stranded	AWG	3/0 ... 600 kcmil
	• Ribbon cable conductors (number x width x thickness)	mm	Min. 6 x 9 x 0.8; max. 20 x 24 x 0.5
Rear clamping point connected			
	• Finely stranded with end sleeve	mm ²	120 ... 185
	• Finely stranded without end sleeve	mm ²	120 ... 185
	• Stranded	mm ²	120 ... 240
	• AWG cables, solid or stranded	AWG	250 ... 500 kcmil
	• Ribbon cable conductors (number x width x thickness)	mm	Min. 6 x 9 x 0.8; max. 20 x 24 x 0.5
Both clamping points connected			
	• Finely stranded with end sleeve	mm ²	Min. 2 x 50, max. 2 x 185
	• Finely stranded without end sleeve	mm ²	Min. 2 x 50, max. 2 x 185
	• Stranded	mm ²	Min. 2 x 70, max. 2 x 240
	• AWG cables, solid or stranded	AWG	Min. 2 x 1/0, max. 2 x 500 kcmil
	• Ribbon cable conductors (number x width x thickness)	mm	Max. 2 x (20 x 24 x 0.5)
	• Terminal screws - Tightening torque	Nm	M12 (hexagon socket, A/F 5) 20 ... 22 (180 ... 195 lb.in)
Auxiliary conductors:			
• Solid		mm ²	2 x (0.5 ... 1.5) ²⁾ ; 2 x (0.75 ... 2.5) ²⁾ according to IEC 60947; max. 2 x (0.75 ... 4)
• Finely stranded with end sleeve		mm ²	2 x (0.5 ... 1.5) ²⁾ ; 2 x (0.75 ... 2.5) ²⁾
• AWG cables, solid or stranded		AWG	2 x (18 ... 14)
• Terminal screws - Tightening torque		Nm	M3 (PZ 2) 0.8 ... 1.2 (7 ... 10.3 lb.in)

1) When connecting cable lugs to DIN 46234, the 3RT19 66-4EA1 terminal cover must be used for conductor cross-sections of 240 mm² and more as well as DIN 46235 for conductor cross-sections of 185 mm² and more to keep the phase clearance.

2) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Contactor	Type Size	3RT12 64 S10	3RT12 65 S10	3RT12 66 S10	3RT12 75 S12	3RT12 76 S12
and rating						
Rated insulation voltage		V AC	600		600	
Uninterrupted current , at 40 °C, open and enclosed		A	330		540	
Maximum horsepower ratings (and approved values)						
• Rated power for induction motors at 60 Hz						
- At 200 V	hp	60	75	100	125	150
- At 230 V	hp	75	100	125	150	200
- At 460 V	hp	150	200	250	300	400
- At 575 V	hp	200	250	300	400	500
Short-circuit protection ¹⁾		kA	10	18	18	30
• CLASS L fuse		A	700	800	800	1200
• Circuit breakers acc. to UL 489		A	500	700	900	1200
NEMA/EEMAC ratings						
• NEMA/EEMAC size		hp	—	—	5	—
• Uninterrupted current						
- Open	A	—	—	300	—	600
- Enclosed	A	—	—	270	—	540
• Rated power for induction motors at 60 Hz						
- At 200 V	hp	—	—	75	—	150
- At 230 V	hp	—	—	100	—	200
- At 460 V	hp	—	—	200	—	400
- At 575 V	hp	—	—	200	—	400
Overload relays		Type	3RB20 66		3RB20 66	

Power Contactors for Switching Motors

SIRIUS 3RT12 vacuum contactors, 3-pole, 110 ... 250 kW

Selection and ordering data

AC/DC operation (40 Hz to 60 Hz, DC)

Auxiliary and control conductors: screw terminals

Withdrawable coils

Integrated coil circuit (Varistor)

Main conductors: busbar connections



3RT12 7 .

3RT12 7 .

Size	Rated data						Auxiliary contacts, lateral		Rated control supply voltage U_s	Screw terminals
	AC-2 and AC-3, T_u : Up to 60 °C					AC-1, T_u : 40 °C	Version			
	Operational current I_e up to	Rating of induction motors at 50 Hz and				Operational current I_e up to			Order No.	
	1000 V	230 V	415 V	500 V	690 V	1000 V				
	A	kW	kW	kW	kW	A	NO	NC	V AC/DC	
Conventional operating mechanism										
S10	225	55	110	160	200	330	2	2	23 ... 26 110 ... 127 220 ... 240 380 ... 420	3RT12 64-6AB36 3RT12 64-6AF36 3RT12 64-6AP36 3RT12 64-6AV36
	265	75	132	160	250	330	2	2	23 ... 26 110 ... 127 220 ... 240 380 ... 420	3RT12 65-6AB36 3RT12 65-6AF36 3RT12 65-6AP36 3RT12 65-6AV36
	300	90	160	200	250	330	2	2	23 ... 26 110 ... 127 220 ... 240 380 ... 420	3RT12 66-6AB36 3RT12 66-6AF36 3RT12 66-6AP36 3RT12 66-6AV36
	S12	400	132	200	250	400	610	2	2	23 ... 26 110 ... 127 220 ... 240 380 ... 420
	500	160	250	355	500	610	2	2	23 ... 26 110 ... 127 220 ... 240 380 ... 420	3RT12 75-6AB36 3RT12 76-6AF36 3RT12 76-6AP36 3RT12 75-6AV36

For accessories, see page 2/176

For spare parts, see page 2/183

1) Built-in surge suppression: varistor circuit.

2) For EMC please refer technical details or please contact Sales Office.

Power Contactors for Switching Motors

3TF6 vacuum contactors, 3-pole, 335 ... 450 kW

Overview

IEC 60947-4-1, EN 60947-4-1 (VDE 0660 Part 102)

The 3TF68/69 contactors are climate-proof. They are finger-safe according to EN 50274. Terminal covers may have to be fitted onto the connecting bars, depending on the configuration with other devices (see Accessories and Spare Parts).

Function

Main contacts

Contact erosion indication with 3TF68/69 vacuum contactors

The contact erosion of the vacuum interrupters can be checked during operation with the help of 3 white double slides on the contactor base. If the distance indicated by one of the double slides is < 0.5 mm while the contactor is in the closed position, the vacuum interrupter must be replaced. To ensure maximum reliability, it is recommended to replace all 3 vacuum interrupters.

Auxiliary contacts

Contact reliability

The auxiliary contacts are suitable for solid-state circuits

- With currents ≥ 1 mA
- And voltages from 17 V.

Surge suppression

Control circuit

Protection of coils against overvoltages:

AC operation

- Fitted with varistors as standard

DC operation

Retrofitting options:

- With varistors

If TF68/TF69 is to be used for DC operation, an additional reversing contactor is required; this is included in the scope of supply in the same packaging as the vacuum contactor.

Electromagnetic compatibility

3TF68/69 . . . C contactors for AC operation are fitted with an electronically controlled solenoid operating mechanism with a high interference immunity.

Contact type	Rated control supply voltage U_c	Overvoltage type (IEC 60801)	Degree of severity (IEC 60801)	Overvoltage strength
3TF68 44-.C., 3TF69 44-.C..	110 ... 132 V	Burst Surge	3 4 6 kV	2 kV
	200 ... 277 V	Burst Surge	4 4	4 kV 5 kV
	380 ... 600 V	Burst Surge	4 4	4 kV 6 kV

Note:

During operation in installations in which the emitted interference limits cannot be observed, e.g. when used for output contactors in converters, 3TF68/69 . . . Q contactors without a main conductor path circuit are recommended (see description below).

Application

The standard 3TF68 . . . C and 3TF69 . . . C contactors with electronically controlled contactor mechanism, have high resistance to electromagnetic interference.

The 3TF68 . . . Q and 3TF69 . . . Q contactors have been designed for use in installations in which the AC control supply voltage is subject to very high levels of interference.

Causes for such interference can be, for example:

- Frequency converters which are operated nearby can cause periodic overvoltages at the control level of the contactors.
- High-energy pulses caused by switching operations and atmospheric discharges can cause interference on the control cables.

To reduce interference voltages caused by frequency converters, the manufacturer recommends the use of e.g. input filters, output filters, grounding or shielding in the installation.

Further measures that should be applied for overvoltage damping:

- Feeding the contactors using control transformer according to EN 60204 - rather than directly from the network
- Use of surge arresters, if required

For operating conditions where there are high interference voltages and no measures that reduce interference voltage coupling to the control voltage level have been taken, use of 3TF68 . . . Q and 3TF69 . . . Q contactors is highly recommended.

Version

The magnetic systems of the 3TF68 . . . Q and 3TF69 . . . Q contactors for AC operation are equipped with rectifiers for DC economy circuit.

A 3TC44 reversing contactor with a mounted series resistor is used to switch to the holding excitation.

The reversing contactor can be fitted separately. The reversing contactors is connected to the 3TF6 main contactor by means of a one-meter connecting cable with plug-in connectors.

Connection

Control circuit

The rectifier bridge is connected to varistors for protection against overvoltages. The built-in rectifier bridge affords sufficient protection for the coils.

Main circuit

As standard 3TF6 contactors with integrated RC varistors.

Protection of the main current paths

An integrated RC varistor connection for the main current paths of the contactors dampens the switching overvoltage rises to safe values. This prevents multiple restriking.

The operator of an installation can therefore rest assured that the motor winding cannot be damaged by switching overvoltages with steep voltage rises.

Important note: The overvoltage damping circuit is not required if 3TF68/69 contactors are used in circuits with DC choppers, frequency converters or speed-variable operating mechanisms, for example. It could be damaged by the voltage peaks and harmonics which are generated. This may cause phase-to-phase short-circuits in the contactors.

Solution: Order special contactor version without overvoltage damping. The Order No. must include "Z" and the order code "A02". Without additional charge.

Power Contactors for Switching Motors

3TF6 vacuum contactors, 3-pole, 335 ... 450 kW

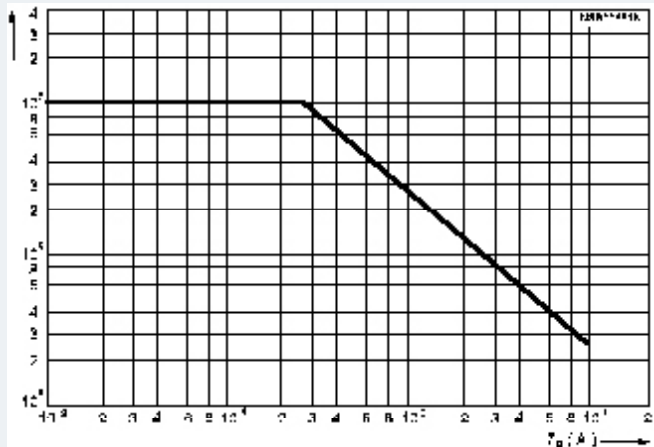
Technical specifications

Contactor	Type	3TF68 and 3TF69
Rated data of the auxiliary contacts		Acc. to IEC 60947-5-1 (VDE 0660 Part 200)
Rated insulation voltage U_i (degree of pollution 3)	V	690
Continuous thermal current I_{th} = Rated operational current I_n /AC-12	A	10
AC load		
Rated operational current I_n /AC-15/AC-14 for rated operational voltage U_e		
	24 V A	10
	110 V A	10
	125 V A	10
	220 V A	6
	230 V A	5.6
	380 V A	4
	415 V A	3.6
	500 V A	2.5
	660 V A	2.5
	690 V A	2.3
DC load		
Rated operational current I_n /DC-12 for rated operational voltage U_e		
	24 V A	10
	60 V A	10
	110 V A	3.2
	125 V A	2.5
	220 V A	0.9
	440 V A	0.33
	600 V A	0.22
Rated operational current I_n /DC-13 for rated operational voltage U_e		
	24 V A	10
	60 V A	5
	110 V A	1.14
	125 V A	0.98
	220 V A	0.48
	440 V A	0.13
	600 V A	0.07
CSA and UL rated data for the auxiliary contacts		
Rated voltage	V AC, max.	600
Switching capacity		A 600, P 600

Endurance of the auxiliary contacts

The contact endurance for utilization category AC-12 or AC-15/AC-14 depends mainly on the breaking current. It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.

3TF68 and 3TF69 contactors at 230 V AC



Contact erosion indication with 3TF68 and 3TF69 vacuum contactors

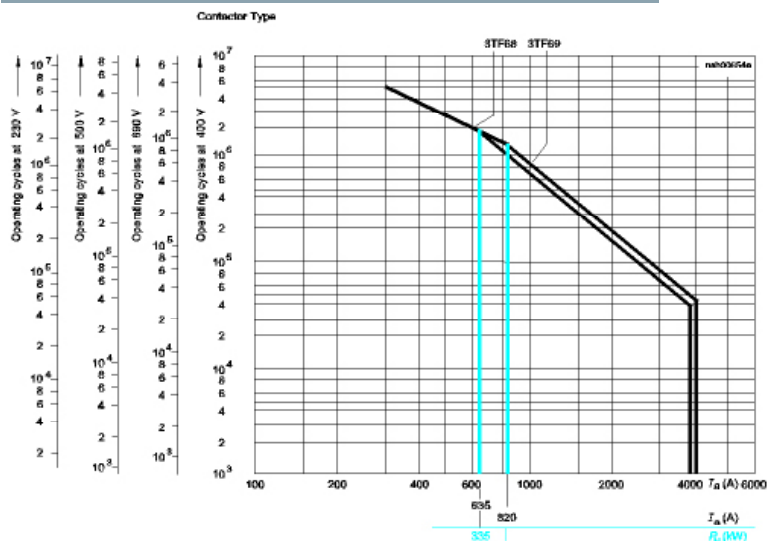
The contact erosion of the vacuum interrupters can be checked during operation with the help of 3 white double slides on the contactor base.

If the distance indicated by one of the double slides is < 0.5 mm while the contactor is in the closed position, the vacuum interrupter must be replaced. To ensure maximum reliability, it is recommended to replace all 3 vacuum interrupters.

Power Contactors for Switching Motors

3TF6 vacuum contactors, 3-pole, 335 ... 450 kW

Endurance of the main contacts



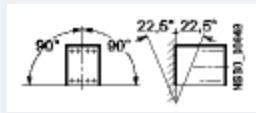
3TF68 and 3TF69 contactors

Legend for the diagrams:

P_N = Rated power for squirrel-cage motors at 400 V

I_n = Breaking current

I_e = Rated operational current

Contactor	Type Size	3TF68 14	3TF69 14	
General data				
Permissible mounting position, installation instructions ^{1) 2)} The contactors are designed for operation on a vertical mounting surface.	AC operation and DC operation			
Mechanical endurance	Operating cycles	5 million		
Electrical endurance	Operating cycles	³⁾		
Rated insulation voltage U_i (degree of pollution 3)	kV	1		
Rated impulse withstand voltage U_{imp}	kV	8		
Safe isolation between the coil and the main contacts acc. to EN 60947-1, Appendix N	kV	1		
Mirror contacts A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact. One NC contact each must be connected in series for the right and left auxiliary switch block respectively.		Yes, acc. to EN 60947-4-1, Appendix F		
Permissible ambient temperature	During operation During storage	°C °C	-25 ... +55 -55 ... +80	
Degree of protection acc. to EN 60947-1, Appendix C		IP00/open, coil assembly IP40		
Touch protection acc. to EN 50274		Finger-safe with cover		
Shock resistance				
• Rectangular pulse	AC operation DC operation	g/ms g/ms	8.1/5 and 4.7/10 9/5 and 5.7/10	9.5/5 and 5.7/10 8.6/5 and 5.1/10
• Sine pulse	AC operation DC operation	g/ms g/ms	12.8/5 and 7.4/10 14.4/5 and 9.1/10	13.5/5 and 7.8/10 13.5/5 and 7.8/10
Conductor cross-sections		See Conductor Cross-Sections		
Electromagnetic compatibility (EMC)		See Electromagnetic compatibility (EMC)		
Short-circuit protection				
Main circuit Fuse links, gL/gG LV HRC 3NA, DIAZED 5SB, NEOZED 5SE				
- acc. to IEC 60947-4-1/ EN 60947-4-1	• Type of coordination "1" A • Type of coordination "2" A • Weld-free ⁴⁾ A	1000 500 400	1250 630 500	
Auxiliary circuit				
• Fuse links gL/gG LV HRC 3NA, DIAZED 5SB, NEOZED 5SE (weld-free protection at $I_k \geq 1$ kA)	A	10		
• Or miniature circuit breakers with C characteristic ($I_k < 400$ A)	A	10		

- 1) To easily replace the laterally mounted auxiliary switches it is recommended to maintain a minimum distance of 30 mm between the contactors.
- 2) If mounted at a 90° angle (conducting paths are horizontally above each other), the switching frequency is reduced by 80 % compared with the normal values.

- 3) See endurance of the auxiliary contacts.
- 4) Test conditions according to IEC 60947-4-1.

Power Contactors for Switching Motors

3TF6 vacuum contactors, 3-pole, 335 ... 450 kW

Contactor	Type		3TF68	3TF69
	Size		14	14
Control				
Magnetic coil operating range			0.8 x $U_{s \min}$... 1.1 x $U_{s \max}$	
Power consumption of the magnetic coils (when coil is cold and 1.0 x U_s)				
• AC operation, $U_{s \max}$	- Closing	VA/p.f.	1850/1	950/0.98
	- Closed	VA/p.f.	49/0.15	30.6/0.31
• AC operation, $U_{s \min}$	- Closing	VA/p.f.	1200/1	600/0.98
	- Closed	VA/p.f.	13.5/0.47	12.9/0.43
• DC economy circuit ¹⁾	- Closing at 24 V	W	1010	960
	- Closed	W	28	20.6
Operating times at 0.8 ... 1.1 x U_s (Total break time = Opening delay + Arcing time)			(Values apply to cold and warm coil)	
• AC operation	- Closing delay	ms	70 ... 120 (22 ... 65) ²⁾	80 ... 120
	- Opening delay	ms	70 ... 100	70 ... 80
• DC economy circuit	- Closing delay	ms	76 ... 110	86 ... 280
	- Opening delay	ms	50	19 ... 25
• Arcing time		ms	10 ... 15	10
Operating times at 1.0 x U_s (Total break time = Opening delay + Arcing time)				
• AC operation	- Closing delay	ms	80 ... 100 (30 ... 45) ²⁾	85 ... 100
	- Opening delay	ms	70 ... 100	70
• DC economy circuit	- Closing delay	ms	80 ... 90	90 ... 125
	- Opening delay	ms	50	19 ... 25
Minimum command duration for closing	Standard	ms	120	120
	Reduced make-time	ms	90	—
Minimum interval time between two ON commands			ms	100
Main circuit				
AC capacity				
Utilization category AC-1 Switching resistive loads				
Rated operational currents I_e	at 40 °C up to 690 V	A	700	910
	at 55 °C up to 690 V	A	630	850
	at 55 °C up to 1000 V	A	450	800
Rated power for AC loads with p.f. = 0.95 at 55°C	415 V	kW	415	558
Minimum conductor cross-sections for loads with I_e	at 40°C	mm ²	2 x 240	$I_e \geq 800$ A: 2 x 60 x 5 (Cu busbars)
	at 55°C	mm ²	2 x 185	$I_e < 800$ A: 2 x 240
Utilization category AC-2 and AC-3				
Rated operational currents I_e	up to 690 V	A	630	820
	1000 V	A	435	580
Rated power for slipping or squirrel-cage motors at 50 Hz and 60 Hz	at 230 V	kW	200	260
	415 V	kW	347	450
	500 V	kW	434	600
	690 V	kW	600	800
	1000 V	kW	600	800
Utilization category AC-4 (for $I_a = 6 \times I_e$)				
Rated operational current I_e	up to 690 V	A	610	690
Rated power for squirrel-cage motors with 50 Hz and 60 Hz	at 415 V	kW	355	400
• The following applies to a contact endurance of about 200000 operating cycles:				
Rated operational currents I_e	up to 690 V	A	300	360
	1000 V	A	210	250
Rated power for squirrel-cage motors with 50 Hz and 60 Hz	at 230 V	kW	97	110
	415 V	kW	168	191
	500 V ³⁾	kW	210	250
	690 V ³⁾	kW	278	335
	1000 V ³⁾	A	290	350
Utilization category AC-6a switching AC transformers				
Rated operational currents I_e	up to 400 V			
	• For inrush current n = 20	A	513	675
• For inrush current n = 30		A	342	450
Rating P				
For inrush current n = 20	415 V	kVA	338	445
For inrush current n = 30 ⁴⁾	415 V	kVA	226	297
Utilization category AC-6b, switching low-inductance (low-loss, metallized dielectric) AC capacitors				
Rated operational currents I_e	up to 415 V	A	433	
	at 230 V	kvar	175	
Rated power for single capacitors at 50 and 60 Hz	415 V	kvar	300	
	500 V	kvar	400	
	690 V	kvar	300	
Rated power for banks of capacitors (minimum inductance is 6 µH between capacitors connected in parallel) at 50 and 60 Hz	at 230 V	kvar	145	
	415 V	kvar	250	
	500 V	kvar	333	
	690 V	kvar	250	

1) At 24 V DC; for further voltages, deviations of up to ±10 % are possible.

2) Values in brackets apply to contactors with reduced operating times.

3) Max. permissible rated operational current I_e /AC-4 = I_e /AC-3 up to 500 V, for reduced contact endurance and reduced switching frequency.

4) For deviating inrush current factors x, the power must be recalculated as follows: $P_x = P_{n30} \cdot 30/x$.

Power Contactors for Switching Motors

3TF6 vacuum contactors, 3-pole, 335 ... 450 kW

Contactor	Type		3TF68 14	3TF69 14
Main circuit				
AC capacity				
Short-time current carrying capacity (5 ... 30 s)				
• CLASS 5 and 10	A		630	820
• CLASS 15	A		630	662
• CLASS 20	A		536	572
• CLASS 25	A		479	531
• CLASS 30	A		441	500
Thermal current-carrying capacity	A		5040	7000
10-s-current ¹⁾				
Power loss per conducting path at I_e/AC-3 /690 V	W		45	70
Switching frequency				
Switching frequency z in operating cycles/hour				
• Contactors without overload relays	No-load switching frequency AC	1/h	2000	1000
	No-load switching frequency DC	1/h	1000	1000
	AC-1	1/h	700	700
	AC-2	1/h	200	200
	AC-3	1/h	500	500
	AC-4	1/h	150	150
• Contactors with overload relays (mean value)		1/h	15	15
Conductor cross-sections				
• Screw terminals	Main conductors:		 Screw terminals	
	• <u>Busbar connections</u>			
	- finely stranded with cable lug	mm ²	50 ... 240	50 ... 240
	- stranded with cable lug	mm ²	70 ... 240	50 ... 240
	- solid or stranded	AWG	2/0 ... 500 MCM	2/0 ... 500 MCM
	- connecting bar (max. width)	mm	50	60 (U _e ≤ 690 V) 50 (U _e > 690 V)
	• Terminal screw		M10 x 30 M12 x 40	
	- tightening torque	Nm	14 ... 24 (124 ... 210 lb.in)	20 ... 35 (177 ... 310 lb.in)
	• <u>With box terminal²⁾</u>			
	- connectable copper bars			
	- width	mm	15 ... 25	15 ... 38
	- max. thickness	mm	1 x 26 or 2 x 11	1 x 46 or 2 x 18
	- terminal screw		A/F 6 (hexagon socket)	A/F 8 (hexagon socket)
	- tightening torque	Nm	25 ... 40 (221 ... 354 lb.in)	35 ... 50 (266 ... 443 lb.in)
	Auxiliary conductors:			
	• Solid	mm ²	2 x (0.5 ... 1) ^{3)/2} x (1 ... 2.5) ³⁾	
	• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1) ^{3)/2} x (0.75 ... 2.5) ³⁾	
	• Pin-end connector to DIN 46231	mm ²	2 x (1 ... 1.5)	
	• Solid or stranded	AWG	2 x (18 ... 12)	
	• Tightening torque	Nm	0.8 ... 1.4 (7 ... 12 lb.in)	
CSA and UL rated data				
Rated insulation voltage			V AC	600
Uninterrupted current			A	630
Maximum horsepower ratings (CSA and UL approved values)				
Rated power for induction motors at 60 Hz	at 200 V	hp	231	290
	230 V	hp	266	350
	460 V	hp	530	700
	575 V	hp	664	860
NEMA/EEMAC ratings				
SIZE		hp	6	7
Uninterrupted current	Open	A	600	820
	Enclosed	A	540	810
Rated power for induction motors at 60 Hz	at 200 V	hp	150	—
	230 V	hp	200	300
	460 V	hp	400	600
	575 V	hp	400	600
Overload relays	Type		3RB12	
	Setting range	A	200 ... 820	

For short-circuit protection with overload relays see Protection Equipment: Overload Relays.

1) According to IEC 60947-4-1.

2) See Accessories and Spare Parts.

3) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Power Contactors for Switching Motors

3TF6 vacuum contactors, 3-pole, 335 ... 450 kW

Selection and ordering data

Auxiliary and control conductors: screw terminals Main conductors: busbar connections

Size 14

IEC 60947-4-1, EN 60947-4-1 (VDE 0660 Part 102)

The 3TF68/69 contactors are climate-proof.

They are finger-safe according to EN 50274.

Terminal covers may have to be fitted onto the connecting bars, depending on the configuration with other devices (see Accessories and Spare Parts on page 2/56).



3TF68

Rated data							Auxiliary contacts		Rated control	Screw terminals
AC-2 and AC-3, T_u : Up to 55 °C							Version			Order No.
Operational current I_e up to 690 V	Rating of induction motors at 50 Hz and					AC-1, Operational current I_e up to (at 40°C)				
	230 V	415 V	500 V	690 V	1000 V		NO	NC	V	
A	kW	kW	kW	kW	kW	A				
AC operation ^{1) 2)} · 50/60 Hz										
630	200	335	434	600	—	700	4	4	110 ... 132 AC 200 ... 240 AC 380 ... 460 AC	3TF68 44-0CF7 3TF68 44-0CM7 3TF68 44-0CQ7
820	260	450	600	800	—	910	4	4	110 ... 132 AC 200 ... 240 AC 380 ... 460 AC	3TF69 44-0CF7 3TF69 44-0CM7 3TF69 44-0CQ7
DC operation · DC economy circuit										
630	200	335	434	600	—	700	3	3	24 DC 110 DC 220 DC	3TF68 33-1DB4 3TF68 33-1DF4 3TF68 33-1DM4
820	260	450	600	800	—	910	3	3	24 DC 110 DC 220 DC	3TF69 33-1DB4 3TF69 33-1DF4 3TF69 33-1DM4
AC operation · 50/60 Hz · Version for AC controls which are subject to strong electromagnetic interference										
630	200	335	434	600	—	700	3	3	110 ... 120 AC 220 ... 240 AC 380 ... 420 AC	3TF68 33-1QG7 3TF68 33-1QL7 3TF68 33-1QV7
820	260	450	600	800	—	910	3	3	110 ... 120 AC 220 ... 240 AC 380 ... 420 AC	3TF69 33-1QG7 3TF69 33-1QL7 3TF69 33-1QV7

For accessories, see page 2/188

For spare parts, see page 2/191

1) Built-in surge suppression: varistor circuit.

2) For EMC please refer technical details or please contact Sales Office.

3TF68/69 for 1000V application is available on request.

Overview

The 3RA23 contactor assemblies for reversing can be ordered as follows:

Size S00 and S0

- Fully wired and tested, with mechanical and electrical interlock. For assemblies with AC operation and 50/60 Hz, a dead interval of 50 ms must be provided when used with voltages ≥ 500 V; a dead interval of 30 ms is recommended for use with voltages ≥ 400 V. These dead times do not apply to assemblies with DC operation.
- As individual parts for customer assembly.

There is also a range of accessories (auxiliary switch blocks, surge suppressors, etc.) that must be ordered separately.

For overload relays for motor protection see "Protection Equipment" → "Overload Relays".

Screw terminals

Rated data AC-2 and AC-3 for 50 Hz 415 V AC		Size	Order No.			
Rating	Operational current I_e		Contactor	Mechanical interlock ¹⁾	Assembly kit ²⁾	Fully wired and tested contactor assemblies
kW	A					
3	7	S00	3RT20 15-1	—	3RA29 13-2AA1	3RA23 15-8XB30-1 ..
4	9		3RT20 16-1			3RA23 16-8XB30-1 ..
5.5	12		3RT20 17-1			3RA23 17-8XB30-1 ..
7.5	16		3RT20 18-1			3RA23 18-8XB30-1 ..
5.5	12	S0	3RT20 24-1	—	3RA29 23-2AA1	3RA23 24-8XB30-1 ..
7.5	16		3RT20 25-1			3RA23 25-8XB30-1 ..
11	25		3RT20 26-1			3RA23 26-8XB30-1 ..
15	32		3RT20 27-1			3RA23 27-8XB30-1 ..
18.5	38		3RT20 28-1			3RA23 28-8XB30-1 ..

Spring-type terminals

Rated data AC-2 and AC-3 for 50 Hz 415 V AC		Size	Order No.			
Rating	Operational current I_e		Contactor	Mechanical interlock ¹⁾	Assembly kit	Fully wired and tested contactor assemblies
kW	A					
3	7	S00	3RT20 15-2	—	3RA29 13-2AA2 ²⁾	3RA23 15-8XB30-2 ..
4	9		3RT20 16-2			3RA23 16-8XB30-2 ..
5.5	12		3RT20 17-2			3RA23 17-8XB30-2 ..
7.5	16		3RT20 18-2			3RA23 18-8XB30-2 ..
5.5	12	S0	3RT20 24-2	—	3RA29 23-2AA2 ³⁾	3RA23 24-8XB30-2 ..
7.5	16		3RT20 25-2			3RA23 25-8XB30-2 ..
11	25		3RT20 26-2			3RA23 26-8XB30-2 ..
15	32		3RT20 27-2			3RA23 27-8XB30-2 ..
18.5	38		3RT20 28-2			3RA23 28-8XB30-2 ..

1) The interlock can only be ordered with assembly kit.

2) The assembly kit contains: mechanical interlock; connecting clips for 2 contactors; wiring modules on the top and bottom (main, control and auxiliary circuits).

3) The assembly kit contains: mechanical interlock; connecting clips for 2 contactors; wiring modules on the top and bottom (main circuits).

Reversing contactor assemblies with communication interface

The reversing contactor assemblies with communication interface are essential for mounting the SIRIUS function modules for connection to the control system.

Components for customer assembly

Assembly kits for all sizes are available for customer assembly of reversing contactor assemblies.

Contactors, overload relays and – for momentary-contact operation – auxiliary switch blocks for latching (required only for S00; with S0 the NO contacts integrated in the basic device can be used) must be ordered separately.

The 3RA23 contactor assemblies have screw or spring-type terminals (main and control circuits) and are suitable for screwing or snapping onto 35mm standard mounting rails.

Complete reversing contactor assemblies

The fully wired reversing contactor assemblies are suitable for use in any climate. They are finger-safe according to EN 61140.

The contactor assemblies size S00 and S0 each consist of 2 contactors with the same power, with one NC contact (S00) or one NO contact and one NC contact (S0) in the basic unit. The contactors are mechanically and electrically interlocked (NC contact interlock).

For motor protection, either 3RU2 or 3RB3 overload relays for direct mounting or stand-alone installation or thermistor motor protection tripping units must be ordered separately.

Operating times

The operating times of the individual 3RT20 contactors are rated in such a way that no overlapping of the contact making and the arcing time between two contactors can occur on reversing, providing they are interlocked by way of their auxiliary switches (NC contact interlock) and the mechanical interlock. For assemblies with AC operation and 50/60 Hz, a dead interval of 50 ms must be provided when used with voltages ≥ 500 V; a dead interval of 30 ms is recommended for use with voltages ≥ 400 V. These dead times do not apply to assemblies with DC operation.

The operating times of the individual contactors are not affected by the mechanical interlock.

Contactors Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA23 reversing contactor assemblies

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
	□ □ □	□	□	□	□	-	□	□	□	□	-	□	□	□
SIRIUS contactor assemblies	3	R	A											
Innovations		2												
Device type (e. g. 3 = reversing contactor assembly)			3											
Contactor size (1 = S00, 2 = S0)				□										
Power dependent on size (e. g. 27 = 15 kW)					□									
Type of overload relay (8X = without)						□	□							
Assembly (B = ready-assembled, E = ready-assembled with communication)								□						
Interlock (3 = mechanical and electrical)									□					
Free auxiliary switches (e. g. S00: 0 = none, S0: 0 = 2 NO total)										□				
Connection type (1 = screw, 2 = spring)											□			
Operating range / solenoid coil circuit (e. g. A = AC standard / without)												□		
Rated control supply voltage (e. g. L2 = 230 V, 50/60 Hz)													□	□
Example	3	R	A	2	3	2	7	-	8	X	B	3	0	-

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Benefits

Using wiring kits for reversing starters has the following advantages:

- Notable reduction of wiring in the control circuit
- Integrated mechanical interlocking
- Prevention of wiring errors in the main circuit

Connecting combs for screw terminals also result in:

- Prevention of wiring errors in the control circuit
- Reduction of testing costs
- Ready-jumpered actuation of the auxiliary switches and the frame (A2)
- Integrated electrical interlocking

Accessories

Selecting the auxiliary switches

The following points should be noted:

Size S00

- For maintained-contact operation:
Use contactors with an NC contact in the basic unit for the electrical interlock.
- For momentary-contact operation:
Use contactors with an NC contact in the basic unit for the electrical interlock; in addition, an auxiliary switch block with at least one NO contact for latching is required per contactor.

Size S0

- For maintained-contact operation:
The contactors have two integrated auxiliary contacts (1 NO + 1 NC); the NC contact can be used for electrical interlocking.
- For momentary-contact operation:
Electrical interlock as for maintained-contact operation; the NO contact in the basic device can be used for the latching.

Surge suppression

Sizes S00 and S0

All contactor assemblies can be fitted with RC elements or varistors for damping opening surges in the coil.

As with the individual contactors, the surge suppressors can either be plugged onto the top of the contactors (S00) or be plugged into the front of the contactors (S0).

Contactor Assemblies

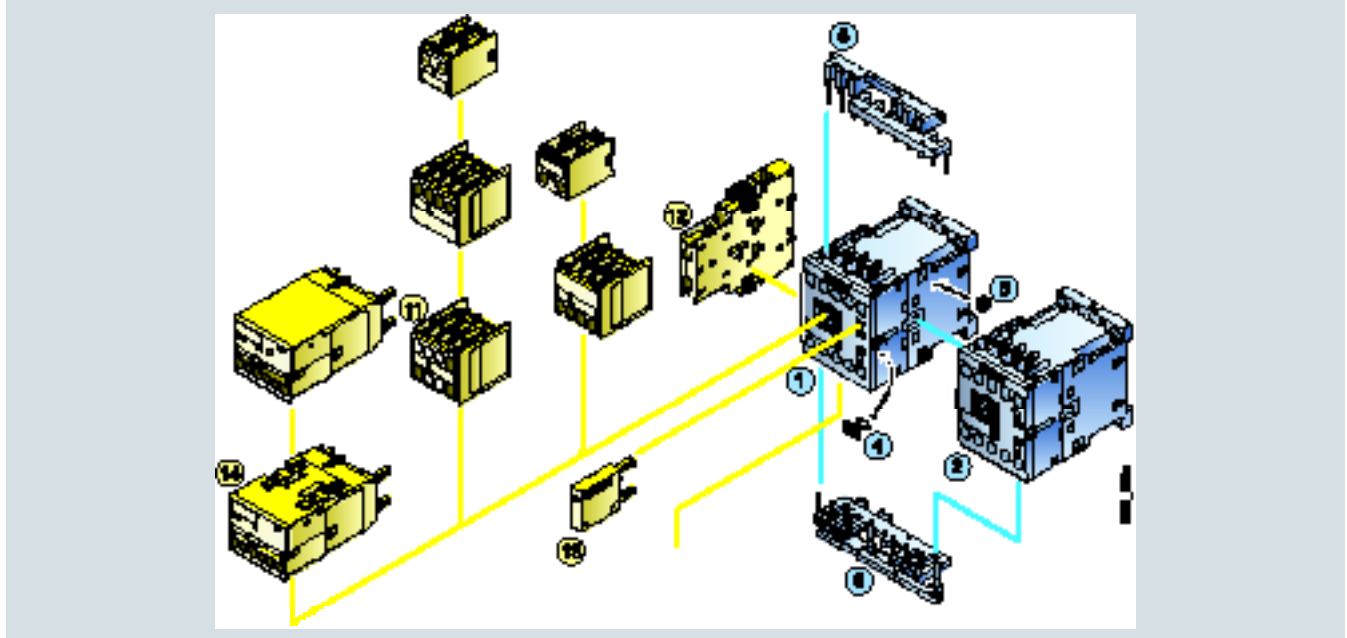
3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA23 reversing contactor assemblies

Selection and ordering data

Fully wired and tested contactor assemblies · Size S00 · up to 7.5 kW

The figure shows the version with screw terminals



Mountable accessories			Fully wired and tested contactor assemblies			
Accessories	Order No.	Page	Individual parts	Order No.		Page
				Q11	Q12	
⑪ Auxiliary switch block, front ¹⁾	3RH29 11-1	2/151	①② Contactor, 3 kW	3RT20 15	3RT20 15	2/24
⑫ Auxiliary switch block, lateral	3RH29 21-1DA . .	2/161	①② Contactor, 4 kW	3RT20 16	3RT20 16	2/24
⑬ Surge suppressors	3RT29 16-1	2/164	①② Contactor, 5.5 kW	3RT20 17	3RT20 17	2/24
⑭ Function module for connection to the control system	3RA27 1 .-1BA00	2/145	①② Contactor, 7.5 kW	3RT20 18	3RT20 18	2/24
			④⑤⑥ Assembly kit comprising:	3RA29 13-2AA1		2/141
			④ Mechanical interlocks			
			⑤ 2 connecting clips for 2 contactors			
			⑥ Wiring modules on the top and bottom for connecting the main current paths, electrical interlock included ²⁾ , interruptible (NC contact interlock)			

1) Auxiliary switch block according to EN 50005 must be used.

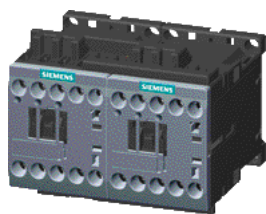
2) 3RT20 1. contactors with one NC contact in the basic unit are required for the electrical interlock.

Contactor Assemblies

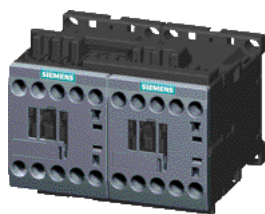
3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA23 reversing contactor assemblies

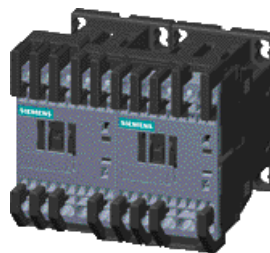
Fully wired and tested contactor assemblies²⁾ · Size S00 · up to 7.5 kW



3RA23 18-8XE30-1 BB4



3RA23 15-8XB30-1A.0



3RA23 18-8XB30-2A.0

Rated data AC-2 and AC-3						Rated control supply voltage U_s ¹⁾	Screw terminals 	Spring-type terminals 
Operational current I_e up to	Rating of induction motors at 50 Hz and					V	Order No.	Order No.
	415 V	230 V	415 V	500 V	690 V			
A	kW	kW	kW	kW	kW	V		
AC operation, 50/60 Hz								
7	2.2	3	3.5	4	24 AC 110 AC 230 AC		3RA23 15-8XB30-1AB0 3RA23 15-8XB30-1AF0 3RA23 15-8XB30-1AP0	3RA23 15-8XB30-2AB0 3RA23 15-8XB30-2AF0 3RA23 15-8XB30-2AP0
9	3	4	4.5	5.5	24 AC 110 AC 230 AC		3RA23 16-8XB30-1AB0 3RA23 16-8XB30-1AF0 3RA23 16-8XB30-1AP0	3RA23 16-8XB30-2AB0 3RA23 16-8XB30-2AF0 3RA23 16-8XB30-2AP0
12	3	5.5	5.5	5.5	24 AC 110 AC 230 AC		3RA23 17-8XB30-1AB0 3RA23 17-8XB30-1AF0 3RA23 17-8XB30-1AP0	3RA23 17-8XB30-2AB0 3RA23 17-8XB30-2AF0 3RA23 17-8XB30-2AP0
16	4	7.5	7.5	7.5	24 AC 110 AC 230 AC		3RA23 18-8XB30-1AB0 3RA23 18-8XB30-1AF0 3RA23 18-8XB30-1AP0	3RA23 18-8XB30-2AB0 3RA23 18-8XB30-2AF0 3RA23 18-8XB30-2AP0
DC operation								
7	2.2	3	3.5	4	24 DC		3RA23 15-8XB30-1BB4	3RA23 15-8XB30-2BB4
9	3	4	4.5	5.5	24 DC		3RA23 16-8XB30-1BB4	3RA23 16-8XB30-2BB4
12	3	5.5	5.5	5.5	24 DC		3RA23 17-8XB30-1BB4	3RA23 17-8XB30-2BB4
16	4	7.5	7.5	7.5	24 DC		3RA23 18-8XB30-1BB4	3RA23 18-8XB30-2BB4
With communication interface								
7	2.2	3	3.5	4	24 DC		3RA23 15-8XE30-1BB4	3RA23 15-8XE30-2BB4
9	3	4	4.5	5.5	24 DC		3RA23 16-8XE30-1BB4	3RA23 16-8XE30-2BB4
12	3	5.5	5.5	5.5	24 DC		3RA23 17-8XE30-1BB4	3RA23 17-8XE30-2BB4
16	4	7.5	7.5	7.5	24 DC		3RA23 18-8XE30-1BB4	3RA23 18-8XE30-2BB4

- 1) Coil operating range
at 50 Hz: $0.8 \dots 1.1 \times U_s$;
at 60 Hz: $0.85 \dots 1.1 \times U_s$.

- 2) The contactors integrated in the contactor assemblies have no unassigned auxiliary contacts.

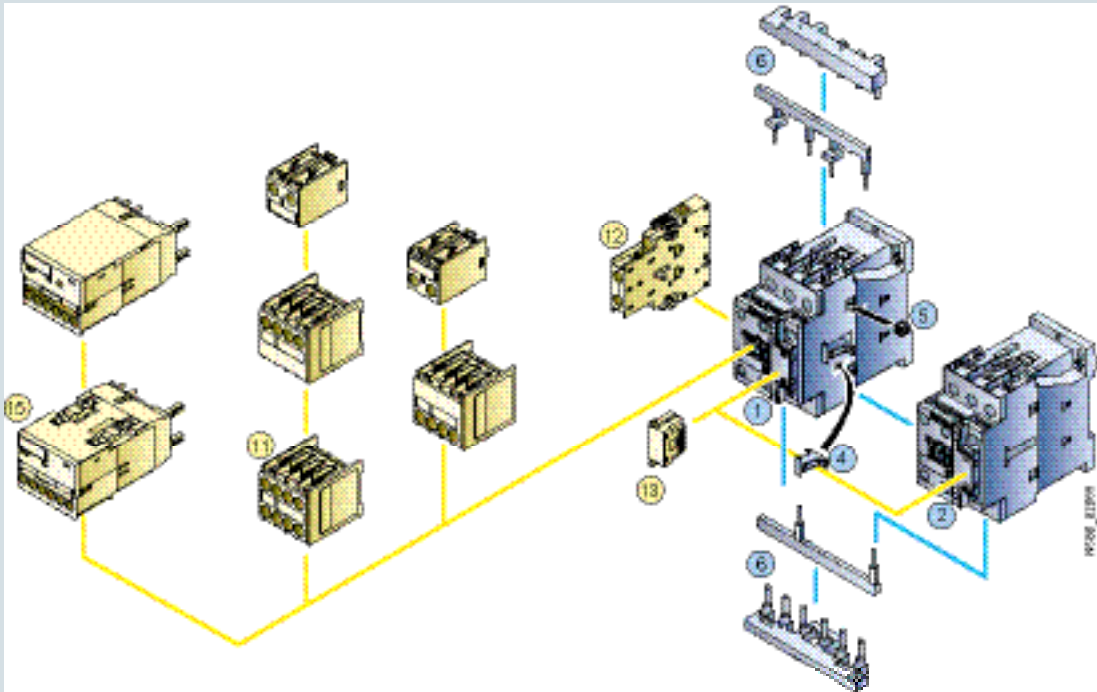
Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA23 reversing contactor assemblies

Fully wired and tested contactor assemblies · Size S0 · up to 18.5 kW

The figure shows the version with screw terminals



Mountable accessories		
Individual parts	Order No.	Page
11 Auxiliary switch block, front	3RH29 21-1	2/151
12 Auxiliary switch block, lateral	3RH29 21-1DA . .	2/161
13 Surge suppressors	3RT29 26-1	2/164
15 Function module for connection to the control system		

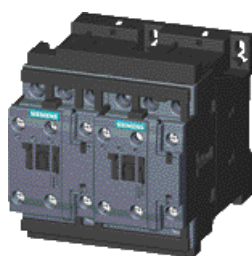
Fully wired and tested contactor assemblies					
Individual parts		Order No.		Page	
		Q11	Q12		
1 2	Contactor, 5.5 kW	3RT20 24	3RT20 24	2/25	
1 2	Contactor, 7.5 kW	3RT20 25	3RT20 25	2/25	
1 2	Contactor, 11 kW	3RT20 26	3RT20 26	2/25	
1 2	Contactor, 15 kW	3RT20 27	3RT20 27	2/25	
1 2	Contactor, 18.5 kW	3RT20 28	3RT20 28	2/28	
4 5 6	Assembly kit comprising:	3RA29 23-2AA1		2/141	
	4 Mechanical interlocks				
	5 2 connecting clips for 2 contactors				
	6 Wiring modules on the top and bottom for connecting the main current paths, electrical interlock included (NC contact interlock)				

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA23 reversing contactor assemblies

Fully wired and tested contactor assemblies · Size S0 · up to 18.5 kW



3RA23 2 4 -8XE30-1 BB4

3RA23 2 . -8XB30-1 A . 2

3RA23 2 . -8XB30-2 A . 2

Rated data AC-2 and AC-3						Rated control supply voltage $U_s^{1)}$	Screw terminals		Spring-type terminals	
Operational current I_e up to	Rating of induction motors at 50 Hz and						Order No.		Order No.	
	415 V	230 V	415 V	500 V	690 V					
A	kW	kW	kW	kW	V					
AC operation, 50/60 Hz										
12	3	5.5	7.5	7.5	24 AC 110 AC 230 AC	3RA23 24-8XB30-1AC2 3RA23 24-8XB30-1AG2 3RA23 24-8XB30-1AL2	3RA23 24-8XB30-2AC2 3RA23 24-8XB30-2AG2 3RA23 24-8XB30-2AL2			
16	4	7.5	10	11	24 AC 110 AC 230 AC	3RA23 25-8XB30-1AC2 3RA23 25-8XB30-1AG2 3RA23 25-8XB30-1AL2	3RA23 25-8XB30-2AC2 3RA23 25-8XB30-2AG2 3RA23 25-8XB30-2AL2			
25	5.5	11	11	11	24 AC 110 AC 230 AC	3RA23 26-8XB30-1AC2 3RA23 26-8XB30-1AG2 3RA23 26-8XB30-1AL2	3RA23 26-8XB30-2AC2 3RA23 26-8XB30-2AG2 3RA23 26-8XB30-2AL2			
32	7.5	15	18.5	18.5	24 AC 110 AC 230 AC	3RA23 27-8XB30-1AC2 3RA23 27-8XB30-1AG2 3RA23 27-8XB30-1AL2	3RA23 27-8XB30-2AC2 3RA23 27-8XB30-2AG2 3RA23 27-8XB30-2AL2			
38	7.5	18.5	18.5	18.5	24 AC 110 AC 230 AC	3RA23 28-8XB30-1AC2 3RA23 28-8XB30-1AG2 3RA23 28-8XB30-1AL2	3RA23 28-8XB30-2AC2 3RA23 28-8XB30-2AG2 3RA23 28-8XB30-2AL2			
DC operation										
12	3	5.5	7.5	7.5	24 DC	3RA23 24-8XB30-1BB4	3RA23 24-8XB30-2BB4			
16	4	7.5	10	11	24 DC	3RA23 25-8XB30-1BB4	3RA23 25-8XB30-2BB4			
25	5.5	11	11	11	24 DC	3RA23 26-8XB30-1BB4	3RA23 26-8XB30-2BB4			
32	7.5	15	18.5	18.5	24 DC	3RA23 27-8XB30-1BB4	3RA23 27-8XB30-2BB4			
38	7.5	18.5	18.5	18.5	24 DC	3RA23 28-8XB30-1BB4	3RA23 28-8XB30-2BB4			
With communication interface										
12	3	5.5	7.5	7.5	24 DC	3RA23 24-8XE30-1BB4	3RA23 24-8XE30-2BB4			
16	4	7.5	10	11	24 DC	3RA23 25-8XE30-1BB4	3RA23 25-8XE30-2BB4			
25	5.5	11	11	11	24 DC	3RA23 26-8XE30-1BB4	3RA23 26-8XE30-2BB4			
32	7.5	15	18.5	18.5	24 DC	3RA23 27-8XE30-1BB4	3RA23 27-8XE30-2BB4			
38	7.5	18.5	18.5	18.5	24 DC	3RA23 28-8XE30-1BB4	3RA23 28-8XE30-2BB4			

1) Coil operating range
at 50 Hz: 0.8 ... 1.1 × U_s ; at 60 Hz: 0.85 ... 1.1 × U_s .

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA23 reversing contactor assemblies

Components for customer assembly



3RA29 23-2AA1



3RA29 23-2AA2

For contactors	Size	Version	Screw terminals 	Spring-type terminals 
Type			Order No.	Order No.
Assembly kits for making 3-pole contactor assemblies				
3RT20 1	S00-S00	The assembly kit contains: mechanical interlock; 2 connecting clips for 2 contactors, wiring modules on the top and bottom • For main, auxiliary and control circuits	3RA29 13-2AA1	3RA29 13-2AA2
3RT20 2	S0-S0	The assembly kit contains: mechanical interlock; 2 connecting clips for 2 contactors, wiring modules on the top and bottom • For main, auxiliary and control circuits • Only for main circuit ¹⁾	3RA29 23-2AA1 —	— 3RA29 23-2AA2
Wiring modules (single)				
3RT20 1	S00-S00	Top (in-phase) Bottom (with phase reversal)	3RA29 13-3DA1 3RA29 13-3EA1	3RA29 13-3DA2 3RA29 13-3EA2
3RT20 2	S0-S0	Top (in-phase) Bottom (with phase reversal)	3RA29 23-3DA1 3RA29 23-3EA1	3RA29 23-3DA2 3RA29 23-3EA2
Mechanical connectors				
		For lateral interlock, without switching interval		
3RT20 1	S00-S00	For 3- and 4-pole contactors	3RA29 12-2H	3RA29 12-2H
3RT20 2	S0-S0	For 3- and 4-pole contactors	3RA29 22-2H	3RA29 22-2H

- 1) Version in size S0 with spring-type terminals:
Only the wiring modules for the main circuit are included.
No connectors are included for the auxiliary and control circuit.

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA23 reversing contactor assemblies

Components for customer assembly



3RA27 11-1BA00



3RA27 11-2BA00

For contactors	Size	Version	Screw terminals 	Spring-type terminals 
Type			Order No.	Order No.
Function modules for connection to the control system				
3RT20 1, 3RT20 2	S00, S0	IO-Link connection Comprising one basic and one coupling module and an additional module connector for assembling an IO-Link group	3RA27 11-1BA00	3RA27 11-2BA00
3RT20 1, 3RT20 2	S00, S0	AS-Interface connection Comprising one basic and one coupling module	3RA27 12-1BA00	3RA27 12-2BA00
Accessories for 3RA27 function modules				
Module connectors				
3RT20 1, 3RT20 2	S00, S0	14-pole, 8 cm • For size jump S00-S0 + 1 space	3RA27 11-0EE02	3RA27 11-0EE02
3RT20 1, 3RT20 2	S00, S0	14-pole, 21 cm • For diverse space combinations	3RA27 11-0EE03	3RA27 11-0EE03
3RT20 1, 3RT20 2	S00, S0	10-pole, 8 cm • For separate auxiliary voltage supply within an IO-Link group	3RA27 11-0EE04	3RA27 11-0EE04
3RT20 1, 3RT20 2	S00, S0	Sealable covers	3RA29 10-0	3RA29 10-0

Overview

The 3RA13 reversing contactor assemblies can be ordered as follows:

- **Sizes S2 and S3**
Fully wired and tested, with mechanical and electrical interlock. For assemblies with AC operation and 50/60 Hz, a dead interval of 50 ms must be provided when used with voltages ≥ 500 V; a dead interval of 30 ms is recommended for use with voltages ≥ 400 V. These dead times do not apply to assemblies with DC operation.
- **Sizes S2 to S12**
As individual parts for customer assembly.

There is also a range of accessories (auxiliary switch blocks, surge suppressors, etc.) that must be ordered separately.

For overload relays for motor protection see "Protection Equipment" → "Overload Relays".

The 3RA13 contactor assemblies have screw terminals and are suitable for screw and snap-on mounting onto 35 mm standard mounting rails.

Complete units

The fully wired reversing contactor assemblies are suitable for use in any climate. They are finger-safe according to EN 50274.

The contactor assemblies consist of 2 contactors with the same power, with one NC contact in the basic unit. The contactors are mechanically and electrically interlocked (NC contact interlock).

For motor protection, either 3RU11 or 3RB2 . overload relays for direct mounting or stand-alone installation or thermistor motor protection tripping units must be ordered separately.

Components for customer assembly

Assembly kits for all sizes are available for customer assembly of reversing contactor assemblies.

Contactors, overload relays, the mechanical interlock (as of size S2) and – for momentary-contact operation – auxiliary switch blocks for latching must be ordered separately.

Rated data AC-2 and AC-3 for 50 Hz 400 V AC		Size	Order No.					Fully wired and tested contactor assemblies
Rating kW	Operational current I_e A		Contactor	Mechanical interlock ¹⁾	Mechanical interlock ²⁾	Mechanical interlock ³⁾	Assembly kit	
15	32	S2	3RT10 34	3RA19 24-1A	3RA19 24-2B	—	3RA19 33-2A ⁴⁾	3RA13 34-8XB30-1 ..
18.5	40		3RT10 35					3RA13 35-8XB30-1 ..
22	50		3RT10 36					3RA13 36-8XB30-1 ..
30	65	S3	3RT10 44	3RA19 24-1A	3RA19 24-2B	—	3RA19 43-2A ⁴⁾	3RA13 44-8XB30-1 ..
37	80		3RT10 45					3RA13 45-8XB30-1 ..
45	95		3RT10 46					3RA13 46-8XB30-1 ..
55	115	S6	3RT10 54	—	—	3RA19 54-2A	3RA19 53-2M ⁵⁾	—
75	150		3RT10 55					
90	185		3RT10 56					
110	225	S10	3RT10 64	—	—	3RA19 54-2A	3RA19 63-2A ⁵⁾	—
132	265		3RT10 65					
160	300		3RT10 66					
200	400	S12	3RT10 75	—	—	3RA19 54-2A	3RA19 73-2A ⁵⁾	—
250	500		3RT10 76					

1) Can be mounted onto the front.

2) Laterally mountable with one auxiliary contact.

3) Laterally mountable without auxiliary contact.

4) Assembly kit contains: 2 connecting clips for contactors; wiring modules on the top and bottom.

5) Assembly kit contains: wiring module on the top and bottom.

Contactors Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA13 reversing contactor assemblies

Selection and ordering data

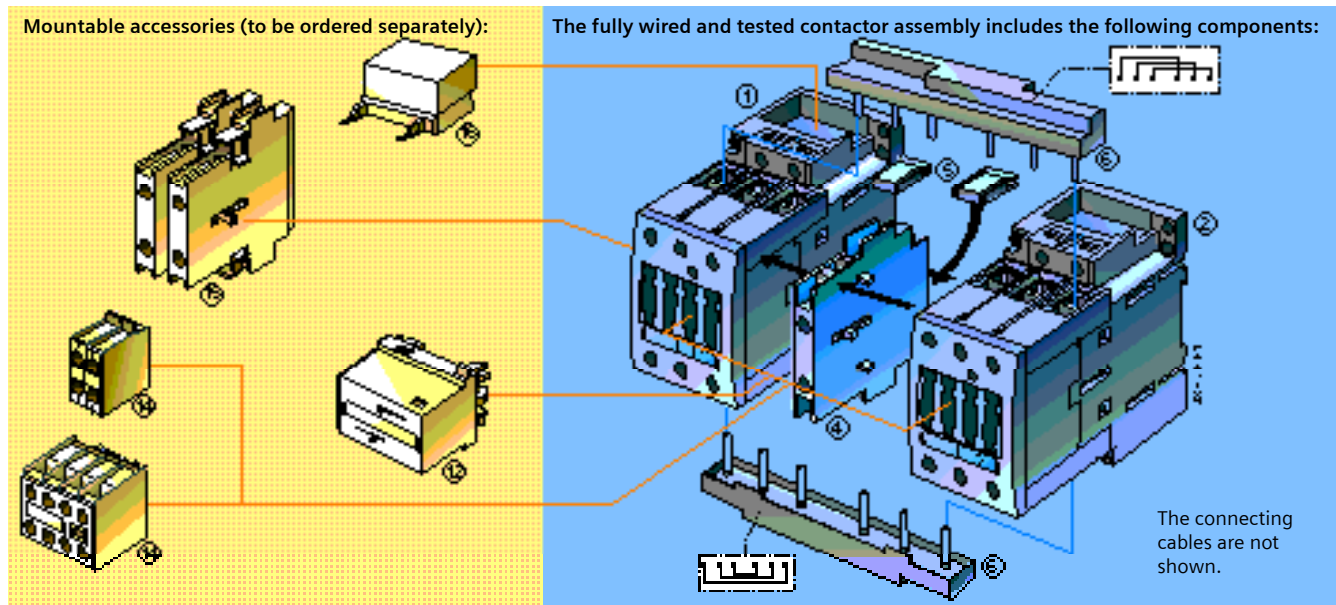
Fully wired and tested contactor assemblies · Size S2 · up to 22 kW



3RA13 3...-8XB30-1...

1) Coil operating range
at 50 Hz: 0.8 ... 1.1 x U_s ; at 60 Hz: 0.85 ... 1.1 x U_s .

Rated data AC-2 and AC-3					Rated control supply voltage U_s ¹⁾	Screw terminals	
Operational current I_e up to 500 V	Ratings of induction motors at 50 Hz and					Order No.	
	230 V	415 V	500 V	690 V			
A	kW	kW	kW	kW	V		
AC operation, 50/60 Hz							
32	7.5	15	18.5	18.5	110 AC 230 AC	3RA13 34-8XB30-1AG2 3RA13 34-8XB30-1AL2	
40	11	18.5	22	22	110 AC 230 AC	3RA13 35-8XB30-1AG2 3RA13 35-8XB30-1AL2	
50	15	22	30	22	110 AC 230 AC	3RA13 36-8XB30-1AG2 3RA13 36-8XB30-1AL2	
DC operation							
32	7.5	15	18.5	18.5	24 DC	3RA13 34-8XB30-1BB4	
40	11	18.5	22	22	24 DC	3RA13 35-8XB30-1BB4	
50	15	22	30	22	24 DC	3RA13 36-8XB30-1BB4	



Accessories	Order No.	Page	Individual parts	Order No.	Page
				K1	K2
12 Mechanical interlock, front	3RA19 24-1A	2/72	1 2 Contactors, 15 kW	3RT10 34	3RT10 34 2/45
14 Auxiliary switch block, front	3RH19 21-1CA . .	2/176	1 2 Contactors, 18.5 kW	3RT10 35	3RT10 35 2/45
15 Auxiliary switch block, lateral	3RH19 21-1EA . .	2/177	1 2 Contactors, 22 kW	3RT10 36	3RT10 36 2/45
16 Surge suppressors	3RT19 26-1	2/179	4 Mechanical interlock, lateral	3RA19 24-2B	2/72
	3RT19 36-1	2/179	5 6 Installation kit	3RA19 33-2A	2/73
The installation kit contains:					
5 2 connecting clips for 2 contactors with a clearance of 10 mm					
6 Wiring modules on the top and bottom for connecting the main current paths					

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA13 reversing contactor assemblies

Fully wired and tested contactor assemblies · Size S3 · up to 45 kW

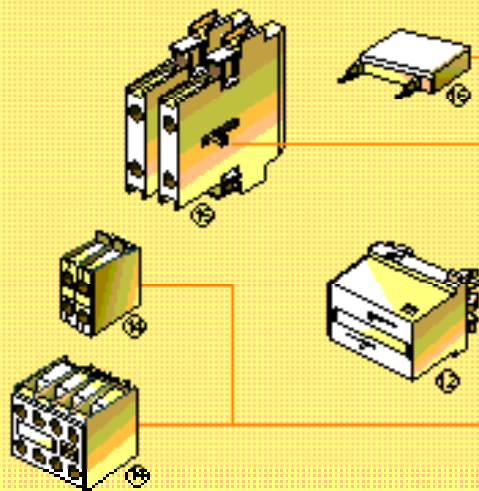


3RA13 1.-8XB30-1 . . .

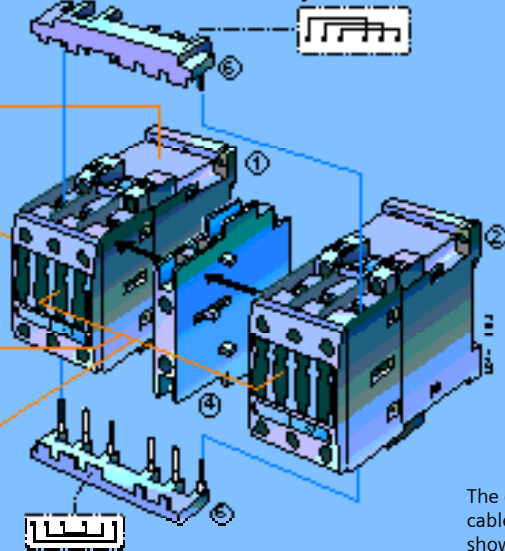
Rated data AC-2 and AC-3					Rated control supply voltage U_s ¹⁾	Screw terminals	
Operational current I_e up to 500 V	Ratings of induction motors at 50 Hz and					Order No.	
	230 V	415 V	500 V	690 V			
A	kW	kW	kW	kW	V		
AC operation, 50/60 Hz							
65	18.5	30	37	45	110 AC 230 AC	3RA13 44-8XB30-1AG2 3RA13 44-8XB30-1AL2	
80	22	37	45	55	110 AC 230 AC	3RA13 45-8XB30-1AG2 3RA13 45-8XB30-1AL2	
95	22	45	55	55	110 AC 230 AC	3RA13 46-8XB30-1AG2 3RA13 46-8XB30-1AL2	
DC operation							
65	18.5	30	37	45	24 DC	3RA13 44-8XB30-1BB4	
80	22	37	45	55	24 DC	3RA13 45-8XB30-1BB4	
95	22	45	55	55	24 DC	3RA13 46-8XB30-1BB4	

1) Coil operating range
at 50 Hz: 0.8 ... 1.1 x U_s ; at 60 Hz: 0.85 ... 1.1 x U_s .

Mountable accessories (to be ordered separately):



The fully wired and tested contactor assembly includes the following components:



The connecting cables are not shown.

Accessories	Order No.	Page	Individual parts	Order No.	Order No.	Page
				K1	K2	
⑫ Mechanical interlock, front	3RA19 24-1A	2/72	①② Contactors, 30 kW	3RT10 44	3RT10 44	2/45
⑭ Auxiliary switch block, front	3RH19 21-1CA ..	2/176	①② Contactors, 37 kW	3RT10 45	3RT10 45	2/45
⑮ Auxiliary switch block, lateral	3RH19 21-1EA ..	2/177	①② Contactors, 45 kW	3RT10 46	3RT10 46	2/45
⑯ Surge suppressors	3RT19 26-1 3RT19 36-1	2/179 2/179	④ Mechanical interlock, lateral	3RA19 24-2B		2/72
			⑤⑥ Installation kit	3RA19 43-2A		2/73
The installation kit contains:						
⑤ 2 connecting clips for 2 contactors with a clearance of 10 mm						
⑥ Wiring modules on the top and bottom for connecting the main current paths						

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA13 reversing contactor assemblies

Selection and ordering data

	For contactors	Size	Version	Order No.
	Type			
Mechanical interlocks				
	3RT10 3	S2	For lateral mounting¹⁾ Each with one auxiliary contact (1 NC contact) per contactor (can only be used to connect contactors which are not more than 1 size larger or smaller. The mounting depth of the smaller contactor has to be adapted.)	3RA19 24-2B
	3RT10 4	S3		
	3RT13 2			
	3RT13 3			
	3RT13 4			
3RT15 2				
3RT15 3				
3RA19 24-1A mounted onto 2 contactors				
	3RT10 3	S2	For mounting to the front²⁾ Onto contactors with sizes S0 to S3 (for contactors of the same size) <u>Note:</u> <i>Sizes S2 and S3: Use 3RA19 32-2C mechanical connectors</i>	3RA19 24-1A
	3RT10 4	S3		
	3RT1 . 5 to 3RT1 . 7	S6 S10 S12		
3RA19 54-2A				
	3RT10 4 . -A with 3RT10 5	S3 with S6	Adapters, laterally mountable For mechanical interlocking of contactor S3 (only for AC operation) with contactor S6 using 3RA19 54-2A locking device (must be ordered separately) incl. connecting clips.	3RA19 54-2C
3RA19 54-2C				
Base plates				
	3RT10 5	S6	For customer assembly of reversing contactor assemblies	3RA19 52-2A 3RA19 62-2A 3RA19 72-2A
	3RT1 . 6	S10		
	3RT1 . 7	S12		

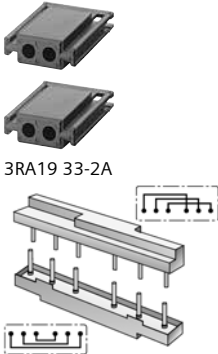
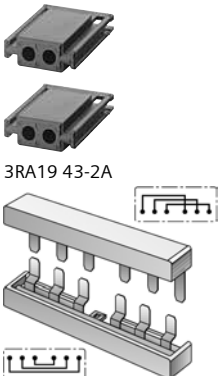
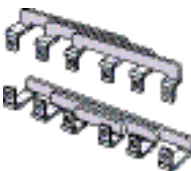
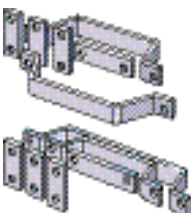
1) Can also be used for 4-pole contactors with sizes S2 and S3.

2) Can also be used for size S0 4-pole contactors.

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

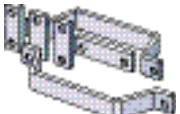
SIRIUS 3RA13 reversing contactor assemblies

For contactors Type	Size	Version	Order No.	
Installation kits for making 3-pole contactor assemblies				
 3RA19 33-2A	3RT10 3	S2	The installation kit contains: 2 connecting clips for 2 contactors; wiring modules on the top and bottom	3RA19 33-2A
 3RA19 43-2A	3RT10 4	S3	The installation kit contains: 2 connecting clips for 2 contactors; wiring modules on the top and bottom	3RA19 43-2A
	3RT10 5	S6	The installation kit contains: wiring modules on the top and bottom (for connection with box terminal)	3RA19 53-2A
	3RT10 5 3RT1. 6 3RT1. 7	S6 S10 S12	The installation kit contains: wiring modules on the top and bottom (for connection without box terminal)	3RA19 53-2M 3RA19 63-2A 3RA19 73-2A

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA13 reversing contactor assemblies

	For contactors Type	Size	Contactor clearance mm	Version	Order No.
Wiring modules, single					
 3RA19 53-3D	3RT10 3	S2-S2	10	top (in-phase) bottom (with phase reversal)	3RA19 33-3D 3RA19 33-3E
	3RT10 4	S3-S3	10	top (in-phase) bottom (with phase reversal)	3RA19 43-3D 3RA19 43-3E
	3RT10 5	S6-S6	10	top (in-phase, for connection with box terminal)	3RA19 53-3D
				top (with phase reversal, for connection without box terminal)	3RA19 53-3P
 3RA19 53-3P					

	For contactors Type	Size	Contactor clearance mm	Interlocking	Version	Order No.
Mechanical connectors						1 pack = 10 sets for 10 assemblies
 3RA19 32-2C	3RT1. 3	S2-S2	0	mountable on front	for 3-pole contactors	3RA19 32-2C
	3RT1. 4	S3-S3				
 3RA19 32-2D	3RT1. 3	S2-S2	10	laterally mountable	for 3-pole contactors	3RA19 32-2D
	3RT1. 4	S3-S3				
	3RT1. 5	S6-S6				
 3RA19 32-2G	3RT1. 3	S2-S2	10	laterally mountable	for 4-pole contactors	3RA19 32-2G
 3RA19 42-2G	3RT1. 4	S3-S3	10	laterally mountable	for 4-pole contactors	3RA19 42-2G

Overview

These 3RA24 contactor assemblies for wye-delta starting are designed for standard applications.

Note:

Contactor assemblies for wye-delta starting in special applications such as very heavy starting¹⁾ or wye-delta starting of special motors must be customized. Help with designing such special applications is available from Technical Assistance.

The 3RA24 contactor assemblies for wye-delta starting can be ordered as follows:

Sizes S00 and S0

- Fully wired and tested, with electrical and mechanical interlock.
- As individual parts for customer assembly.

Screw terminals

Rated data at 50 Hz 415 V AC			Size			
Rating	Operational current I_e	Motor current		Line/delta contactor	Star contactor	Order No. complete
kW	A	A				
5.5	12	9.5 ... 13.8	S00-S00-S00	3RT20 15-1	3RT20 15-1	3RA24 15-8XF31-1 . . .
7.5	16	12.1 ... 17		3RT20 17-1	3RT20 15-1	3RA24 16-8XF31-1 . . .
11	25	19 ... 25		3RT20 18-1	3RT20 16-1	3RA24 17-8XF31-1 . . .
11	25	19 ... 25	S0-S0-S0	3RT20 24-1	3RT20 24-1	3RA24 23-8XF32-1 . . .
15	32	24.1 ... 34		3RT20 26-1	3RT20 24-1	3RA24 25-8XF32-1 . . .
18.5	40	34.5 ... 40		3RT20 26-1	3RT20 24-1	3RA24 25-8XF32-1 . . .
22	50	31 ... 43		3RT20 27-1	3RT20 26-1	3RA24 26-8XF32-1 . . .

Spring-type terminals

Rated data at 50 Hz 415 V AC			Size			
Rating	Operational current I_e	Motor current		Line/delta contactor	Star contactor	Order No. complete
kW	A	A				
5.5	12	9.5 ... 13.8	S00-S00-S00	3RT20 15-2	3RT20 15-2	3RA24 15-8XF31-2 . . .
7.5	16	12.1 ... 17		3RT20 17-2	3RT20 15-2	3RA24 16-8XF31-2 . . .
11	25	19 ... 25		3RT20 18-2	3RT20 16-2	3RA24 17-8XF31-2 . . .
11	25	19 ... 25	S0-S0-S0	3RT20 24-2	3RT20 24-2	3RA24 23-8XF32-2 . . .
15	32	24.1 ... 34		3RT20 26-2	3RT20 24-2	3RA24 25-8XF32-2 . . .
18.5	40	34.5 ... 40		3RT20 26-2	3RT20 24-2	3RA24 25-8XF32-2 . . .
22	50	31 ... 43		3RT20 27-2	3RT20 26-2	3RA24 26-8XF32-2 . . .

Note:

The selection of contactor types refers to fused configurations.

Motor protection

Overload relays or thermistor motor protection releases can be used for overload protection.

The overload relay can be either mounted onto the line contactor or separately fitted. It must be set to 0.58 times the rated motor current.

Surge suppression

Sizes S00 and S0

Surge suppression (varistor) is included in the function modules for wye-delta starting.

Function modules for wye-delta starting

The 3RA28 16-OEW20 wye-delta function module replaces the complete wiring in the control circuit and can be used in the

A dead interval of 50 ms on reversing is already integrated in the function module for wye-delta starting.

There is also a range of accessories (lateral auxiliary switch blocks, etc.) that must be ordered separately.

For overload relays for motor protection see "Protection Equipment" → "Overload Relays" → "3RB3 Solid-State Overload Relays".

The 3RA24 contactor assemblies have screw or spring-type terminals and are suitable for screwing or snapping onto 35 mm standard mounting rails.

With the fully wired and tested 3RA24 contactor assemblies, the auxiliary contacts included in the basic devices are unassigned.

voltage range from 24 to 240 V AC/DC. It is snapped onto the front of the contactor assembly size S00 or S0.

One function module comprises a complete module kit:

- One 3RA29 12-0 basic module with integrated control logic and time setting,
- and two 3RA29 11-0 coupling modules with related connecting cables.

The scope of supply thus comprises a complete module kit for one contactor assembly for wye-delta starting size S00 or S0, regardless of the connection method.

Contactors Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA24 contactor assemblies for wye-delta starting

Components for customer assembly

Assembly kits with wiring modules and mechanical connectors are available for contactor assemblies for wye-delta starting. Contactors, overload relays, function modules for wye-delta starting or wye-delta timing relays, auxiliary switches for electrical interlock – if required also feeder terminals and base plates – must be ordered separately.

The wiring kits for sizes S00 and S0 contain the top and bottom main conducting path connections between the line and delta contactors (top) and between the delta and star contactors (bottom).

Control circuit

Features:

- Time setting range 0.5 to 60 s (3 selectable settings)
- Wide voltage range 24 to 240 V AC/DC
- Dead interval of 50 ms, non-adjustable.

Screw terminals

Rating kW	Accessories for customer assembly			Overload relay, thermal (CLASS 10 trip class)		Overload relay, solid-state (CLASS 10 trip class)	
	Function modules for wye-delta starting	Assembly kit B, for single infeed	Star jumper	Setting range A	Order No.	Setting range A	Order No.
5.5	3RA28 16-0EW20	3RA29 13-2BB1 ¹⁾	3RT29 16-4BA31	5.5 ... 8	3RU21 16-1HB0	4 ... 16	3RB30 16-1TB0
7.5				7 ... 10	3RU21 16-1JB0		
11				11 ... 16	3RU21 16-4AB0		
11	3RA28 16-0EW20	3RA29 23-2BB2 ²⁾	3RT29 26-4BA31	11 ... 16	3RU21 26-4AB0	6 ... 25	3RB30 26-1QB0
15				14 ... 20	3RU21 26-4BB0		
18.5				20 ... 25	3RU21 26-4DB0		
22				20 ... 25	3RU21 26-4DB0		

Spring-type terminals

Rating kW	Accessories for customer assembly			Overload relay, thermal (CLASS 10 trip class)		Overload relay, solid-state (CLASS 10 trip class)	
	Function modules for wye-delta starting	Assembly kit B, for single infeed	Star jumper	Setting range A	Order No.	Setting range A	Order No.
5.5	3RA28 16-0EW20	3RA29 13-2BB2 ¹⁾	3RT29 16-4BA32	5.5 ... 8	3RU21 16-1HC0	4 ... 16	3RB30 16-1TE0
7.5				7 ... 10	3RU21 16-1JC0		
11				11 ... 16	3RU21 16-4AC0		
11	3RA28 16-0EW20	3RA29 23-2BB2 ²⁾	3RT29 26-4BA32	11 ... 16	3RU21 26-4AC0	6 ... 25	3RB30 26-1QE0
15				14 ... 20	3RU21 26-4BC0		
18.5				20 ... 25	3RU21 26-4DC0		
22				20 ... 25	3RU21 26-4DC0		

1) The assembly kit contains: mechanical interlock, 4 connecting clips; wiring modules on the top (connection between line and delta contactor) and on the bottom (connection between delta and star contactor); star jumper and auxiliary circuit wiring.

2) The assembly kit contains: mechanical interlock, 4 connecting clips; wiring modules on the top (connection between line and delta contactor) and on the bottom (connection between delta and star contactor); star jumper.

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
	☐ ☐ ☐	☐	☐	☐	☐	-	☐	☐	☐	☐	-	☐	☐	☐
SIRIUS contactor assemblies	3	R	A											
Innovations			2											
Device type (e. g. 4 = contactor assembly for wye-delta starting)				4										
Contactor size (1 = S00, 2 = S0)					☐									
Power dependent on size (e. g. 25 = 15 kW)						☐								
Type of overload relay (8X = without)							☐	☐						
Assembly (B = ready-assembled, E, H = ready-assembled with communication)								☐						
Interlock (3 = mechanical and electrical)									☐					
Free auxiliary switches (e. g. S00: 1 = 3 NO total, S0: 2 = 3 NO + 3 NC total)										☐				
Connection type (1 = screw, 2 = spring)											☐			
Operating range / solenoid coil circuit (e. g. A = AC standard / without)												☐		
Rated control supply voltage (e. g. L2 = 230 V, 50/60 Hz)													☐	☐
Example	3	R	A	2	4	2	5	-	8	X	F	3	2	-

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

2

A 3D diagram of a rectangular block. The dimensions are labeled: L for length, H for height, and D for depth. A coordinate system is shown at the bottom-left corner with axes x , y , and z .

- 1) Dimensions for devices with screw terminals / spring-type terminals.
- 2) For short-circuit protection with overload relays see "Protection Equipment" → "Overload Relays" → "3RB3 Solid-State Overload Relays".
- 3) Up to $I_n < 0.5 \text{ kA}$; $\leq 260 \text{ V}$.

Contactor Assemblies

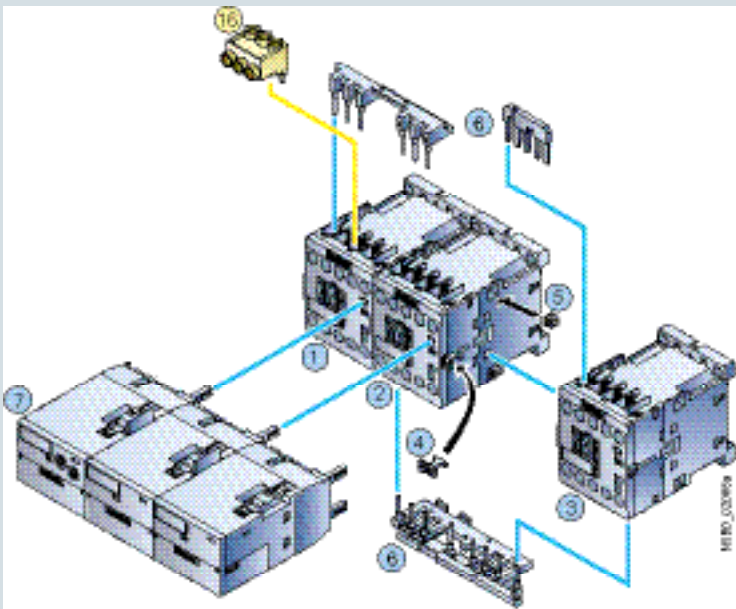
3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA24 contactor assemblies for wye-delta starting

Selection and ordering data

Fully wired and tested contactor assemblies · Size S00-S00-S00 · up to 11 kW

The figure shows the version with screw terminals



Mountable accessories			Fully wired and tested contactor assemblies				
Individual parts	Order No.	Page	Individual parts	Order No.	Q11 ¹⁾	Q13 ²⁾	Q12 ²⁾ Page
16 Three-phase feeder terminal ³⁾	3RA29 13-3K	2/82	1 2 3 Contactor, 5.5 kW	3RT20 15	3RT20 15	3RT20 15	2/24
			1 2 3 Contactor, 7.5 kW	3RT20 17	3RT20 17	3RT20 15	2/24
			1 2 3 Contactor, 11 kW	3RT20 18	3RT20 18	3RT20 16	2/24
			4 5 6 Assembly kit comprising:	3RA29 13-2BB1			2/82
			4 Mechanical interlock				
			5 4 connecting clips				
			6 Wiring modules on the top and bottom for connecting the main current paths				
			7 Function modules for wye-delta starting	3RA28 16-0EW20			

1) Use version with 1 NO.
2) Use version with 1 NC.
3) Part 16 can only be mounted with contactors with screw terminal.

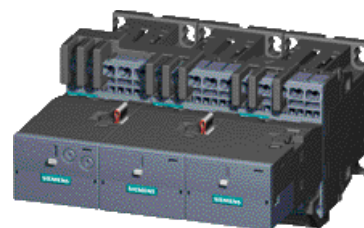
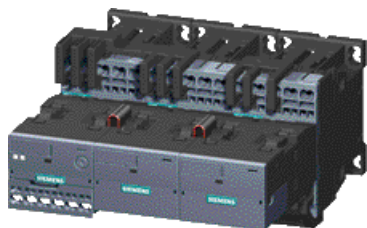
Note:
When using the function modules for contactor assemblies for wye-delta starting, no other auxiliary switches are allowed to be connected to the basic units.

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

**SIRIUS 3RA24 contactor assemblies
for wye-delta starting**

Fully wired and tested contactor assemblies · Size 500-500-500 · up to 11 kW



3RA24 1...-8XE31-2BB4

3RA24 1...-8XF31-1A...0

3RA24 1...-8XF31-2A.0

Rated data AC-2					Rated control supply voltage $U_s^{1)}$	Screw terminals 	Spring-type terminals 
Operational current I_e up to	Rating of induction motors at 50 Hz and					Order No.	Order No.
415 V	230 V	415 V	500 V	690 V			
A	kW	kW	kW	kW	V		
AC operation, 50/60 Hz							
12	3.3	5.5	7.2	9.2	24 AC 110 AC 230 AC	3RA24 15-8XF31-1AB0 3RA24 15-8XF31-1AF0 3RA24 15-8XF31-1AP0	3RA24 15-8XF31-2AB0 3RA24 15-8XF31-2AF0 3RA24 15-8XF31-2AP0
16	4.7	7.5	10.3	9.2	24 AC 110 AC 230 AC	3RA24 16-8XF31-1AB0 3RA24 16-8XF31-1AF0 3RA24 16-8XF31-1AP0	3RA24 16-8XF31-2AB0 3RA24 16-8XF31-2AF0 3RA24 16-8XF31-2AP0
25	5.5	11	11	11	24 AC 110 AC 230 AC	3RA24 17-8XF31-1AB0 3RA24 17-8XF31-1AF0 3RA24 17-8XF31-1AP0	3RA24 17-8XF31-2AB0 3RA24 17-8XF31-2AF0 3RA24 17-8XF31-2AP0
DC operation							
12	3.3	5.5	7.2	9.2	24 DC	3RA24 15-8XF31-1BB4	3RA24 15-8XF31-2BB4
16	4.7	7.5	10.3	9.2	24 DC	3RA24 16-8XF31-1BB4	3RA24 16-8XF31-2BB4
25	5.5	11	11	11	24 DC	3RA24 17-8XF31-1BB4	3RA24 17-8XF31-2BB4
For IO-Link connection							
12	3.3	5.5	7.2	9.2	24 DC	3RA24 15-8XE31-1BB4	3RA24 15-8XE31-2BB4
16	4.7	7.5	10.3	9.2	24 DC	3RA24 16-8XE31-1BB4	3RA24 16-8XE31-2BB4
25	5.5	11	11	11	24 DC	3RA24 17-8XE31-1BB4	3RA24 17-8XE31-2BB4
For AS-Interface connection							
12	3.3	5.5	7.2	9.2	24 DC	3RA24 15-8XH31-1BB4	3RA24 15-8XH31-2BB4
16	4.7	7.5	10.3	9.2	24 DC	3RA24 16-8XH31-1BB4	3RA24 16-8XH31-2BB4
25	5.5	11	11	11	24 DC	3RA24 17-8XH31-1BB4	3RA24 17-8XH31-2BB4

1) Coil operating range
at 50 Hz: 0.8 ... 1.1 x U_c ; at 60 Hz: 0.85 ... 1.1 x U_c .

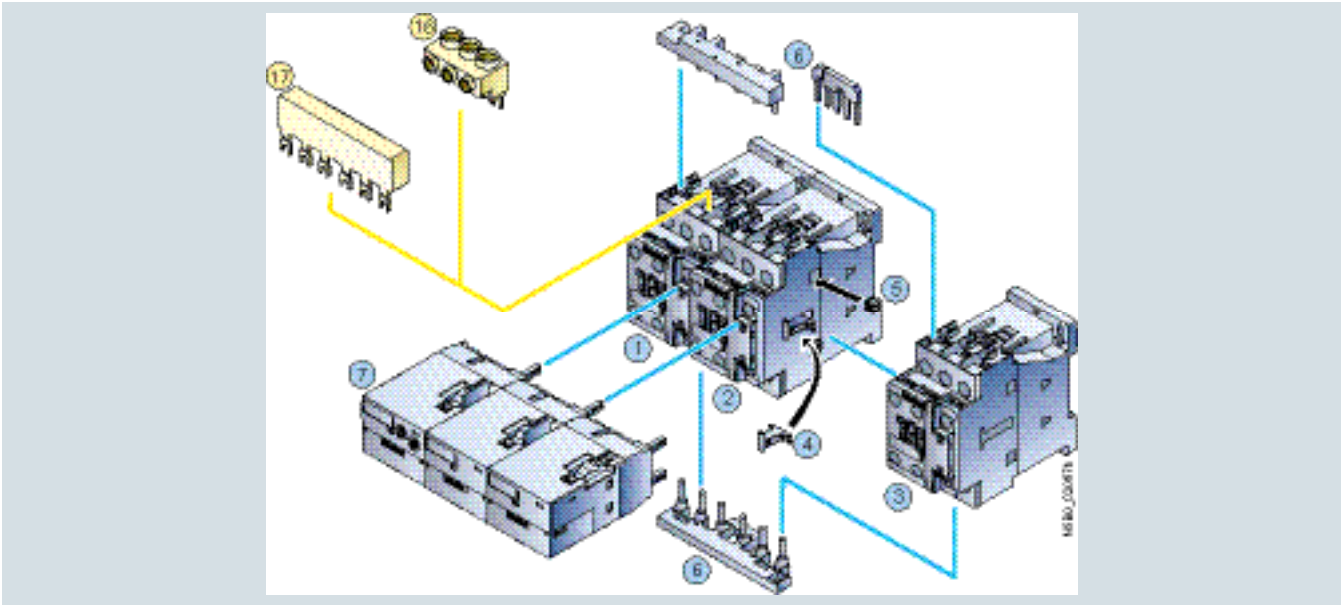
Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA24 contactor assemblies for wye-delta starting

Fully wired and tested contactor assemblies · Size S0-S0-S0 · up to 22 kW

The figure shows the version with screw terminals



Mountable accessories			Fully wired and tested contactor assemblies				
Individual parts	Order No.	Page	Individual parts	Order No.			Page
16 Three-phase feeder terminal ¹⁾	3RV29 25-5AB	2/82	1 2 3 Contactor, 11 kW	3RT20 24	Q11	Q13	Q12
17 Three-phase busbar ¹⁾	3RV19 15-1AB	2/82	1 2 3 Contactor, 15/18.5 kW	3RT20 26	3RT20 24	3RT20 24	2/25
			1 2 3 Contactor, 22 kW	3RT20 27	3RT20 26	3RT20 26	2/25
			4 5 6 Assembly kit	3RA29 23-2BB1			2/82
			The assembly kit contains:				
			4	Mechanical interlock			
			5	Connecting clips			
			6	Wiring modules on the top and bottom for connecting the main current paths			
			7	Function modules for wye-delta starting 3RA28 16-0EW20			

1) The parts 16 and 17 Can only be mounted with contactors with screw terminal.

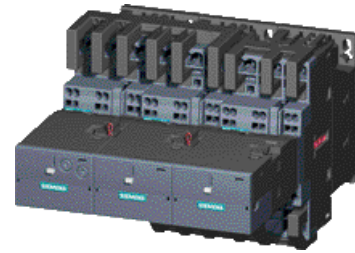
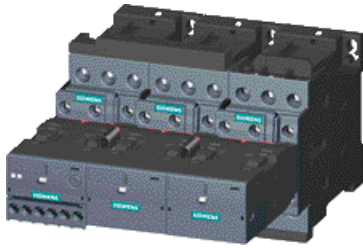
Note:
When using the function modules for contactor assemblies for wye-delta starting, no other auxiliary switches are allowed to be connected to the basic units.

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA24 contactor assemblies
for wye-delta starting

Fully wired and tested contactor assemblies · Size 50-50-50 · up to 22 kW



3RA24 2.-8XE32-1BB4

3RA24 2.-8XF32-1A . 2

3RA24 2.-8XF32-2A . 2

Rated data AC-3					Rated control supply voltage U_s ¹⁾	Screw terminals		Spring-type terminals	
Operational current I_e up to 415 V	Rating of induction motors at 50 Hz and					Order No.		Order No.	
	230 V	415 V	500 V	690 V					
A	kW	kW	kW	kW	V				
AC operation, 50/60 Hz									
25	7.1	11	15.6	19	24 AC 110 AC 230 AC	3RA24 23-8XF32-1AC2 3RA24 23-8XF32-1AG2 3RA24 23-8XF32-1AL2		3RA24 23-8XF32-2AC2 3RA24 23-8XF32-2AG2 3RA24 23-8XF32-2AL2	
32 / 40	11.4	15 / 18.5	19	19	24 AC 110 AC 230 AC	3RA24 25-8XF32-1AC2 3RA24 25-8XF32-1AG2 3RA24 25-8XF32-1AL2		3RA24 25-8XF32-2AC2 3RA24 25-8XF32-2AG2 3RA24 25-8XF32-2AL2	
50	—	22	19	19	24 AC 110 AC 230 AC	3RA24 26-8XF32-1AC2 3RA24 26-8XF32-1AG2 3RA24 26-8XF32-1AL2		3RA24 26-8XF32-2AC2 3RA24 26-8XF32-2AG2 3RA24 26-8XF32-2AL2	
DC operation									
25	7.1	11	15.6	19	24 DC	3RA24 23-8XF32-1BB4		3RA24 23-8XF32-2BB4	
32 / 40	11.4	15 / 18.5	19	19	24 DC	3RA24 25-8XF32-1BB4		3RA24 25-8XF32-2BB4	
50	—	22	19	19	24 DC	3RA24 26-8XF32-1BB4		3RA24 26-8XF32-2BB4	
For IO-Link connection									
25	7.1	11	15.6	19	24 DC	3RA24 23-8XE32-1BB4		3RA24 23-8XE32-2BB4	
32 / 40	11.4	15 / 18.5	19	19	24 DC	3RA24 25-8XE32-1BB4		3RA24 25-8XE32-2BB4	
50	—	22	19	19	24 DC	3RA24 26-8XE32-1BB4		3RA24 26-8XE32-2BB4	
For AS-Interface connection									
25	7.1	11	15.6	19	24 DC	3RA24 23-8XH32-1BB4		3RA24 23-8XH32-2BB4	
32 / 40	11.4	15 / 18.5	19	19	24 DC	3RA24 25-8XH32-1BB4		3RA24 25-8XH32-2BB4	
50	—	22	19	19	24 DC	3RA24 26-8XH32-1BB4		3RA24 26-8XH32-2BB4	

1) Coil operating range at 50 Hz:
0.8 ... 1.1 x U_s ; at 60 Hz: 0.85 ... 1.1 x U_s .

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA24 contactor assemblies for wye-delta starting

Components for customer assembly



3RA29 23-2BB1



3RA29 23-2BB2

For contactors	Size	Version	Screw terminals 	Spring-type terminals 
Type			Order No.	Order No.
Assembly kits¹⁾ for making 3-pole contactor assemblies				
3RT20 1	S00	The assembly kit contains: mechanical interlock, 4 connecting clips, star jumper, wiring modules on the top and bottom • For main, auxiliary and control circuits	3RA29 13-2BB1	3RA29 13-2BB2
3RT20 2	S0	The assembly kit contains: mechanical interlock, 4 connecting clips, star jumper, wiring modules on the top and bottom • For main, auxiliary and control circuits • Only for main circuit ²⁾	3RA29 23-2BB1 —	— 3RA29 23-2BB2



3RV29 25-5AB



3RV19 15-1AB



3RT19 16-4BA31



3RT29 16-4BA32

Three-phase feeder terminals				
		Feeder terminal blocks for the line contactor for large conductor cross-sections		
3RT20 1	S00	• Conductor cross-section 6 mm ²	3RA29 13-3K	—
3RT20 2	S0	• Conductor cross-section 16 mm ²	3RV29 25-5AB	—
Three-phase busbars				
3RT20 2	S0	Bridging phase-by-phase of all input terminals of the line contactor (Q11) and the delta contactor (Q13)	3RV19 15-1AB	—
Links for paralleling, 3-pole (star jumpers)				
3RT20 1	S00	Without connection terminal	3RT19 16-4BA31	3RT29 16-4BA32
3RT20 2	S0	(the links for paralleling can be reduced by one pole)	3RT19 26-4BA31	3RT29 26-4BA32

- When using the function modules for wye-delta starting, the wiring modules for the auxiliary current are not required.
- Version in size S0 with spring-type terminals:
Only the wiring modules for the main circuit are included.
No connectors are included for the auxiliary and control circuit.

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA24 contactor assemblies
for wye-delta starting

Components for customer assembly



3RA28 16-0EW20



3RA27 12-1CA00



3RA27 11-2CA00

For contactors	Size	Version	Screw terminals 	Spring-type terminals 
Type			Order No.	Order No.
Function modules for wye-delta starting				
3RT20 1, 3RT20 2	S00, S0	Comprising one basic module and two coupling modules Rated control supply voltage 24 ... 240 V AC/DC Time setting range 0.5 ... 60 s (10, 30, 60 s selectable)	3RA28 16-0EW20	3RA28 16-0EW20
Accessories for 3RA28 function modules				
3RT20 1, 3RT20 2	S00, S0	Sealable covers	3RA29 10-0	3RA29 10-0
Function modules for wye-delta starting for connection to the control system				
3RT20 1, 3RT20 2	S00, S0	IO-Link connection Comprising one basic module and two coupling modules, plus an additional module connector for assembling an IO-Link group	3RA27 11-1CA00	3RA27 11-2CA00
3RT20 1, 3RT20 2	S00, S0	AS-Interface connection Comprising one basic module and two coupling modules	3RA27 12-1CA00	3RA27 12-2CA00
Accessories for 3RA27 function modules				
Module connectors				
3RT20 1, 3RT20 2	S00, S0	14-pole, 8 cm long • For size jump S00-S0 + 1 space	3RA27 11-0EE02	3RA27 11-0EE02
3RT20 1, 3RT20 2	S00, S0	14-pole, 21 cm long • For diverse space combinations	3RA27 11-0EE03	3RA27 11-0EE03
3RT20 1, 3RT20 2	S00, S0	10-pole, 8 cm long • For separate auxiliary voltage supply within an IO-Link group	3RA27 11-0EE04	3RA27 11-0EE04
3RT20 1, 3RT20 2	S00, S0	Sealable covers	3RA29 10-0	3RA29 10-0

Note:

When using the function modules for contactor assemblies for wye-delta starting, no other auxiliary switches are allowed to be connected to the basic units.

Contactors Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA14 contactor assemblies for wye-delta starting

Overview

These 3RA14 contactor assemblies for wye-delta starting are designed for standard applications.

Note:

Contactor assemblies for wye-delta starting in special applications such as very heavy starting¹⁾ or wye-delta starting of special motors must be customized. Help with designing such special applications is available from Technical Assistance.

The 3RA14 contactor assemblies for wye-delta starting can be ordered as follows:

- **Sizes S2 and S3:**
Fully wired and tested, with electrical interlock, reversing time up to 10 s.
- **Sizes S2 to S12:**
As individual parts for customer assembly.

A dead interval of 50 ms on reversing is already integrated in the time relay function.

There is also a range of accessories (auxiliary switch blocks, surge suppressors, etc.) that must be ordered separately.

For overload relays for motor protection see "Protection Equipment" → "Overload Relays" → "SIRIUS 3RB2 Solid-State Overload Relays".

The 3RA14 contactor assemblies have screw terminals and are suitable for screw and snap-on mounting onto 35 mm standard mounting rails.

Fully wired and tested 3RA14 contactor assemblies have one unassigned NO contact which is mounted onto the front of the K3 delta contactor.

With the preassembled contactor assembly sizes S2 and S3, 11 to 75 kW, a timing relay is mounted on the side.

Rated data at 50 Hz 415 V AC			Size			Order No. complete
Rating P kW	Operational current I_e A	Motor current A		Line/delta contactor	Star contactor	
22	50	31 ... 43	S2-S2-S0	3RT10 34	3RT10 26	3RA14 34-8XC21-1 . . .
30	50	48.3 ... 65		3RT10 34		—
37	80	62.1 ... 77.8	S2-S2-S2		3RT10 34	3RA14 35-8XC21-1 . . .
45	86	69 ... 86		3RT10 36		3RA14 36-8XC21-1 . . .
55	115	77.6 ... 108.6	S3-S3-S2	3RT10 44	3RT10 35	3RA14 44-8XC21-1 . . .
75	150	120.7 ... 150		3RT10 45	3RT10 36	3RA14 45-8XC21-1 . . .
90	160	86 ... 160	S6-S6-S3	3RT10 54	3RT10 44	—
110	195	86 ... 195				
132	230	86 ... 230		3RT10 55	3RT10 45	
160	280	86 ... 280		3RT10 56	3RT10 46	
200	350	95 ... 350	S10-S10-S6	3RT10 64	3RT10 54	—
250	430	95 ... 430		3RT10 65	3RT10 55	
315	540	277 ... 540	S12-S12-S10	3RT10 75	3RT10 64	—
355	610	277 ... 610				
400	690	277 ... 690			3RT10 65	
500	850	277 ... 850		3RT10 76	3RT10 66	

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA14 contactor assemblies for wye-delta starting

Components for customer assembly

Assembly kits with wiring modules and, if necessary, mechanical connectors are available for contactor assemblies for wye-delta starting. Contactors, overload relays, wye-delta timing relays, auxiliary switches for electrical interlock – if required also feeder terminals, mechanical interlocks and base plates – must be ordered separately.

In the case of sizes S2 to S12 only the bottom main conducting path connection between the delta and star contactors is included in the wiring module, owing to the larger conductor cross-section at the infeed.

Motor protection

Overload relays or thermistor motor protection releases can be used for overload protection.

The overload relay can be either mounted onto the line contactor or separately fitted. It must be set to 0.58 times the rated motor current.

P kW	Accessories for customer assembly					Overload relay, thermal (CLASS 10 trip class)		Overload relay, solid-state (CLASS 10 trip class)	
	Timing relays	Assembly kit A, for double infeed	Assembly kit B, for single infeed	Star jumper	Base plates	Setting range A	Order No.	Setting range A	Order No.
22 30	3RP15 74-1N . 30	3RA19 33-2C ¹⁾	3RV19 35-1A	3RT19 26-4BA31	3RA19 32-2E	18 ... 25 28 ... 40	3RU11 36-4DB0 3RU11 36-4FB0	12.5 ... 50	3RB20 36-1UB0
37 45	3RP15 74-1N . 30	3RA19 33-2B ¹⁾	3RV19 35-1A	3RT19 36-4BA31	3RA19 32-2F	36 ... 45 40 ... 50	3RU11 36-4GB0 3RU11 36-4HB0	12.5 ... 50	3RB20 36-1UB0
55 75	3RP15 74-1N . 30	3RA19 43-2C ¹⁾	—	3RT19 36-4BA31	3RA19 42-2E	45 ... 63 70 ... 90	3RU11 46-4JB0 3RU11 46-4LB0	25 ... 100	3RB20 46-1EB0
90 110 132 160	3RP15 74-1N . 30	—	3RA19 53-3D ²⁾	3RT19 46-4BA31	3RA19 52-2E	—	—	50 ... 200	3RB20 56-1FC2
200 250	3RP15 74-1N . 30	—	—	3RT19 56-4BA31	3RA19 62-2E	—	—	55 ... 250 160 ... 630	3RB20 66-1GC2 3RB20 66-1MC2
315 355 400 500	3RP15 74-1N . 30	—	—	3RT19 66-4BA31	3RA19 72-2E	—	—	160 ... 630	3RB20 66-1MC2

1) Assembly kit contains wiring module on the bottom (connection between delta and star contactor) and star jumper.

2) Wiring module on top from reversing contactor assembly (note conductor cross-sections).

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA14 contactor assemblies for wye-delta starting

Technical specifications

All technical specifications not mentioned in the table below are identical to those of the individual 3RT1 contactors and 3RU1 overload relays

Type			3RA14 35	3RA14 36	3RA14 44	3RA14 45
Size			S2-S2-S2	S2-S2-S2	S3-S3-S2	S3-S3-S2
Dimensions (W x H x D) with base plate						
• DC operation			198 x 140 x 184		218 x 180 x 207	
• AC operation			198 x 140 x 169		218 x 180 x 194	
			mm			
			mm			
General data						
Individual contactors						
• Q1 line contactor	Type		3RT10 35	3RT10 36	3RT10 44	3RT10 45
• Q3 delta contactor	Type		3RT10 35	3RT10 36	3RT10 44	3RT10 45
• Q2 star contactor	Type		3RT10 34	3RT10 34	3RT10 35	3RT10 36
Mechanical endurance		Operating cycles	3 million			
Short-circuit protection						
Main circuit without overload relays ¹⁾						
Fuse links gG						
Type NH 3NA, DIAZED 5SB, NEOZED 5SE, with single or double infeed						
Highest rated current of the fuse acc. to IEC 60947-4-1/EN 60947-4-1						
• Type of coordination "1"	A		125	160	250	250
• Type of coordination "2"	A		63	80	125	160
Control circuit						
• Fuse links gG	A		10			
• Type DIAZED 5SB, NEOZED 5SE (short-circuit current $I_k \leq 1$ kA)	A		6 ²⁾ , if the auxiliary contact of the overload relay is connected in the contactor coil circuit			
• Miniature circuit breaker with C characteristic	A		10			
	A		6 ²⁾ , if the auxiliary contact of the overload relay is connected in the contactor coil circuit			
Main circuit						
Current-carrying capacity with reversing time up to 10 s						
• Rated operational current I_e	At 400 V	A	80	86	115	150
	500 V	A	69.3	86	112.6	138.6
	690 V	A	69.3	69.3	98.7	138.6
• Rated power for induction motors at 50 Hz and 60 Hz and	At 230 V	kW	25.5	27.8	37	49
	400 V	kW	44	48	65	85
	500 V	kW	48	60	80	98
	690 V	kW	66	67	97	136
	1000 V	kW	—	—	—	—
• Switching frequency with overload relay		h ⁻¹	15	15	15	15
Current-carrying capacity with reversing time up to 15 s						
• Rated operational current I_e	At 400 V	A	57	67	97	106
	500 V	A	57	67	97	106
	690 V	A	57	67	97	106
• Rated power for induction motors at 50 Hz and 60 Hz and	At 230 V	kW	18.2	21.6	32	35
	400 V	kW	31.6	38	55	60
	500 V	kW	40	47	69	75
	690 V	kW	55	65	95	104
	1000 V	kW	—	—	—	—
• Switching frequency with overload relay		h ⁻¹	15	15	15	15
Current-carrying capacity with reversing time up to 20 s						
• Rated operational current I_e	At 400 V	A	51	57	85	92
	500 V	A	51	57	85	92
	690 V	A	51	57	85	92
• Rated power for induction motors at 50 Hz and 60 Hz and	At 230 V	kW	16.3	18.4	28	30
	400 V	kW	28	32	48	52
	500 V	kW	35	40	60	65
	690 V	kW	49	55	83	90
	1000 V	kW	—	—	—	—
• Switching frequency with overload relay		h ⁻¹	15	15	15	15

1) For short-circuit protection with overload relays see "Protection Equipment" —> "Overload Relays" —> "SIRIUS 3RB2 Solid-State Overload Relays".

2) Up to $I_k < 0.5$ kA; ≤ 260 V.

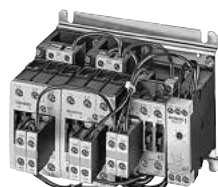
Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA14 contactor assemblies
for wye-delta starting

Selection and ordering data

Fully wired and tested contactor assemblies · Size S2-S2-S0 · up to 30 kW



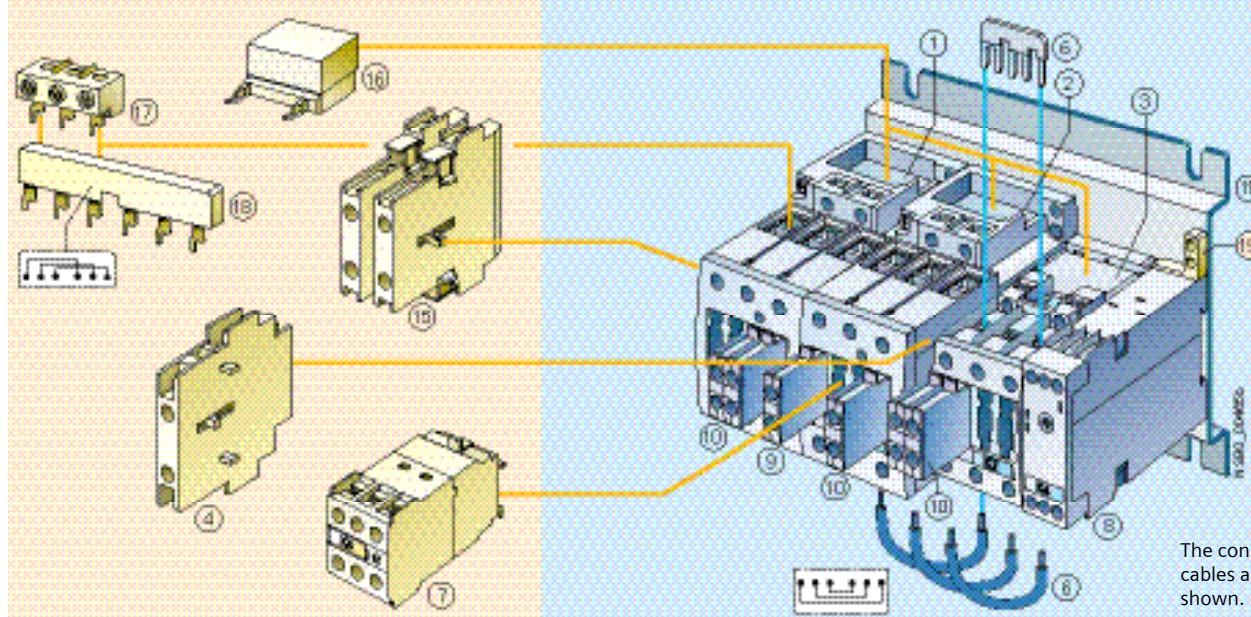
3RA14 34-8XC21-1 . . .

Rated data AC-3					Rated control supply voltage U_s ¹⁾	Screw terminals	
Operational current I_e up to 415 V	Ratings of induction motors at 50 Hz and					Order No.	
	230 V	415 V	500 V	690 V			
A	kW	kW	kW	kW	V		
AC operation, 50/60 Hz							
50 / 65	19.6	22 / 30	35	34	230 AC	3RA14 34-8XC21-1AL2	
DC operation							
50 / 65	19.6	22 / 30	35	34	24 DC	3RA14 34-8XC21-1BB4	

1) Coil operating range at 50 Hz: 0.8 ... 1.1 x U_s ; at 60 Hz: 0.85 ... 1.1 x U_s .

Mountable accessories (to be ordered separately):

The fully wired and tested contactor assembly includes the following components:



The connecting cables are not shown.

Accessories	Order No.	Page	Individual parts	Order No.			Page
				K1	K3	K2	
④ Mechanical interlock, lateral Depth compensation required K3: 1.5 mm; K2: 0 mm ¹⁾	3RA19 24-2B	2/72	①②③ Contactors, 22/30 kW	3RT10 34	3RT10 34	3RT10 26	2/45
⑦ Solid-state time-delay auxiliary switch block, front ²⁾	3RT19 26-2G . . .	2/172	⑧ Timing relay, lateral	3RP15 74-1N . 30			2/176
⑮ Auxiliary switch block, lateral	3RH19 21-1EA . .	2/177	⑨ Auxiliary switch block with 1 unassigned NO contact	3RH19 21-1CA10			2/176
⑯ Surge suppressors	3RT19 26-1 3RT19 36-1	2/179 2/179	⑩ Auxiliary switch block for local control	3RH19 21-1CA01 3RH19 21-1CA10			2/176 2/176
⑰ 3-phase feeder terminal	3RV19 35-5A	2/90	⑪ Base plate	3RA19 32-2E			2/90
⑱ 3-phase busbars	3RV19 35-1A	2/90	⑫ Installation kit	3RA19 33-2C			2/90
⑲ Push-in lug ³⁾ for timing relay screw mounting	3RP19 03	Chap 6	The installation kit contains the star jumper on the top and the wiring module on the bottom for connecting the main current paths.				

1) Use the 3RA19 32-2B base plate for this configuration.

2) Generally possible. If a solid-state time-delay auxiliary switch block is mounted onto the front of K3, a standard auxiliary switch block can only be mounted onto the side.

3) Not part of the scope of supply of the preassembled contactor assemblies; can be ordered as an accessory.

Contactors Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA14 contactor assemblies for wye-delta starting

Fully wired and tested contactor assemblies · Size S2-S2-S2 · up to 45 kW



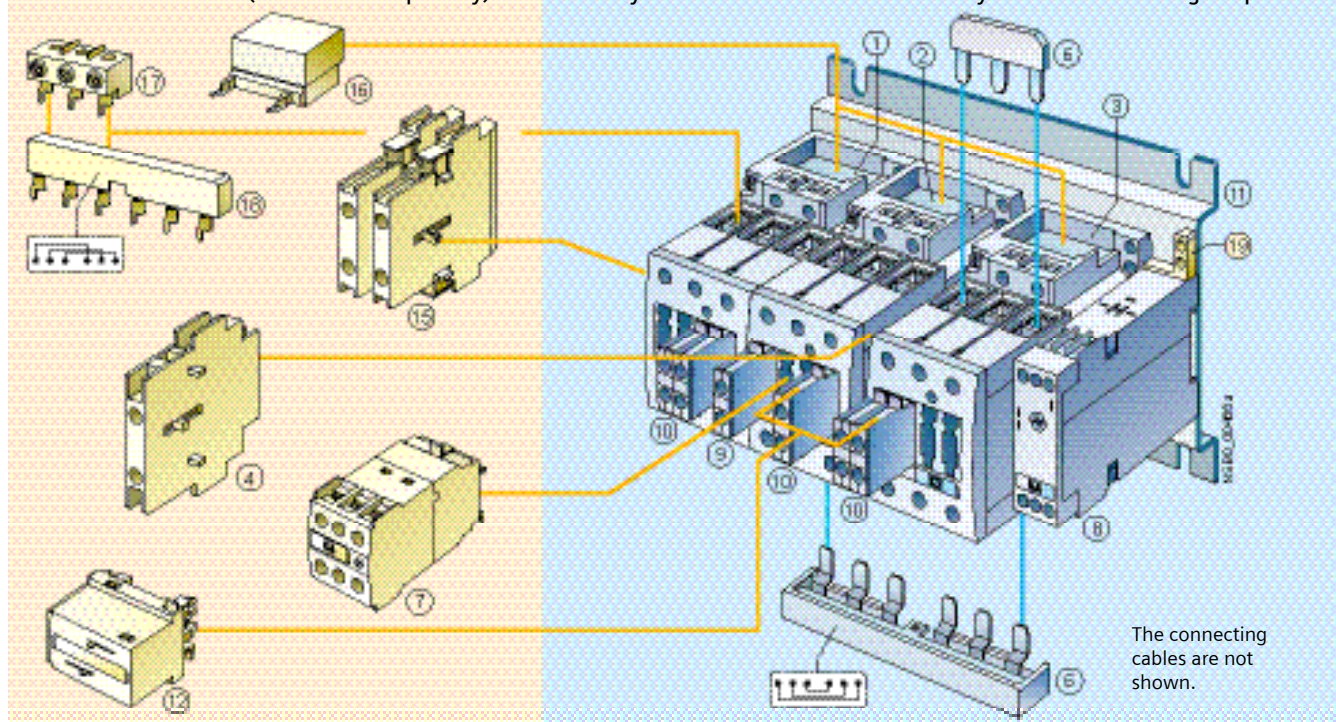
3RA14 3...-8XC21-1...

1) Coil operating range at 50 Hz: 0.8 ... 1.1 x U_s ; at 60 Hz: 0.85 ... 1.1 x U_s .

Rated data AC-3					Rated control supply voltage U_s ¹⁾	Screw terminals	
Operational current I_e up to 415 V	Ratings of induction motors at 50 Hz and					Order No.	
	230 V	415 V	500 V	690 V			
A	kW	kW	kW	kW	V		
AC operation, 50/60 Hz							
80	25	37	51	63	230 AC	3RA14 35-8XC21-1AL2	
86	27	45	55	63	230 AC	3RA14 36-8XC21-1AL2	
DC operation							
80	25	37	51	63	24 DC	3RA14 35-8XC21-1BB4	
86	27	45	55	63	24 DC	3RA14 36-8XC21-1BB4	

Mountable accessories (to be ordered separately):

The fully wired and tested contactor assembly includes the following components:



Accessories	Order No.	Page	Individual parts	Order No.			Page
				K1	K3	K2	
④ Mechanical interlock, lateral	3RA19 24-2B	2/72	① ② ③ Contactors, 37 kW	3RT10 35	3RT10 35	3RT10 34	2/45
⑦ Solid-state time-delay auxiliary switch block, front ¹⁾	3RT19 26-2G ...	2/172	① ② ③ Contactors, 45 kW	3RT10 36	3RT10 36	3RT10 34	2/45
⑫ Mechanical interlock, front	3RA19 24-1A	2/72	⑧ Timing relay, lateral	3RP15 74-1N . 30			2/176
⑮ Auxiliary switch block, lateral	3RH19 21-1EA ..	2/177	⑨ Auxiliary switch block with 1 unassigned NO contact	3RH19 21-1CA10			2/176
⑯ Surge suppressors	3RT19 26-1 ... 3RT19 36-1	2/179 2/179	⑩ Auxiliary switch block for local control	3RH19 21-1CA01 3RH19 21-1CA10			2/176 2/176
⑰ 3-phase feeder terminals	3RV19 35-5A	2/90	⑪ Base plate	3RA19 32-2F			2/90
⑱ 3-phase busbars	3RV19 35-1A	2/90	⑥ Installation kit	3RA19 33-2B			2/90
⑲ Push-in lug ²⁾ for timing relay screw mounting	3RP19 03	Chap 6	The installation kit contains the star jumper on the top and the wiring module on the bottom for connecting the main current paths.				

1) Generally possible. If a solid-state time-delay auxiliary switch block is mounted onto the front of K3, a standard auxiliary switch block can only be mounted onto the side.

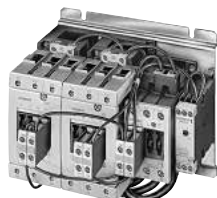
2) Not part of the scope of supply of the preassembled contactor assemblies; can be ordered as an accessory.

Contactors Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

**SIRIUS 3RA14 contactor assemblies
for wye-delta starting**

Fully wired and tested contactor assemblies · Size S2-S3-S2 · up to 75 kW



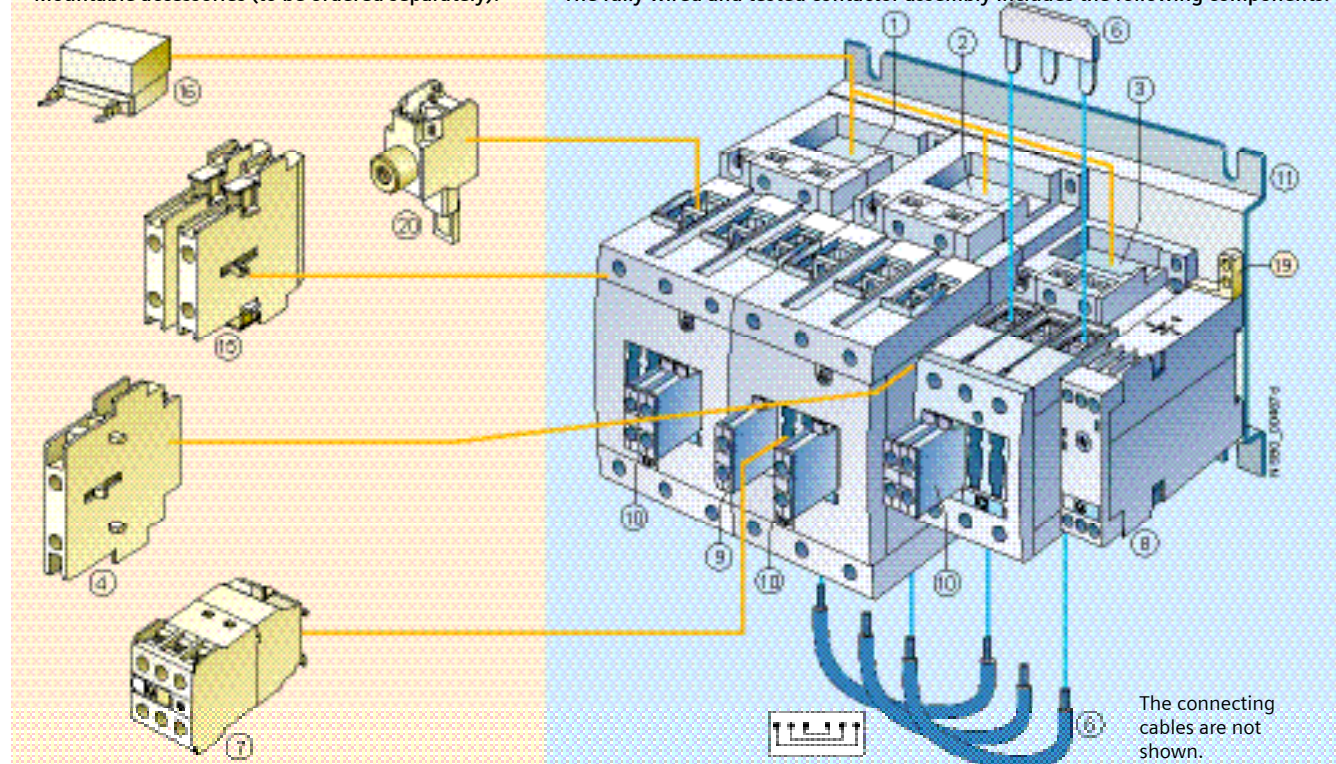
3RA14 4...8XC21-1...

Rated data AC-3					Rated control supply voltage U_s ¹⁾	Screw terminals
Operational current I_e up to 415 V	Ratings of induction motors at 50 Hz and					Order No.
	230 V	415 V	500 V	690 V		
A	kW	kW	kW	kW	V	
AC operation, 50/60 Hz						
115	37	55	81	93	230 AC	3RA14 44-8XC21-1AL2
150	47	75	103	110	230 AC	3RA14 45-8XC21-1AL2
DC operation						
115	37	55	81	93	24 DC	3RA14 44-8XC21-1BB4
150	47	75	103	110	24 DC	3RA14 45-8XC21-1BB4

1) Coil operating range at 50 Hz: 0.8 ... 1.1 x U_s ; at 60 Hz: 0.85 ... 1.1 x U_s .

Mountable accessories (to be ordered separately):

The fully wired and tested contactor assembly includes the following components:



Accessories		Order No.	Page	Individual parts		Order No.			Page
						K1	K3	K2	
④	Mechanical interlock, lateral Depth compensation required K3: 0 mm; K2: 27.5 mm ¹⁾	3RA19 24-2B	2/72	①②③	Contactors, 55 kW	3RT10 44	3RT10 44	3RT10 35	2/45
				①②③	Contactors, 75 kW	3RT10 45	3RT10 45	3RT10 36	2/45
⑦	Solid-state time-delay auxiliary switch block, front ²⁾	3RT19 26-2G . . .	2/178	⑧	Timing relay, lateral	3RP15 74-1N . 30			
⑮	Auxiliary switch block, lateral	3RH19 21-1EA . .	2/177	⑨	Auxiliary switch block with 1 unassigned NO contact	3RH19 21-1CA10			2/176
⑮	Surge suppressors	3RT19 . 6-1	2/179	⑩	Auxiliary switch block for local control				
⑰	Push-in lug ³⁾ for timing relay screw mounting	3RP19 03	Chap 6		2 units	3RH19 21-1CA01			2/176
					3 units	3RH19 21-1CA10			2/176
⑳	1-phase feeder terminal	3RA19 43-3L	2/90	⑪	Base plate	3RA19 42-2E			2/90
				⑥	Installation kit	3RA19 43-2C			2/90

1) Use the 3RA19 42-2B base plate for this configuration.

2) Generally possible. If a solid-state time-delay auxiliary switch block is mounted onto the front of K3, a standard auxiliary switch block can only be mounted onto the side.

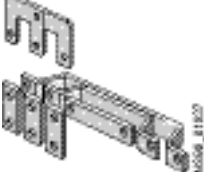
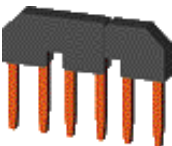
3) Not part of the scope of supply of the preassembled contactor assemblies; can be ordered as an accessory.

Contactor Assemblies

3RA23, 3RA13, 3RA24, 3RA14 Contactor Assemblies

SIRIUS 3RA14 contactor assemblies for wye-delta starting

Components for customer assembly

	Version	Size	Order No.
Assembly kits			
 3RA19 53-2B  3RA19 53-2N, 3RA19 63-2B, 3RA19 73-2B	The assembly kit contains: star jumper, wiring module on the bottom	S2-S2-S0 S2-S2-S2 S3-S3-S2 S3-S3-S3 S6-S6-S6 S6-S6-S6 S10-S10-S10 S12-S12-S12	3RA19 33-2C 3RA19 33-2B 3RA19 43-2C 3RA19 43-2B 3RA19 53-2B 3RA19 53-2N 3RA19 63-2B 3RA19 73-2B
Single-phase feeder terminals			
	Conductor cross-section: 95 mm²	S3	3RA19 43-3L
Three-phase feeder terminals			
	Feeder terminal block for the line contactor for large conductor cross-sections		
	Conductor cross-section: 50 mm²	S2	3RV19 35-5A
Three-phase busbars			
	Bridging phase-by-phase of all input terminals of the line contactor (K1) and the delta contactor (K3)		
		S2	3RV19 35-1A
Links for paralleling, 3-pole (star jumpers)			
 3RT19 26-4BA31	Without connection terminal (the links for paralleling can be reduced by one pole)	S2	3RT19 36-4BA31
		S3	3RT19 46-4BA31
		S6 ¹⁾	3RT19 56-4BA31
		S10, S12 ¹⁾	3RT19 66-4BA31
Base plates			
	For customer assembly of contactor assemblies for wye-delta starting with a laterally mounted timing relay		
	Side-by-side mounting	S2, S2, S0	3RA19 32-2E
	10 mm distance between K3 and K2	S2, S2, S2	3RA19 32-2F
	Side-by-side mounting	S3, S3, S2	3RA19 42-2E
	10 mm distance between K1, K3 and K2	S6, S6, S3 S6, S6, S6 S10, S10, S6 S10, S10, S10 S12, S12, S10 S12, S12, S12	3RA19 52-2E 3RA19 52-2F 3RA19 62-2E 3RA19 62-2F 3RA19 72-2E 3RA19 72-2F
	For customer assembly of contactor assemblies for wye-delta starting with a front-mounted timing relay, 10 mm distance between K1, K3 and K2	S2, S2, S0 S2, S2, S2 S3, S3, S2	3RA19 32-2B 3RA19 32-2B 3RA19 42-2B

1) The 3RT19 56-4EA1 (S6) or 3RT19 66-4EA1 (S10, S12) cover can be used for touch protection.

Overview

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1,
IEC 60947-5-1, EN 60947-5-1 (auxiliary switches)

The contactors are suitable for use in any climate. They are finger-safe according to EN 50274.

3RT14 contactors are used for switching resistive loads (AC-1) or as contactors, for example for variable-speed operating mechanisms that normally only have to carry the current.

Size S3: AC or DC operation

Sizes S6 to S12: AC/DC operation

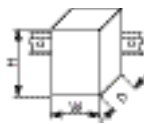
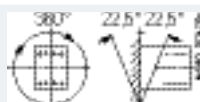
The following applies for sizes S6 to S12:

- Withdrawable coils
- Integrated coil circuit (varistor)
- Main conductors: busbar connections
- Auxiliary and control conductors: Screw terminals

The accessories for the 3RT10 contactors can also be used here.

For more detailed descriptions about the sizes S3 to S12, see "3RT10 Contactors, 3-pole, 3 to 250 kW".

Technical specifications

Type		3RT14 46	3RT14 56	3RT14 66	3RT14 76
Size		S3	S6	S10	S12
Dimensions (W x H x D)	mm	70 x 146 x 134	120 x 172 x 170	145 x 210 x 202	160 x 214 x 225
• With mounted auxiliary switch block	mm	70 x 146 x 183	120 x 172 x 217	145 x 210 x 251	160 x 214 x 271
					
General data					
Permissible mounting positions					
The contactors are designed for operation on a vertical mounting surface.					
Mechanical endurance	Operating cycles	10 million			
Electrical endurance in operating cycles	Operating cycles	0.5 million			
Utilization category AC-1 at I_e					
Rated insulation voltage U_i (pollution degree 3)	V	1 000			
Rated impulse withstand voltage U_{imp}	kV	6	8		
Protective separation between the coil and the main contacts acc. to EN 60947-1, Appendix N	V	690			
Mirror contacts					
A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.					
• Removable auxiliary switch block		Yes, acc. to EN 60947-4-1, Appendix F			
Permissible ambient temperature					
• During operation	°C	-25 ... +60	-25 ... +60		
• During storage	°C	-55 ... +80	-55 ... +80		
Degree of protection acc. to EN 60947-1, Appendix C		IP20 (terminal compartment IP00), AC coil assembly IP40, DC coil assembly IP30	IP00/open, coil assembly IP20		
Touch protection acc.to EN 50274		Finger-safe	Finger-safe with cover		
Shock resistance					
• Rectangular pulse, for AC and DC operation	g/ms	6.8/5 and 4/10	8.5/5 and 4.2/10		
• Sine pulse, for AC and DC operation	g/ms	10.6/5 and 6.2/10	13.4/5 and 6.5/10		
Conductor cross-sections		1)	1)		

1) For conductor cross-sections see pages 2/94 to 2/95.

Contactors for Special Applications

SIRIUS 3RT14 contactors for resistive loads (AC-1), 3-pole, 140 ... 690 A

Contactor	Type Size	3RT14 46 S3	3RT14 56 S6	3RT14 66 S10	3RT14 76 S12
Short-circuit protection for contactors without overload relays					
Main circuit					
• Fuse links, operational class gG, LV HRC, 3NA - Type of coordination "1"	A	250	355	500	800
• Fuse links, gR operational class, SITOR 3NE - Type of coordination "2"	A	250	350	500	710
Auxiliary circuit					
• Fuse links gG (weld-free protection at $I_k \geq 1$ kA) Type DIAZED 5SB, NEOZED 5SE	A	10			
• Or miniature circuit breakers with C characteristic ($I_k < 400$ A)	A	10			
Control circuit					
Coil operating range (AC/DC)		0.8 ... 1.1 x U_s		0.8 x $U_{s \min}$... 1.1 x $U_{s \max}$	
Power consumption of the solenoid coils (when coil is cold and 1.0 x U_s)					
Standard version:					
• AC operation, 50 Hz	Closing	VA	270	—	
	P.f.		0.68	—	
	Closed	VA	22	—	
	P.f.		0.27	—	
• AC operation, 50/60 Hz	Closing	VA	298/274	—	
	P.f.		0.7/0.62	—	
	Closed	VA	27/20	—	
	P.f.		0.29/0.31	—	
• DC operation	Closing = Closed	W	15	—	
Operating times for 0.8 ... 1.1 x $U_s^{1)}$ Total break time = Opening delay + Arcing time					
• AC operation	- Closing delay	ms	17 ... 90	—	—
	- Opening delay	ms	10 ... 25	—	—
• DC operation	- Closing delay	ms	90 ... 230	—	—
	- Opening delay	ms	14 ... 20	—	—
• Arcing time		ms	10 ... 15	—	—
Operating times for 1.0 x $U_s^{1)}$					
• AC operation	- Closing delay	ms	18 ... 30	—	—
	- Opening delay	ms	11 ... 23	—	—
• DC operation	- Closing delay	ms	100 ... 120	—	—
	- Opening delay	ms	16 ... 20	—	—

- 1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (varistor +2 ms to 5 ms, diode assembly: 2 to 6 times).

Contactors for Special Applications

SIRIUS 3RT14 contactors for resistive loads (AC-1), 3-pole, 140 ... 690 A

Contactor	Type	3RT14 46	3RT14 56	3RT14 66	3RT14 76
	Size	S3	S6	S10	S12
Control circuit					
Operating times (Total break time = Opening delay + Arcing time)					
• Conventional operating mechanisms					
- For $0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$	Closing delay	ms	20 ... 95	30 ... 95	45 ... 100
	Opening delay	ms	40 ... 60	40 ... 80	60 ... 100
- For $U_{s \min} \dots U_{s \max}$	Closing delay	ms	25 ... 50	35 ... 50	50 ... 70
	Opening delay	ms	40 ... 60	50 ... 80	70 ... 100
• Solid-state operating mechanism, actuated via A1/A2					
- For $0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$	Closing delay	ms	95 ... 135	105 ... 145	120 ... 150
	Opening delay	ms	80 ... 90	80 ... 200	80 ... 100
- For $U_{s \min} \dots U_{s \max}$	Closing delay	ms	100 ... 120	110 ... 130	125 ... 150
	Opening delay	ms	80 ... 90	80 ... 100	80 ... 100
• Solid-state operating mechanism, actuated via PLC input					
- For $0.8 \times U_{s \min} \dots 1.1 \times U_{s \max}$	Closing delay	ms	35 ... 75	45 ... 80	60 ... 90
	Opening delay	ms	80 ... 90	80 ... 100	80 ... 100
- For $U_{s \min} \dots U_{s \max}$	Closing delay	ms	40 ... 60	50 ... 65	65 ... 80
	Opening delay	ms	80 ... 90	80 ... 100	80 ... 100
• Arcing time	ms		10 ... 15	10 ... 15	10 ... 15

Contactor	Type	3RT14 46	3RT14 56	3RT14 66	3RT14 76	
	Size	S3	S6	S10	S12	
Main circuit						
AC capacity						
Utilization category AC-1, switching resistive loads						
• Rated operational currents I_e	At 40 °C up to 690 V	A	140	275	400	690
	At 60 °C up to 690 V	A	130	250	380	650 ¹⁾
	At 1000 V	A	60	100	150	250
• Rated power for AC loads ²⁾ with p.f.= 0.95 (at 60 °C)	At 415 V	kW	86	165	250	430
• Minimum conductor cross-section for loads with I_e	At 40 °C	mm ²	50	2 x 70	240	2 x 240
	At 60 °C	mm ²	50	120	240	2 x 240
Utilization categories AC-2 and AC-3						
With an electrical endurance of 1.3 million operating cycles						
• Rated operational current I_e	Up to 690 V	A	44	97	138	170
• Rated power for slipping or squirrel-cage motors at 50 and 60 Hz (at 60 °C)	At 230 V	kW	12.7	30	37	55
	400 V	kW	22	55	75	90
	500 V	kW	29.9	55	90	110
	690 V	kW	38.2	90	132	160
Power loss per conducting path	At I_e /AC-1	W	12.5	20	27	55
Switching frequency						
Switching frequency z in operating cycles/hour						
• Contactors without overload relays	No-load switching frequency AC	1/h	5 000			
	No-load switching frequency DC	1/h	1 000			
• Rated operation	Acc. to AC-1 (AC/DC)	1/h	650			
	Acc. to AC-3 (AC/DC)	1/h	1000			
Dependence of the switching frequency z' on the operational current I' and operational voltage U':z' = z · (I/I') · (400 V/U') ^{1.5} · 1/h.						

1) 600 A for 3RT14 76-N contactor.

2) Industrial furnaces and electric heaters with resistance heating, etc.
(increased power consumption on heating up has been taken into account).

Contactors for Special Applications

SIRIUS 3RT14 contactors for resistive loads (AC-1), 3-pole, 140 ... 690 A

Contactor	Type	3RT14 46
	Size	S3
Conductor cross-sections		
(1 or 2 conductors can be connected)	Main conductors: With box terminal	 Screw terminals
Front clamping point connected 	- Finely stranded with end sleeve mm² 2.5 ... 50 - Finely stranded without end sleeve mm² 4 ... 50 - Solid mm² 2.5 ... 16 - Stranded mm² 4 ... 70 - Ribbon cable conductors (number x width x thickness) mm 6 x 9 x 0.8 - AWG cables, solid or stranded AWG 10 ... 2/0	
Rear clamping point connected 	- Finely stranded with end sleeve mm² 2.5 ... 50 - Finely stranded without end sleeve mm² 10 ... 50 - Solid mm² 2.5 ... 16 - Stranded mm² 10 ... 70 - Ribbon cable conductors (number x width x thickness) mm 6 x 9 x 0.8 - AWG cables, solid or stranded AWG 10 ... 2/0	
Both clamping points connected 	- Finely stranded with end sleeve mm² max. 2 x 35 - Finely stranded without end sleeve mm² max. 2 x 35 - Solid mm² max. 2 x 16 - Stranded mm² max. 2 x 50 - Ribbon cable conductors (number x width x thickness) mm 2 x (6 x 9 x 0.8) - AWG cables, solid or stranded AWG 2 x (10 ... 1/0) - Terminal screws M6 (hexagon socket, A/F 4) - Tightening torque Nm 4 ... 6 - lb.in 36 ... 53	
Connection for drilled copper bars	Max. width ¹⁾ mm 10	
	Main conductors: Without box terminal with cable lugs ²⁾	
	- Finely stranded with cable lug mm² 10 ... 50³⁾ - Stranded with cable lug mm² 10 ... 70³⁾ - AWG cables, solid or stranded AWG 7 ... 1/0	
	Auxiliary conductors:	
	- Solid mm² 2 x (0.5 ... 1.5)⁴⁾; 2 x (0.75 ... 2.5)⁴⁾ acc. to IEC 60947; max. 2 x (0.75 ... 4) - Finely stranded with end sleeve mm² 2 x (0.5 ... 1.5)⁴⁾; 2 x (0.75 ... 2.5)⁴⁾ - AWG cables, solid or stranded AWG 2 x (20 ... 16); 2 x (18 ... 14); 1 x 12 - Terminal screws M3 - Tightening torque Nm 0.8 ... 1.2 - lb.in 7 ... 10.3	

- 1) If bars larger than 12 x 10 mm are connected, a 3RT19 46-4EA1 terminal cover is needed to comply with the phase clearance.
- 2) When connecting rails which are larger than 25 mm², the 3RT19 46-4EA1 terminal cover must be used to keep the phase clearance.
- 3) Only with crimped cable lugs according to DIN 46234. Cable lug max. 20 mm wide.
- 4) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Contactors for Special Applications

SIRIUS 3RT14 contactors for resistive loads (AC-1), 3-pole, 140 ... 690 A

Contactor	Type	3RT14 56	3RT14 66	3RT14 76
	Size	S6	S10	S12
Conductor cross-sections				
(1 or 2 conductors can be connected) Front or rear clamping point connected 	Main conductors		 Screw terminals	
	With 3RT19 55-4G box terminal			
	• Finely stranded with end sleeve	mm ²	10 ... 70	—
	• Finely stranded without end sleeve	mm ²	16 ... 70	—
	• Stranded	mm ²	16 ... 70	—
Both clamping points connected 	• AWG cables, solid or stranded	AWG	6 ... 2/0	—
	• Ribbon cable conductors (number x width x thickness)	mm	3 x 9 x 0.8 ... 6 x 15.5 x 0.8	—
	• Finely stranded with end sleeve	mm ²	1 x 50, 1 x 70	—
	• Finely stranded without end sleeve	mm ²	1 x 50, 1 x 70	—
	• Stranded	mm ²	2 x 70	—
Front clamping point connected 	• AWG cables, solid or stranded	AWG	2 x 1/0	—
	• Ribbon cable conductors (number x width x thickness)	mm	2 x (6 x 15.5 x 0.8)	—
	• Terminal screws		—	—
	- Tightening torque	Nm lb.in	—	—
	With 3RT19 56-4G box terminal			
Rear clamping point connected 	• Finely stranded with end sleeve	mm ²	10 ... 120	70 ... 240
	• Finely stranded without end sleeve	mm ²	16 ... 120	70 ... 240
	• Stranded	mm ²	16 ... 120	95 ... 300
	• AWG cables, solid or stranded	AWG	6 ... 250 kcmil	3/0 ... 600 kcmil
	• Ribbon cable conductors (number x width x thickness)	mm	3 x 9 x 0.8 ... 10 x 15.5 x 0.8	Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5
Both clamping points connected 	• Finely stranded with end sleeve	mm ²	10 ... 120	120 ... 185
	• Finely stranded without end sleeve	mm ²	16 ... 120	120 ... 185
	• Stranded	mm ²	16 ... 120	120 ... 240
	• AWG cables, solid or stranded	AWG	6 ... 250 kcmil	250 ... 500 kcmil
	• Ribbon cable conductors (number x width x thickness)	mm	3 x 9 x 0.8 ... 10 x 15.5 x 0.8	Min. 6 x 9 x 0.8, max. 20 x 24 x 0.5
	• Finely stranded with end sleeve	mm ²	Max. 1 x 95, 1 x 120	Min. 2 x 50, max. 2 x 185
	• Finely stranded without end sleeve	mm ²	Max. 1 x 95, 1 x 120	Min. 2 x 50, max. 2 x 185
	• Stranded	mm ²	Max. 2 x 120	Min. 2 x 70, max. 2 x 240
	• AWG cables, solid or stranded	AWG	Max. 2 x 3/0	Min. 2 x 2/0, max. 2 x 500 kcmil
	• Ribbon cable conductors (number x width x thickness)	mm	Max. 2 x (10 x 15.5 x 0.8)	Max. 2 x (20 x 24 x 0.5)
	• Terminal screws		M10 (hexagon socket, A/F4)	M12 (hexagon socket, A/F 5)
	- Tightening torque	Nm lb.in	10 ... 12 90 ... 110	20 ... 22 180 ... 195
	<u>Without box terminal/busbar connection</u>		1)	2)
	• Finely stranded with cable lug	mm ²	16 ... 95	50 ... 240
	• Stranded with cable lug	mm ²	25 ... 120	70 ... 240
	• AWG cables, solid or stranded	AWG	4 ... 250 kcmil	2/0 ... 500 kcmil
	• Connecting bar (max. width)	mm	17	25
	• Terminal screws		M8 x 25 (A/F 13)	M10 x 30 (A/F 17)
	- Tightening torque	Nm	10 ... 14 (90 ... 110) lb.in	14 ... 24 (124 ... 210) lb.in
	Auxiliary conductors			
	• Solid	mm ²	2 x (0.5 ... 1.5) ³⁾ ; 2 x (0.75 ... 2.5) ³⁾ according to IEC 60947; max. 2 x (0.75 ... 4)	
	• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5) ³⁾ ; 2 x (0.75 ... 2.5) ³⁾	
	• AWG cables, solid or stranded	AWG	2 x (18 ... 14)	
	• Terminal screws		M3 (PZ 2)	M3 (PZ 2)
	- Tightening torque	Nm lb.in	0.8 ... 1.2 7 ... 10.3	

1) When connecting cable lugs to DIN 46235, use 3RT19 56-4EA1 terminal cover for conductor cross-sections from 95 mm² to ensure phase spacing.

2) When connecting cable lugs to DIN 46234, the 3RT19 66-4EA1 terminal cover must be used for conductor cross-sections of 240 mm² and more as well as DIN 46235 for conductor cross-sections of 185 mm² and more to keep the phase clearance.

3) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Contactors for Special Applications

SIRIUS 3RT14 contactors for resistive loads (AC-1), 3-pole, 140 ... 690 A

Selection and ordering data

Size S3: AC or DC operation



3RT14 46-1A . . 0

Size	Rated data AC-1, T_u : 40 °C					Auxiliary contacts		Rated control supply voltage U_s	Screw terminals						
	Operational current I_e up to	Rating of AC loads (p f. = 0.95) at				Version			Order No.						
		690 V	230 V	415 V	500 V	690 V				V					
A									kW	kW	kW	kW	NO	NC	V
For screw and snap-on mounting onto TH 35 and TH 75 standard mounting rail															
AC operation															
Auxiliary switches can be retrofitted															
S3	140	53	92	115	159	—	—	24 AC, 50 Hz 110 AC, 50 Hz 230 AC, 50 Hz	3RT14 46-1AB00-8K 3RT14 46-1AF00-8K 3RT14 46-1AP00-8K						
DC operation · DC solenoid system															
Auxiliary switches can be retrofitted															
S3	140	53	92	115	159	—	—	24 DC 220 DC	3RT14 46-1BB40 3RT14 46-1BM40						

Other voltages on request.

For accessories, see page 2/176.

For spare parts, see page 2/183.

Contactors for Special Applications

**SIRIUS 3RT14 contactors for resistive loads
(AC-1), 3-pole, 140 ... 690 A**

Sizes S6 to S12: UC operation (AC/DC)

Integrated coil circuit (varistor)

Main conductors: Busbar connections

Auxiliary and control conductors: Screw terminals



3RT14 6.

Size	Rated data AC-1, T_u : 40 °C					Auxiliary contacts		Rated control supply voltage U_s	Screw terminals 	
	Operational current I_e up to	Rating of AC loads (p f. = 0.95) at				Version			Order No.	
		690 V	230 V	415 V	500 V	690 V				
	A	kW	kW	kW	kW	NO	NC	V		
Conventional operating mechanisms										
S6	275	105	180	225	310	2	2	110 ... 127 220 ... 240	3RT14 56-6AF36-8K 3RT14 56-6AP36-8K	
S10	400	151	263	329	454	2	2	110 ... 127 220 ... 240	3RT14 66-6AF36-8K 3RT14 66-6AP36-8K	
S12	690	261	454	568	783	2	2	110 ... 127 220 ... 240	3RT14 76-6AF36-8K 3RT14 76-6AP36-8K	

Other voltages on request.

For accessories, see page 2/176.

For spare parts, see page 2/183.

Contactors for Special Applications

SIRIUS 3RT23 contactors for resistive loads (AC-1), 4-pole, 4 NO, 18 ... 50 A

Overview

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1,
IEC 60947-5-1, EN 60947-5-1 (auxiliary switches)

The contactors are suitable for use in any climate. They are finger-safe according to EN 50274.

The accessories for the 3-pole SIRIUS 3RT20 contactors can also be used for the 4-pole versions.

Size S0 contactors have 2 auxiliary contacts 1 NO and 1 NC integrated in the basic unit.

Mountable auxiliary contacts

Size S00

4 auxiliary contacts, including no more than 3 NC.

Size S0

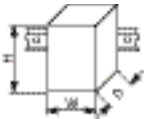
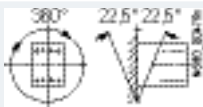
4 additional auxiliary contacts.

Application

The contactors are suitable for:

- Switching resistive loads
- Isolating systems with ungrounded or poorly grounded neutral conductors
- System transfers when alternative AC power supplies are used
- Use as contactors which only carry current and do not have to switch in case of inductive loads – e. g. variable-speed operating mechanisms
- Switching mixed loads in distribution systems (e. g. for supplying heaters, lamps, motors, PC power supply units) with p.f. > 0.8 according to IEC 60947-4-1, test conditions for -utilization category AC-1.

Technical specifications

Type		3RT23 16	3RT23 17	3RT23 25	3RT23 26	3RT23 27
Size		S00		S0		
Dimensions (W x H x D) ¹⁾		mm	45 x 57.5 x 73 / 45 x 70 x 73	60 x 85 x 97 / 60 x 101.5 x 97		
• With mounted auxiliary switch block		mm	45 x 57.5 x 116 / 45 x 70 x 121	60 x 85 x 141 / 60 x 101.5 x 144		
General data						
Permissible mounting positions						
The contactors are designed for operation on a vertical mounting surface.						
Mechanical endurance	Operating cycles	30 million		10 million		
Electrical endurance at I_e/AC-1	Operating cycles	Approx. 0.5 million				
Rated insulation voltage U_i (pollution degree 3)	V	690				
Permissible ambient temperature						
• During operation	°C	-25 ... +60				
• During storage	°C	-55 ... +80				
Degree of protection acc. to EN 60947-1, Appendix C						
• Device	A	IP20				IP20
• Connection range	A	—				IP00
Touch protection acc. to EN 50274		Finger-safe				
Short-circuit protection of contactors without overload relays						
Main circuit						
Fuse links, operational class gG : Type LV HRC 3NA, DIAZED 5SB, NEOZED 5SE						
Acc. to IEC 60947-4-1/EN 60947-4-1						
• Type of coordination "1" ¹⁾	A	35		63		
• Type of coordination "2" ¹⁾	A	20		20		
• Weld-free	A	10		16		

1) Dimensions for devices with screw terminals / spring-type terminals
Size S0 for AC operation. DC operation: Depth + 10 mm.

Contactors for Special Applications

SIRIUS 3RT23 contactors for resistive loads (AC-1), 4-pole, 4 NO, 18 ... 50 A

Type		3RT23 16	3RT23 17	3RT23 25	3RT23 26	3RT23 27
Size		S00		S0		
Control circuit						
Coil operating range						
• AC operation	At 50 Hz	0.8 ... 1.1 x U_s		—		
	At 60 Hz	0.85 ... 1.1 x U_s		—		
• DC operation	At 50 °C	0.8 ... 1.1 x U_s		—		
	At 60 °C	0.85 ... 1.1 x U_s		—		
• AC/DC operation		—		0.8 ... 1.1 x U_s		
Power consumption of the solenoid coils (when coil is cold and 1.0 x U_s)						
• AC operation, 50 Hz, standard version						
- Closing	VA	—		77		
- P.f.		—		0.82		
- Closed	VA	—		9.8		
- P.f.		—		0.25		
• AC operation, 50/60 Hz, standard version						
- Closing	VA	27/24.3	37/33	81/79		
- P.f.		0.8/0.75	0.8/0.75	0.72/0.74		
- Closed	VA	4.2/3.3	5.7/4.4	10.5/8.5		
- P.f.		0.25/0.25	0.25/0.25	0.25/0.28		
• DC operation (closing = closed)	W	4		5.9		
Operating times for 0.8 ... 1.1 x $U_s^{1)}$ Total break time = Opening delay + Arcing time						
• AC operation						
- Closing delay	ms	8 ... 35	8 ... 33	9 ... 38	8 ... 40	
- Opening delay	ms	3.5 ... 14	4 ... 15	4 ... 16	4 ... 16	
• DC operation						
- Closing delay	ms	30 ... 100		50 ... 170		
	ms	7 ... 13		15 ... 17.5		
• Arcing time	ms	10 ... 15		10		
Main circuit						
AC capacity						
Utilization category AC-1, switching resistive loads						
• Rated operational currents I_e	At 40 °C, up to 690 V A	18	22	35	40	50
	At 60 °C, up to 690 V A	16	20	30	35	42
• Rated power for AC loads P.f. = 0.95 (at 40 °C)	At 230 V kW	6.5	7.5	11	13	16
	415 V kW	12	14.5	23	26	33
• Minimum conductor cross-section for loads with I_e	At 40 °C mm ²	2.5	2.5	10	10	10
	At 60 °C mm ²	2.5	2.5	10	10	10
Utilization categories AC-2 and AC-3						
• Rated operational currents I_e	At 60 °C, up to 400 V A	9	12	15.5	17	17
• Rated power for slipring or squirrel-cage motors at 50 and 60 Hz	At 230 V kW	3	3	4	4	4
	415 V kW	4	5.5	7.5	9	9

1) With size S00, DC operation: Operating times at 0.85 ... 1.1 x U_s .

Contactors for Special Applications

SIRIUS 3RT23 contactors for resistive loads (AC-1), 4-pole, 4 NO, 18 ... 50 A

Selection and ordering data

AC operation



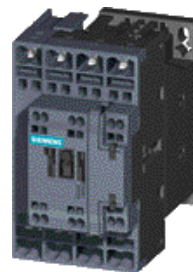
3RT23 1.-1A.00



3RT23 1.-2A.00



3RT23 2.-1A.00



3RT23 2.-2A.00

Rated data AC-1, T_u : 40/60 °C		Auxiliary contacts		Rated control supply voltage U_s	Screw terminals	Spring-type terminals
Operational current I_e	Ratings of AC loads (p.f. = 0.95) at 50 Hz and 415 V	Ident. No.	Version		Order No.	Order No.
A	kW			V AC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00¹⁾

18 / 16	12 / 11	—	—	—	24, 50/60 Hz 110, 50/60 Hz 230, 50/60 Hz	3RT23 16-1AB00 3RT23 16-1AF00 3RT23 16-1AP00	3RT23 16-2AB00 3RT23 16-2AF00 3RT23 16-2AP00
22 / 20	14.5 / 13	—	—	—	24, 50/60 Hz 110, 50/60 Hz 230, 50/60 Hz	3RT23 17-1AB00 3RT23 17-1AF00 3RT23 17-1AP00	3RT23 17-2AB00 3RT23 17-2AF00 3RT23 17-2AP00

Size S0

30	13	11	1	1	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT23 24-1AB00 3RT23 24-1AF00 3RT23 24-1AP00	— — —
35 / 30 ²⁾	22 / 20	11	1	1	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT23 25-1AB00 3RT23 25-1AF00 3RT23 25-1AP00	3RT23 25-2AB00 3RT23 25-2AF00 3RT23 25-2AP00
40 / 35 ²⁾	26 / 23	11	1	1	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT23 26-1AB00 3RT23 26-1AF00 3RT23 26-1AP00	3RT23 26-2AB00 3RT23 26-2AF00 3RT23 26-2AP00
50 ²⁾	33	11	1	1	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT23 27-1AB00 3RT23 27-1AF00 3RT23 27-1AP00	3RT23 27-2AB00 3RT23 27-2AF00 3RT23 27-2AP00

Other voltages on request.

For accessories, see page 2/158.

For spare parts, see page 2/168.

1) For size S00: Coil operating range
at 50 Hz: 0.8 ... 1.1 x U_s ,
at 60 Hz: 0.85 ... 1.1 x U_s .

2) Minimum conductor cross-section 10 mm².

Contactors for Special Applications

**SIRIUS 3RT23 contactors for resistive loads
(AC-1), 4-pole, 4 NO, 18 ... 50 A**

DC operation · DC solenoid system



3RT23 1 -1A . 00



3RT23 1 -2A . 00



3RT23 2 -1A . 00



3RT23 2 -2A . 00

Rated data AC-1, T_u : 40/60 °C		Auxiliary contacts		Rated control supply voltage U_s	Screw terminals 	Spring-type terminals 
Operational current I_e	Ratings of AC loads (p.f. = 0.95) at 50 Hz and 415 V	Ident. No.	Version		Order No.	Order No.
A	kW		 	V AC		
		NO	NC			

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00

18 / 16	12 / 11	—	—	—	24 220	3RT23 16-1BB40 3RT23 16-1BM40	3RT23 16-2BB40 3RT23 16-2BM40
22 / 20	14.5 / 13	—	—	—	24 220	3RT23 17-1BB40 3RT23 17-1BM40	3RT23 17-2BB40 3RT23 17-2BM40

Size S0

30	13	11	1	1	24 220	3RT23 24-1BB40 3RT23 24-1BM40	— —
35 / 30 ¹⁾	22 / 20	11	1	1	24 220	3RT23 25-1BB40 3RT23 25-1BM40	3RT23 25-2BB40 3RT23 25-2BM40
40 / 35 ¹⁾	26 / 23	11	1	1	24 220	3RT23 26-1BB40 3RT23 26-1BM40	3RT23 26-2BB40 3RT23 26-2BM40
50 ¹⁾	33	11	1	1	24 220	3RT23 27-1BB40 3RT23 27-1BM40	3RT23 27-2BB40 3RT23 27-2BM40

Other voltages on request.

For accessories, see page 2/158.

For spare parts, see page 2/168.

1) Minimum conductor cross-section 10 mm².

Contactors for Special Applications

SIRIUS 3RT13 contactors for resistive loads (AC-1), 4-pole, 4 NO, 60 ... 140 A

Overview

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1,
IEC 60947-5-1, EN 60947-5-1 (auxiliary switches)

The contactors are suitable for use in any climate. They are finger-safe according to EN 50274.

The accessories for the 3-pole SIRIUS 3RT10 contactors can also be used for the 4-pole versions.

The contactors are also suitable for switching mixed loads in distribution systems (e. g. for supplying heaters, lamps, motors, PC power supply units) with p.f. > 0.8 according to IEC 60947-4-1, test conditions for utilization category AC-1.

Technical specifications

Type			3RT13 36	3RT13 44	3RT13 46
Size			S2	S3	S3
Dimensions (W x H x D) ¹⁾			61 x 85 x 86	73 x 112 x 110	93 x 146 x 134
• With mounted auxiliary switch block			61 x 85 x 135	73 x 112 x 160	93 x 146 x 183
					
General data					
Permissible mounting position¹⁾					
Mechanical endurance	Operating cycles		10 million		
Electrical endurance at I_e/AC-1	Operating cycles		Approx. 0.5 million		
Rated insulation voltage U_i (pollution degree 3)	V		690		
Permissible ambient temperature					
• During operation	°C		-25 ... +60		
• During storage	°C		-55 ... +80		
Degree of protection	Device		IP20		
Acc. to EN 60947-1, Appendix C	Connection range		IP00		
Touch protection acc.to EN 50274			Finger-safe		
Short-circuit protection of contactors without overload relays					
Main circuit					
Fuse links, operational class gG	• Type of coordination "1" ¹⁾	A	160	250	250
Type LV HRC, 3NA, DIAZED, 5SB, NEOZED, 5SE	• Type of coordination "2" ¹⁾	A	63	125	160
Acc. to IEC 60947-4-1/EN 60947-4-1	• Weld-free	A	50	63	100
Control circuit					
Coil operating range (AC/DC)			0.8 ... 1.1 x U _s		
Power consumption of the solenoid coils (when coil is cold and 1.0 x U_s)					
• AC operation, 50 Hz	- Closing	VA	145	270	
	- P.f.	VA	0.79	0.68	
	- Closed	VA	12.5	22	
	- P.f.	VA	0.36	0.27	
• AC operation, 50/60 Hz	- Closing	VA	170/155	298/274	
	- P.f.	VA	0.76/0.72	0.72/0.62	
	- Closed	VA	15/11.8	27/20	
	- P.f.	VA	0.35/0.38	0.29/0.31	
• DC operation	- Closing = Closed	W	13.3	15	
Operating times for 0.8 ... 1.1 x U_s²⁾					
Total break time = Opening delay + Arcing time					
• DC operation	- Closing delay	ms	50 ... 110	110 ... 200	
	- Opening delay	ms	15 ... 30	14 ... 20	
• AC operation	- Closing delay	ms	4 ... 35	20 ... 50	
	- Opening delay	ms	10 ... 30	10 ... 25	
• Arcing time		ms	10 ... 15	10 ... 15	
Main circuit					
AC capacity					
Utilization category AC-1, switching resistive loads					
• Rated operational currents I _e	At 40 °C, up to 690 V	A	60	110	140
	At 60 °C, up to 690 V	A	55	100	120
• Rated power for AC loads P.f. = 0.95 (at 40 °C)	At 230 V	kW	23	42	53
	415 V	kW	39	72	92
• Minimum conductor cross-section for loads with I _e	At 40 °C	mm ²	16	50	50
	At 60 °C	mm ²	16	50	50
Utilization categories AC-2 and AC-3					
• Rated operational currents I _e	At 60 °C, up to 400 V	A	26	—	—
• Rated power of slipping or squirrel-cage motors at 50 and 60 Hz	At 230 V	kW	5.5	—	—
	400 V	kW	11	—	—

1) In accordance with the corresponding 3-pole 3RT1 contactors.

2) With size S00, DC operation: Operating times at 0.85 ... 1.1 x U_s.

Contactors for Special Applications

**SIRIUS 3RT13 contactors for resistive loads
(AC-1), 4-pole, 4 NO, 60 ... 140 A**

Selection and ordering data

AC operation, 4 NO contacts



3RT13 3...-1A...00

Rated data AC-1, T_u : 40/60 °C		Rated control supply voltage U_s	Screw terminals 
Operational current I_e	Ratings of AC loads (p.f. = 0.95) at 50 Hz and 415 V		Order No.
A	kW	V AC	
For screw and snap-on mounting onto 35 mm standard mounting rail			
Size S2			
Snap-on auxiliary switch blocks according to EN 50012 and EN 50005			
60 / 55	39 / 36	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT13 36-1AB00 3RT13 36-1AF00 3RT13 36-1AP00
Size S3			
Snap-on auxiliary switch blocks according to EN 50012 and EN 50005			
90	36	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT13 43-1AB00 3RT13 43-1AF00 3RT13 43-1AP00
110 / 100	72 / 66	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT13 44-1AB00 3RT13 44-1AF00 3RT13 44-1AP00
140 / 120	92 / 79	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT13 46-1AB00 3RT13 46-1AF00 3RT13 46-1AP00

Other voltages on request.

For accessories, see page 2/176.

For spare parts, see page 2/183.

Contactors for Special Applications

SIRIUS 3RT13 contactors for resistive loads (AC-1), 4-pole, 4 NO, 60 ... 140 A

DC operation · DC solenoid system, 4 NO contacts



3RT13 36-1 . . . 0

3RT13 4.-1 . . . 0

Rated data AC-1, T_u : 40/60 °C		Rated control supply voltage U_s	Screw terminals 
Operational current I_e	Ratings of AC loads (p.f. = 0.95) at 50 Hz and 415 V		
A	kW	V DC	Order No.
For screw and snap-on mounting onto 35 mm standard mounting rail			
Size S2			
Snap-on auxiliary switch blocks according to EN 50012 or EN 50005			
60 / 55	39 / 36	24 220	3RT13 36-1BB40 3RT13 36-1BM40
Size S3			
Snap-on auxiliary switch blocks according to EN 50012 or EN 50005			
90	36	24 220	3RT13 43-1BB40 3RT13 43-1BM40
110 / 100	72 / 66	24 220	3RT13 44-1BB40 3RT13 44-1BM40
140 / 120	92 / 79	24 220	3RT13 46-1BB40 3RT13 46-1BM40

Other voltages on request.

For accessories, see page 2/176.

For spare parts, see page 2/183.

Contactors for Special Applications

**3TK1 contactors for resistive loads (AC-1),
4-pole, 4 NO, 200 ... 1000 A**

Overview

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1,
IEC 60947-5-1, EN 60947-5-1 (auxiliary switches)

The contactors also comply with the requirements of the standards NFC 63-110 and NFC 20-040.

The contactors are suitable for use in any climate. They are finger-safe according to EN 50274. Terminal covers may have to be fitted onto the connecting bars, depending on the configuration with other devices.

The contactors are also suitable for switching mixed loads in distribution systems (e. g. for supplying heaters, lamps, motors, PC power supply units) with p.f. > 0.8 according to IEC 60947-4-1, test conditions for utilization category AC-1.

Solenoid coils for 3TK10 to 3TK13 contactors: as withdrawable coils.

Surge suppression

Control circuit

Solenoid coils for 3TK1 contactors: can be retrofitted with RC elements.

Technical specifications

Contactor	Type	3TK1
Rated data of the auxiliary contacts		Acc. to IEC 60947-5-1
Rated insulation voltage U_i (pollution degree 3)	V	690
Conventional thermal current I_{th} = Rated operational current I_e/AC-12	A	10
AC load Rated operational current I_e/AC-15/AC-14 • For rated operational voltage U_e		
	24 V A	6
	110 V A	6
	125 V A	6
	220 V A	6
	230 V A	6
	380 V A	4
	400 V A	4
	500 V A	1
	660 V A	1
	690 V A	1
DC load Rated operational current I_e/DC-12 • For rated operational voltage U_e		
	24 V A	—
	60 V A	—
	110 V A	—
	125 V A	—
	220 V A	—
	440 V A	—
	600 V A	—
Rated operational current I_e/DC-13 • For rated operational voltage U_e		
	24 V A	6
	60 V A	6
	110 V A	1.8
	125 V A	—
	220 V A	0.6
	440 V A	—
	600 V A	—
Ⓔ and Ⓛ rating of the auxiliary contacts		
Rated voltage	V AC, max.	600
Switching capacity		A 600, P 600

Contactors for Special Applications

3TK1 contactors for resistive loads (AC-1), 4-pole, 4 NO, 200 ... 1000 A

Type									
Dimensions (W x H x D)		mm	3TK10 165 x 156 x 155	3TK11 165 x 172 x 155	3TK12 201 x 198 x 172	3TK13	3TK14 244 x 273 x 226	3TK15	3TK17
General data									
Permissible mounting positions									
Upright mounting position also permissible									
Mechanical endurance	Operating cycles	Mill.	10				5		
Electrical endurance for I _e /AC-1 at 55 °C	Operating cycles	Mill.	0.8	0.8	0.8	0.4	0.65	0.5	0.4
Rated insulation voltage U _i (pollution degree 3)	V		1 000						
Ambient temperature									
• During operation	°C	-25 ... +55							
• During storage	°C	-50 ... +70							
Degree of protection acc. to EN 60947-1, Appendix C			IP00						
Touch protection acc.to EN 50274			Finger-safe with cover						
Shock resistance , sine pulse	g/ms	10/15							
Short-circuit protection									
Main circuit									
Fuse links gG, type NH 3NA, DIAZED 5SB, NEOZED 5SE according to IEC 60947-4-1/ EN 60947-4-1									
• Type of coordination "1"	A	250			355		800	1 000	
• Type of coordination "2"	A	250			315		630	850	
Auxiliary circuit (short-circuit current I _k ≥ 1 kA), fuse links gG, type DIAZED 5SB, NEOZED 5SE			A	10					
Control circuit									
Coil operating range			0.85 ... 1.1 x U _s						
Power consumption of the solenoid coils (when coil is cold and 1.0 x U _s)									
• 50 Hz									
- Closing	VA	820			1 100		3 500		
- P.f.		0.4			0.35		0.26		
- Closed	VA	44			52		125		
- P.f.		0.34			0.35		0.4		
• 60 Hz									
- Closing	VA	990			1 200		4 000		
- P.f.		0.35			0.31		0.22		
- Closed	VA	52			65		140		
- P.f.		0.35			0.34		0.43		
Operating times at 1.0 x U_s									
• Closing delay	ms	20 ... 40					30 ... 60		
• Opening delay	ms	7 ... 15					10 ... 20		
• Arcing time	ms	10					10		
Main circuit									
AC capacity									
Utilization category AC-1, switching resistive loads									
• Rated operational currents I _e	At 40° C up to 690 V	A	200	250	300	350	550	800	1000
	At 50 ° C up to 690 V	A	180	230	270	310	470	650	850
• Rated power for AC loads with p.f. = 0.95 (at 40°C)	At 230 V	kW	76	95	114	132	208	303	378
	400 V	kW	132	165	197	230	362	527	658
	500 V	kW	165	206	247	288	452	658	828
	690 V	kW	227	284	341	397	624	908	1135
• Minimum conductor cross-section for load with I _e	At 40° C	mm ²	95	150	185	240	185	240	300
Utilization categories AC-2 and AC-3									
• Rated operational currents I _e	Up to 400 V	A	120	145	210	210	400	550	700
• Rated power of squirrel-cage or slipping motors at 50 Hz and 60 Hz	At 230 V	kW	30	45	75	75	110	160	220
	400 V	kW	55	75	110	110	200	280	370
• Short-time current at 40° C in cold state up to 10 s	A		900	1 200	1 600	1 600	5 300	5 300	6 400
Switching frequency¹⁾									
Switching frequency z in operating cycles/hour									
• Contactors without overload relays	No-load switching frequency	1/h	3600						
	AC-1	1/h	300						
	AC-3	1/h	300						

1) Dependence of the switching frequency z' on the operational current I' and operational voltage U' : $z' = z \cdot (I_e/I') \cdot (400 V/U')^{1.5} \cdot 1/h$.

Contactors for Special Applications

3TK1 contactors for resistive loads (AC-1),
4-pole, 4 NO, 200 ... 1000 A

Type		3TK10	3TK11	3TK12	3TK13	3TK14	3TK15	3TK17
General data								
Main conductors:		Screw terminals						
• Stranded with cable lug	mm ²	2 x 70	2 x 120	2 x 120		2 x 300		
• AWG cables, solid or stranded	MCM	2 x 00	2 x 250	2 x 250		2 x 600		
• Connecting bar (max. width)	mm	30	30	33		55		
• Terminal screw	M	M6	M10	M10		M10		
- Tightening torque	Nm	5	16	16		16		
	lb.in	42	135	135		135		
Auxiliary conductors:								
• Solid	mm ²	2 x (0.5 ... 2.5)						
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 2.5)						
• AWG cables, solid or stranded	MCM	20 ... 14						
- Tightening torque	Nm	1.2 (10 lb.in)						

Selection and ordering data

Screw terminals

Screw fixing



3TK13

Rated data AC-1					Auxiliary contacts		Rated control supply voltage U_c	Screw terminals
Operational current I_n up to 690 V (at 40 °C)	Ratings of AC loads (p.f. = 0.95) at				Version		V AC	Order No.
	230 V	415 V	690 V	1000 V	NO	NC		
A	kW	kW	kW	kW				
AC operation								
200	75	130	225	205	2	2	220 ... 230, 50 Hz 230 ... 240, 50 Hz 110/120, 50/60 Hz 24, 50 Hz	3TK10 42-0AP0 3TK10 42-0AU0 3TK10 42-0AF0 3TK10 42-0AB0
250	90	165	280	200	2	2	220 ... 230, 50 Hz 230 ... 240, 50 Hz 110/120, 50/60 Hz 24, 50 Hz	3TK11 42-0AP0 3TK11 42-0AU0 3TK11 42-0AF0 3TK11 42-0AB0
300	110	195	340	325	2	2	220 ... 230, 50 Hz 230 ... 240, 50 Hz 110/120, 50/60 Hz 24, 50 Hz	3TK12 42-0AP0 3TK12 42-0AU0 3TK12 42-0AF0 3TK12 42-0AB0
350	130	230	395	370	2	2	220 ... 230, 50 Hz 230 ... 240, 50 Hz 110/120, 50/60 Hz 24, 50 Hz	3TK13 42-0AP0 3TK13 42-0AU0 3TK13 42-0AF0 3TK13 42-0AB0
550	205	360	620	510	2	2	220 ... 230, 50 Hz ¹⁾ 230 ... 240, 50 Hz 110/120, 50/60 Hz	3TK14 42-0AP0 3TK14 42-0AU0 3TK14 42-0AF0
800	300	525	905	575	2	2	220 ... 230, 50 Hz ¹⁾ 230 ... 240, 50 Hz 110/120, 50/60 Hz	3TK15 42-0AP0 3TK15 42-0AU0 3TK15 42-0AF0
1000	375	655	1135	—	2	2	220 ... 230, 50 Hz ¹⁾ 230 ... 240, 50 Hz 110/120 50/60 Hz	3TK17 42-0AP0 3TK17 42-0AU0 3TK17 42-0AF0

For accessories see page 2/188 onwards.

For spare parts, see page 2/191 onwards.

1) At 60 Hz: 240 V.

Contactors for Special Applications

SIRIUS 3RT25 contactors, 4-pole, 2 NO + 2 NC, 4 ... 11 kW

Overview

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1

The contactors are suitable for use in any climate. They are finger-safe according to EN 50274.

The accessories for the 3-pole SIRIUS 3RT20 contactors can also be used for the 4-pole versions.

Size S0 contactors have 2 auxiliary contacts 1 NO and 1 NC integrated in the basic unit.

Mountable auxiliary contacts

Size S00 and S0

4 additional auxiliary contacts, including no more than 2 NC.

Application

The contactors are suitable for:

- Changing the polarity of hoisting gear motors
- Switching two separate loads

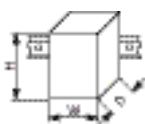
Note:

*Single device for pole reversal; not suitable for reversing duty.
3RT25 contactors are not suitable for switching a load between 2 current sources.*

Technical specifications

Type		3RT25 16	3RT25 17	3RT25 18	3RT25 26
Size		S00	S00	S00	S0
Dimensions (W x H x D) ¹⁾	mm	45 x 57.5 x 73 / 45 x 70 x 73			60 x 85 x 97 / 60 x 101.5 x 97
	mm	45 x 57.5 x 116 / 45 x 70 x 121			60 x 85 x 141 / 60 x 101.5 x 144

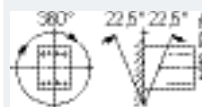
- With mounted auxiliary switch block



General data

Permissible mounting positions

The contactors are designed for operation on a vertical mounting surface.



Mechanical endurance	Operat. cycles	30 million	10 million
Electrical endurance at $I_{\Delta AC-1}$	Operat. cycles	Approx. 0.5 million	
Rated insulation voltage U_i (pollution degree 3)	V	690	
Permissible ambient temperature			
• During operation	°C	-25 ... +60	
• During storage	°C	-55 ... +80	
Degree of protection acc. to EN 60947-1, Appendix C		IP20	IP20
• Terminal compartment		IP20	IP00
Touch protection acc. to EN 50274		Finger-safe	

Short-circuit protection of contactors without overload relays

Main circuit

Fuse links, operational class gG
Type LV HRC 3NA, DIAZED 5SB, NEOZED 5SE
acc. to IEC 60947-4-1/EN 60947-4-1

• Type of coordination "1"	A	35	63
• Type of coordination "2"	A	20	35
• Weld-free	A	10	16

Control circuit

Coil operating range

• AC operation	At 50 Hz	0.8 ... 1.1 x U_s	—
	At 60 Hz	0.85 ... 1.1 x U_s	—
• DC operation	At 50 Hz	0.8 ... 1.1 x U_s	—
	At 60 Hz	0.85 ... 1.1 x U_s	—
• AC/DC operation		—	0.8 ... 1.1 x U_s

Power consumption of the solenoid coils (when coil is cold and 1.0 x U_s)	See 3RT23 16	See 3RT23 17	See 3RT23 26

Operating times for 0.8 ... 1.1 x U_s Total break time = Opening delay + Arcing time	See 3RT23 16	See 3RT23 17	See 3RT23 26

1) Dimensions for devices with screw terminals / spring-type terminals.
Size S0 for AC operation. DC operation: Depth +10 mm.

Contactors for Special Applications

**SIRIUS 3RT25 contactors,
4-pole, 2 NO + 2 NC, 4 ... 11 kW**

Type	3RT25 16	3RT25 17	3RT25 18	3RT25 26
Size	S00	S00	S00	S0
Main circuit				
AC capacity				
Utilization category AC-1, switching resistive loads				
• Rated operational currents I_e	At 40 °C up to 690 V A	18	22	40
	At 60 °C up to 690 V A	16	20	35
• Rated power for AC loads P.f. = 0.95 (at 60 °C)	At 230 V kW	6.5	7.5	15
	415 V kW	11	13	26
• Minimum conductor cross-section for loads with I_e	At 40 °C mm ²	2.5	2.5	10
Utilization categories AC-2 and AC-3				
• Rated operational currents I_e (at 60 °C)	Up to 415 V A	9	12	16
• Rated power for slipring or squirrel-cage motors at 50 and 60 Hz	At 230 V kW	3	3	4
	NO contacts at 415 V kW	4	5.5	7.5
	NC contacts at 415 V kW	4	4	4
Load rating with DC				
Utilization category DC-1, switching resistive load ($L/R \leq 1$ ms)				
• Rated operational currents I_e (at 60 °C) - 1 conducting path	Up to 24 V A	16	20	35
	60 V A	16	20	20
	110 V A	2.1	2.1	4.5
	220 V A	0.8	0.8	1
	440 V A	0.6	0.6	0.4
- 2 conducting paths in series	Up to 24 V A	16	20	35
	60 V A	16	20	35
	110 V A	12	12	35
	220 V A	1.6	1.6	5
	440 V A	0.8	0.8	1
Utilization category DC-3/DC-5²⁾, shunt-wound and series-wound motors ($L/R \leq 15$ ms)				
• Rated operational currents I_e (at 60 °C) - 1 conducting path	Up to 24 V A	16	20	20
	60 V A	0.5	0.5	5
	110 V A	0.15	0.15	2.5
	220 V A	0.75	0.75	1
	440 V A	—	—	0.09
- 2 conducting paths in series	Up to 24 V A	16	20	35
	60 V A	5	5	35
	110 V A	0.35	0.35	15
	220 V A	—	—	3
	440 V A	—	—	0.27

1) For AC operation: 25 A; for DC operation: 20 A.

2) For $U_e > 24$ V the rated operational currents I_e for the NC contact conducting paths are 50 % of the values for the NO contact conducting paths.

Contactors for Special Applications

SIRIUS 3RT25 contactors, 4-pole, 2 NO + 2 NC, 4 ... 11 kW

Selection and ordering data

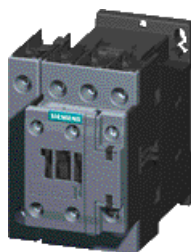
AC operation,
2 NO + 2 NC¹⁾



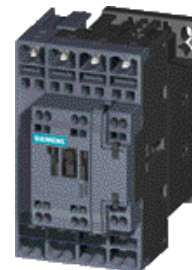
3RT25 1.-1.



3RT25 1.-2.



3RT25 2.-1.



3RT25 2.-2.

Rated data		Auxiliary contacts		Rated control supply voltage U_s		Screw terminals	Spring-type terminals
AC-2/AC-3, T_u : Up to 60 °C	AC-1, T_u : 40/60 °C	Ident. No.	Version				
Operational current I_e	Ratings of induction motors at 50 Hz and					Order No.	Order No.
At 415 V	415 V						
A	kW						
		NO	NC	V AC			

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00²⁾

9	4	18 / 16	—	—	—	24, 50/60 Hz 110, 50/60 Hz 230, 50/60 Hz	3RT25 16-1AB00 3RT25 16-1AF00 3RT25 16-1AP00	3RT25 16-2AB00 3RT25 16-2AF00 3RT25 16-2AP00
12	5.5 ³⁾	22 / 20	—	—	—	24, 50/60 Hz 110, 50/60 Hz 230, 50/60 Hz	3RT25 17-1AB00 3RT25 17-1AF00 3RT25 17-1AP00	3RT25 17-2AB00 3RT25 17-2AF00 3RT25 17-2AP00
16	7.5 ³⁾	22 / 20	—	—	—	24, 50/60 Hz 110, 50/60 Hz 230, 50/60 Hz	3RT25 18-1AB00 3RT25 18-1AF00 3RT25 18-1AP00	3RT25 18-2AB00 3RT25 18-2AF00 3RT25 18-2AP00

Size S0

25	11	40 / 35	11	1	1	24, 50 Hz 110, 50 Hz 230, 50 Hz	3RT25 26-1AB00 3RT25 26-1AF00 3RT25 26-1AP00	3RT25 26-2AB00 3RT25 26-2AF00 3RT25 26-2AP00

Other voltages on request.

For accessories, see page 2/158.

For spare parts, see page 2/168.

1) Single device for pole reversal; not suitable for reversing duty.

2) For size S00: Coil operating range
at 50 Hz: 0.8 ... 1.1 x U_s
at 60 Hz: 0.85 ... 1.1 x U_s .

3) The NC contact can switch no more than 4 kW.

Contactors for Special Applications

**SIRIUS 3RT25 contactors,
4-pole, 2 NO + 2 NC, 4 ... 11 kW**

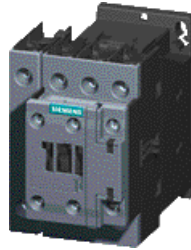
**DC operation
2 NO + 2 NC¹⁾**



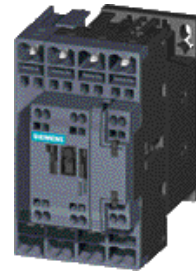
3RT25 1..-1



3RT25 1..-2



3RT25 2..-1



3RT25 2..-2

Rated data		Auxiliary contacts		Rated control supply voltage U_s		Screw terminals	Spring-type terminals
AC-2/AC-3, T_u : Up to 60 °C		AC-1, T_u : 40/60 °C					
Operational current I_e	Ratings of induction motors at 50 Hz and	Ident. No.	Version			Order No.	Order No.
At 415 V	415 V						
A	kW	NO	NC	V DC			
For screw and snap-on mounting onto 35 mm standard mounting rail							
Size S00							
9	4	18 / 16	—	—	24	3RT25 16-1BB40	3RT25 16-2BB40
					220	3RT25 16-1BM40	3RT25 16-2BM40
12	5.5 ²⁾	22 / 20	—	—	24	3RT25 17-1BB40	3RT25 17-2BB40
						3RT25 17-1BM40	3RT25 17-2BM40
16	7.5 ²⁾	22 / 20	—	—	24	3RT25 18-1BB40	3RT25 18-2BB40
						3RT25 18-1BM40	3RT25 18-2BM40
Size S0							
20	11	40 / 35	11	1	1	3RT25 26-1BB40	3RT25 26-2BB40
					24 DC	3RT25 26-1BM40	3RT25 26-2BM40
					220 DC		

Contactors for Special Applications

SIRIUS 3RT15 contactors, 4-pole, 2 NO + 2 NC, 18.5 kW

Overview

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1

The contactors are suitable for use in any climate. They are finger-safe according to EN 50274.

Note:

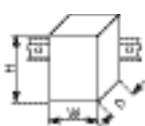
*Single device for pole reversal; not suitable for reversing duty.
3RT15 contactors are not suitable for switching a load between two current sources.*

The accessories for the 3-pole SIRIUS 3RT10 contactors can also be used for the 4-pole versions.

Mountable auxiliary contacts

Maximum 4 auxiliary contacts can be either laterally mounted or snapped onto the top (auxiliary switch blocks according to EN 50012 or EN 50005).

Technical specifications

Type	3RT15 35	
Size	S2	
Dimensions (W x H x D)	mm	73 x 112 x 110
• With mounted auxiliary switch block	mm	73 x 112 x 160
		
General data		
Permissible mounting position¹⁾		
Mechanical endurance	Operating cycles	10 million
Electrical endurance at $I_e/AC-1$	Operating cycles	Approx. 0.5 million
Rated insulation voltage U_i (pollution degree 3)	V	690
Permissible ambient temperature		
• During operation	°C	-25 ... +60
• During storage	°C	-55 ... +80
Degree of protection acc. to EN 60947-1, Appendix C		IP20 (IP00 terminal compartment)
Touch protection acc. to EN 50274		Finger-safe
Short-circuit protection of contactors without overload relays		
Main circuit		
With fuse links gG Type LV HRC 3NA, DIAZED 5SB, NEOZED 5SE acc. to IEC 60947-4-1/EN 60947-4-1		
• Type of coordination "1"	A	160
• Type of coordination "2"	A	80
• Weld-free	A	50
Control circuit		
Coil operating range (AC/DC)		0.8 ... 1.1 x U_s
Power consumption of the solenoid coils (when coil is cold and 1.0 x U_s)		
• AC operation, 50 Hz		
- Closing	VA	145
- P.f.	VA	0.79
- Closed	VA	12.5
- P.f.	VA	0.36
• AC operation, 50/60 Hz		
- Closing	VA	170/155
- P.f.	VA	0.76/0.72
- Closed	VA	15/11.8
- P.f.	VA	0.35/0.38
• DC operation (closing = closed)	W	13.3
Operating times for 0.8 ... 1.1 x U_s²⁾		
Total break time = Opening delay + Arcing time		
• AC operation		
- Closing delay	ms	4 ... 35
- Opening delay	ms	10 ... 30
• DC operation		
- Closing delay	ms	50 ... 110
- Opening delay	ms	15 ... 30
• Arcing time	ms	10 ... 15

1) In accordance with the corresponding 3-pole 3RT1 contactors.

2) With size S00, DC operation: Operating times at 0.85 ... 1.1 x U_s

Contactors for Special Applications

**SIRIUS 3RT15 contactors,
4-pole, 2 NO + 2 NC, 18.5 kW**

Contactor	Type	3RT25 16
	Size	S00
Main circuit		
AC capacity		
Utilization category AC-1, switching resistive loads		
• Rated operational currents I_e	At 40 °C up to 690 V A	60
	At 60 °C up to 690 V A	55
• Rated power for AC loads P.f. = 0.95 (at 60 °C)	At 230 V kW	20
	400 V kW	36
• Minimum conductor cross-section for loads with I_e	At 40 °C mm ²	16
Utilization categories AC-2 and AC-3		
• Rated operational currents I_e (at 60 °C)	Up to 400 V A	40
• Rated power of slipring or squirrel-cage motors at 50 and 60 Hz	At 230 V kW	9.5
	400 V kW	18.5

Selection and ordering data

AC and DC operation, 2 NO contacts + 2 NC contacts¹⁾



3RT15 35-1

Rated data AC-2/AC-3, T_u : Up to 60 °C		AC-1, T_u : 40/60 °C	Rated control supply voltage U_s	Screw terminals 
Operational current I_e At 415 V	Ratings of induction motors at 50 Hz and 415 V	Operational current I_e		Order No.
A	kW	A	V	

For screw and snap-on mounting onto 35 mm standard mounting rail

AC operation

Size S2

Snap-on auxiliary switch blocks according to EN 50012 or EN 50005

40	18.5	55 / 50	24, 50 Hz 110, 50 Hz 230, 50 Hz

**3RT15 35-1AB00
3RT15 35-1AF00
3RT15 35-1AP00**

DC operation · DC solenoid system

Size S2

Snap-on auxiliary switch blocks according to EN 50012 or EN 50005

40	18.5	55 / 50	24 DC 220 DC

**3RT15 35-1BB40
3RT15 35-1BM40**

Other voltages on request.

For accessories, see page 2/176.

For spare parts, see page 2/183.

1) Single device for pole reversal; not suitable for reversing duty.

Contactor for Special Applications

SIRIUS 3RT16 capacitor contactors, 12.5 ... 50 kvar

Overview

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1,
IEC 60947-5-1, EN 60947-5-1 (auxiliary switches)

The contactors are suitable for use in any climate. They are finger-safe according to EN 50274.

Function

The 3RT16 capacitor contactors are special version of the size S00 to S3 SIRIUS contactors. The capacitors are precharged by means of the mounted leading NO contacts and resistors; only then do the main contacts close.

This prevents disturbances in the network and welding of the contactors.

Only discharged capacitors are permitted to be switched on with capacitor contactors.

Capacitor switching capacity of the basic 3RT10 contactor version.

Auxiliary switches

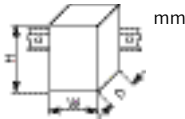
The auxiliary switch block which is snapped onto the capacitor contactor contains the three leading NO contacts and in the case of S00 one standard NC contact and in the case of S0 and S3 one standard NO contact, which is unassigned. Size S00 also contains another unassigned NO contact in the basic unit.

In addition, a 2-pole auxiliary switch block can be mounted laterally on the 3RT16 47 capacitor contactors (2 NO, 2 NC or 1 NO + 1 NC versions); type 3RH19 21-1EA . . . The fitting of auxiliary switches for 3RT16 17 and 3RT16 27 is not expandable.

Technical specifications

All technical specifications not mentioned in the table below are identical to those of the 3RT10 17 contactors for size S00, to

those of the 3RT10 26 contactors for size S0 and to those of the 3RT10 45 contactors for size S3.

Type		3RT16 17- . A . . 3 S00	3RT16 27- . A . . 1 S0	3RT16 47- . A . . 1 S3	
Size					
Dimensions (W x H x D) including auxiliary switches and connecting cables					
General data					
Capacitor rating at rated power (utilization category AC-6b)	230 V, 50/60 Hz	kvar	3 ... 7.5	3.5 ... 15	3.5 ... 30
	400 V, 50/60 Hz	kvar	5 ... 12.5	6 ... 25	5 ... 50
	525 V, 50/60 Hz	kvar	7.5 ... 15	7.8 ... 30	7.5 ... 60
	690 V, 50/60 Hz	kvar	10 ... 21	10 ... 42	10 ... 84
Auxiliary contacts mounted (unassigned)			1 NO + 1 NC	1 NO	
Auxiliary contacts mountable (lateral), not for sizes S00 and S0					2 NC + 2 NO or 1 NO + 1 NC
Coil operating range			0.8 ... 1.1 x U _s		
Max. switching frequency		h ⁻¹	180	100	
Electrical endurance		Operating cycles	> 250 000	> 150 000	> 100 000
Ambient temperature		°C	60		
Standards			IEC 60947/EN 60947 (VDE 0660)		
Short-circuit protection			1.6 ... 2.2 x I _e		
Conductor cross-sections (1 or 2 conductors connectable)					
Main conductors			 Screw terminals		
• Solid	mm ²		2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5) acc. to IEC 60947; max. 2 x (1 ... 4)	2 x (1 ... 2.5); 2 x (2.5 ... 6) acc. to IEC 60947; max. 1 x 10 ¹⁾	—
• Finely stranded with end sleeve	mm ²		2 x (0.5 ... 1.5); 2 x (0.75 ... 2.5)	2 x (1 ... 2.5); 2 x (2.5 ... 6) ¹⁾	—
• AWG cables					
- Solid	AWG		2 x (20 ... 16)	2 x (16 ... 12)	—
- Solid or stranded	AWG		2 x (18 ... 14)	2 x (14 ... 10)	—
- Stranded	AWG		1 x 12	1 x 8	—
• Terminal screws			M3	M4 (Pozidriv size 2)	—
- Tightening torque	Nmlb.in		0.8 ... 1.2 7 ... 10.3	2 ... 2.5 18 ... 22	—

1) 3RV19 25-5AB feeder terminal for 16 mm².

Contactors for Special Applications

SIRIUS 3RT16 capacitor contactors, 12.5 ... 50 kvar

Contactor	Type		3RT16 17- . A . . 3	3RT16 27- . A . . 1	3RT16 47- . A . . 1
	Size		S00	S0	S3
Conductor cross-sections (1 or 2 conductors connectable)			Screw terminals		
Front clamping point connected 	Main conductors: With box terminal				
	• Finely stranded with end sleeve	mm ²	—		2.5 ... 35
	• Finely stranded without end sleeve	mm ²	—		4 ... 50
	• Solid	mm ²	—		2.5 ... 16
	• Stranded	mm ²	—		4 ... 70
	• Ribbon cable conductors (number x width x thickness)	mm	—		6 x 9 x 0.8
	• AWG cables, solid or stranded	AWG	—		10 ... 2/0
Rear clamping point connected 	• Finely stranded with end sleeve	mm ²	—		2.5 ... 50
	• Finely stranded without end sleeve	mm ²	—		10 ... 50
	• Solid	mm ²	—		2.5 ... 16
	• Stranded	mm ²	—		10 ... 70
	• Ribbon cable conductors (number x width x thickness)	mm	—		6 x 9 x 0.8
	• AWG cables, solid or stranded	AWG	—		10 ... 2/0
Both clamping points connected 	• Finely stranded with end sleeve	mm ²	—		max. 2 x 35
	• Finely stranded without end sleeve	mm ²	—		max. 2 x 35
	• Solid	mm ²	—		max. 2 x 16
	• Stranded	mm ²	—		max. 2 x 50
	• Ribbon cable conductors (number x width x thickness)	mm	—		2 x (6 x 9 x 0.8)
	• AWG cables, solid or stranded	AWG	—		2 x (10 ... 1/0)
Connection for drilled copper bars¹⁾	• Terminal screw		—		M6 (hexagon socket, A/F 4)
	- Tightening torque	Nm lb.in	—		4 ... 6 36 ... 53
	Max. width	mm	—		10
	Without box terminal with cable lugs ²⁾ (1 or 2 conductors can be connected)	mm ²	—		10 ... 50 ³⁾
	• Stranded with cable lug	mm ²	—		10 ... 70 ³⁾
	• AWG cables, solid or stranded	AWG	—		7 ... 1/0
Auxiliary conductors:					
	• Solid	mm ²	2 x (0.5 ... 1.5) ⁴⁾ ; 2 x (0.75 ... 2.5) ⁴⁾ acc. to IEC 60947; max. 2 x (1 ... 4)	2 x (0.5 ... 1.5) ⁴⁾ ; 2 x (0.75 ... 2.5) ⁴⁾ acc. to IEC 60947; max. 2 x (0.75 ... 4)	
	• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5) ⁴⁾ ; 2 x (0.75 ... 2.5) ⁴⁾		
	• AWG cables, solid or stranded	AWG	2 x (20 ... 16) ⁴⁾ ; 2 x (18 ... 14) ⁴⁾ ; 1 x 12		
	• Terminal screw		M3		
	- Tightening torque	Nm lb.in	0.8 ... 1.2 7 ... 10.3		

- 1) If bars larger than 12 x 10 mm are connected, a 3RT19 46-4EA1 terminal cover is needed to comply with the phase clearance.
- 2) When connecting conductors which are larger than 25 mm², the 3RT19 46-4EA1 terminal cover must be used to keep the phase clearance.
- 3) Only with crimped cable lugs according to DIN 46234. Cable lug max. 20 mm wide.
- 4) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Contactors for Special Applications

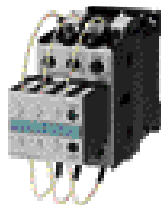
SIRIUS 3RT16 capacitor contactors, 12.5 ... 50 kvar

Selection and ordering data

AC operation Screw terminals



3RT16 17-1A . 03



3RT16 27-1A . 01



3RT16 47-1A . 01

Utilization category AC-6b Switching of AC capacitors for an ambient temperature of 60 °C ¹⁾ Capacitor rating at operational voltage 50/60 Hz				Auxiliary contacts, unassigned Version		Rated control supply voltage U_c ²⁾		Screw terminals 
At 230 V	At 415 V	At 525 V	At 690 V	NO	NC	V AC	Hz	Order No.
kvar	kvar	kvar	kvar					
For screw and snap-on mounting onto 35 mm standard mounting rail								
Size S00								
3 ... 7.5	5 ... 12.5	7.5 ... 15	10 ... 21	1	1	24 110 230	50 / 60	3RT16 17-1AB03 3RT16 17-1AF03 3RT16 17-1AP03
Size S0³⁾								
3.5 ... 15	6 ... 25	7.8 ... 30	10 ... 42	1	—	24 110 230	50	3RT16 27-1AB01 3RT16 27-1AF01 3RT16 27-1AP01
Size S3								
3.5 ... 30	5 ... 50	7.5 ... 60	10 ... 84	1	—	24 110 230	50	3RT16 47-1AB01 3RT16 47-1AF01 3RT16 47-1AP01

Other voltages on request.

For accessories, see page 2/176.

- 1) For size S3: 55 °C.
- 2) Operating range: $0.85 \dots 1.1 \times U_c$.
- 3) For conductor cross-sections $> 6 \text{ mm}^2$
use 3RV19 25-5AB terminals (2 units).

Contactors for Special Applications

Contactors for Switching DC Voltage

3TC contactors,
1- and 2-pole, 32 ... 400 A

Overview

3TC4 and 3TC5

EN 60947-4-1 (VDE 0660 Part 102).

The contactors are finger-safe according to EN 50274.

Terminal covers may have to be fitted onto the connecting bars, depending on the configuration with other devices.

The DC motor ratings given in the tables are applicable to the DC-3 and DC-5 utilization categories with two-pole switching of the load or with the two conducting paths of the contactor connected in series.

One contactor conducting path can switch full power up to 220 V. The ratings for higher voltages are available on request.

Technical specifications

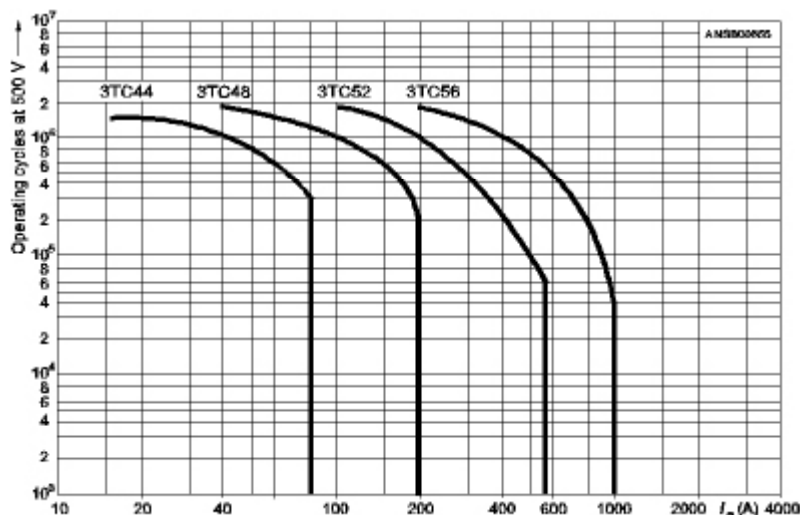
Contactor	Type	3TC4	3TC5
Rated data of the auxiliary contacts			
Rated insulation voltage U_i (degree of pollution 3)	V	690	
Continuous thermal current I_{th} = Rated operational current I_e/AC-12		10	10
AC load			
Rated operational current I_e/AC-15/AC-14 for rated operational voltage U_e			
	24 V A	10	10
	110 V A	10	10
	125 V A	10	10
	220 V A	6	6
	230 V A	5.6	5.6
	380 V A	4	4
	415 V A	3.6	3.6
	500 V A	2.5	2.5
	660 V A	2.5	2.5
	690 V A	—	—
DC load			
Rated operational current I_e/DC-12 for rated operational voltage U_e			
	24 V A	10	10
	60 V A	10	10
	110 V A	3.2	8
	125 V A	2.5	6
	220 V A	0.9	2
	440 V A	0.33	0.6
	600 V A	0.22	0.4
Rated operational current I_e/DC-13 for rated operational voltage U_e			
	24 V A	10	10
	60 V A	5	5
	110 V A	1.14	2.4
	125 V A	0.98	2.1
	220 V A	0.48	1.1
	440 V A	0.13	0.32
	600 V A	0.07	0.21
Contactor	Type	3TC44 ... 3TC56	
CSA and UL rated data for the auxiliary contacts			
Rated voltage	V AC, max.	600	
Switching capacity		A 600, P 600	

Contactors for Special Applications

Contactors for Switching DC Voltage

3TC contactors,
1- and 2-pole, 32 ... 400 A

Contactor	Type	3TC44 ... 3TC56
Endurance of the main contacts		



3TC44 and 3TC56 contactors

Legend for the diagrams:

I_a = Breaking current

Contactor	Type	Size	3TC44	3TC48	3TC52	3TC56
			2	4	8	12
General data						
Permissible mounting position						
The contactors are designed for operation on a vertical mounting surface.						
Mechanical endurance	Operating cycles		10 million			
Electrical endurance	Operating cycles		1) ¹⁾			
Rated insulation voltage U_i (degree of pollution 3)	V		800		1000	
Safe isolation between the coil and the main contacts acc. to EN 60947-1, Appendix N	V		up to 300		Up to 660	
Mirror contacts²⁾ A mirror contact is an auxiliary NC contact that cannot be closed simultaneously with a NO main contact.	Yes, acc. to EN 60947-4-1, Appendix F					
Permissible ambient temperature	During operation	°C	-25 ... +55			
	During storage	°C	-50 ... +80			
Degree of protection acc. to EN 60947-1, Appendix C			IP00/open, for AC operation, coil assembly IP40			
Shock resistance	Rectangular pulse	g/ms	7.5/5 and 3.4/10	10/5 and 5/10	12/5 and 5.5/10	12/5 and 5.6/10
Short-circuit protection						
Main circuit						
Fuse links gL/gG	Type of coordination "1"	A	50	160	250	400
LV HRC 3NA, DIAZED 5SB, NEOZED 5SE	Type of coordination "2"	A	35	63	80	250
Auxiliary circuit (short-circuit current $I_k \geq 1$ kA)						
• Fuse links, gL/gG DIAZED 5SB, NEOZED 5SE		A	16			
• Miniature circuit breaker with C characteristic		A	10			

1) See the endurance diagram above.

2) For 3TC44, one NC contact each must be connected in series for the right and left auxiliary switch block respectively.

Contactors for Special Applications

Contactors for Switching DC Voltage

3TC contactors,
1- and 2-pole, 32 ... 400 A

Contactor	Type		3TC44 2	3TC48 4	3TC52 8	3TC56 12
Control						
Magnetic coil operating range			0.8 ... 1.1 x U _N			
Power consumption of the magnetic coils (for cold coil and 1.0 x U _N)						
DC operation	• Closing = Closed	W	10	19	30	86
AC operation, 50 Hz coil	• Closing	VA/p.f.	68/0.86	300/0.5	640/0.48	1780/0.3
	• Closed	VA/p.f.	10/0.29	26/0.24	46/0.23	121/0.22
AC operation, 60 Hz coil	• Closing	VA/p.f.	95/0.79	365/0.45	730/0.38	2140/0.3
	• Closed	VA/p.f.	12/0.3	35/0.26	56/0.24	140/0.29
AC operation, 50/60 Hz coil	• Closing at 50 Hz/60 Hz	VA/p.f.	79/73/0.83/0.78	—	—	—
	• Closed at 50 Hz/60 Hz	VA/p.f.	11/9/0.28/0.27	—	—	—
Operating times (at 0.8 ... 1.1 x U _N)			(The values apply up to and including 20 % undervoltage, 10 % overvoltage, as well as when the coil is cold and warm)			
Total break time = opening delay + Arcing time						
• DC operation	Closing delay	ms	35 ... 190	90 ... 380	120 ... 400	110 ... 400
	Opening delay ¹⁾	ms	10 ... 25	17 ... 28	22 ... 35	40 ... 110
• AC operation	Closing delay	ms	10 ... 40	20 ... 50	20 ... 50	20 ... 50
	Opening delay ¹⁾	ms	5 ... 25	5 ... 30	10 ... 30	10 ... 30
• Arcing time	DC-1	ms	20	—	—	—
	DC-3/DC-5	ms	30	—	—	—
Main circuit						
DC capacity						
Utilization category DC-1, switching resistive loads (L/R ≤ 1 ms)						
Rated operational currents I _e	up to U _N 750 V	A	32	75	220	400
(at 55 °C)						
Minimum conductor cross-section		mm ²	6	25	95	240
Rated power at U _e	at 220 V	kW	7	16.5	48	88
	440 V	kW	14	33	97	176
	600 V	kW	19.2	45	132	240
	750 V	kW	24	56	165	300
Utilization category DC-3 and DC-5						
Shunt-wound and series-wound motors (L/R ≤ 15 ms)						
Rated operational currents I _e	up to 220 V	A	32	75	220	400
	440 V	A	29	75	220	400
	600 V	A	21	75	220	400
	750 V	A	7.5	75	170	400
(at 55 °C)						
Rated power at U _e	at 110 V	kW	2.5	6.5	20	35
	220 V	kW	5	13	41	70
	440 V	kW	9	27	82	140
	600 V	kW	9	38	110	200
	750 V	kW	4	45	110	250
Switching frequency						
Switching frequency z in operating cycles/hour						
AC/DC operation	With resistive load DC-1	h ⁻¹	1500	1000		
	For inductive load DC-3/DC-5	h ⁻¹	750	600		
Conductor cross-sections						
Screw terminals (1 or 2 conductors can be connected)			Screw terminals			
Main conductors:						
• Solid	mm ²		2 x (2.5 ... 10)	2 x (6 ... 16)	—	—
• Finely stranded with end sleeve	mm ²		2 x (1.5 ... 4)	—	—	—
• Stranded with cable lug	mm ²		2 x 16	2 x 35	2 x 120	2 x 150
• Pin-end connector to DIN 46231	mm ²		2 x (1 ... 6)	—	—	—
• Busbars	mm		—	15 x 2.5	25 x 4	2 x (25 x 3)
• Terminal screw			M5	M6	M10	M10
Auxiliary conductors:						
• Solid	mm ²		2 x (1 ... 2.5)			
• Finely stranded with end sleeve	mm ²		2 x (0.75 ... 1.5)			

1) The opening delay times can increase if the contactor coils are damped against voltage peaks. Only 3TC44 contactors are allowed to be fitted with diodes.

Contactors for Special Applications

Contactors for Switching DC Voltage

3TC contactors,
1- and 2-pole, 32 ... 400 A

Selection and ordering data



3TC44

3TC48

Size	Rated data DC-3 and DC-5 Operational current $I_e^{2)}$	Ratings of DC motors at					Auxiliary contacts ¹⁾ Version		Rated control supply voltage U_s	Screw terminals
		110 V	220 V	440 V	600 V	750 V	NO	NC	V	Order No.
A		kW	kW	kW	kW	kW				

3TC44 to 3TC56 two-pole contactors

DC operation

Screw and snap-on mounting onto 35 mm standard mounting rail

2	32	2.5	5	9	9	4	2	2	24 DC 110 DC 220 DC	3TC44 17-0AB4 3TC44 17-0AF4 3TC44 17-0AM4
Screw mounting										
4	75	6.5	13	27	38	45	2	2	24 DC 110 DC 220 DC	3TC48 17-0AB4 3TC48 17-0AF4 3TC48 17-0AM4
8	220 ³⁾	20	41	82	110	110	2	2	24 DC 110 DC 220 DC	3TC52 17-0AB4 3TC52 17-0AF4 3TC52 17-0AM4
12	400	35	70	140	200	250	2	2	24 DC 110 DC 220 DC	3TC56 17-0AB4 3TC56 17-0AF4 3TC56 17-0AM4

AC operation, 50 Hz

Screw and snap-on mounting onto 35 mm standard mounting rail

2	32	2.5	5	9	9	4	2	2	220 / 230 AC ⁴⁾ 110 / 110 AC	3TC44 17-0BP0 3TC44 17-0BF0
Screw fixing										
4	75	6.5	13	27	38	45	2	2	220 / 230 AC ⁴⁾ 110 AC	3TC48 17-0BP0 3TC48 17-0BF0
8	220 ³⁾	20	41	82	110	110	2	2	220 / 230 AC ⁴⁾ 110 AC	3TC52 17-0BP0 3TC52 17-0BF0
12	400	35	70	140	200	250	2	2	220 / 230 AC ⁴⁾ 110 AC	3TC56 17-0BP0 3TC56 17-0BF0

1) The fitting of auxiliary switches cannot be altered on DC-operated contactors.

2) The following rated operational currents are permitted for reversing duty with 3TC44 to 3TC56 contactors:

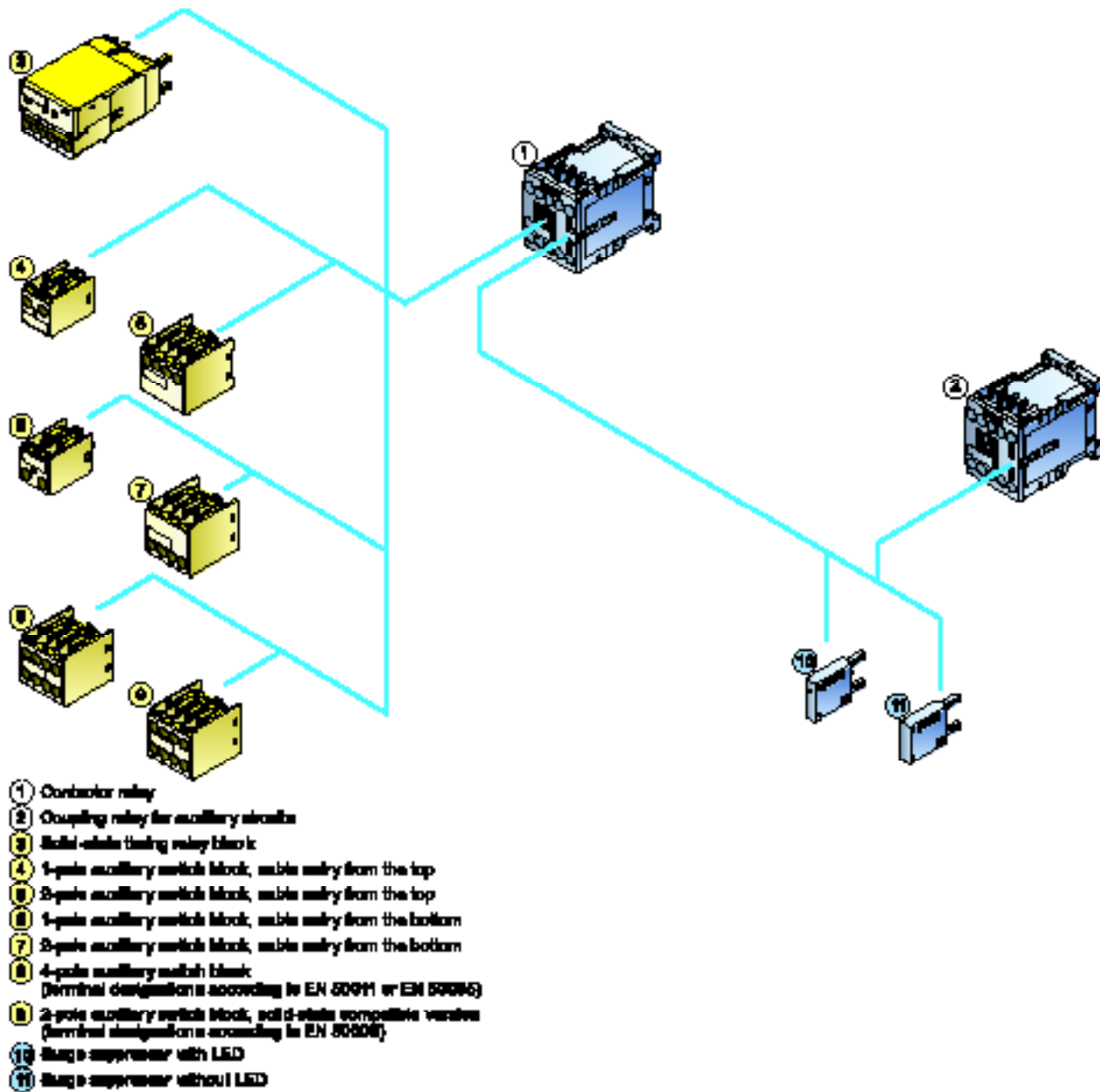
Contactor	Rated operational voltage	
Type	110 V, 220 V	440 V
3TC44	32 A	7 A
3TC48	75 A	75 A
3TC52	170 A	170 A
3TC56	400 A	400 A

3) At > 600 V: $I_e = 170$ A.

4) Operating range at 220 V: 0.85 to 1.15 x U_s .

Overview

Contactor relays and coupling relays
Size S00 with accessories



Contactors Relays

SIRIUS 3RH2 contactor relays, 4-pole

Standards

IEC 60947-1, EN 60947-1,
IEC 60947-5-1, EN 60947-5-1

The 3RH2 contactor relays have screw, ring terminal lug or spring-type terminals. Four contacts are available in the basic unit.

The 3RH2 contactor relays are suitable for use in any climate. They are finger-safe according to EN 50274. The devices with ring terminal lug connection comply with degree of protection IP20 when fitted with the related terminal cover.

Contact reliability

High contact stability at low voltages and currents, suitable for solid-state circuits with currents ≥ 1 mA at a voltage of ≥ 17 V.

Surge suppression

RC elements, varistors, diodes or diode assemblies (combination of a diode and a Zener diode) can be plugged onto all contactor relays from the front for damping opening surges in the coil. The plug-in direction is determined by a coding device.

Note:

The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times; diode assembly 2 to 6 times, varistor +2 to 5 ms).

Auxiliary switch blocks

The 3RH2 contactor relays can be expanded by up to four contacts by the addition of snap-on auxiliary switch blocks.

The auxiliary switch block can easily be snapped onto the front of the contactors. The auxiliary switch block has a centrally positioned release lever for disassembly.

The contactor relays with 4 contacts according to EN 50011, with the identification number 40E, can be extended with 80E to 44E auxiliary switch blocks to obtain contactor relays with 8 contacts according to EN 50011. The identification numbers 80E to 44E on the auxiliary switch blocks apply to the complete contactors. These auxiliary switch blocks (3RH29 11-1GA..) cannot be combined with contactor relays with identification numbers 31E and 22E; they are coded.

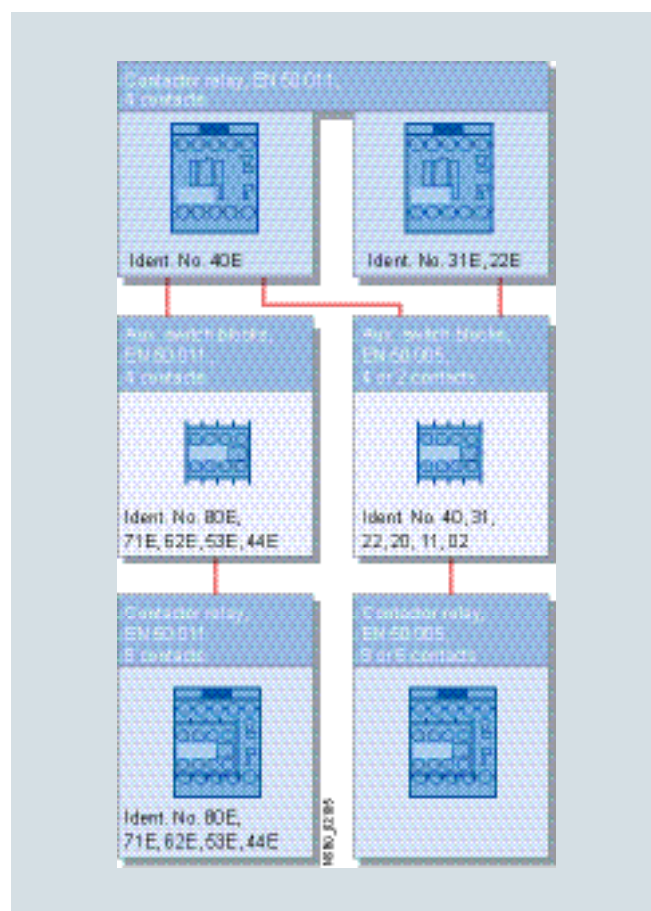
All contactor relays with 4 contacts according to EN 50011, identification numbers 40E to 22E, can be extended with auxiliary switch blocks 40 to 02 to obtain contactor relays with 6 or 8 contacts in accordance with EN 50005.

The identification numbers on the auxiliary switch blocks apply only to the attached auxiliary switch blocks.

In addition, fully mounted 3RH22 8-pole contactor relays are available; the mounted 4-pole auxiliary switch block in the 2nd tier is not removable. The terminal designations are according to EN 50011.

These versions are built according to special Swiss regulations SUVA and are distinguished externally by a red labeling plate.

Of the auxiliary contacts (integrated plus mountable) possible on the device, no more than four NC contacts are permitted.



Order No. scheme

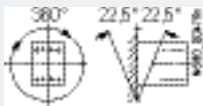
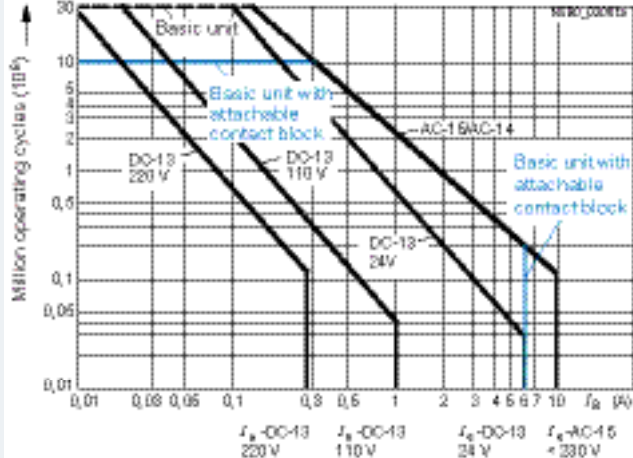
Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
	□ □ □	□	□	□	□	-	□	□	□	□	-	□	□	□
SIRIUS contactor relays	3 R H													
Innovations			2											
Device type (e. g. 1 = 4-pole contactor relay, 3 = 8-pole contactor relay)				□										
Number of NO contacts (e. g. 2 = 2 NO)					□									
Number of NC contacts (e. g. 2 = 2 NC)						□								
Connection type (1 = screw, 2 = spring)							□							
Operating range / solenoid coil circuit (e. g. A = AC standard / without)								□						
Rated control supply voltage (e. g. P0 = 230 V, 50 Hz)									□	□				
No significance											□			
Special version												□	□	□
Example	3	R	H	2	1	2	2	-	1	A	P	0	0	

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

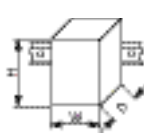
Technical specifications

Contactor	Type Size	3RH2 S00
Permissible mounting positions		
The contactors are designed for operation on a vertical mounting surface.		
Positively-driven operation of contacts in contactor relays		
3RH2: Yes , in the basic unit and the auxiliary switch block as well as between the basic unit and the front-mounted auxiliary switch block (removable) acc. to: - ZH 1/457 - EN 60947-5-1, Appendix L 3RH22: Yes , in the basic unit and the auxiliary switch block as well as between the basic unit and the snap-on auxiliary switch block (permanently mounted) acc. to: - ZH 1/457 - EN 60947-5-1, Appendix L <u>Note:</u> 3RH29 11 - NF : <i>solid-state compatible auxiliary switch blocks have no positively-driven contacts.</i>		Explanations: There is positively-driven operation if it is ensured that the NC and NO contacts cannot be closed at the same time. ZH1/457 Safety rules for control units on power-operated presses in the metal-working industry. EN 60947-5-1, Appendix L Low-Voltage Controlgear, Control Equipment and Switching Elements. Special requirements for positively-driven contacts
Contact reliability		
Contact reliability at 17 V, 1 mA acc. to EN 60947-5-4		Frequency of contact faults $<10^{-8}$ i. e. < 1 fault per 100 million operating cycles
Contact endurance for AC-15/AC-14 and DC-13 utilization categories		
The contact endurance is mainly dependent on the breaking current. It is assumed that the operating mechanisms are switched randomly, i. e. not synchronized with the phase angle of the supply system. If magnetic circuits other than the contactor coil systems or solenoid valves are present, e. g. magnetic brakes, protective measures for the load circuits are necessary, e. g. in the form of RC elements and freewheel diodes. The characteristic curves apply to: 3RH21/3RH22 contactor relays 3RH24 latched contactor relays 3RH29 11 auxiliary switch blocks¹⁾ - Auxiliary switch blocks for snapping onto the front, max. 4-pole and for mounting onto the side in size S00		 Diagram legend: I_b = Breaking current I_n = Rated operational current

1) $I_n = 6$ A for AC-15/AC-14.

Contactor Relays

SIRIUS 3RH2 contactor relays, 4-pole

Type Size				
Dimensions (W x H x D) with screw terminals				
• With mounted auxiliary switch block				
		mm		
		mm		
			3RH21 S00	3RH22 S00
			45 x 57.5 x 73	—
			45 x 57.5 x 116	45 x 57.5 x 116
				3RH24 S00
				90 x 57.5 x 73
				—
General data				
Mechanical endurance				
• Basic units		Operat. cycles	30 million	5 million
• Basic unit with snap-on auxiliary switch block		Operat. cycles	10 million	
• Solid-state compatible auxiliary switch block		Operat. cycles	5 million	
Rated insulation voltage U_i (pollution degree 3)			V	690
Rated impulse withstand voltage U_{imp}			kV	6
Protective separation between the coil and the contacts in the basic unit acc. to EN 60947-1, Appendix N			V	415
Permissible ambient temperature				
• During operation		°C	-25 ... +60	
• During storage		°C	-55 ... +80	
Degree of protection acc. to EN 60947-1, Appendix C			IP20, coil assembly IP40	
Touch protection acc.to EN 50274			Finger-safe	
Shock resistance				
• Rectangular pulse	- AC operation	g/ms	7.3/5 and 4.7/10	
	- DC operation	g/ms	>10/5 and >5/10	
• Sine pulse	- AC operation	g/ms	11.4/5 and 7.3/10	
	- DC operation	g/ms	>15/5 and >8/10	
Short-circuit protection				
(weld-free protection at $I_k \geq 1$ kA)				
• Fuse links, operational class gG				
- DIAZED, Type 5SB	A		10	
- NEOZED, Type 5SE	A		10	
• Or miniature circuit breakers with C characteristic (short-circuit current $I_k < 400$ A)	A		6	
Conductor cross-sections				
Auxiliary conductors and coil terminals (1 or 2 conductors can be connected)			 Screw terminals	
• Solid	mm ²		2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾ according to IEC 60947; max. 2 x (0.5 ... 4)	
• Finely stranded with end sleeve	mm ²		2 x (0.5 ... 1.5) ¹⁾ ; 2 x (0.75 ... 2.5) ¹⁾	
• AWG cables, solid or stranded	AWG		2 x (20 ... 16) ¹⁾ ; 2 x (18 ... 14) ¹⁾	
• Terminal screw			M3 (for standard screwdriver size 2 and Pozidriv 2)	
- Tightening torque	Nm		0.8 ... 1.2 (7 ... 10.3 lb.in)	
Auxiliary conductors and coil terminals (1 or 2 conductors can be connected)			 Spring-type terminals	
• Operating devices	mm		3.0 x 0.5; 3.5 x 0.5	
• Solid	mm ²		2 x (0.5 ... 4)	
• Finely stranded with end sleeve	mm ²		2 x (0.5 ... 2.5)	
• Finely stranded without end sleeve	mm ²		2 x (0.5 ... 2.5)	
• AWG cables, solid or stranded	AWG		2 x (20 ... 12)	
Auxiliary conductors for front and laterally mounted auxiliary switches				
• Operating devices	mm		3.0 x 0.5; 3.5 x 0.5	
• Solid	mm ²		2 x (0.5 ... 2.5)	
• Finely stranded with end sleeve	mm ²		2 x (0.5 ... 1.5)	
• Finely stranded without end sleeve	mm ²		2 x (0.5 ... 1.5)	
• AWG cables, solid or stranded	AWG		2 x (20 ... 14)	

An insulation stop must be used for conductor cross-sections ≤ 1 mm².

Note:

Maximum external diameter of the conductor insulation: 3.6 mm.

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified.

Contactor	Type Size	3RH2 . S00
Control circuit		
Coil operating range		
• AC operation	At 50 Hz At 60 Hz	0.8 ... 1.1 x U_s 0.85 ... 1.1 x U_s
• DC operation	At 50 °C At +60 °C	0.8 ... 1.1 x U_s 0.85 ... 1.1 x U_s
Power consumption of the solenoid coils (when coil is cold and 1.0 x U_s)		
• AC operation, 50 Hz		
- Closing	VA/p.f.	37/0.8
- Closed	VA/p.f.	5.7/0.25
• AC operation, 60 Hz		
- Closing	VA/p.f.	33/0.75
- Closed	VA/p.f.	4.4/0.25
• DC operationClosing = closed	W	4.0
Operating times¹⁾ (Total break time = OFF-delay + Arcing time) Values apply with coil in cold state and at operating temperature for operating range		
<u>AC operation</u>		
• Closing		
- ON-delay of NO contact	With 0.8 ... 1.1 x U_s ms With 1.0 x U_s ms 3RH24 minimum operating time ms	8 ... 33 9 ... 22 ≥ 35
- OFF-delay of NC contact	With 0.8 ... 1.1 x U_s ms With 1.0 x U_s ms	6 ... 25 6.5 ... 19
• Opening		
- OFF-delay of NO contact	With 0.8 ... 1.1 x U_s ms With 1.0 x U_s ms 3RH24 minimum operating time ms	4 ... 15 4.5 ... 15 ≥ 30
- ON-delay of NC contact	With 0.8 ... 1.1 x U_s ms With 1.0 x U_s ms	5 ... 15 5 ... 15
<u>DC operation</u>		
• Closing		
- ON-delay of NO contact	With 0.8 ... 1.1 x U_s ms With 1.0 x U_s ms 3RH24 minimum operating time ms	30 ... 100 35 ... 50 ≥ 100
- OFF-delay of NC contact	With 0.8 ... 1.1 x U_s ms With 1.0 x U_s ms	25 ... 90 30 ... 45
• Opening		
- OFF-delay of NO contact	With 0.8 ... 1.1 x U_s ms With 1.0 x U_s ms 3RH24 minimum operating time ms	7 ... 13 7 ... 12 ≥ 30
- ON-delay of NC contact	With 0.8 ... 1.1 x U_s ms With 1.0 x U_s ms	13 ... 19 13 ... 18
• Arcing time	ms	10 ... 15
Dependence of the switching frequency z' on the operational current I' and operational voltage U' : $z' = z \cdot I_e / I' \cdot (U_e / U')^{1.5} \cdot 1/h$		

1) The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times; diode assembly 2 to 6 times, varistor +2 to 5 ms).

Contactor Relays

SIRIUS 3RH2 contactor relays, 4-pole

Contactor	Type Size	3RH2. S00
Load side		
Rated operational currents I_e		
AC-12	A	10
AC-15/AC-14	Up to 230 V A	10 ¹⁾
For rated operational voltage U_s	400 V A	3
	500 V A	2
	690 V A	1
DC-12		
For rated operational voltage U_s		
• 1 conducting path	24 V A	6
	60 V A	6
	110 V A	3
	220 V A	1
	440 V A	0.3
	600 V A	0.15
• 2 conducting paths in series	24 V A	10
	60 V A	10
	110 V A	4
	220 V A	2
	440 V A	1.3
	600 V A	0.65
• 3 conducting paths in series	24 V A	10
	60 V A	10
	110 V A	10
	220 V A	3.6
	440 V A	2.5
	600 V A	1.8
DC-13		
For rated operational voltage U_s		
• 1 conducting path	24 V A	6
	60 V A	2
	110 V A	1
	220 V A	0.3
	440 V A	0.14
	600 V A	0.1
• 2 conducting paths in series	24 V A	10
	60 V A	3.5
	110 V A	1.3
	220 V A	0.9
	440 V A	0.2
	600 V A	0.1
• 3 conducting paths in series	24 V A	10
	60 V A	4.7
	110 V A	3
	220 V A	1.2
	440 V A	0.5
	600 V A	0.26
Switching frequency z		
• In operating cycles/h during rated operation for utilization category	AC-12/DC-12 h ⁻¹	1000
	AC-15/AC-14 h ⁻¹	1000
	DC-13 h ⁻¹	1000
• No-load switching frequency	h ⁻¹	10000
Dependence of the switching frequency z' on the operational current I' and operational voltage U': $z' = z \cdot I_e / I' \cdot (U_e / U')^{1.5} \cdot 1/h$		

Selection and ordering data

AC operation

Size S00



3RH2 1 . . . 1



3RH2 1 . . . 2

Rated operational current I_N AC-15/AC-14 at 230 V	Contacts Ident. No.	Version		Rated control supply voltage U_s at 50/60 Hz ²⁾	Screw terminals	Spring-type terminals
					Order No.	Order No.
A		NO	NC	V AC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Terminal designations according to EN 50011

10	40E	4	—	24 110 230	3RH21 40-1AB00 3RH21 40-1AF00 3RH21 40-1AP00	3RH21 40-2AB00 3RH21 40-2AF00 3RH21 40-2AP00
	31E	3	1	24 110 230	3RH21 31-1AB00 3RH21 31-1AF00 3RH21 31-1AP00	3RH21 31-2AB00 3RH21 31-2AF00 3RH21 31-2AP00
	22E	2	2	24 110 230	3RH21 22-1AB00 3RH21 22-1AF00 3RH21 22-1AP00	3RH21 22-2AB00 3RH21 22-2AF00 3RH21 22-2AP00

1) Coil operating range
at 50 Hz: 0.8 to 1.1 x U_s
at 60 Hz: 0.85 to 1.1 x U_s .

Contactor Relays

SIRIUS 3RH2 contactor relays,
4-pole

DC operation · DC solenoid system

Size S00



3RH21 ...-1 ...

3RH21 ...-2 ...

Rated operational current I_N /AC-15/AC-14 at 230 V	Contacts		Rated control supply voltage U_s	Screw terminals 	Spring-type terminals 
	Ident. No.	Version		Order No.	Order No.
		 			
A		NO NC	V DC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Terminal designations according to EN 50011

10	40E	4	—	24 220	3RH21 40-1BB40 3RH21 40-1BM40	3RH21 40-2BB40 3RH21 40-2BM40
	31E	3	1	24 220	3RH21 31-1BB40 3RH21 31-1BM40	3RH21 31-2BB40 3RH21 31-2BM40
	22E	2	2	24 220	3RH21 22-1BB40 3RH21 22-1BM40	3RH21 22-2BB40 3RH21 22-2BM40

Options

Rated control supply voltages
(the 10th and 11th position of the order number must be changed)

Rated control supply voltage U_s	Control supply voltage at	Contactor type
		3RH21

AC operation

Solenoid coils for 50/60 Hz and 60 Hz

50/60 Hz ¹⁾	60 Hz	
24 V AC	—	B0
42 V AC	—	D0
48 V AC	—	H0
110 V AC	—	F0
220 V AC	—	N2
230 V AC	—	P0
400 V AC	—	V0

DC operation

12 V DC	A4
24 V DC	B4
42 V DC	D4
48 V DC	W4
60 V DC	E4
110 V DC	F4
125 V DC	G4
220 V DC	M4
230 V DC	P4

1) Coil operating range
at 50 Hz: 0.8 to 1.1 x U_s
at 60 Hz: 0.85 to 1.1 x U_s .

Contactors Relays

SIRIUS 3RH24 latched contactor relays, 4-pole

Overview

Standards

IEC 60947-1, EN 60947-1,

IEC 60947-5-1, EN 60947-5-1

The terminal designations comply with EN 50011.

Auxiliary switches

The number of auxiliary contacts can be extended by means of front auxiliary switch blocks (max. 4 contacts).

Control circuit

The contactor coil and the coil of the release solenoid are both designed for uninterrupted duty.

RC elements, varistors diodes or diode assemblies can be fitted to both coils from the front for damping opening surges in the coil.

The contactor relay can also be switched on and released manually (for minimum actuating times see [Technical Specifications](#)).

Selection and ordering data



3RH24 . . . -1

Rated operational current I_N /AC-15/AC-14 at 230 V	Contacts		Rated control supply voltage U_s	Screw terminals 
	Ident. No. acc. to EN 50011	Version		
		 		Order No.
A		NO NC V		

For screw and snap-on mounting onto 35 mm standard mounting rail

AC operation

10	40 E	4	—	AC 50/60 Hz ¹⁾	3RH24 40-1AB00 3RH24 40-1AF00 3RH24 40-1AP00
				24 110 230	
	31 E	3	1	24 110 230	3RH24 31-1AB00 3RH24 31-1AF00 3RH24 31-1AP00
	22 E	2	2	24 110 230	3RH24 22-1AB00 3RH24 22-1AF00 3RH24 22-1AP00

DC operation · DC solenoid system

10	40 E	4	—	DC	3RH24 40-1BB40 3RH24 40-1BF40 3RH24 40-1BM40
				24 110 220	
	31 E	3	1	24 110 220	3RH24 31-1BB40 3RH24 31-1BF40 3RH24 31-1BM40
	22 E	2	2	24 110 220	3RH24 22-1BB40 3RH24 22-1BF40 3RH24 22-1BM40

For accessories see pages 2/158.

1) Coil operating range
at 50 Hz: 0.8 to 1.1 × U_s
at 60 Hz: 0.85 to 1.1 × U_s .

SIRIUS 3RH21 coupling relays for switching auxiliary circuits, 4-pole

Application

DC operation

IIEC 60947-1, EN 60947-1,
IEC 60947-5-1, EN 60947-5-1

The 3RH21 coupling relays for switching auxiliary circuits are tailored to the special requirements of working with electronic controls.

The 3RH21 coupling relays cannot be extended with auxiliary switch blocks.

Coupling relays have a low power consumption and an extended coil operating range.

Technical specifications

All technical specifications not mentioned in the table below are identical to those of the 3RH21 contactor relays.

Contactor type Size		3RH21 . . . HB40 S00	3RH21 . . . JB40 S00	3RH21 . . . KB40 S00
Control circuit				
Coil operating range		0.7 ... 1.85 x U_s		
Power consumption of the solenoid coil (for cold coil) Closing = Closed				
• At $U_s = 17\text{ V}$	W	1.4		
• At $U_s = 24\text{ V}$	W	2.8		
• At $U_s = 30\text{ V}$	W	4.4		
Permissible residual current of the electronics for 0 signal		< 10 mA x (24 V/ U_s)		
Overvoltage configuration of the solenoid coil		No overvoltage damping 	With diode 	With suppressor diode 
Operating times				
• Closing at 17 V				
- ON-delay NO	ms	40 ... 130		
- OFF-delay NC	ms	30 ... 80		
• At 24 V				
- ON-delay NO	ms	35 ... 60		
- OFF-delay NC	ms	25 ... 40		
• At 30 V				
- ON-delay NO	ms	25 ... 50		
- OFF-delay NC	ms	15 ... 30		
• Closing at 17 ... 30 V				
- OFF-delay NO	ms	7 ... 20	38 ... 65	7 ... 20
- ON-delay NC	ms	20 ... 30	55 ... 75	20 ... 30

Contactor Relays

SIRIUS 3RH21 coupling relays for switching auxiliary circuits, 4-pole

Selection and ordering data

DC operation

Low power consumption

Extended operating range of the solenoid coil

Integrated coil circuit



3RH21 . . .-1 . B40



3RH21 . . .-2 . B40

Rated operational current I_N /AC-15/AC-14 at 230 V	Auxiliary contacts Ident. No. acc. to EN 50011	Version	Screw terminals	Spring-type terminals
		NO NC		
A			Order No.	Order No.

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00

Diode, varistor or RC element, attachable (retrofitting)

Terminal designations according to EN 50011

(no auxiliary switch blocks can be mounted)

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.7 to 1.25 x U_s**

Power consumption of the coils **2.8 W** at 24 V

10	40E	4	—	3RH21 40-1HB40	3RH21 40-2HB40
	31E	3	1	3RH21 31-1HB40	3RH21 31-2HB40
	22E	2	2	3RH21 22-1HB40	3RH21 22-2HB40

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.85 to 1.85 x U_s** Power consumption of the coils **1.6 W** at 24 V

10	40E	4	—	3RH21 40-1MB40-0KT0	3RH21 40-2MB40-0KT0
	31E	3	1	3RH21 31-1MB40-0KT0	3RH21 31-2MB40-0KT0
	22E	2	2	3RH21 22-1MB40-0KT0	3RH21 22-2MB40-0KT0

With integrated coil circuit (diode)

Terminal designations according to EN 50011

(no auxiliary switch blocks can be mounted)

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.7 to 1.25 x U_s**

Power consumption of the coils **2.8 W** at 24 V

10	40E	4	—	3RH21 40-1JB40	3RH21 40-2JB40
	31E	3	1	3RH21 31-1JB40	3RH21 31-2JB40
	22E	2	2	3RH21 22-1JB40	3RH21 22-2JB40

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.85 to 1.85 x U_s** Power consumption of the coils **1.6 W** at 24 V

10	40E	4	—	3RH21 40-1VB40	3RH21 40-2VB40
	31E	3	1	3RH21 31-1VB40	3RH21 31-2VB40
	22E	2	2	3RH21 22-1VB40	3RH21 22-2VB40

With integrated coil circuit (suppressor diode)

Terminal designations according to EN 50011

(no auxiliary switch blocks can be mounted)

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.7 to 1.25 x U_s**

Power consumption of the coils **2.8 W** at 24 V

10	40E	4	—	3RH21 40-1KB40	3RH21 40-2KB40
	31E	3	1	3RH21 31-1KB40	3RH21 31-2KB40
	22E	2	2	3RH21 22-1KB40	3RH21 22-2KB40

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.85 to 1.85 x U_s** Power consumption of the coils **1.6 W** at 24 V

10	40E	4	—	3RH21 40-1SB40	3RH21 40-2SB40
	31E	3	1	3RH21 31-1SB40	3RH21 31-2SB40
	22E	2	2	3RH21 22-1SB40	3RH21 22-2SB40

Application

DC operation

IEC 60947-1, EN 60947-1,
IEC 60947-4-1, EN 60947-4-1,
IEC 60947-5-1, EN 60947-5-1 (auxiliary switches)

The 3RT20 coupling contactors for switching motors are tailored to the special requirements of working with electronic controls.

The 3RT20 1 coupling contactors cannot be extended with auxiliary switch blocks.

Coupling contactors have a low power consumption and an extended solenoid coil operating range.

Technical specifications

All technical specifications not mentioned in the table below are identical to those of the 3RT20 contactors for switching.

Contactor	Type Size	3RT20 1 . - . HB4 . S00	3RT20 1 . - . JB4 . S00	3RT20 1 . - . KB4 . S00	3RT20 2 . - . KB4 . S0
General data					
Mechanical endurance	Operating cycles	30 million			10 million
Safe isolation between the coil and the main contacts acc. to EN 60947-1, Appendix N	V	415			
Control circuit					
Coil operating range		0.7 ... 1.25 x U _s			
Power consumption of the solenoid coil (for cold coil) Closing = Closed	At U _s 17 V W	1.6			2.3
	24 V W	2.8			4.5
	30 V W	4.4			7
Permissible residual current of the electronics (with 0 signal)		< 10 mA x (24 V/U _s)			< 6 mA x (24 V/U _s)
Overvoltage configuration of the solenoid coil		No overvoltage damping 	With diode 	With suppressor diode 	With varistor 
Operating times					
• Closing					
- At 17 V	ON-delay NO	ms	40 ... 130		70 ... 270
	OFF-delay NC	ms	30 ... 80		60 ... 250
- At 24 V	ON-delay NO	ms	35 ... 60		65 ... 90
	OFF-delay NC	ms	25 ... 40		55 ... 80
- At 30 V	ON-delay NO	ms	25 ... 50		52 ... 65
	OFF-delay NC	ms	15 ... 30		43 ... 57
• Closing at 17 ... 30 V	OFF-delay NO	ms	7 ... 20	38 ... 65	7 ... 20
	ON-delay NC	ms	20 ... 30	55 ... 75	20 ... 30

Coupling Contactors

SIRIUS 3RT20 coupling contactors (interface), 3-pole, 3 ... 15 kW

Selection and ordering data

DC operation

Low power consumption

Extended operating range of the solenoid coil



3RT20 1..-1..B4.



3RT20 1..-2..B4.

Rated data AC-2 and AC-3 T_u : Up to 60 °C		Auxiliary contacts		Screw terminals 	Spring-type terminals 
Operational current I_e up to	Rating of induction motors at 50 Hz and	Ident. No.	Version	Order No.	Order No.
415 V	415 V		 		
A	kW		NO NC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00

Diode, varistor or RC element, attachable (retrofitting)

Terminal designations according to EN 50012 (no auxiliary switch blocks can be mounted)

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.7 to 1.25 x U_s**

Power consumption of the coils **2.8 W** at 24 V

7	3	10 01	1 —	— 1	3RT20 15-1HB41 3RT20 15-1HB42	3RT20 15-2HB41 3RT20 15-2HB42
9	4	10 01	1 —	— 1	3RT20 16-1HB41 3RT20 16-1HB42	3RT20 16-2HB41 3RT20 16-2HB42
12	5.5	10 01	1 —	— 1	3RT20 17-1HB41 3RT20 17-1HB42	3RT20 17-2HB41 3RT20 17-2HB42

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.85 to 1.85 x U_s**

Power consumption of the coils **1.6 W** at 24 V

7	3	10 01	1 —	— 1	3RT20 15-1MB41-OKT0 3RT20 15-1MB42-OKT0	3RT20 15-2MB41-OKT0 3RT20 15-2MB42-OKT0
9	4	10 01	1 —	— 1	3RT20 16-1MB41-OKT0 3RT20 16-1MB42-OKT0	3RT20 16-2MB41-OKT0 3RT20 16-2MB42-OKT0
12	5.5	10 01	1 —	— 1	3RT20 17-1MB41-OKT0 3RT20 17-1MB42-OKT0	3RT20 17-2MB41-OKT0 3RT20 17-2MB42-OKT0

For surge suppressors see page 2/158.

Coupling Contactors

**SIRIUS 3RT20 coupling contactors (interface),
3-pole, 3 ... 15 kW**

DC operation

Low power consumption

Extended operating range of the solenoid coil

Integrated coil circuit



3RT20 1...-1...B4



3RT20 1...-2...B4

Rated data AC-2 and AC-3 T_u : Up to 60 °C		Auxiliary contacts		Screw terminals 	Spring-type terminals 
Operational current I_e up to	Rating of induction motors at 50 Hz and	Ident. No.	Version	Order No.	Order No.
415 V	415 V		 NO		
A	kW		 NC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S00

With integrated coil circuit (diode)

Terminal designations according to EN 50012 (no auxiliary switch blocks can be mounted)

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.7 to 1.25 x U_s**
Power consumption of the coils **2.8 W** at 24 V

7	3	10 01	1 —	— 1	3RT20 15-1JB41 3RT20 15-1JB42	3RT20 15-2JB41 3RT20 15-2JB42
9	4	10 01	1 —	— 1	3RT20 16-1JB41 3RT20 16-1JB42	3RT20 16-2JB41 3RT20 16-2JB42
12	5.5	10 01	1 —	— 1	3RT20 17-1JB41 3RT20 17-1JB42	3RT20 17-2JB41 3RT20 17-2JB42

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.85 to 1.85 x U_s**
Power consumption of the coils **1.6 W** at 24 V

7	3	10 01	1 —	— 1	3RT20 15-1VB41 3RT20 15-1VB42	3RT20 15-2VB41 3RT20 15-2VB42
9	4	10 01	1 —	— 1	3RT20 16-1VB41 3RT20 16-1VB42	3RT20 16-2VB41 3RT20 16-2VB42
12	5.5	10 01	1 —	— 1	3RT20 17-1VB41 3RT20 17-1VB42	3RT20 17-2VB41 3RT20 17-2VB42

With integrated coil circuit (suppressor diode)

Terminal designations according to EN 50012 (no auxiliary switch blocks can be mounted)

Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.7 to 1.25 x U_s**
Power consumption of the coils **2.8 W** at 24 V

7	3	10 01	1 —	— 1	3RT20 15-1KB41 3RT20 15-1KB42	3RT20 15-2KB41 3RT20 15-2KB42
9	4	10 01	1 —	— 1	3RT20 16-1KB41 3RT20 16-1KB42	3RT20 16-2KB41 3RT20 16-2KB42
12	5.5	10 01	1 —	— 1	3RT20 17-1KB41 3RT20 17-1KB42	3RT20 17-2KB41 3RT20 17-2KB42

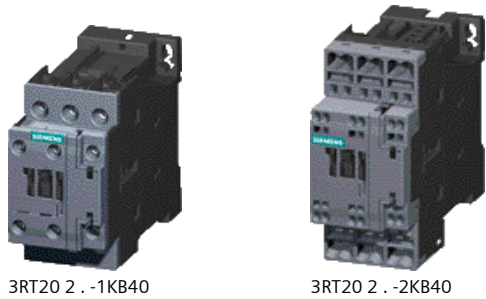
Rated control supply voltage $U_s = 24$ V DC, coil operating range **0.85 to 1.85 x U_s**
Power consumption of the coils **1.6 W** at 24 V

7	3	10 01	1 —	— 1	3RT20 15-1SB41 3RT20 15-1SB42	3RT20 15-2SB41 3RT20 15-2SB42
9	4	10 01	1 —	— 1	3RT20 16-1SB41 3RT20 16-1SB42	3RT20 16-2SB41 3RT20 16-2SB42
12	5.5	10 01	1 —	— 1	3RT20 17-1SB41 3RT20 17-1SB42	3RT20 17-2SB41 3RT20 17-2SB42

Coupling Contactors

SIRIUS 3RT20 coupling contactors (interface),
3-pole, 3 ... 15 kW

DC operation
 Low power consumption
 Extended operating range of the solenoid coil
 Integrated coil circuit



Rated data AC-2 and AC-3 T_n : Up to 60 °C		Auxiliary contacts		Screw terminals 	Spring-type terminals 
Operational current I_e up to	Rating of induction motors at 50 Hz and	Ident. No.	Version	Order No.	Order No.
415 V	415 V		 		
A	kW		NO NC		

For screw and snap-on mounting onto 35 mm standard mounting rail

Size S0

With integrated coil circuit (varistor)

Terminal designations according to EN 50012 (no auxiliary switch blocks can be mounted)

Rated control supply voltage U_s = 24 V DC, coil operating range **0.7 to 1.25 x U_s**
 Power consumption of the coils **4.5 W** at 24 V

12	5.5	11	1	1	3RT20 24-1KB40	3RT20 24-2KB40
16	7.5	11	1	1	3RT20 25-1KB40	3RT20 25-2KB40
25	11	11	1	1	3RT20 26-1KB40	3RT20 26-2KB40
32	15	11	1	1	3RT20 27-1KB40	3RT20 27-2KB40

Overview

The function modules for mounting onto contactors enable the assembly of starters and contactor assemblies for direct-on-line, reversing and wye-delta starting without any additional, complicated wiring of the individual components.

They include the key control functions required for the particular feeder, e. g. timing and interlocking, and can be connected to the control system by either parallel wiring or through IO-Link or AS-Interface.

Version	SIRIUS function modules	SIRIUS function modules for IO-Link ¹⁾	SIRIUS function modules for AS-Interface ¹⁾
For direct-on-line starting	Timing relays: ON-delay or OFF-delay with semiconductor output With screw or spring-type terminals 	With screw or spring-type terminals 	With screw or spring-type terminals 
For reversing starting	Wiring modules for sizes S00 and S0 With screw or spring-type terminals (with screw terminals for main and control circuit) 	1 function module for size S00 and S0, screw and spring-type connection, plus the respective wiring modules ¹⁾  	1 function module for size S00 and S0, screw and spring-type connection, plus the respective wiring modules ¹⁾  
For wye-delta starting	1 function module for size S00 and S0, screw and spring-type connection of the contactors, plus the respective wiring modules ²⁾ 	For wye-delta starting: 1 function module for size S00 and S0, screw and spring-type connection, plus the respective wiring modules ²⁾ 	For wye-delta starting: 1 function module for size S00 and S0, screw and spring-type connection, plus the respective wiring modules ²⁾ 
Accessories	Sealable covers 	Operator panel for autonomous controlling of up to 4 feeders Module connector for the grouping of starters Connection cable between the operator panel and the feeder group Sealable covers 	AS-Interface addressing units Sealable covers 

1) Use of the communication-capable function modules for IO-Link or AS-Interface requires contactors with communication interface (see pages 2/26 and 2/27).

2) The modules for the control current wiring, which are included in the wiring kit, are not required.

Note:

When using the function modules, no other auxiliary switches are allowed to be connected to the basic units.

SIRIUS function modules

Overview

Simply by being plugged in place, the SIRIUS function modules enable different functionalities required for the assembly of starters to be realized in the feeder. The function modules and wiring kits thus help to reduce the wiring work within the feeder practically to zero.

SIRIUS function modules for direct-on-line starting

All solid-state timing relays which can be mounted onto the contactor are designed for applications in the range from 24 to 240 V AC/DC (wide voltage range). Both the electrical and mechanical connection are made by simple snapping on and locking.

A protection circuit (varistor) is integrated in each module.

The solid-state timing relay with semiconductor output uses two contact legs to actuate the contactor underneath by means of a semiconductor after the set time t has elapsed.

The switching state feedback is performed by a mechanical switching state indicator (plunger). In addition, the auxiliary switches in the contactors are freely accessible and can be used for feedbacks to the control system or for signal lamps.

A sealable cover is available to protect against careless adjustment of the set times.

SIRIUS function modules for reversing starting

The wiring kits for reversing starters enable the cost-effective assembly of contactor assemblies. They can be used for all applications with reversing duty up to 18.5 kW.

For a detailed description see page 2/61.

SIRIUS function modules for wye-delta starting

Both interlocking and timing functions are required for the assembly of wye-delta starters. With the function modules for wye-delta starting and the matching link modules for the main circuit, these starters can be assembled easily and with absolutely no errors.

The entire sequence in the control circuit is integrated in the snap-on modules. This covers:

- An adjustable star time t from 0.5 to 60 s
- A non-adjustable dead interval of 50 ms
- Electrical contacting to the contactors by means of coil pick-off (contact legs)
- Feedback of the switching state at the contactor using a mechanical switch position indicator (plunger)
- Electrical interlocking between the contactors

These modules do not require their own terminals and can therefore be used for contactors with both screw and spring-type terminals in the two sizes S00 and S0. To start the wye-delta starter, only the first of the three contactors (line contactor) is actuated. All other functions then take place inside the individual modules.

This also offers advantages if the timing function was previously implemented in a controller, as it again results in a significant reduction in the number of PLC outputs, the programming work and the wiring outlay.

The kits for the main circuit include the mechanical interlock, the star jumper, the wiring modules at the top and at the bottom, and the required connecting clips.

A protection circuit (varistor) is integrated in the basic module.

Application

The snap-on function modules for direct-on-line starting are used above all for realizing timing functions independently of the control system.

With the OFF-delay variant of the timing relay it is possible for example for the fan motor for cooling a main drive to be switched off with a delay so that sufficient cooling after operation is guaranteed even if the plant and its control system have already been switched off.

The ON-delay timing relays enable for example the time-delayed starting of several drives so that the summation starting current does not rise too high, which could result in voltage failure.

The function modules for wye-delta starting are mostly used where current-limiting measures for starting a drive are required, e. g. for large fans and ventilators, and a high level of availability is essential at the same time. This technology has been used with success for several decades and has the additional advantage of requiring relatively little know-how. Through the use of function modules, the assembly work with simple standard components is even easier and error-free.

Benefits

The use of snap-on function modules for direct-on-line starting (timing relays) results in the following advantages:

- Reduction of control current wiring
- Prevention of wiring errors
- Reduction of testing costs
- Implementation of timing functions independently of the control system
- Less space required in the control cabinet compared to a separate timing relay
- No additive protection circuit required (varistor integrated)

For the advantages of using wiring kits for the assembly of reversing starters see page 2/62.

The use of function modules for wye-delta starting results in the following advantages:

- Operation solely through the line contactor A1/A2 – no further wiring needed
- Reduction of the control current wiring inside the contactor assembly and to the higher-level control system where applicable
- Prevention of wiring errors
- Reduction of testing costs
- Integrated electrical interlocking saves costs and prevents errors
- Less space needed in the control cabinet compared to using a separate timing relay
- Adjustable starting in star mode from 0.5 to 60 s
- Independent of the contactor's control supply voltage (24 to 240 V AC/DC)
- Varistor integrated – no additive protection circuit required
- No control current wiring thanks to plug-in technology and connecting cables
- Mechanically coded assembly enables easy configuration and reliable wiring
- Fewer versions – one module kit for screw and spring-type connection and for the two sizes S00 and S0
- Mechanical interlocking (with wiring kit for the main circuit)

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules

Technical specifications

Type			3RA28 11	3RA28 12	3RA28 16
Function			With ON-delay	OFF-delay with auxiliary voltage	Wye-delta function
Dimensions			See 3RT20 contactors, pages 2/16 and 2/23.		
General data					
Rated insulation voltage U_i	V AC		300		
Pollution degree 3					
Overvoltage category III					
Operating range of excitation			0.85 ... 1.1 x U_i , 0.95 ... 1.05 times the rated frequency		
Overvoltage protection			Varistor integrated		
Rated power	W		1		1
• Power consumption at 230 V AC, 50 Hz	VA		1		2
Rated operational currents I_e					
• AC-140	At 24 ... 240 V, 50 Hz	A	0.4		—
• DC-13	At 24 ... 240 V	A	0.4		—
• AC-15	At 24 ... 240 V, 50 Hz	A	—		3
• DC-13	- At 24 V	A	—		1
	- At 125 V	A	—		0.2
	- At 250 V	A	—		0.1
DIAZED fuse	Operational class gG	A	—		4
Switching frequency for load					
• With I_e at 230 V AC		h ⁻¹	2 500		—
• With 3RT2 contactor at 230 V AC		h ⁻¹	2 500		—
Recovery time		ms	50		150
Minimum ON period		ms	—	35	—
Residual current	Max.	mA	5		—
Voltage drop	Max.	VA	3.5		—
With conducting output					
Short-time loading capacity	Up to 10 ms	A	10		—
Setting accuracy	Typ.		±15 %		
With reference to upper limit of scale					
Repeat accuracy	Max.		±1 %		
Mechanical endurance		Operating cycles	100 x 10 ⁶		10 x 10 ⁶
Permissible ambient temperature					
• During operation		°C	-25 ... +60		
• During storage		°C	-40 ... +80		
Degree of protection acc. to EN 60947-1, Appendix C		IP20			
Shock resistance		g/ms	15/11		
Half-sine acc. to IEC 60068-2-27					
Vibration resistance					
Acc. to IEC 60068-2-6		Hz/mm	10 ... 55/0.35		
Electromagnetic compatibility (EMC)			IEC 61812-1, IEC 61000-6-2, IEC 61000-6-4		IEC 60947-4-1
Permissible mounting positions			Any		
Conductor cross-sections					
Connection type			 Screw terminals		
• Solid	mm ²		1 x (0.5 ... 4), 2 x (0.5 ... 2.5)		—
• Finely stranded with end sleeve	mm ²		1 x (0.5 ... 2.5), 2 x (0.5 ... 1.5)		—
• AWG cables, solid or stranded	AWG		2 x (20 ... 14)		—
• Terminal screws			M3 (for standard screw driver size 2 or Pozidriv 2)		—
• Tightening torque	Nm		0.8 ... 1.2		—
Connection type			 Spring-type terminals		
• Operating devices	mm		3.0 x 0.5		—
• Solid	mm ²		2 x (0.25 ... 1.5)		—
• Finely stranded with end sleeve	mm ²		2 x (0.25 ... 1.5)		—
• Finely stranded	mm ²		2 x (0.25 ... 1.5)		—
• AWG cables, solid or stranded	AWG		2 x (24 ... 16)		—

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for direct-on-line starting

Selection and ordering data



3RA28 11-1



3RA28 12-2

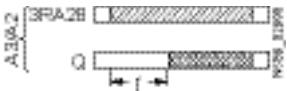
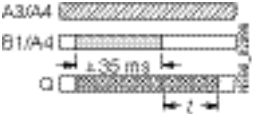
For contactors	Rated control supply voltage $U_s^{1)}$	Time setting range t	Screw terminals 	Spring-type terminals 
Type	V	s	Order No.	Order No.
Solid-state timing relays with semiconductor output, for snapping onto the front				
The electrical connection between the timing relay and the contactor underneath is established automatically when it is snapped on and locked. With ON-delay Two-wire version, varistor integrated				
3RT20 1 . , 3RT20 2 . 3RH21 ²⁾ 3RH24	24 ... 240 AC/DC	0.05 ... 100 (1, 10, 100, selectable)	3RA28 11-1CW10	3RA28 11-2CW10
OFF-delay with auxiliary voltage Varistor integrated				
3RT20 1 . , 3RT20 2 . 3RH21 ²⁾ 3RH24	24 ... 240 AC/DC	0.05 ... 100 (1, 10, 100, selectable)	3RA28 12-1DW10	3RA28 12-2DW10
Accessories				
Sealable covers For 3RA27, 3RA28, 3RA29			3RA29 10-0	

1) AC voltage values apply for 50 Hz and 60 Hz.

2) Cannot be fitted onto coupling relays.

Note:

When using the function modules, no other auxiliary switches are allowed to be connected to the basic units.

Function	Function charts
	 Timing relay energized  Contact closed  Contact open
1 NO contact (semiconductor output)	
With ON-delay	3RA28 11-.CW10 
OFF-delay with auxiliary voltage	3RA28 12-.DW10 

SIRIUS function modules for reversing starting / wye-delta starting



S

3RA29 23-2AA2

3RA29 23-2BB2

3RA29 11-0

3RA29 10-0

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for IO-Link

Overview

The SIRIUS function modules for IO-Link enable the assembly of starters and contactor assemblies for direct-on-line, reversing and wye-delta starting without any additional, complicated wiring of the individual components. They include the key control functions required for the particular feeder, e. g. timing and interlocking.

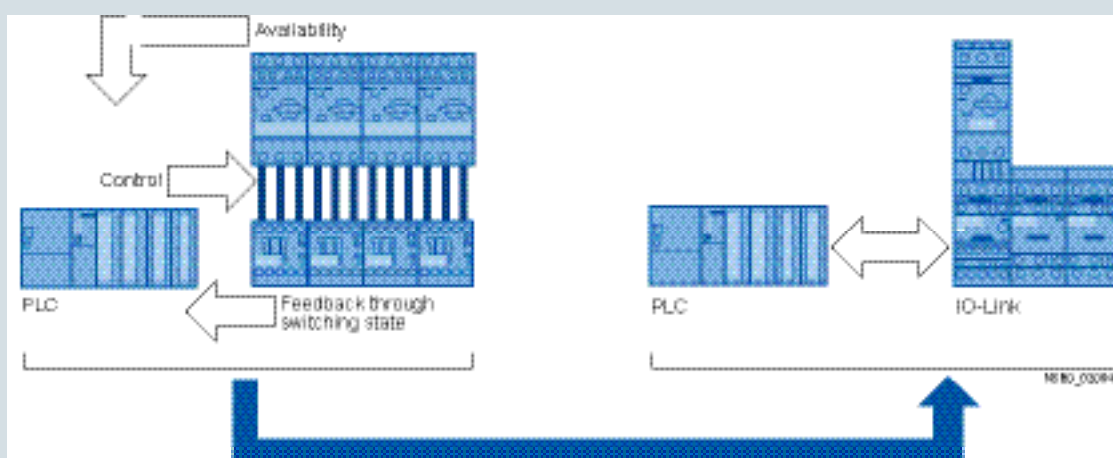
The electrical and mechanical connection to the contactor is established by snapping on and locking. An additive protection circuit for the individual contactors can be dispensed with completely because a varistor is integrated in the modules. Feedback from the contactor contacts is performed with Hall sensors which provide reliable feedback concerning the switching state even under extremely dusty conditions.

The starters are connected to the higher-level control system through IO-Link, with the possibility of connecting up to four starters as a group to one port of the IO-Link master.

Through this type of connection to the control system, a maximum of wiring is saved.

The following essential signals are transmitted:

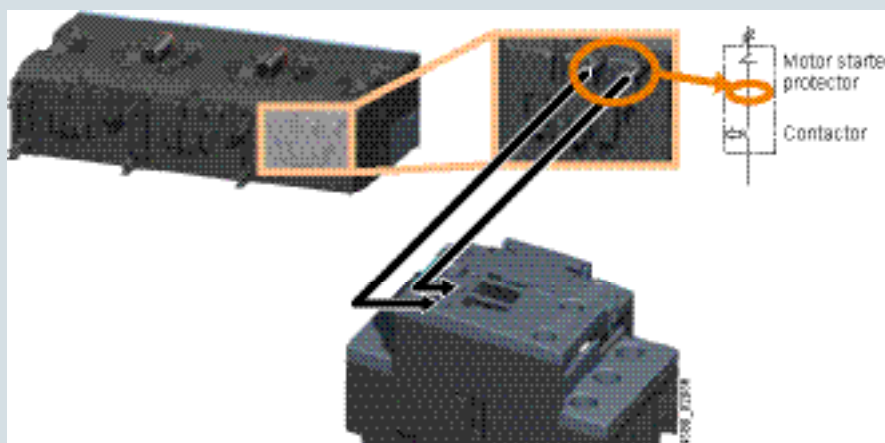
- Availability of the feeder in response to an indirect inquiry from the motor starter protector
- Starter operation
- Feedback concerning the switching state of the starter



Signal transmission through IO-Link

The inquiry from the motor starter protector does not take place through additive wiring between the auxiliary switch and the module but by means of a voltage inquiry at the contactor input.

This requires special versions of the contactors with communication interface (see pages 2/26 and 2/27).



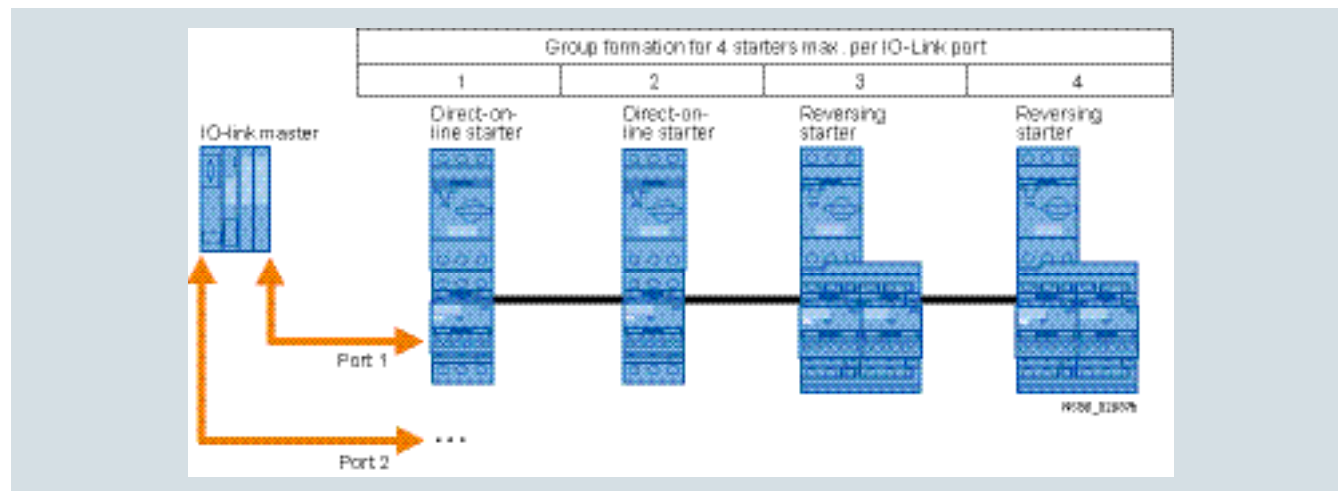
Availability signal through voltage pick-off

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for IO-Link

By grouping up to four starters it is possible to connect up to 16 starters to one master of the ET 200S. In this case all the signals of the individual controls are made available directly in the process image of the input through only 3 individual wires

per starter group. If the potential at the master of the ET 200S is the same as that of the controls, a further reduction in wiring is possible by providing the control supply voltage to the contactors by jumpering the corresponding communication wires.



Group formation with IO-Link

In case of a malfunction, the corresponding error signals are also sent directly to the PLC in acyclic mode. This is in addition to transmission of the switching signals and status signals.

Possible error signals:

- Device defect
- No main voltage (motor starter protector tripped)
- No control supply voltage
- Limit position on the right / on the left
- Manual mode
- Process image fault

This easy integration of the starters in the TIA world does not limit the flexibility in the field in the least. For example, all function modules have special terminals in order to enable direct local disconnection. These terminals can be connected for example to a position switch. The input interrupts the voltage supply to the contactor coil directly, i. e. without going through the PLC. These terminals are jumpered in the as-delivered state.

Local manual operation of the complete starter group is also straight-forward using a hand-held device. The latter is easily connected to the last starter and can be built into the front panel of the control cabinet if required. This offers significant advantages particularly for commissioning.

Application

The use of SIRIUS function modules with IO-Link is recommended above all in machines and plants in which there are several motor feeders in one control cabinet. Using IO-Link, the connection of these feeders to the automation level is easy, quick and error-free. And with IO modules no longer needed, the width of the ET 200S is far smaller.

Benefits

- Reduction of the control current wiring to no more than three cables for four feeders
- Elimination of testing costs and wiring errors
- Reduction of configuration work
- Integration in TIA means clear diagnostics if a fault occurs
- Dispensing with IO modules saves space in the control cabinet
- All essential timing and interlocking functions for reversing duty and wye-delta starting are integrated
- No additive protection circuit required

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for IO-Link

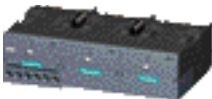
Technical specifications

Type			3RA27 11
Dimensions			See 3RT20 contactors, pages 2/16 and 2/23.
General data			
Suitable for IO-Link masters acc. to specification	1.0		
Permissible ambient temperature			
• During operation	Acc. to EN 60947-1	°C	-25 ... +60
• During storage	Acc. to EN 60721-3-1	°C	-40 ... +80
• During transport	Acc. to EN 60721-3-2	°C	-40 ... +80
Degree of protection	IP20		
Operational voltage U_{HI}	V DC		24 ± 20 %
Power consumption, max. at U_{HI}	A		2
Max. length of the cables for the input Y1–Y2	Acc. to EN 50295	m	30
EMC interference immunity			
• Electrostatic discharge	Acc. to EN 61000-4-2	kV	6/8
• Field-related interference	Acc. to EN 61000-4-3	V/m	10 (80 MHz ... 3 GHz)
• Burst	Acc. to EN 61000-4-4	kV	2/1
• Conductor-related interference	Acc. to EN 61000-4-5	kV	0.5/1
• High-frequency, asymmetric	Acc. to EN 61000-4-6	V rms	10 (150 kHz ... 80 MHz)
Conductor cross-sections			
Connection type			 Screw terminals
• Solid	mm²		1 x (0.5 ... 4), 2 x (0.5 ... 2.5)
• Finely stranded with end sleeve	mm²		1 x (0.5 ... 2.5), 2 x (0.5 ... 1.5)
• AWG cables	AWG		2 x (20 ... 14)
• Terminal screws			M3 (for standard screwdriver Ø 6 mm or Pozidriv 2)
• Tightening torque of the terminal screws	Nm		0.8 ... 1.2
Connection type			 Spring-type terminals
• Operating devices	mm		3.0 x 0.5
• Solid	mm²		2 x (0.25 ... 1.5)
• Finely stranded with end sleeve	mm²		2 x (0.25 ... 1.5)
• Finely stranded	mm²		2 x (0.25 ... 1.5)
• AWG cables	AWG		2 x (24 ... 16)

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for IO-Link

Selection and ordering data

Version		Screw terminals	Spring-type terminals
		Order No.	Order No.
Function modules for direct-on-line starting			
 3RA27 11-1AA00	IO-Link connection Includes one module connector for assembling an IO-Link group	3RA27 11-1AA00	3RA27 11-2AA00
 3RA27 11-2AA00			
Function modules for reversing starting ¹⁾			
 3RA27 11-1BA00	IO-Link connection Comprising one basic and one coupling module and an additional module connector for assembling an IO-Link group	3RA27 11-1BA00	3RA27 11-2BA00
 3RA29 13-2AA1	Assembly kits for making 3-pole contactor assemblies³⁾ The assembly kit contains: mechanical interlock; 2 connecting clips for 2 contactors, wiring modules on the top and bottom		
	• For size S00	3RA29 13-2AA1	3RA29 13-2AA2
	• For size S0 - For main, auxiliary and control current - Only for main current⁴⁾	3RA29 23-2AA1 —	— 3RA29 23-2AA2
Function modules for wye-delta starting ²⁾			
 3RA27 11-1CA00	IO-Link connection Comprising one basic module and two coupling modules, plus an additional module connector for assembling an IO-Link group	3RA27 11-1CA00	3RA27 11-2CA00
 3RA29 13-2BB1	Assembly kits for making 3-pole contactor assemblies³⁾ The assembly kit contains: Mechanical interlock, 4 connecting clips for 3 contactors; star jumper, wiring modules on the top and bottom		
	• For size S00	3RA29 13-2BB1	3RA29 13-2BB2
	• For size S0 - For main, auxiliary and control current - Only for main current⁴⁾	3RA29 23-2BB1 —	— 3RA29 23-2BB2

Matching contactors with communication interface required (see pages 2/26 and 2/27).

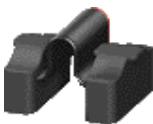
Note:

When using the function modules, no other auxiliary switches are allowed to be connected to the basic units.

- 1) For prewired contactor assemblies for reversing starting with communication interface see pages 2/64 and 2/66. When these contactor assemblies are used, the assembly kit for the wiring is already integrated.
- 2) For complete contactor assemblies for wye-delta starting including function modules see pages 2/78 and 2/81.
- 3) When using the function modules for wye-delta starting, the wiring modules for the auxiliary current are not required.
- 4) Version in size S0 with spring-type terminals:
Only the wiring modules for the main circuit are included.
No connectors are included for the auxiliary and control circuit.

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for IO-Link

Version		Order No.
Accessories		
 3RA27 11-0EE0.	Module connector sets , comprising:	3RA27 11-0EE01
	• 2 module connectors, 14-pole, short + 2 interface covers	
	Module connectors , 14-pole, 8 cm	3RA27 11-0EE02
	• For size jump S00-S0 + 1 space	
	Module connectors , 14-pole, 21 cm	3RA27 11-0EE03
 3RA29 10-0	• For diverse space combinations	
	Module connectors , 10-pole, 8 cm	3RA27 11-0EE04
	• For separate auxiliary voltage supply within an IO-Link group	
	Sealable covers For 3RA27, 3RA28, 3RA29	3RA29 10-0
Manuals Function modules for IO-Link		3ZX1 012-0RA27-1AB1
Operator panels¹⁾		
 3RA69 35-0A	Operator panels (set)	3RA69 35-0A
	• 1 x operator panel	
	• 1 x enabling module	
	• 1 x interface cover	
	• 1 x fixing terminal	
	Connection cables , Length 2 m, 10- to 14-pole	3RA27 11-0EE11
	For connecting the operator panel to the communication module	
	Enabling modules (replacement)	3RA69 36-0A
	Interface covers (replacement)	3RA69 36-0B

1) Suitable only for communication through IO-Link.

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for AS-Interface

Overview

The SIRIUS function modules for AS-Interface enable the assembly of starters and contactor assemblies for direct-on-line, reversing and wye-delta starting without any additional, complicated wiring of the individual components. They include the key control functions required for the particular feeder, e. g. timing and interlocking.

The electrical and mechanical connection to the contactor is established by snapping on and locking. An additive protection circuit for the individual contactors can be dispensed with completely because a varistor is integrated in the modules. Feedback from the contactor contacts is performed with Hall sensors which provide reliable feedback concerning the switching state even under extremely dusty conditions.

Connection of the starters to the higher-level control system takes place through AS-Interface with the Specification V2.1 in

A/B technology. As the result, up to 62 starters can be connected to one master and the address is entered in normal manner with an addressing unit.

Through the AS-Interface connection to the control system, a maximum of wiring is saved. The wiring outlay is reduced to the control supply voltage and the two individual wires for AS-Interface.

The following essential signals are transmitted:

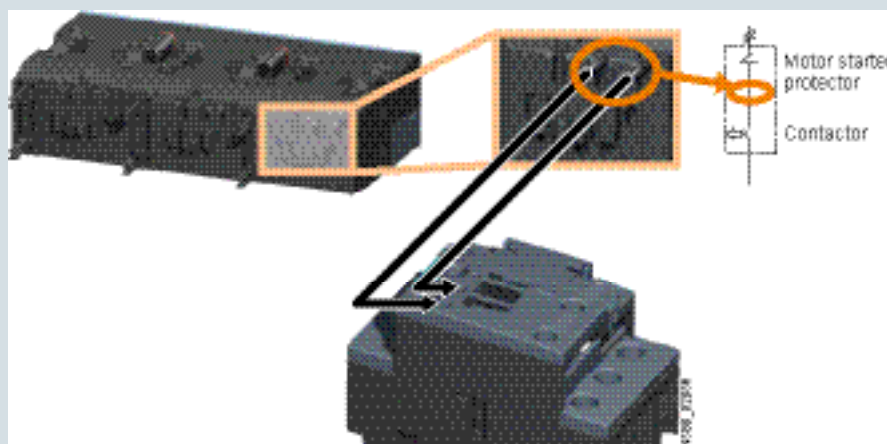
- Availability of the feeder in response to an indirect inquiry from the motor starter protector
- Starter operation
- Feedback concerning the switching state of the starter



Signal transmission through AS-Interface

The inquiry from the motor starter protector does not take place through additive wiring between the auxiliary switch and the module but by means of a voltage inquiry at the contactor input.

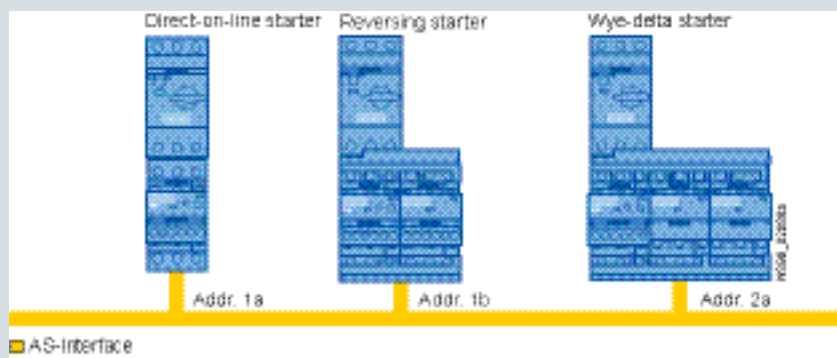
This requires special versions of the contactors with communication interface (see pages 2/26 and 2/27).



Availability signal through voltage pick-off

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for AS-Interface



Topology with AS-Interface

This easy integration of the starters in the TIA world does not limit the flexibility in the field in the least. For example, all function modules have special terminals in order to enable direct local disconnection. These terminals can be connected for

example to a position switch. The input interrupts the voltage supply to the contactor coil directly, i. e. without going through the PLC. These terminals are jumpered in the as-delivered state.

Application

The use of SIRIUS function modules with AS-Interface is recommended above all in machines and plants requiring easy connection of several different sensors and actuators both inside and outside the control cabinet to the higher-level control system. And with IO modules no longer needed, the width of the control unit is far smaller.

Benefits

- Reduction of control current wiring
- Elimination of testing costs and wiring errors
- Reduction of configuration work
- Dispensing with IO modules saves space in the control cabinet
- All essential timing and interlocking functions for reversing duty and wye-delta starting are integrated
- No additive protection circuit required

Technical specifications

Type	3RA27 12		
Dimensions	See 3RT20 contactors, pages 2/16 and 2/23.		
General data			
Slave type	A/B slave		
Suitable for AS-i masters acc. to Spec.	2.1 or higher		
AS-i Slave Profile IO.ID.ID2	7.A.E		
ID1 Code (factory setting)	7		
Permissible ambient temperature			
• During operation	Acc. to EN 60947-1	°C	-25 ... +60
• During storage	Acc. to EN 60721-3-1	°C	-40 ... +80
• During transport	Acc. to EN 60721-3-2		-40 ... +80
Degree of protection			IP20
Operational voltage			
• AS-Interface		V	26.5 ... 31.6
• AUX PWR 24 V DC		V	24 ± 20 %
Power consumption, max.			
• AS-Interface		mA	30
• AUX PWR			
- Maximum pick-up/hold current	Size S00	mA	200
	Size S0	mA	300
Max. length of the cables for the input Y1–Y2	Acc. to EN 50295	m	30
EMC interference immunity			
• Electrostatic discharge	Acc. to EN 61000-4-2	kV	6/8
• Field-related interference	Acc. to EN 61000-4-3	V/m	10 (80 MHz ... 3 GHz)
• Burst	Acc. to EN 61000-4-4	kV	1/2
• Conductor-related interference	Acc. to EN 61000-4-5	kV	0.5/1
• High-frequency, asymmetrical	Acc. to EN 61000-4-6	V rms	10 (150 kHz ... 80 MHz)

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for AS-Interface

Type	3RA27 12	
Conductor cross-sections		
Connection type		 Screw terminals
• Solid	mm ²	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)
• Finely stranded with end sleeve	mm ²	1 x (0.5 ... 2.5), 2 x (0.5 ... 1.5)
• AWG cables	AWG	2 x (20 ... 14)
• Terminal screws		M3 (for standard screwdriver Ø 6 mm or Pozidriv 2)
• Tightening torque of the terminal screws	Nm	0.8 ... 1.2
Connection type		 Spring-type terminals
• Operating devices	mm	3.0 x 0.5
• Solid	mm ²	2 x (0.25 ... 1.5)
• Finely stranded with end sleeve	mm ²	2 x (0.25 ... 1.5)
• Finely stranded	mm ²	2 x (0.25 ... 1.5)
• AWG cables	AWG	2 x (24 ... 16)

Selection and ordering data

Version		Screw terminals 	Spring-type terminals 
		Order No.	Order No.
Function modules for direct-on-line starting			
 3RA27 12-1AA00  3RA27 12-2AA00	AS-Interface connection	3RA27 12-1AA00	3RA27 12-2AA00
Function modules for reversing starting¹⁾			
 3RA27 12-1BA00  3RA29 23-2AA1	AS-Interface connection Comprising one basic and one coupling module	3RA27 12-1BA00	3RA27 12-2BA00
	Assembly kits for making 3-pole contactor assemblies The assembly kit contains: mechanical interlock; 2 connecting clips for 2 contactors, wiring modules on the top and bottom		
	• For size S00	3RA29 13-2AA1	3RA29 13-2AA2
	• For size S0	3RA29 23-2AA1	—
	- For main, auxiliary and control current	—	3RA29 23-2AA2
	- Only for main current		

Matching contactors with communication interface required (see pages 2/26 and 2/27).

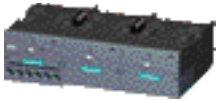
Note:

When using the function modules, no other auxiliary switches are allowed to be connected to the basic units.

1) For prewired contactor assemblies for reversing starting with communication interface see pages 2/64 and 2/66. When these contactor assemblies are used, the assembly kit for the wiring is already integrated.

Function Modules for Mounting onto SIRIUS 3RT2 Contactors

SIRIUS function modules for AS-Interface

Version		Screw terminals 	Spring-type terminals 
		Order No.	Order No.
Function modules for wye-delta starting¹⁾			
 3RA27 12-1CA00  3RA29 23-2BB1	AS-Interface connection Comprising one basic module and two coupling modules	3RA27 12-1CA00	3RA27 12-2CA00
	Assembly kits for making 3-pole contactor assemblies The assembly kit contains: Mechanical interlock, 4 connecting clips for 3 contactors; star jumper, wiring modules on the top and bottom		
	• For size S00	3RA29 13-2BB1	3RA29 13-2BB2
	• For size S0 - For main, auxiliary and control current - Only for main current	3RA29 23-2BB1 —	— 3RA29 23-2BB2

Matching contactors with communication interface required (see pages 2/26 and 2/27).

1) For complete contactor assemblies for wye-delta starting including function modules see pages 2/64 and 2/66.

Note:

When using the function modules, no other auxiliary switches are allowed to be connected to the basic units.

Version		Order No.
Accessories		
 3RA29 10-0	Sealable covers For 3RA27, 3RA28, 3RA29	3RA29 10-0
	Manuals Function modules for AS-Interface	3ZX1 012-0RA27-0AB0

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

General data

Overview

Selection aid for mountable auxiliary switch blocks for motor contactors and contactor relays

The auxiliary switch blocks of the 3RH29 series for mounting on the front and side can be used for motor contactor sizes S00 and S0 as well as for contactor relays. The exact possibilities of use are listed in the following tables.

The auxiliary switch blocks and their use are described in the sections "Motor Contactors" and "Contactor Relays".

Note:

The auxiliary switches according to EN 50012 also meet the requirements according to EN 50005.

Motor contactors

Contactor Size	Integrated auxiliary switches	Examples Version	All auxiliary contacts with mirror contact function according to EN 60947-4-1 EN 50005				EN 50012	
			On front 1-pole	2-pole	4-pole	Lateral 2-pole	On front 4-pole	Lateral 2-pole
								
			3RH29 11-1AA . . 3RH29 11-1BA . .	3RH29 11-1LA . . 3RH29 11-1MA . .	3RH29 11-.F . . . 3RH29 11-.H . . .	3RH29 11-.D . . . 3RH29 21-.D . . .	3RH29 11-.HA . .	3RH29 11-.D . . . 3RH29 21-.D . . .
S00	1 NO or 1 NC	A	1	—	—	1	—	—
		B	—	1	1	—	1	—
		C	—	—	—	2 (1 x left + 1 x right)	—	1 (right)
S0	1 NO + 1 NC	A	1	—	—	1	—	—
		B	—	1	1	—	1	—
		C	—	—	—	2 (1 x left + 1 x right)	—	1 (right)

Examples according to EN 50005

Version A, S00: S00 basic unit + one 1-pole front auxiliary switch block + one 2-pole lateral auxiliary switch block

—> 3RT20 16-1AP01 + 3RH29 11-1AA01 + 3RH29 11-1DA11

Version B, S0: S0 basic unit + one 4-pole front auxiliary switch block

—> 3RT20 27-2AP00 + 3RH29 11-2HA22

Example according to EN 50012

Version C, S0: S0 basic unit + one 2-pole lateral switch block, mounted on the right

—> 3RT20 26-2AP00 + 3RH29 11-2DA11

Note:

The front solid-state compatible auxiliary switches have no mirror contact functionality.

Contactor relays

Contactor relay Size	Integrated auxiliary switches	Examples Version	All front auxiliary contacts with positively-driven operation according to EN 60947-5-1 EN 50005				EN 50011
			On front 1-pole	2-pole	4-pole	Lateral ¹⁾ 2-pole	On front 4-pole
							
			3RH29 11-1AA . . 3RH29 11-1BA . .	3RH29 11-1LA . . 3RH29 11-1MA . .	3RH29 11-.F . . . 3RH29 11-.H . . .	3RH29 11-.DA . . 3RH29 21-.DA . .	3RH29 11-.GA . .
S00	2 NO + 2 NC or 3 NO + 1 NC or 4 NO	A	1	—	—	1	1
		B	—	1	1	—	1
		C	—	—	—	2 (1 x left + 1 x right)	1

1) Lateral auxiliary contacts without positively-driven operation.

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

General data

Terminal designations and identification numbers for auxiliary contacts

Terminal designations

The terminal designations are 2-digit, e. g. 13, 14, 21, 22:

- Tens digit: Identification number
 - Related terminals have the same identification number
- Units digit: Function digit
 - 1-2 for normally closed contacts (NC)
 - 3-4 for normally open contacts (NO)

Identification numbers

The identification number indicates the number and type of the auxiliary contacts, e. g. 40, 31, 22, 13:

- 1st digit: Number of NO contacts
- 2nd digit: Number of NC contacts

Examples:

- 31 = 3 NO + 1 NC
- 40 = 4 NO

3RH2 contactor relays and 3RT2 motor contactors (basic units) – overview of the identification digits

Contactor with integrated auxiliary contacts	3RH21 contactor relay, S00, with 4 normally open contacts (4 NO)	3RT20 motor contactor, S00, with 1 normally open contact (1 NO)	3RT20 motor contactor, S00, with 1 normally closed contact (1 NC)	3RT20 motor contactor, S0, with 1 NO + 1 NC
Identification number for front auxiliary switches	5. 6. 7. 8. (only with auxiliary switches acc. to EN 50005 and EN 50011)	2. 3. 4. 5.	5. 6. 7. 8. (only with auxiliary switches according to EN 50005)	3. 4. 5. 6.

3RH29 auxiliary switch blocks – overview of the function digits (examples)

Auxiliary switch block with auxiliary contacts	3RH29 auxiliary switch, 4 contacts 2 NO + 2 NC	3RH29 auxiliary switch, 4 contacts 4 NC	3RH29 auxiliary switch, 4 contacts 3 NO + 1 NC	3RH29 auxiliary switch, 4 contacts 4 NO
Function digit for front auxiliary switches	.3 .1 .1 .3 .4 .2 .2 .4	.1 .1 .1 .1 .2 .2 .2 .2	.1 .3 .3 .3 .2 .4 .4 .4	.3 .3 .3 .3 .4 .4 .4 .4

Basic units with mounted 3RH29 auxiliary switch blocks – overview of the terminal designations (examples)

Contactor with mounted auxiliary switch block	3RH29 auxiliary switch, 4 contacts 2 NO + 2 NC	3RH29 auxiliary switch, 4 contacts 4 NC	3RH29 auxiliary switch, 4 contacts 3 NO + 1 NC	3RH29 auxiliary switch, 4 contacts 4 NO
Terminal designations of all the auxiliary contacts	13 23 33 43 53 61 71 83 14 24 34 44 54 62 72 84	13 21 31 41 51 14 22 32 42 52	21 51 63 73 83 22 52 63 74 84	13 21 33 43 53 63 14 22 34 44 54 64

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

General data

Solid-state time-delay auxiliary switches

All solid-state delayed auxiliary switch which can be mounted onto the contactor are designed for applications in the range from 24 to 240 V AC/DC (wide voltage range). Both the electrical and mechanical connection are made by simple snapping on and locking.

The time-delay auxiliary switch is supplied with power directly by two plug-in contacts through the coil terminals of the contactor, in parallel with A./A2.

A protection circuit (varistor) is integrated in each module.

A sealable cover is available to protect against careless adjustment of the set times.

Note:

Mounting more auxiliary switches to the contactor is not permitted.

OFF-delay devices for contactors

AC and DC operation

IEC 60947, EN 60947

For screw and snap-on mounting onto TH 35 standard mounting rails. The OFF-delay devices have screw terminals.

The OFF-delay device prevents a contactor from dropping out unintentionally when there is a short-time voltage dip or voltage failure. It supplies a downstream, DC-operated contactor with the necessary energy during a voltage dip, ensuring that the contactor does not trip. The 3RA29 16 OFF-delay devices are specifically designed for operation with the 3RT contactors and 3RH contactor relays in the SIRIUS series.

The OFF-delay device operates without external voltage on a capacitive basis, and can be energized with either AC or DC (24 V version only for DC operation). Voltage matching, which is only necessary with AC operation, is performed using a rectifier bridge.

A contactor opens after a delay when the capacitors of the solenoid coil, built into the OFF-delay device, are switched in parallel. In the event of voltage failures, the capacitors are discharged via the solenoid coil and thereby delay the opening of the contactor.

If the command devices are upstream of the OFF-delay device in the circuit, the OFF-delay takes effect with every opening operation. If the opening operation is downstream of the OFF-delay device, an OFF-delay only applies in the event of failure of the mains voltage.

Operation

In the case of the versions for rated control supply voltages of 110 and 230 V, either AC voltage or DC voltage can be applied on the line side, whereas the variant for 24 V is designed for DC operation only.

A DC-operated contactor is connected to the output in accordance with the input voltage that is applied.

The mean value of the OFF-delay is approximately 1.5 times the specified minimum time.

Additional load module

Size S00 for plugging onto the front of the contactors with and without auxiliary switch block.

The module is used for increasing the permissible residual current and for limiting the residual voltage. It ensures the safe opening of contactors with direct control via 230 V AC semiconductor outputs of SIMATIC controllers. It acts simultaneously as a surge suppressor.

Surge suppressors

- Without LED (also for spring-type terminals)
Sizes S00 and S0
- With LED (also for spring-type terminals)
Sizes S00 and S0

All 3RT2 contactors and 3RH2 contactor relays can be retrofitted with RC elements or varistors for damping opening surges in the coil. Diodes or diode assemblies (comprising noise suppression diodes and Zener diodes for short break times) can be used.

The surge suppressors are plugged onto the front of size S00 contactors. Space is provided for them next to a snap-on auxiliary switch block.

Varistors, RC elements or diode assemblies can be plugged onto the front of size S0 contactors.

Coupling relays are supplied either without overvoltage damping or with a suppressor diode, varistor or diode connected as standard, according to the version.

Note:

The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times; diode assembly 2 to 6 times, varistor +2 to 5 ms).

Coupling links for control by PLC

DC operation

IEC 60947 and EN 60947

The coupling link is suitable for use in any climate. It is finger-safe according to EN 50274. The terminal designations comply with EN 50005.

System-compatible operation with 24 V DC, operating range 17 to 30 V.

Low power consumption of 0.5 W in conformity with the technical specifications of the solid-state systems. An LED indicates the switching state.

Surge suppression

The 3RH29 24-1GP11 coupling link has an integrated surge suppressor (varistor) for the contactor coil being switched.

Mounting

The 3RH29 24-1GP11 coupling link is mounted on the contactor coil size S0 using a coil connection module.

Sealable covers

When contactors and contactor relays are used in safety-oriented applications, it must be ensured that it is impossible to operate the contactors manually.

For SIRIUS contactors there are sealable covers available for this purpose as accessories; these prevent accidental manual operation. These are transparent molded-plastic caps with a bracket that enables the contactor to be sealed.

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

General data

Technical specifications

Version	Type Function Dimensions	3RA28 13 ON-delay	3RA28 14 OFF-delay with auxiliary voltage	3RA28 15 OFF-delay without auxiliary voltage
General data		See 3RT20 contactors, pages 2/16 and 2/23 (dimensions with mounted function module).		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III	V AC	300		
Operating range of excitation		0.85 ... 1.1 x U_e , 0.95 ... 1.05 times the rated frequency		
Rated power	W	1		
• Power consumption at 230 V AC, 50 Hz	VA	2		
Rated operational currents I_e				
• AC-140	At 24 ... 240 V, 50 Hz A	—		
• AC-15	At 24 ... 240 V, 50 Hz A	3		
• DC-13	At 24 V A	1		
	At 125 V A	0.2		
	At 250 V A	0.1		
DIAZED fuse Operational class gG	A	4		
Switching frequency for load				
• With I_e at 230 V AC	h ⁻¹	2 500		
• With 3RT2 contactor at 230 V AC	h ⁻¹	2 500		
Recovery time	ms	150		—
Minimum ON period	ms	—	35	200
Residual current, max.	mA	—		
Voltage drop, max. with conducting output	VA	—		
Short-time loading capacity up to 10 ms	A	—		
Setting accuracy, typ. with reference to upper limit of scale		±15 %		
Repeat accuracy, max.		±1 %		
Mechanical endurance	Operating cycles	10 x 10 ⁶		
Permissible ambient temperature				
• During operation	°C	-25 ... +60		
• During storage	°C	-40 ... +80		
Degree of protection acc. to EN 60947-1, Appendix C		IP20		
Shock resistance Half-sine acc. to IEC 60068-2-27	g/ms	15/11		
Vibration resistance Acc. to IEC 60068-2-6	Hz/mm	10 ... 55/0.35		
Electromagnetic compatibility (EMC)		IEC 61000-6-2, IEC 61000-6-4, IEC 61812-1, IEC 60947-1		
Overvoltage protection		Varistor integrated		
Permissible mounting positions		Any		
Conductor cross-sections				
Connection type		 Screw terminals		
• Solid	mm ²	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)		
• Finely stranded with end sleeve	mm ²	1 x (0.5 ... 2.5), 2 x (0.5 ... 1.5)		
• AWG cables, solid or stranded	AWG	2 x (20 ... 14)		
• Terminal screws		M3 (for standard screw driver size 2 or Pozidriv 2)		
• Tightening torque	Nm	0.8 ... 1.2		
Connection type		 Spring-type terminals		
• Operating devices	mm	3.0 x 0.5		
• Solid	mm ²	2 x (0.25 ... 1.5)		
• Finely stranded with end sleeve	mm ²	2 x (0.25 ... 1.5)		
• Finely stranded	mm ²	2 x (0.25 ... 1.5)		
• AWG cables, solid or stranded	AWG	2 x (24 ... 16)		

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

General data

Version	Type Function	3RT29 26-2P Pneumatic delay block ¹⁾
General data		
Mechanical endurance	Operating cycles	5 million
Electrical endurance at I_e	Operating cycles	1 million
Rated insulation voltage U_i (pollution degree 3)	V	690
Permissible ambient temperature		
• During operation	°C	-25 ... +60
• During storage	°C	-50 ... +80
Rated operational currents I_e Acc. to utilization categories EN 60947		
• AC-12	A	10
• AC-15/AC-14 at U_e	Up to 230/220 V A	6
	400/380 V A	4
	500 V A	2.5
	690/660 V A	1.5
• DC-13 at U_e	At 24 V A	4
	48 V A	2
	110 V A	0.7
	220 V A	0.3
	440 V A	0.15
Time delay		
• Accuracy		±10 %
☞ and ☞ rating		
• Rated voltage	V AC	600
• Switching capacity		A 600, Q 600
Conductor cross-sections		
• Solid, stranded:	mm ²	2 x 0.5 ... 2.5 ²⁾ or 2 x 2.5 ... 4 ²⁾
• Finely stranded with end sleeve	mm ²	2 x 0.5 ... 2.5
• AWG cables	AWG	2 x 22 ... 14
• Tightening torque of the terminal screws	Nm	0.8 ... 1.1

1) For size S0.

In addition to the pneumatic delay block, no other auxiliary contacts are permitted.

2) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified.

Technical specifications according to EN 61812-1 (VDE 0435 Part 2021)

Version	Type Function	3RT29 26-3A Mechanical latching block for 3RT2 . 2 . contactors
Rated insulation voltage U_i (pollution degree 3)	V	690
Mechanical endurance		
• With 3RT2 . 2. contactor	Operating cycles	3 million
Permissible ambient temperature		
• During operation	°C	-25 ... +60
• During storage	°C	-50 ... +80
Degree of protection acc. to EN 60947-1, Appendix C		IP20
Operating range of the solenoid coil At AC 50/60 Hz and DC		0.85 ... 1.1 x U_s
Power consumption of the solenoid coils of the unlocking magnet (for cold coil and 1.0 x U_s) AC and DC operation	W	Approx. 4
Command duration for de-energizing		
• AC operation	ms	18 ... 31
• DC operation	ms	18 ... 26
Conductor cross-sections		
• Solid	mm ²	2 x (0.5 ... 2.5); 1 x 4
• AWG cables, solid	AWG	2 x 14; 1 x 12
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 2.5); 1 x 2.5
• AWG cables, finely stranded with end sleeve	AWG	2 x 14; 1 x 12
Tightening torque of the terminal screws	Nm lb.in	0.8 ... 1.1 7 ... 9.5

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

General data

Version	Type Function	3RH29 24-1GP11 Coupling links for PLC for mounting on contactors acc. to IEC 60947/EN 60947
General data		
Rated insulation voltage U_i (pollution degree 3)	V	300
Protective separation between the coil and the contacts acc. to EN 60947-1, Appendix N	V AC	Up to 300
Degree of protection acc. to EN 60947-1, Appendix C		
• Connections		IP20
• Enclosures		IP40
Permissible ambient temperature		
• During operation	°C	-25 ... +60
• During storage	°C	-40 ... +80
Conductor cross-section		
• Solid	mm ²	2 x (0.5 ... 2.5)
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5)
Terminal screws		M3
Short-circuit protection (weld-free protection at $I_k \geq 1$ kA)		
• Fuse links, operational class gG : Type LV HRC 3NA, DIAZED 5SB, NEOZED 5SE	A	6
Control side		
Rated control supply voltage U_s	V DC	24
Operating range	V DC	17 ... 30
Power consumption at U_s	W	0.5
Nominal current input	mA	20
Release voltage	V	≥ 4
Function display		Yellow LED
Protection circuit		Varistor
Load side		
Mechanical endurance	Operating cycles	20 million
Electrical endurance at I_e	Operating cycles	0.1 million
Switching frequency	h ⁻¹	5 000 operating cycles
Make-time	ms	Approx. 7
Break-time	ms	Approx. 4
Bounce time	ms	Approx. 2
Contact material		AgSnO
Switching voltage	V AC/DC	24 ... 250
Permissible residual current of the electronics (with 0 signal)	mA	2.5
Rated operational currents ¹⁾ Conventional thermal current I_{th}	A	6
Rated operational currents I_e Acc. to utilization categories EN 60947		
• AC-15	At 24 V A At 110 V A At 230 V A	3 3 3
• DC-13	At 24 V A At 110 V A At 230 V A	1 0.2 0.1
Switching current with resistive load to EN 60255 (relay standard) and EN 60947		
• AC-12	At 24 V A At 110 V A At 230 V A	6 6 6
• DC-12	At 24 V A At 110 V A At 230 V A	6 0.3 0.2 ¹⁾

1) Capacitive loads can result in micro-weldings on the contacts.

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Auxiliary switch blocks

Selection and ordering data



3RH29 11-1HA . .



3RH29 11-2HA . .

For contactors	Contactor with AS block Ident. No.	Auxiliary contacts Version	Screw terminals 	Spring-type terminals 
Type		NO NC	Order No.	Order No.

Auxiliary switch blocks for snapping onto the front acc. to EN 50012
(also compliant with the requirements according to EN 50005)

Size S00

For assembling contactors with 2, 3, 4 and 5
auxiliary contacts

3RT20 1 .	11	—	1	3RH29 11-1HA01	3RH29 11-2HA01
3RT23 1.	12	—	2	3RH29 11-1HA02	3RH29 11-2HA02
3RT25 1.	13	—	3	3RH29 11-1HA03	3RH29 11-2HA03
	21	1	1	3RH29 11-1HA11	3RH29 11-2HA11
	22	1	2	3RH29 11-1HA12	3RH29 11-2HA12
	23	1	3	3RH29 11-1HA13	3RH29 11-2HA13
	31	2	1	3RH29 11-1HA21	3RH29 11-2HA21
	32	2	2	3RH29 11-1HA22	3RH29 11-2HA22
	41	3	1	3RH29 11-1HA31	3RH29 11-2HA31

Size S0

For assembling contactors with 3, 4 or 5 auxiliary contacts

3RT20 2 .	12	—	1	3RH29 11-1HA01	3RH29 11-2HA01
3RT23 2.	13	—	2	3RH29 11-1HA02	3RH29 11-2HA02
3RT25 2.					

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Auxiliary switch blocks



3RH29 11-1HA . .



3RH29 11-2HA . .

For contactors/ contactor relays	Contactor with AS block Ident. No.	Auxiliary contacts Version	Screw terminals	Spring-type terminals
		 	Order No.	Order No.
Type		NO NC		
Auxiliary switch blocks for snapping onto the front acc. to EN 50012 (also compliant with the requirements according to EN 50005)				

Size S0

For assembling contactors with 3, 4 or 5 auxiliary contacts

3RT20 2 .	21	1	—	3RH29 11-1HA10	3RH29 11-2HA10
3RT23 2 .	22	1	1	3RH29 11-1HA11	3RH29 11-2HA11
3RT25 2 .	23	1	2	3RH29 11-1HA12	3RH29 11-2HA12
	31	2	—	3RH29 11-1HA20	3RH29 11-2HA20
	32	2	1	3RH29 11-1HA21	3RH29 11-2HA21
	41	3	—	3RH29 11-1HA30	3RH29 11-2HA30

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Auxiliary switch blocks



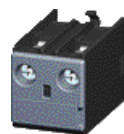
3RH29 11-1FA . .



3RH29 11-2FA . .



3RH29 11-1LA . .



3RH29 11-1AA . .

For contactors/ contactor relays	Auxiliary switches Ident. No.	Auxiliary contacts Version	Screw terminals 	Spring-type terminals 
Type		 NO  NC  NO  NC	Order No.	Order No.

Auxiliary switch blocks for snapping onto the front acc. to EN 50005

Sizes S00 and S0

2- or 4-pole auxiliary switch blocks for assembling contactors with 3 and 5 or 4 and 6 auxiliary contacts

3RT2 . 1 .,	40	4	—	—	—	3RH29 11-1FA40	3RH29 11-2FA40
3RT2 . 2 .,	22	2	2	—	—	3RH29 11-1FA22	3RH29 11-2FA22
3RH21 . .,	04 ¹⁾	—	4	—	—	3RH29 11-1FA04	3RH29 11-2FA04
3RH24 . .	11	—	—	1	1	3RH29 11-1FB11	3RH29 11-2FB11
	22	1	1	1	1	3RH29 11-1FB22	3RH29 11-2FB22
	22	—	—	2	2	3RH29 11-1FC22	3RH29 11-2FC22

1- and 2-pole auxiliary switch blocks, cable entry from above or below

3RT2 . 1 .,	10	1	—	—	—	3RH29 11-1AA10	—
3RT2 . 2 .,	01	—	1	—	—	3RH29 11-1AA01	—
3RH21 . .,	11	1	1	—	—	3RH29 11-1LA11	—
3RH24 . .	20	2	—	—	—	3RH29 11-1LA20	—

1) The mounting of blocks with Ident. No. 04 is permitted only on basic units which have no NC contact integrated.

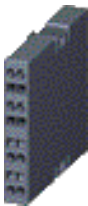
Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Auxiliary switch blocks



3RH29 11-1DA . .



3RH29 11-2DA . .



3RH29 21-1DA . .



3RH29 21-2DA . .

For contactors/ contactor relays	Contactor with AS block Ident. No.	Auxiliary contacts Version	Screw terminals 	Spring-type terminals 
Type		 NO  NC	Order No.	Order No.
Laterally mountable auxiliary switch blocks acc. to EN 50005				
• Mounting on the right and/or on the left				

Size S00

3RT20 1 ., Ident. No. 10	02	—	2	3RH29 11-1DA02	3RH29 11-2DA02
3RT23 1.	11	1	1	3RH29 11-1DA11	3RH29 11-2DA11
3RT25 1.	20	2	—	3RH29 11-1DA20	3RH29 11-2DA20

Size S0

3RT20 2 .	02	—	2	3RH29 21-1DA02	3RH29 21-2DA02
3RT23 2.	11	1	1	3RH29 21-1DA11	3RH29 21-2DA11
3RT25 2.	20	2	—	3RH29 21-1DA20	3RH29 21-2DA20

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Auxiliary switch blocks, delayed

Selection and ordering data



3RA28 14-1



3RA28 14-2

For contactors	Rated control supply voltage $U_c^{1)}$	Time setting range t	Output/ auxiliary contacts	Screw terminals	Spring-type terminals
Type	V	s		Order No.	Order No.

Solid-state time-delay auxiliary switch blocks for snapping onto the front, terminal designations according to DIN 46199-5

Sizes S00 and S0

The electrical connection between the solid-state time-delay auxiliary switch and the contactor underneath is established automatically when it is snapped on and locked.

ON-delay

Varistor integrated

3RT2 . , 3RH21 ²⁾ 3RH24	24 ... 240 AC/DC	0.05 ... 100, (1, 10, 100, selectable)	1 CO 1 NO + 1 NC	3RA28 13-1AW10 3RA28 13-1FW10	3RA28 13-2AW10 3RA28 13-2FW10

OFF-delay with auxiliary voltage

Varistor integrated

3RT2 . , 3RH21 ²⁾ 3RH24	24 ... 240 AC/DC	0.05 ... 100, (1, 10, 100, selectable)	1 CO 1 NO + 1 NC	3RA28 14-1AW10 3RA28 14-1FW10	3RA28 14-2AW10 3RA28 14-2FW10

OFF-delay without auxiliary voltage³⁾

Varistor integrated

3RT2 . , 3RH21 ²⁾ 3RH24	24 ... 240 AC/DC	0.05 ... 100, (1, 10, 100, selectable)	1 CO 1 NO + 1 NC	3RA28 15-1AW10 3RA28 15-1FW10	3RA28 15-2AW10 3RA28 15-2FW10

- 1) AC voltage values apply for 50 Hz and 60 Hz.
- 2) Cannot be fitted onto coupling relays.
- 3) Setting of output contacts in as-supplied state not defined (bistable relay). Application of the control supply voltage once results in contact changeover to the correct setting.

For technical specifications see page 2/154.

Note:

When using the solid-state time-delay auxiliary switches, no other auxiliary switches are allowed to be connected to the basic units.

More information

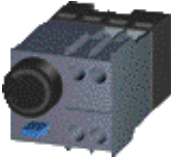
Function	Function charts	
	Timing relay energized Contact closed Contact open	
Solid-state time-delay auxiliary switches	With 1 CO contact	With 1 NO contact + 1 NC contact
ON-delay (varistor integrated)	3RA28 13-.AW10 	3RA28 13-.FW10
OFF-delay with auxiliary voltage (varistor integrated)	3RA28 14-.AW10 	3RA28 14-.FW10
OFF-delay without auxiliary voltage (varistor integrated)	3RA28 15-.AW10 	3RA28 15-.FW10

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Delay and latching blocks

Selection and ordering data

For contactors		Rated control supply voltage U_s	Time setting range t	Screw terminals 
Type	V	s	Order No.	
OFF-delay devices				
<i>Sizes S00 and S0</i>				
For contactors with DC operation				
Non-adjustable delay time				
	3RT2 . 1,	110 AC/DC	S00: > 0.1	3RT29 16-2BK01
	3RT2 . 2,		S0: > 0.08	
	3RH2 . . . -1BF40			
	3RT2 . 1,	220/230 AC/DC	S00: > 0.5	3RT29 16-2BL01
	3RT2 . 2,		S0: > 0.3	
	3RH2 . . . -1BM40			
3RT29 16-2B . 01	3RT2 . 1,	24 DC	S00: > 0.2	3RT29 16-2BE01
	3RT2 . 2,		S0: > 0.1	
	3RH2 . . . -1BB40			
Pneumatic delay blocks, terminal designation according to EN 50005				
<i>Size S0</i>				
For snapping onto the front of contactors¹⁾²⁾				
Auxiliary contacts 1 NO and 1 NC				
	• With ON-delay			
	3RT2 . 2	—	0.1 ... 30	3RT29 26-2PA01
			1 ... 60	3RT29 26-2PA11
	• OFF-delay			
	3RT2 . 2	—	0.1 ... 30	3RT29 26-2PR01
			1 ... 60	3RT29 26-2PR11
3RT29 26-2P . . .				
Mechanical latching blocks				
<i>Size S0</i>				
For snapping onto the front of contactors				
The contactor remains in the energized state after a voltage failure				
	3RT2 . 2	24 AC/DC	—	3RT29 26-3AB31
		110 AC/DC	—	3RT29 26-3AF31
		230 AC/DC	—	3RT29 26-3AP31
3RT29 26-3A . 31				

1) In addition to these, no other auxiliary contacts are permitted.

2) Versions according to DIN VDE 0116 on request.

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

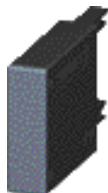
Surge suppressors

Selection and ordering data

For contactors	Version	Rated control supply voltage $U_s^{1)}$		Order No.
		AC operation	DC operation	
Type		V AC	V DC	

Surge suppressors without LED (also for spring-type terminals)

Size S00

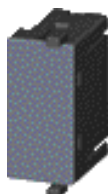


3RT29 16-1B . 00

For plugging onto the front side of the contactors (without and with an auxiliary switch block)

3RT2. 1, 3RH2.	Varistors	24 ... 48	24 ... 70	3RT29 16-1BB00
		48 ... 127	70 ... 150	3RT29 16-1BC00
		127 ... 240	150 ... 250	3RT29 16-1BD00
		240 ... 400	—	3RT29 16-1BE00
		400 ... 600	—	3RT29 16-1BF00
3RT2. 1, 3RH2.	RC elements	24 ... 48	24 ... 70	3RT29 16-1CB00
		48 ... 127	70 ... 150	3RT29 16-1CC00
		127 ... 240	150 ... 250	3RT29 16-1CD00
		240 ... 400	—	3RT29 16-1CE00
		400 ... 600	—	3RT29 16-1CF00
3RT2. 1, 3RH2.	Noise suppression diodes	—	12 ... 250	3RT29 16-1DG00
3RT2. 1, 3RH2.	Diode assemblies (diode and Zener diode) for DC operation	—	12 ... 250	3RT29 16-1EH00

Size S0



3RT29 26-1E . 00

For plugging onto the front side of the contactors (prior to mounting of the auxiliary switch block)

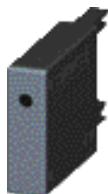
3RT2 . 2	Varistors	24 ... 48	24 ... 70	3RT29 26-1BB00
		48 ... 127	70 ... 150	3RT29 26-1BC00
		127 ... 240	150 ... 250	3RT29 26-1BD00
		240 ... 400	—	3RT29 26-1BE00
		400 ... 600	—	3RT29 26-1BF00
3RT2 . 2	RC elements	24 ... 48	24 ... 70	3RT29 26-1CB00
		48 ... 127	70 ... 150	3RT29 26-1CC00
		127 ... 240	150 ... 250	3RT29 26-1CD00
		240 ... 400	—	3RT29 26-1CE00
		400 ... 600	—	3RT29 26-1CF00
3RT2 . 2	Diode assemblies for DC operation	—	24 30 ... 250	3RT29 26-1ER00 3RT29 26-1ES00

1) Can be used for AC operation for 50/60 Hz. Please inquire about further voltages.

For contactors	Version	Rated control supply voltage $U_s^{1)}$		Power consumption P of the LED at U_s	Order No.
		AC operation	DC operation		
Type		V AC	V DC	mW	

Surge suppressors with LED (also for spring-type terminals)

Size S00

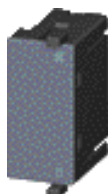


3RT29 16-1J . 00

For plugging onto the front side of the contactors (without and with an auxiliary switch block)

3RT2. 1, 3RH2 .	Varistors	24 ... 48	12 ... 24	10 ... 120	3RT29 16-1JJ00
		48 ... 127	24 ... 70	20 ... 470	3RT29 16-1JK00
		127 ... 240	70 ... 150	50 ... 700	3RT29 16-1JL00
		—	150 ... 250	160 ... 950	3RT29 16-1JP00
3RT2. 1, 3RH2 .	Noise suppression diodes	—	24 ... 70	20 ... 470	3RT29 16-1LM00
		—	50 ... 150	50 ... 700	3RT29 16-1LN00
		—	150 ... 250	160 ... 950	3RT29 16-1LP00

Size S0



3RT29 26-1M R00

For plugging onto the front side of the contactors (prior to mounting of the auxiliary switch block)

3RT2. 2	Varistor	24 ... 48	12 ... 24	10 ... 120	3RT29 26-1JJ00
		48 ... 127	24 ... 70	20 ... 470	3RT29 26-1JK00
		127 ... 240	70 ... 150	50 ... 700	3RT29 26-1JL00
3RT2. 2	Diode assemblies	—	24	20 ... 470	3RT29 26-1MR00

1) Can be used for AC operation for 50/60 Hz. Please inquire about further voltages.

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Other function blocks

Selection and ordering data

For contactors	Version	Order No.
Type		
LED modules for indicating contactor control state		
 3RT29 26-1QT00 (mounted to contactor) Size S0 3RT2 . 2 For snapping into the location hole of an inscription label on the front of a contactor either directly on the contactor or on the front auxiliary switch. The LED module is connected to coil terminals A1 and A2 of the contactor and indicates its energized state. Yellow LED. Rated voltage: 24 ... 240 V AC/DC with reverse polarity protection. 3RT29 26-1QT00		
Coupling links for control by PLC		
 3RH29 24-1GP11 Size S0 3RT2 . 2 For mounting onto the coil terminals of the contactors With LED for indicating switching state. With integrated varistor for damping opening surges. Operating range 17 ... 30 V DC Power consumption: 0.5 W at 24 V DC Permissible residual current of the electronics (with 0 signal): 2.5 mA Rated operational current I_e: • AC-15/AC-14 at 230 V: 3 A • DC-13 at 230 V: 0.1 A 3RH29 24-1GP11		

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Terminals, covers, adapters, connectors

Selection and ordering data

	For contactors	Version	Order No.
Type			
Sealable covers			
	Sizes S00 and S0 3RT2 . 1, 3RT2 . 2, 3RH2 . 1)	Sealable covers for preventing manual operation	3RT29 16-4MA10
3RT29 16-4MA10			
Coil connection modules			
	Size S0 3RT2 . 2	Connection from top Connection from below Connection diagonally	3RT29 26-4RA11 3RT29 26-4RB11 3RT29 26-4RC11
	3RT2 . 2	Connection from top Connection from below	3RT29 26-4RA12 3RT29 26-4RB12
	3RT29 26-4RA11		Spring-type terminals 
	3RT29 26-4RA11		
Screw adapters for fixing the contactors			
	Size S0 3RT2 . 2	Screw adapters for easier screw fixing 2 units required per contactor (1 pack contains 10 sets for 10 contactors)	3RT19 26-4P
3RT19 26-4P			
Safety main current connectors for 2 contactors			
	Sizes S00 and S0 3RT2 . 1 3RT2 . 2	For series connection of 2 contactors	3RA29 16-1A 3RA29 26-1A
	3RA29 16-1A		
	3RA29 16-1A		

1) Exception: Contactors and contactor relays auxiliary switch block mounted onto the front.

Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Terminals, covers, adapters, connectors

For contactors	Max. conductor cross-sections	Order No.
Type	mm ²	

Links for paralleling

Sizes S00 and S0

3-pole, with connection terminal

3RT20 1	25, stranded
3RT20 2	50, stranded



3RT19 16-4BB31



3RT29 26-4BB31



3RT19 16-4BB41

4-pole, with connection terminal

3RT23 1, 3RT25 1	25, stranded

Screw terminals



3RT19 16-4BB31
3RT29 26-4BB31

3RT19 16-4BB41

- 1) The links for paralleling can be reduced by one pole.
2) With sizes S00 and S0 the links for paralleling are insulated.

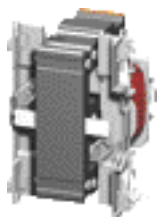
Accessories and Spare Parts

For 3RT2, 3RH2 Contactors and Contactor Relays

Spare parts for 3RT2 contactors

Selection and ordering data

For screw and spring-type connections



3RT29 24-5A . 01

For contactors		Rated control supply voltage U_s			Order No.
Size	Type	50 Hz	50/60 Hz	60 Hz	
		V	V	V	
Solenoid coils · AC operation					
S0	3RT20 23, 3RT20 24, 3RT20 25	24	—	—	3RT29 24-5AB01
		42	—	—	3RT29 24-5AD01
		48	—	—	3RT29 24-5AH01
		110	—	—	3RT29 24-5AF01
		230	—	—	3RT29 24-5AP01
		400	—	—	3RT29 24-5AV01
	—	—	24	—	3RT29 24-5AC21
		—	42	—	3RT29 24-5AD21
		—	48	—	3RT29 24-5AH21
		—	110	—	3RT29 24-5AG21
		—	220	—	3RT29 24-5AN21
		—	230	—	3RT29 24-5AL21
	110 220	—	—	120	3RT29 24-5AK61
		—	—	240	3RT29 24-5AP61
		—	100	110	3RT29 24-5AG61
		—	200	220	3RT29 24-5AN61
		—	400	440	3RT29 24-5AR61
		S0	3RT20 26 , 3RT20 27, 3RT20 28 3RT23 25, 3RT23 26, 3RT23 27 3RT25 2 6	24	—
42	—			—	3RT29 26-5AD01
48	—			—	3RT29 26-5AH01
110	—			—	3RT29 26-5AF01
230	—			—	3RT29 26-5AP01
400	—			—	3RT29 26-5AV01
—	—		24	—	3RT29 26-5AC21
	—		42	—	3RT29 26-5AD21
	—		48	—	3RT29 26-5AH21
	—		110	—	3RT29 26-5AG21
	—		220	—	3RT29 26-5AN21
	—		230	—	3RT29 26-5AL21
110 220	—		—	120	3RT29 26-5AK61
	—		—	240	3RT29 26-5AP61
	—		100	110	3RT29 26-5AG61
	—		200	220	3RT29 26-5AN61
	—		400	440	3RT29 26-5AR61

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

General data

Overview

Snap-on auxiliary switch blocks

Various auxiliary switch blocks can be added to the 3RT1 basic units depending on the application:

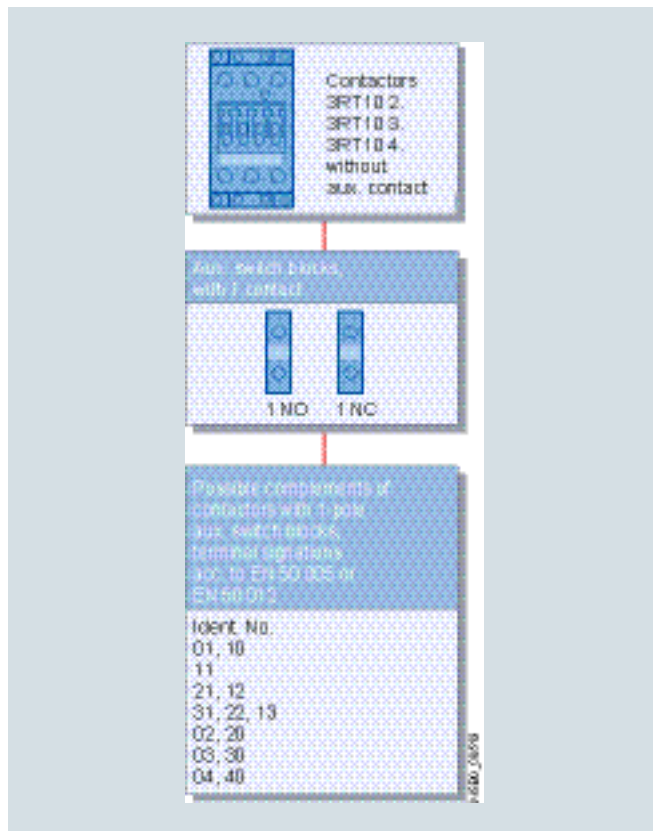
Sizes S2 to S12

Terminal designations according to EN 50005 or EN 50012

One 4-pole or up to four single-pole auxiliary switch blocks (screw or spring-type terminals) can be snapped on. When the contactors are switched on, the NC contacts are opened first and then the NO contacts are closed.

Also available are 2-pole auxiliary switch blocks (screw terminals) for cable entry from above or below in the design of a quad block (feeder auxiliary switch).

If the installation space is limited in depth, 2-pole auxiliary switch blocks (screw or spring-type terminals) can be attached laterally (on the left or on the right).

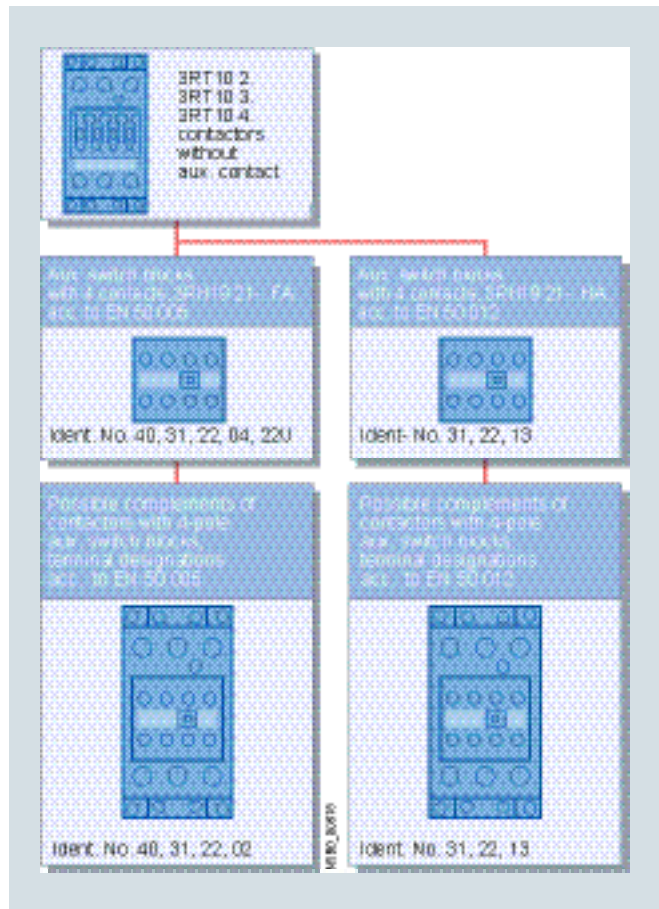


1-pole auxiliary switch blocks for 3RT1 contactors

The terminal designations of the single-pole auxiliary switch blocks are comprised of identification numbers (location identifiers) on the basic unit and of function numbers on the auxiliary switch blocks.

The terminal designations of the individual auxiliary switch blocks correspond to EN 50005 or EN 50012, those of the complete contactors with auxiliary switch block 2 NO + 2 NC correspond to EN 50012.

The auxiliary switch blocks attached to the front can be disassembled with the help of a centrally arranged release lever; the laterally attached auxiliary switch blocks are easy to remove by pressing on the checkered surfaces.



4-pole auxiliary switch blocks for 3RT1 contactors

The laterally mountable auxiliary switch blocks according to EN 50012 can be used only when no 4-pole auxiliary switch blocks are snapped onto the front. If single-pole auxiliary switch blocks are used in addition, the location identifiers on the contactor must be noted.

Two enclosed and two standard contacts are available with the 3RH19 21-FE22 solid-state compatible auxiliary switch block, which can be attached to the front. The 3RH19 21-2DE11 laterally mountable switch block contains 2 enclosed contacts (1 NO + 1 NC). The enclosed contacts are suitable in particular for switching small voltages and currents (hard gold-plated contacts) and for operation in dusty atmospheres. The NC auxiliary contacts are mirror contacts.

Size S2

A maximum of 4 auxiliary contacts can be attached; the auxiliary switch blocks used can be of any version. For reasons of symmetry, when two 2-pole laterally mountable auxiliary switch blocks are used, one block must be attached on the right and one on the left.

More auxiliary contacts are permissible with size S2 under certain conditions (on request).

Sizes S3 to S12

A maximum of 8 auxiliary contacts can be attached; please note the following:

- Of these 8 auxiliary contacts, there must be no more than 4 NC contacts
- Ensure the symmetry of laterally mounted auxiliary switch blocks

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

General data

Solid-state time-delay auxiliary switch blocks

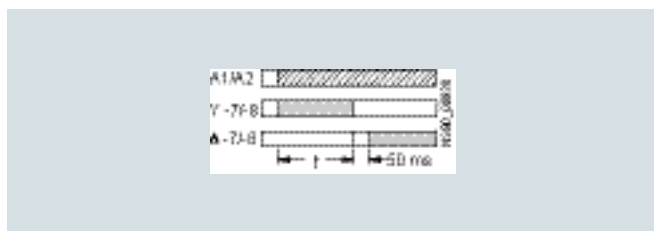
The solid-state, time-delay auxiliary switch block is fitted onto the front side of the contactor.

The timer module, which is available in the "ON-DELAY" and "OFF-DELAY" versions, allows time-delayed functions up to 100 s (3 delay ranges).

It contains a relay with one NO contact and one NC contact; depending on the version, the relay is switched either after an ON-delay or after an OFF-delay.

The timer module with "WYE-DELTA FUNCTION" is equipped with one delayed and one instantaneous NO contact, with a dead time of 50 ms between the two. The delay time of the NO contact can be adjusted between 1.5 s and 30 s.

Wye-delta function



The contactor on which the solid-state time-delay auxiliary switch block is mounted operates without a delay.

Sizes S2 to S12

The timer module is supplied with power through two terminals (A1/A2); the time delay of the auxiliary switch block can be activated either by a parallel link to any contactor coil or by any power source.

The OFF-delay version operates without an auxiliary voltage; the minimum ON period is 200 ms.

A single-pole auxiliary switch block can be snapped onto the front of the contactor in addition to the timer module.

The timer module has no integrated components for overvoltage damping.

Solid-state time-delay blocks with semiconductor output

The timer module in the "ON-DELAY" and "OFF-DELAY" with auxiliary voltage" versions allows time-delayed functions up to 100 s (3 delay ranges). Contactors fitted with a timing relay block close or open after a delay according to the set time.

The ON-delay variant of the timing relay is connected in series with the contactor coil; terminal A1 of this coil must not be connected.

With the OFF-delay variant of the timing relay, the contactor coil is contacted directly through the relay; terminals A1 and A2 of the contactor coil must not be connected.

The timing relays are suitable for both AC and DC operation.

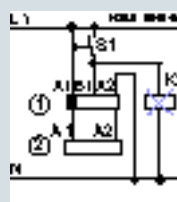
Sizes S2 and S3

The timing relay block for size S0 to S3 contactors is plugged into coil terminals A1 and A2 on top of each contactor; the timing relay is connected both electrically and mechanically by means of pins.

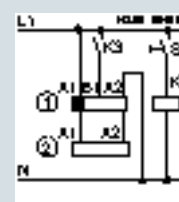
A varistor is integrated in the timer module in order to damp opening surges in the contactor coil.

Configuration

a) AC operation



b) OFF-delay



- ① Timing relay block
- ② Contactor

The activation of loads parallel to the start input is not permissible when using AC control voltage (see (a) in the circuit diagram).

The 3RT19 26-2D . . . OFF-delay timing relay blocks have a zero potential start input B1. This means that if there is a parallel load on terminal B1, activation can be simulated with AC voltage. In this case, the additional load (e. g. contactor K3) must be wired (see (b) in the drawing).

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

General data

OFF-delay device for size S00 and S0 contactors

AC and DC operation

IEC 60947, EN 60947

For screw and snap-on mounting onto 35 mm standard mounting rail. The OFF-delay devices have screw terminals.

The OFF-delay device prevents a contactor from dropping out unintentionally when there is a short-time voltage dip or voltage failure. It supplies a downstream, DC-operated contactor with the necessary energy during a voltage dip, ensuring that the contactor does not trip. The 3RT19 16 OFF-delay devices are specifically designed for operation with the 3RT contactors and 3RH contactor relays of the SIRIUS series.

The OFF-delay device operates without external voltage on a capacitive basis, and can be energized with either AC or DC (24 V version only for DC operation). Voltage matching, which is only necessary with AC operation, is performed using a rectifier bridge.

A contactor opens after a delay when the capacitors of the solenoid coil, built into the OFF-delay device, are switched in parallel. In the event of voltage failures, the capacitors are discharged via the solenoid coil and thereby delay the opening of the contactor.

If the command devices are upstream of the OFF-delay device in the circuit, the OFF-delay takes effect with every opening operation. If the opening operation is downstream of the OFF-delay device, an OFF-delay only applies in the event of failure of the mains voltage.

Operation

In the case of the versions for rated control supply voltages of 110 V and 230 V, either AC voltage or DC voltage can be applied on the line side, whereas the variant for 24 V is designed for DC operation only.

A DC-operated contactor is connected to the output in accordance with the input voltage that is applied.

The mean value of the OFF-delay is approximately 1.5 times the specified minimum time.

Surge suppressors

- Without LED (also for spring-type terminals)
Sizes S2, S3, S6 to S12

All 3RT1 contactors and 3RH1 contactor relays can be retrofitted with RC elements or varistors for damping opening surges in the coil. Diodes or diode assemblies (comprising noise suppression diodes and Zener diodes for short break times) can be used.

With the size S2 and S3 contactors, varistors, RC elements and diode assemblies can be plugged on directly at the coil terminals, either on the top or underneath.

The plug-in direction of the diodes and diode assemblies is determined by a coding device.

Coupling relays are supplied either without overvoltage damping or with a varistor or diode connected as standard, according to the version.

Note:

The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times; diode assembly 2 to 6 times, varistor +2 to 5 ms).

Coupling links for mounting on contactors of sizes S2 and S3

DC operation

IEC 60947 and EN 60947

The coupling link is suitable for use in any climate. It is finger-safe according to EN 50274. The terminal designations comply with EN 50005.

System-compatible operation with 24 V DC, operating range 17 to 30 V.

Low power consumption in conformity with the technical specifications of the solid-state systems. An LED indicates the switching state.

Surge suppression

The 3RH19 24-1GP11 coupling link has an integrated surge suppressor (varistor) for the contactor coil being switched.

Mounting

The 3RH19 24-1GP11 coupling link is mounted directly on the contactor coil.

Sealable covers for sizes S2 to S12

When contactors and contactor relays are used in safety-oriented applications, it must be ensured that it is impossible to operate the contactors manually.

For SIRIUS contactors there are sealable covers available for this purpose as accessories; these prevent accidental manual operation. These are transparent molded-plastic caps with a bracket that enables the contactor to be sealed.

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

General data

Technical specifications

Contactor	Type	3RT19 2 6-2C	3RT19 26-2D	3RT19 26-2E	3RT19 26-2F	3RT19 26-2G
		Solid-state time-delay blocks with semiconductor output		Solid-state time-delay auxiliary switch blocks		
General data						
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to EN 60664-1	V AC	250				
Permissible ambient temperature						
• During operation	°C	-25 ... +60				
• During storage	°C	-40 ... +80				
Degree of protection acc. to EN 60947-1, Appendix C						
• Cover • Terminals		IP40 IP20				
Shock resistance Half-sine acc. to IEC 60068-2-27	g/ms	15/11				
Vibration resistance						
Acc. to IEC 60068-2-6	Hz/mm	10 ... 55/0.35				
EMC tests	Basic specification	IEC 61000-6-4				
Conductor connections						
• Solid	mm²	2 x (0.5 ... 1.5), 2 x (0.75 ... 4)				
• Finely stranded with end sleeve	mm²	2 x (0.5 ... 2.5)				
• AWG cables, solid or stranded	AWG	2 x (18 ... 14)				
• Terminal screws		M3				
• Tightening torque	Nm	0.8 ... 1.2				
Permissible mounting positions		Any				
Control circuit						
Operating range of excitation		0.8 ... 1.1 x U_{sr} 0.95 ... 1.05 times the rated frequency		0.85 ... 1.1 x U_{sr} 0.95 ... 1.05 times the rated frequency		
Rated power	W	1		2		
• Power consumption at 230 V AC, 50 Hz	VA	1		4		
Overvoltage protection		Varistor integrated in timing relay		—		
Recovery time	ms	50		150		
Minimum ON period	ms	35		200 (with OFF-delay)		
Setting accuracy With reference to upper limit of scale	Typ. %	±15				
Repeat accuracy	Max. %	±1				
Load side						
Rated operational currents I_e						
• AC-140, DC-13	A	0.3 for 3RT19 16		—		
	A	0.3 for 3RT19 26		—		
• AC-15, 230 V, 50 Hz	A	—		3		
• DC-13, 24 V	A	—		1		
• DC-13, 110 V	A	—		0.2		
• DC-13, 230 V	A	—		0.1		
Short-time loading capacity	Up to 10 ms	A	10	—		
DIAZED protection operational class gG	A	—		4		
Residual current	Max. mA	5		—		
Voltage drop With conducting output	Max. VA	3.5		—		
Mechanical endurance	Operating cycles	100 x 10 ⁶		10 x 10 ⁶		
Switching frequency for load						
• With I_e at 230 V AC	h ⁻¹	2 500		2 500		
• With 3RT20 16 contactor at 230 V AC	h ⁻¹	2 500		5 000		

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

General data

Function	Function chart	
Solid-state time-delay blocks	1 NO contact (semiconductor output)	
ON-delay Two-wire version (varistor integrated)	3RT19 26-2C 	A2 can be connected to N1/L- using either the contactor or the timing relay. --- To be connected optionally ① Timing relay block ② Contactor
OFF-delay with auxiliary voltage (varistor integrated)	3RT19 26-2D 	A2 must only be connected to N1/L- from the timing relay. ✗ Do not connect ① Timing relay block ② Contactor
Solid-state time-delay auxiliary switch blocks	1 NO + 1 NC	
ON-delay	3RT19 26-2E 	
OFF-delay without auxiliary voltage	3RT19 26-2F 	
Solid-state time-delay auxiliary switch blocks	2 NO	
Wye-delta function: 1 NO delayed, 1 NO instantaneous, dead time 50 ms (varistor integrated)	3RT19 26-2G 	

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

General data

Contactor	Type	3RH19 24, 3TX7 090 Coupling links for mounting on contactors acc. to IEC 60947/EN 60947
General data		
Rated insulation voltage U_i (pollution degree 3)	V	300
Protective separation between the coil and the contacts acc. to EN 60947-1, Appendix N	V AC	Up to 300
Permissible ambient temperature		
• During operation	°C	-25 ... +60
• During storage	°C	-40 ... +80
Degree of protection acc. to EN 60947-1, Appendix C		
• Connections		IP20
• Enclosures		IP40
Circuit diagram		
Conductor cross-sections		
• Solid	mm ²	2 x (0.5 ... 2.5)
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5)
Terminal screws		M3
Short-circuit protection (weld-free protection at $I_{sc} \geq 1$ kA) Fuse links, operational class gG Type LV HRC 3NA, DIAZED 5SB, NEOZED 5SE		
	A	6
Control side		
Rated control supply voltage U_s	V DC	24
Operating range	V DC	17 ... 30
Power consumption at U_s	W	0.5
Nominal current input	mA	20
Release voltage	V	≥ 4
Function display		Yellow LED
Protection circuit		Varistor
Load side		
Mechanical endurance	Operating cycles	20×10^6
Electrical endurance at I_e	Operating cycles	1×10^5
Switching frequency	Operating cycles h ⁻¹	5 000
Make-time	ms	Approx. 7
Break-time	ms	Approx. 4
Bounce time	ms	Approx. 2
Contact material		AgSnO
Switching voltage	AC/DC V	24 ... 250
Permissible residual current of the electronics (with 0 signal)	mA	2.5
Rated operational currents ¹⁾ Conventional thermal current I_{th}		
Rated operational currents I_e acc. to utilization categories EN 60947-1		
• AC-15	At 24 V A	3
	At 110 V A	3
	At 230 V A	3
• DC-13	At 24 V A	1
	At 110 V A	0.2
	At 230 V A	0.1
Switching current with resistive load to EN 61810-1 (relay standard) and EN 60947-1		
• AC-12	At 24 V A	6
	At 110 V A	6
	At 230 V A	6
• DC-12	At 24 V A	6
	At 110 V A	0.3
	At 230 V A	0.2 ¹⁾

1) Capacitive loads can result in micro-weldings on the contacts.

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

General data

Contactor	Type	3RT19 26-3A Mechanical latching blocks
General data		
Rated insulation voltage U_i (pollution degree 3)	V	690
Permissible ambient temperature		
• During operation	°C	-25 ... +60
• During storage	°C	-50 ... +80
Degree of protection acc. to EN 60947-1, Appendix C		IP20
Mechanical endurance		
• With 3RT1 . 2	Operating cycles	3×10^6
• With 3RT1 . 3	Operating cycles	50 000
Conductor cross-sections		
• Solid	mm ² AWG	2 x (0.5 ... 2.5); 1 x 4 2 x 14; 1 x 12
• Finely stranded with end sleeve	mm ² AWG	2 x (0.5 ... 2.5); 1 x 2.5 2 x 14; 1 x 12
Tightening torque of the terminal screws	Nm lb.in	0.8 ... 1.1 7 ... 9.5
Control circuit		
Operating range of the solenoid coil At AC 50/60 Hz and DC		0.85 ... 1.1 x U_s
Power consumption of the solenoid coils of the unlocking magnet (for cold coil and 1.0 x U_s) AC and DC operation	W	Approx. 4
Command duration for de-energizing		
• AC operation	ms	18 ... 31
• DC operation	ms	18 ... 26

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Auxiliary switches

Selection and ordering data



3RH19 21-1HA . .
3RH19 21-1FA . .



3RH19 21-1LA . .



3RH19 21-1MA . .



3RH19 21-1C . .

For contactors		Auxiliary contacts				Screw terminals	
Type	Ident. No.	Version				Order No.	
							
	NO	NC	NO	NC			

Auxiliary switch blocks for snapping onto the front acc. to EN 50012

Sizes S2 and S3¹⁾

4-pole auxiliary switch blocks						
3RT1 . 3, 3RT1 . 4	31	3	1	—	—	3RH19 21-1HA31
	22	2	2	—	—	3RH19 21-1HA22
	13	1	3	—	—	3RH19 21-1HA13

Sizes S2 to S12²⁾

4-pole auxiliary switch blocks						
3RT1 . 3 ... 3RT1 . 7	22	2	2	—	—	3RH19 21-1XA22-0MA0

Auxiliary switch blocks for snapping onto the front acc. to EN 50005

Sizes S2 and S3¹⁾

4-pole auxiliary switch blocks						
3RT1 . 3, 3RT1 . 4	40	4	—	—	—	3RH19 21-1FA40
	31	3	1	—	—	3RH19 21-1FA31
	22	2	2	—	—	3RH19 21-1FA22
	04	—	4	—	—	3RH19 21-1FA04
	22 U	—	—	2	2	3RH19 21-1FC22

Auxiliary switch blocks for snapping onto the front acc. to EN 50005

Sizes S2 and S3¹⁾

2-pole auxiliary switch blocks with cable entry from one side Cable entry from above						
3RT1 . 3, 3RT1 . 4	11	1	1	—	—	3RH19 21-1LA11
	20	2	—	—	—	3RH19 21-1LA20
	02	—	2	—	—	3RH19 21-1LA02
• Cable entry from below						
3RT1 . 3, 3RT1 . 4	11	1	1	—	—	3RH19 21-1MA11
	20	2	—	—	—	3RH19 21-1MA20
	02	—	2	—	—	3RH19 21-1MA02

Sizes S2 to S12²⁾

1-pole auxiliary switch blocks acc. to EN 50005 and EN 50012						
3RT1 . 3 ... 3RT1 . 7	10	1	—	—	—	3RH19 21-1CA10
	01	—	1	—	—	3RH19 21-1CA01
	10	—	—	1	—	3RH19 21-1CD10
	01	—	—	—	1	3RH19 21-1CD01

1) Exception: 3RT16.

2) Exception: 3RT12, 3RT16.

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Auxiliary switches



3RH19 21-1DA11
3RH19 21-1JA11



3RH19 21-1EA11
3RH19 21-1KA11

For contactors	Auxiliary contacts		Screw terminals 
	Version		Order No.
			
Type	NO	NC	
Laterally mountable auxiliary switch blocks acc. to EN 50012			
Sizes S2 and S3			
	Left Right		
	First laterally mountable auxiliary switch block (right or left), 2-pole		
3RT1 . 3, 3RT1 . 4	1	1	3RH19 21-1DA11
Sizes S3 ... S12			
	Left Right		
	Second laterally mountable auxiliary switch block (right or left), 2-pole		
3RT1 . 4 ... 3RT1 . 7	1	1	3RH19 21-1JA11
Laterally mountable auxiliary switch blocks acc. to EN 50005			
Sizes S2 to S12			
	Left Right		
	First laterally mountable auxiliary switch block (right or left), 2-pole		
3RT1 . 3 ... 3RT1 . 7	2	—	3RH19 21-1EA20
	1	1	3RH19 21-1EA11
	—	2	3RH19 21-1EA02
Sizes S3 to S12			
	Left Right		
	Second laterally mountable auxiliary switch block (right or left), 2-pole		
3RT1 . 4 ... 3RT1 . 7	2	—	3RH19 21-1KA20
	1	1	3RH19 21-1KA11
	—	2	3RH19 21-1KA02



3RH19 21-1FE22

For contactors	Contacts				Screw terminals 
	Version				Order No.
					
Type	NO	NO ¹⁾	NC ¹⁾	NC	
Solid-state compatible auxiliary switch blocks					
• For operation in dusty atmospheres • For solid-state circuits with rated operational currents I_e/ AC-14 and DC-13 of 1 ... 300 mA at 3 ... 60 V • Hard gold-plated contacts • Mirror contacts acc. to EN 60947-4-1, Appendix F					
Auxiliary switch blocks for snapping onto the front acc. to EN 50005					
Sizes S2 and S3					
3RT1 . 3 ... 3RT1 . 7	1	1	1	1	3RH19 21-1FE22

1) 1 NO + 1 NC standard auxiliary switches:
[See descriptions on page 2/169.](#)

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Solid-state time-delay auxiliary switch blocks and timing relay blocks

Selection and ordering data

For contactors	Auxiliary contacts	Rated control supply voltage $U_s^{1)}$	Time setting range t	Screw terminals 
Type		V	s	Order No.

Solid-state time-delay auxiliary switch blocks for snapping onto the front, terminal designations according to DIN 46199-5

Sizes S2 ... S12



3RT19 26-2

ON-delay ²						
3RT10, 3RT13, 3RT14, 3RT15	1 NO + 1 NC	24 AC/DC	0.05 ... 1	3RT19 26-2EJ11		
			0.5 ... 10	3RT19 26-2EJ21		
			5 ... 100	3RT19 26-2EJ31		
	100 ... 127 AC		0.05 ... 1	3RT19 26-2EC11		
			0.5 ... 10	3RT19 26-2EC21		
			5 ... 100	3RT19 26-2EC31		
	200 ... 240 AC		0.05 ... 1	3RT19 26-2ED11		
			0.5 ... 10	3RT19 26-2ED21		
			5 ... 100	3RT19 26-2ED31		
	OFF-delay without auxiliary voltage ²⁾³⁾					
	3RT10, 3RT13, 3RT14, 3RT15	1 NO + 1 NC	24 AC/DC	0.05 ... 1	3RT19 26-2FJ11	
				0.5 ... 10	3RT19 26-2FJ21	
			5 ... 100	3RT19 26-2FJ31		
100 ... 127 AC/DC			0.05 ... 1	3RT19 26-2FK11		
			0.5 ... 10	3RT19 26-2FK21		
			5 ... 100	3RT19 26-2FK31		
200 ... 240 AC/DC			0.05 ... 1	3RT19 26-2FL11		
			0.5 ... 10	3RT19 26-2FL21		
			5 ... 100	3RT19 26-2FL31		
Wye-delta function (varistor integrated) ²⁾						
3RT10, 3RT13, 3RT14, 3RT15	1 NO delayed +	24 AC/DC	1.5 ... 30	3RT19 26-2GJ51		
	1 NO instantaneous,	100 ... 127 AC	1.5 ... 30	3RT19 26-2GC51		
	dead time 50 ms	200 ... 240 AC	1.5 ... 30	3RT19 26-2GD51		

Solid-state time-delay blocks with semiconductor output

Sizes S2 and S3

For mounting onto coil terminals on top of the contactors, only for devices with screw terminals ON-delay (varistor integrated)					
	3RT10 3,	—	24 ... 66 AC/DC	0.05 ... 1	3RT19 26-2CG11
	3RT10 4,			0.5 ... 10	3RT19 26-2CG21
	3RT13 ⁴⁾			5 ... 100	3RT19 26-2CG31
	3RT15			90 ... 240 AC/DC	0.05 ... 1
	0.5 ... 10	3RT19 26-2CH21			
	5 ... 100	3RT19 26-2CH31			
	• OFF-delay with auxiliary voltage (varistor integrated)				
	3RT10 3,	—	24 ... 66 AC/DC	0.05 ... 1	3RT19 26-2DG11
	3RT10 4,			0.5 ... 10	3RT19 26-2DG21
	3RT13 ⁴⁾			5 ... 100	3RT19 26-2DG31
	3RT15			90 ... 240 AC/DC	0.05 ... 1
	0.5 ... 10	3RT19 26-2DH21			
	5 ... 100	3RT19 26-2DH31			

For technical specifications, operating travel diagrams and circuit diagrams see pages 2/172 and 2/173.

- 1) The AC voltages are valid for 50 and 60 Hz.
- 2) Terminals A1 and A2 for the control supply voltage of the solid-state time-delay auxiliary switch must be connected to the associated contactor by means of connecting cables.
- 3) Setting of output contacts in as-supplied state not defined (bistable relay). Application of the control supply voltage once results in contact changeover to the correct setting.
- 4) In addition to these, no other auxiliary contacts are permitted.

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Surge suppressors

Selection and ordering data

For contactors	Version	Rated control supply voltage $U_s^{1)}$		Order No.
Type		AC operation	DC operation	
		V AC	V DC	

Surge suppressors without LED (also for spring-type terminals)

Sizes S2 and S3

For fitting onto the coil terminals at top or bottom

 3RT19 26-1B . 00	3RT1 . 3, 3RT1 . 4	Varistors	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	24 ... 70 70 ... 150 150 ... 250 —	3RT19 26-1BB00 3RT19 26-1BC00 3RT19 26-1BD00 3RT19 26-1BE00 3RT19 26-1BF00
	3RT1 . 3 ²⁾ , 3RT1 . 4	RC elements	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	24 ... 70 70 ... 150 150 ... 250 —	3RT19 36-1CB00 3RT19 36-1CC00 3RT19 36-1CD00 3RT19 36-1CE00 3RT19 36-1CF00
	3RT1 . 3, 3RT1 . 4	Diode assemblies for DC operation			
		• Connectable at the top (e. g. for contactor with overload relay)		24 30 ... 250	3RT19 36-1ER00 3RT19 36-1ES00
		• Connectable at the bottom (e. g. for fuseless load feeders)		24 30 ... 250	3RT19 36-1TR00 3RT19 36-1TS00

Sizes S6 ... S12

For connecting to withdrawable coil with screw terminals for contactors with

- Conventional operating mechanism 3RT1. ...A...
- Solid-state operating mechanism 3RT1. ...N...

 3RT19 56-1C . 00	3RT1 . 5, 3RT1 . 6, 3RT1 . 7	RC elements	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	24 ... 70 70 ... 150 150 ... 250 —	3RT19 56-1CB00 3RT19 56-1CC00 3RT19 56-1CD00 3RT19 56-1CE00 3RT19 56-1CF00

1) Can be used for AC operation for 50/60 Hz. Please inquire about further voltages.

2) For 3RT1 . 3 with AC operation mountable only at the top.

For contactors	Version	Order No.
Type		

Main current path surge suppression modules for 3RT12 vacuum contactors

Size S10 and S12

3RT12	For damping overvoltages and protecting motor windings against multiple re-ignition when switching off induction motors. For connection on the contactor feeder side (2-T1/4-T2/6-T3). For separate installation. Rated operational voltage $U_e = 690$ V AC Rated operational voltage $U_e = 1000$ V AC	3RT19 66-1PV3 3RT19 66-1PV4

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Miscellaneous accessories

Selection and ordering data

For contactors	Rated control supply voltage U_c	Screw terminals
Type	V	Order No.

Mechanical latching blocks

Size S2		
	For mounting on 1 contactor ¹⁾ , contactor remains in the energized state even after a voltage failure	
3RT1 . 3	24 AC/DC 110 AC/DC 230 AC/DC	3RT19 26-3AB31 3RT19 26-3AF31 3RT19 26-3AP31

1) Two front-mounted auxiliary switch blocks can be mounted in addition.

For contactors	Version	Screw terminals
Type	V	Order No.

Coupling links for control by PLC

Sizes S2 and S3		
	For mounting onto the coil terminals of the contactors With LED for indicating switching state	
3RT1 . 3, 3RT1 . 4	Operating range 17 ... 30 V DC Power consumption: 0.5 W at 24 V DC Permissible residual current of the electronics (with 0 signal): 2.5 mA Rated operational current I_e : • AC-15/AC-14 at 230 V: 3 A • DC-13 at 230 V: 0.1 A With integrated varistor for damping opening surges.	3RH19 24-1GP11

For contactors	Version	Screw terminals
Type		Order No.

LED modules for indicating the contactor control state (also for spring-type terminals)

Sizes S2 ... S12 ¹⁾		
	For snapping into the location hole of an inscription label on the front of a contactor either directly on the contactor or on the front auxiliary switch. The LED module is connected to coil terminals A1 and A2 of the contactor and indicates its energized state. Yellow LED. Rated voltage: 24 ... 240 V AC/DC with reverse polarity protection. (1 pack = 5 units)	3RT19 26-1QT00

Auxiliary terminals, 3-pole

Size S3		
	For connection of auxiliary and control cables (0.5 to 2.5 mm ²) to the main conductor connections (for one side)	3RT19 46-4F

For technical specifications for latching blocks see page 2/175.

For technical specifications and circuit diagram for coupling links see page 2/174.

1) For sizes S6 ... S12 the connecting leads have to be extended.

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Miscellaneous accessories

For contactors		Version	Order No.	
Size	Type			
Box terminal blocks				
	S6	3RT1 . 5 (3RB20 5)	For round and ribbon cables ¹⁾	
			Up to 70 mm ² ²⁾	
			Up to 120 mm ²	
			Auxiliary conductor connection for box terminals	
3RT19 5-4G	S10, S12	3RT1 . 6, 3RT1 . 7 (3RB20 6, 3RB21 6)	Up to 240 mm ² With auxiliary conductor connection	
Covers				
	S2	3RT10 3	Terminal covers for box terminals (additional touch protection)	
		3RT13 3, 3RT15 3	To be fitted at the box terminals (2 units required per contactor)	
	S3	3RT10 4, 3RT14 4	—	
		3RT13 4	For 4-pole contactors	
	3RT19 36-4EA2	S6 ³⁾	3RT1 . 5	Length: 25 mm
	S10, S12 ³⁾	3RT1 . 6, 3RT1 . 7	Length: 30 mm	
	Terminal covers for cable lugs and busbar connection ³⁾			
	For complying with the phase clearances and as touch protection if box terminal is removed (2 units required per contactor)			
	S3	3RT10 4, 3RT14 4	—	
	S6	3RT1 . 5	Length: 100 mm	
3RT19 46-4EA1	S10/S12	3RT1 . 6, 3RT1 . 7	Length: 120 mm	
	S6	3RT1 . 5	Can be screwed on free screw end; covers one busbar connection (1 set = 6 units)	
		3RT1 . 6, 3RT1 . 7	M8	
	S10, S12	3RT1 . 6, 3RT1 . 7	M10	
	3RTX6 526-3B	For busbar cover between contactor and 3RB2 overload relay or wiring module for contactor assemblies		
		S6	3RT1 . 5	Length: 27 mm
S10/S12 ⁴⁾		3RT1 . 6, 3RT1 . 7	Length: 42 mm	
For busbar cover of the flat line connectors for reversing and wye-delta assemblies				
S6		3RT1 . 5	Length: 38 mm	
Sealable covers				
	S2 ... S12	3RT1 . 3 ... 3RT1 . 7 ⁵⁾	1 unit required per contactor	
		3RT1 . 7 ⁵⁾		
3RT19 . 6-4MA10				

- 1) Connectable cross-sections of the contactors can be found in the "Technical specifications".
- 2) As standard for 3RT10 54-1 contactor (55 kW).
- 3) Also fits on mounted box terminals.
- 4) The 3RT19 66-4EA3 cover is required in addition for use in contactor assemblies (reversing/wye-delta).
- 5) Exception: contactors and contactor relays auxiliary switch block mounted onto the front.

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Miscellaneous accessories

For contactors		Max. conductor cross-sections	Screw terminals
Size	Type	mm²	Order No.
Links for paralleling			
	S2	3RT10 3	3-pole, with connection terminal ¹⁾²⁾ 95
			3RT19 36-4BB31
3RT19 36-4BB31			
	S3	3RT10 4, 3RT14 4	3-pole, with through hole (star jumpers) ¹⁾²⁾ 185
	S6	3RT1 . 5	—
	S10/S12	3RT1 . 6, 3RT1 . 7	—
3RT19 56-4BA31			3RT19 46-4BB31 3RT19 56-4BA31 3RT19 66-4BA31

- 1) The links for paralleling can be reduced by one pole.
 2) Size S2: The links for paralleling are insulated.
 Size S3: A cover plate is included for touch protection.
 (Can only be used when the box terminal is removed.)
 Sizes S6 to S12: The 3RT19 56-4EA1 (for S6) or 3RT19 66-4EA1
 (for S10 and S12) cover can be used for touch protection.

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Spare parts for 3RT1 contactors

Selection and ordering data



3RT19 34-5A . 01

For contactors		Rated control supply voltage U_s			Screw terminals 
Size	Type	50 Hz V	50/60 Hz V	60 Hz V	Order No.
Magnetic coils - AC operation					
S2	3RT10 34	24	—	—	3RT19 34-5AB01
		42	—	—	3RT19 34-5AD01
		48	—	—	3RT19 34-5AH01
		110	—	—	3RT19 34-5AF01
		230	—	—	3RT19 34-5AP01
		400	—	—	3RT19 34-5AV01
		—	24	—	3RT19 34-5AC21
		—	42	—	3RT19 34-5AD21
		—	48	—	3RT19 34-5AH21
		—	110	—	3RT19 34-5AG21
		—	220	—	3RT19 34-5AN21
		—	230	—	3RT19 34-5AL21
	3RT10 35, 3RT10 36, 3RT13 3 ., 3RT15 3 .	110	—	120	3RT19 34-5AK61
		220	—	240	3RT19 34-5AP61
		—	100	110	3RT19 34-5AG61
		—	200	220	3RT19 34-5AN61
		—	400	440	3RT19 34-5AR61
		24	—	—	3RT19 35-5AB01
		42	—	—	3RT19 35-5AD01
		48	—	—	3RT19 35-5AH01
		110	—	—	3RT19 35-5AF01
		230	—	—	3RT19 35-5AP01
		400	—	—	3RT19 35-5AV01
		—	24	—	3RT19 35-5AC21
		—	42	—	3RT19 35-5AD21
		—	48	—	3RT19 35-5AH21
		—	110	—	3RT19 35-5AG21
		—	220	—	3RT19 35-5AN21
		—	230	—	3RT19 35-5AL21
		110	—	120	3RT19 35-5AK61
		220	—	240	3RT19 35-5AP61
		—	100	110	3RT19 35-5AG61
		—	200	220	3RT19 35-5AN61
		—	400	440	3RT19 35-5AR61

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Spare parts for 3RT1 contactors



3RT19 44-5A . 01

3RT19 45-5A . 01

For contactors		Rated control supply voltage U_c				Screw terminals 	
		AC			DC	Order No.	
		50 Hz	50/60 Hz	60 Hz			
Size	Type	V	V	V	V		
Magnetic coils · AC operation							
S3	3RT10 44	24	—	—	—	3RT19 44-5AB01	
		42	—	—	—	3RT19 44-5AD01	
		48	—	—	—	3RT19 44-5AH01	
		110	—	—	—	3RT19 44-5AF01	
		230	—	—	—	3RT19 44-5AP01	
		400	—	—	—	3RT19 44-5AV01	
		—	24	—	—	3RT19 44-5AC21	
		—	42	—	—	3RT19 44-5AD21	
		—	48	—	—	3RT19 44-5AH21	
		—	110	—	—	3RT19 44-5AG21	
		—	220	—	—	3RT19 44-5AN21	
		—	230	—	—	3RT19 44-5AL21	
		110	—	120	—	3RT19 44-5AK61	
		220	—	240	—	3RT19 44-5AP61	
		—	100	110	—	3RT19 44-5AG61	
		—	200	220	—	3RT19 44-5AN61	
		—	400	440	—	3RT19 44-5AR61	
		3RT10 45, 3RT10 46, 3RT13 4 . , 3RT14 46, 3RT15 4 .	24	—	—	—	3RT19 45-5AB01
			42	—	—	—	3RT19 45-5AD01
			48	—	—	—	3RT19 45-5AH01
	110		—	—	—	3RT19 45-5AF01	
	230		—	—	—	3RT19 45-5AP01	
	400		—	—	—	3RT19 45-5AV01	
	—		24	—	—	3RT19 45-5AC21	
	—		42	—	—	3RT19 45-5AD21	
	—		48	—	—	3RT19 45-5AH21	
	—		110	—	—	3RT19 45-5AG21	
	—		220	—	—	3RT19 45-5AN21	
	—		230	—	—	3RT19 45-5AL21	
	110		—	120	—	3RT19 45-5AK61	
	220		—	240	—	3RT19 45-5AP61	
	—	100	110	—	3RT19 45-5AG61		
	—	200	220	—	3RT19 45-5AN61		
	—	400	440	—	3RT19 45-5AR61		
Magnetic coils · DC operation							
S2	3RT10 3 . ,	—	—	—	24	3RT19 34-5BB41	
	3RT13 3 . ,	—	—	—	42	3RT19 34-5BD41	
	3RT15 3 .	—	—	—	48	3RT19 34-5BW41	
		—	—	—	60	3RT19 34-5BE41	
	—	—	—	110	3RT19 34-5BF41		
	—	—	—	125	3RT19 34-5BG41		
	—	—	—	220	3RT19 34-5BM41		
	—	—	—	230	3RT19 34-5BP41		
S3	3RT10 4 . ,	—	—	—	24	3RT19 44-5BB41	
	3RT13 4 . ,	—	—	—	42	3RT19 44-5BD41	
	3RT14 4 . ,	—	—	—	48	3RT19 44-5BW41	
	3RT15 4 .	—	—	—	60	3RT19 44-5BE41	
	—	—	—	110	3RT19 44-5BF41		
	—	—	—	125	3RT19 44-5BG41		
	—	—	—	220	3RT19 44-5BM41		
	—	—	—	230	3RT19 44-5BP41		

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Spare parts for 3RT1 contactors



3RT19 55-5A . . .

For contactors		Rated control supply voltage $U_{s \min} \dots U_{s \max}$	Screw terminals 
Size	Type	V AC/DC	Order No.
Withdrawable coils			
<i>Conventional operating mechanisms</i>			
S6	3RT10 5, 3RT14 5	23 ... 26	3RT19 55-5AB31
		42 ... 48	3RT19 55-5AD31
		110 ... 127	3RT19 55-5AF31
		200 ... 220	3RT19 55-5AM31
		220 ... 240	3RT19 55-5AP31
		240 ... 277	3RT19 55-5AU31
		380 ... 420	3RT19 55-5AV31
		440 ... 480	3RT19 55-5AR31
		500 ... 550	3RT19 55-5AS31
		575 ... 600	3RT19 55-5AT31
S10	3RT10 6, 3RT14 6	23 ... 26	3RT19 65-5AB31
		42 ... 48	3RT19 65-5AD31
		110 ... 127	3RT19 65-5AF31
		200 ... 220	3RT19 65-5AM31
		220 ... 240	3RT19 65-5AP31
		240 ... 277	3RT19 65-5AU31
		380 ... 420	3RT19 65-5AV31
		440 ... 480	3RT19 65-5AR31
		500 ... 550	3RT19 65-5AS31
		575 ... 600	3RT19 65-5AT31
S10	3RT12 6 vacuum contactors	23 ... 26	3RT19 66-5AB31
		42 ... 48	3RT19 66-5AD31
		110 ... 127	3RT19 66-5AF31
		200 ... 220	3RT19 66-5AM31
		220 ... 240	3RT19 66-5AP31
		240 ... 277	3RT19 66-5AU31
		380 ... 420	3RT19 66-5AV31
		440 ... 480	3RT19 66-5AR31
		500 ... 550	3RT19 66-5AS31
		575 ... 600	3RT19 66-5AT31
S12	3RT10 7, 3RT14 7, 3RT12 7 vacuum contactors	23 ... 26	3RT19 75-5AB31
		42 ... 48	3RT19 75-5AD31
		110 ... 127	3RT19 75-5AF31
		200 ... 220	3RT19 75-5AM31
		220 ... 240	3RT19 75-5AP31
		240 ... 277	3RT19 75-5AU31
		380 ... 420	3RT19 75-5AV31
		440 ... 480	3RT19 75-5AR31
		500 ... 550	3RT19 75-5AS31
		575 ... 600	3RT19 75-5AT31

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Spare parts for 3RT1 contactors



3RT19 55-5N . . .

For contactors		Rated control supply voltage U_s	Screw terminals
Size	Type	V AC/DC	Order No.
Withdrawable coils			
Solid-state operating mechanism			
For 24 V DC PLC output			
S6	3RT10 5, 3RT14 5	21 ... 27.3	3RT19 55-5NB31
		96 ... 127	3RT19 55-5NF31
		200 ... 277	3RT19 55-5NP31
S10	3RT10 6, 3RT14 6	21 ... 27.3	3RT19 65-5NB31
		96 ... 127	3RT19 65-5NF31
		200 ... 277	3RT19 65-5NP31
	3RT12 6 vacuum contactors	21 ... 27.3	3RT19 66-5NB31
		96 ... 127	3RT19 66-5NF31
		200 ... 277	3RT19 66-5NP31
S12	3RT10 7, 3RT14 7, 3RT12 7 vacuum contactors	21 ... 27.3	3RT19 75-5NB31
		96 ... 127	3RT19 75-5NF31
		200 ... 277	3RT19 75-5NP31
For 24 V DC PLC output/PLC relay output, with remaining lifetime indicator (RLT) (withdrawable coil with laterally mounted solid-state module)			
S6	3RT10 5, 3RT14 5	96 ... 127	3RT19 55-5PF31
		200 ... 277	3RT19 55-5PP31
S10	3RT10 6, 3RT14 6	96 ... 127	3RT19 65-5PF31
		200 ... 277	3RT19 65-5PP31
S12	3RT10 7, 3RT14 7	96 ... 127	3RT19 75-5PF31
		200 ... 277	3RT19 75-5PP31

Accessories and Spare Parts

For 3RT1, 3RH1 Contactors and Contactor Relays

Spare parts for 3RT1 contactors

For contactors		Version	Order No.
Size	Type		
Arc chutes			
S2	3RT10 3 .	Arc chutes, 3-pole	3RT19 36-7A
S3	3RT10 4 . , 3RT14 46		3RT19 46-7A
S6	3RT10 54		3RT19 54-7A
	3RT10 55		3RT19 55-7A
	3RT10 56		3RT19 56-7A
S10	3RT10 64		3RT19 64-7A
	3RT10 65		3RT19 65-7A
	3RT10 66		3RT19 66-7A
S12	3RT10 75		3RT19 75-7A
	3RT10 76		3RT19 76-7A
S6	3RT14 56		3RT19 56-7B
S10	3RT14 66		3RT19 66-7B
S12	3RT14 76	3RT19 76-7B	
Contacts with fixing parts			
For contactors with 3 main contacts			
S2	3RT10 34	Main contacts (3 NO contacts) for utilization category AC-3 (1 set = 3 movable and 6 fixed switching elements with fixing parts)	3RT19 34-6A
	3RT10 35		3RT19 35-6A
	3RT10 36		3RT19 36-6A
S3	3RT10 44		3RT19 44-6A
	3RT10 45		3RT19 45-6A
	3RT10 46		3RT19 46-6A
S6	3RT10 54		3RT19 54-6A
	3RT10 55		3RT19 55-6A
	3RT10 56		3RT19 56-6A
S10	3RT10 64		3RT19 64-6A
	3RT10 65		3RT19 65-6A
	3RT10 66		3RT19 66-6A
S12	3RT10 75		3RT19 75-6A
	3RT10 76		3RT19 76-6A
S3	3RT14 46	Main contacts (3 NO contacts) for utilization category AC-1 (1 set = 3 movable and 6 fixed switching elements with fixing parts)	3RT19 46-6D
S6	3RT14 56		3RT19 56-6D
S10	3RT14 66		3RT19 66-6D
S12	3RT14 76		3RT19 76-6D
For 3RT12 vacuum contactors			
S10	3RT12 64	3 vacuum interrupters with fixing parts	3RT19 64-6V
	3RT12 65		3RT19 65-6V
	3RT12 66		3RT19 66-6V
S12	3RT12 75		3RT19 75-6V
	3RT12 76		3RT19 76-6V
For contactors with 4 main contacts			
S2	3RT13 36	Main contacts (4 NO contacts) for utilization category AC-1 (1 set = 4 movable and 8 fixed switching elements with fixing parts)	3RT19 36-6E
S3	3RT13 44		3RT19 44-6E
	3RT13 46		3RT19 46-6E

Accessories and Spare Parts

For 3T Contactors and Contactor Relays

Accessories for 3TC, 3TF6 contactors

Selection and ordering data

	For contactors	Version	Rated control supply voltage U_s		Order No.
	Size	Type	V AC	V DC	
Surge suppressors ¹⁾ · Varistors					
 3TX7 402-3 .	2	3TC44 ²⁾	Varistors ³⁾ With line spacer, for mounting onto the coil terminal	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	24 ... 70 70 ... 150 150 ... 250 — — 3TX7 402-3G 3TX7 402-3H 3TX7 402-3J 3TX7 402-3K 3TX7 402-3L
	4 and 6	3TC56	Varistors ³⁾ For sticking onto the contactor base or for mounting separately	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	24 ... 70 70 ... 150 150 ... 250 — — 3TX7 462-3G 3TX7 462-3H 3TX7 462-3J 3TX7 462-3K 3TX7 462-3L
	8 and 12	3TC52 and 3TC56	Varistors For sticking onto the contactor base or for mounting separately	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	— — — — — 3TX7 462-3G 3TX7 462-3H 3TX7 462-3J 3TX7 462-3K 3TX7 462-3L
	8 ... 12	3TC52 and 3TC56	Varistors ³⁾ For separate screw connection or snapping onto 35 mm standard mounting rail	— — —	24 ... 70 70 ... 150 150 ... 250 3TX7 522-3G 3TX7 522-3H 3TX7 522-3J
	14	3TF68 and 3TF69	Varistors ³⁾ For DC economy circuit; for snapping onto the side of auxiliary switches	— — —	24 ... 48 48 ... 127 127 ... 240 3TX7 572-3G 3TX7 572-3H 3TX7 572-3J
Surge suppressors · RC elements					
 3TX7 462-3 . , 3TX7 522-3 .	4	3TC48	RC elements For lateral snapping onto auxiliary switch or TH 35 standard mounting rail	24 ... 48 — 48 ... 127 — 127 ... 240 — 240 ... 400 400 ... 600	— 24 ... 70 — 70 ... 150 — 150 ... 250 — — 3TX7 462-3R 3TX7 522-3R 3TX7 462-3S 3TX7 522-3S 3TX7 462-3T 3TX7 522-3T 3TX7 462-3U 3TX7 462-3V
	6 ... 12	3TC52 and 3TC56	RC elements For lateral snapping onto auxiliary switch or TH 35 standard mounting rail	24 ... 48 48 ... 127 127 ... 240 240 ... 400 400 ... 600	— — — — — 3TX7 522-3R 3TX7 522-3S 3TX7 522-3T 3TX7 522-3U 3TX7 522-3V
	Surge suppressors ⁴⁾ · Diodes				
	6 ... 12	3TC48 ... 3TC56	Diode assemblies (diode and Zener diode) For DC solenoid system, for sticking onto the contactor base or for mounting separately	—	24 ... 250 3TX7 462-3D
	 3TX7 462-3 .				

- 1) The surge suppressor is included in the scope of supply of the following contactors: 3TF68 and 3TF69 (AC operation): varistor circuit.
- 2) The connection piece for mounting the surge suppressor must be bent slightly.
- 3) Includes the peak value of the alternating voltage on the DC side.
- 4) Not for DC economy circuit.

Accessories and Spare Parts

For 3T Contactors and Contactor Relays

Accessories for 3TC, 3TF6 contactors

For contactors		Version	Screw terminals 
Size	Type		Order No.
Solid-state compatible auxiliary switch blocks with screw terminals			
	14	3TF68, 3TF69	3TY7 561-1UA00
	2 and 4	3TC44 ... 3TC48	
		For operation in dusty atmospheres and in solid-state circuits with rated operational currents I_e AC-14 and DC-13 of 1 ... 300 mA at 3 ... 60 V	
		For mounting onto the side of contactors	
		With 1 changeover contact. 2nd auxiliary switch block, left or right (replacement for 3TY6 561-1U, 3TY6 561-1V)	
5TY7 561-1 .			
Coupling links for control by PLC			
14	3TF68, 3TF69	For snapping onto the side of auxiliary switch, with surge suppression. Operating range: 17 V to 30 V DC. Power consumption: 0.5 W at 24 V DC. Fitted with varistor.	3TX7 090-0D
Terminal covers for protection against inadvertent contact with exposed busbar connections			
	14	3TF68 3TF69	3TX7 686-0A 3TX7 696-0A
	Can be screwed onto free screw end on middle connecting bar. 2 units required per contactor. (1 set = 2 units)		
	6	3TC48	M6 3TX6 506-3B
	8		M8 3TX6 526-3B
	10 and 14	3TC52, 3TC56	M10 3TX6 546-3B
		Can be screwed on free screw end. Covers one busbar connection (1 set = 6 units).	
3TX6 526-3B			
Links for paralleling (star jumpers) · 3-pole, without connection terminal¹⁾			
14	3TF68		3TX7 680-0D
Cover plates for links for paralleling			
14	3TF68	A cover plate must be used in order to protect against inadvertent contact with exposed busbar connections (EN 50274).	3TX7 680-0E
Box terminals for laminated copper bars			
Without auxiliary conductor connection (1 set = 3 units)			
14	3TF68	With single covers for protection against inadvertent contact (EN 50274)	3TX7 570-1E
With auxiliary conductor connection (1 set = 3 units)			
14	3TF69	Conductor cross-sections for auxiliary conductors: • Solid 2 x (0.75 ... 2.5) mm ² • Finely stranded with end sleeve 2 x (0.5 ... 2.5) mm ² • Solid or stranded 2 x (18 ... 12) AWG • Tightening torque 0.8 ... 1.4 Nm (7 ... 12 lb.in)	3TX7 690-1F

1) The link for paralleling can be reduced by one pole.

Accessories and Spare Parts

For 3T Contactors and Contactor Relays

Accessories for 3TC, 3TF6 contactors

For contactors		Remarks	Rated control supply voltage U_c	Order No.
Size	Type		V DC	
Arc chutes				
<i>For contactors with extended operating range</i>				
2	3TC44 17-OL . .	With cutout for mounting resistor		3TY2 442-0B
Solenoid coils				
<i>For contactors with extended operating range</i>				
2	3TC44	With series resistor, without varistor	24 110	3TY6 443-0LB4 3TY6 443-0LF4
4	3TC48		24 110	3TY6 483-0LB4 3TY6 483-0LF4
6	3TB50		24 110	3TY6 503-0LB4 3TY6 503-0LF4
8	3TB52 and 3TC52		24 110	3TY6 523-0LB4 3TY6 523-0LF4
10	3TB54		24 110	3TY6 543-0LB4 3TY6 543-0LF4
12	3TB56 and 3TC56		24 110	3TY6 563-0LB4 3TY6 563-0LF4

All spare parts not mentioned above are identical to those for the standard contactors.

Accessories and Spare Parts

For 3T Contactors and Contactor Relays

Spare parts for 3TC contactors



3TY6 561-1A

For contactors		Version		Screw terminals
Size		Type	Auxiliary contacts	Order No.
			NO	NC
Auxiliary switch blocks				
For mounting on the side				
			Left	Right
 3TY6 561-1A	2 and 4	3TC44, 3TC48	Auxiliary switch block (replacement for 3TY6 501-1A/-1B)	
			1	1
	4	3TC48	2nd auxiliary switch block, left ¹⁾	
			1	1
			2nd auxiliary switch block, right ¹⁾	
			1	1
	8 and 12	3TC52, 3TC56	Auxiliary switch block, left	
			1	1
			Auxiliary switch block, right	
			1	1
			2nd auxiliary switch block, left ¹⁾	
			1	1
			2nd auxiliary switch block, right ¹⁾	
			1	1

1) Can only be mounted on AC-operated contactors.

For contactors		Version	Order No.
Size	Type		
Contacts with fixing parts			
	In order to ensure reliable operation of the contactors, only original replacement contacts should be used.		
3TY2 520-0A	2	3TC44	(1 set = 2 moving and 4 fixed switching elements)
	4	3TC48	3TY2 440-0A
	8	3TC52	3TY2 480-0A
	12	3TC56	3TY2 520-0A
			3TY2 560-0A
Arc chutes			
	2	3TC44	Arc chutes, 2-pole
	4	3TC48	3TY2 442-0A
	8	3TC52	3TY2 482-0A
	12	3TC56	3TY2 522-0A
			3TY2 562-0A
3TC2 48			
Solenoid coils			
	DC operation ¹⁾		
	2	3TC44	3TY6 443-0B..
	4	3TC48	3TY6 483-0B..
	8	3TC52	3TY6 523-0B..
	12	3TC56	3TY6 563-0B..
	AC operation ¹⁾		
	2	3TC44	3TY7 403-0A..
	4	3TC48	3TY6 483-0A..
	8	3TC52	3TY6 523-0A..
	12	3TC56	3TY6 566-0A..

1) For rated control supply voltages for solenoid coils see page 2/194. The 10th and 11th digit of the Order No. must be supplemented accordingly.

Accessories and Spare Parts

For 3T Contactors and Contactor Relays

Spare parts for 3TF6, 3TK1 contactors

Selection and ordering data

For contactors		Version			Screw terminals
		Auxiliary contacts			
					
Size	Type	NO	NC	NC	Order No.
Auxiliary switch blocks					
For mounting on the side		Left Right			
	14	3TF68, 3TF69	1st auxiliary switch block (replacement for 3TY7 561-1A/-1B)		3TY7 561-1AA00
			1	1 —	
			1st auxiliary switch block		3TY7 561-1EA00
			1	— 1	
			2nd auxiliary switch block (replacement for 3TY7 561-1K/-1L)		3TY7 561-1KA00
		1	1 —		
For coil reconnection with DC economy circuit					
14	3TF68, 3TF69	—	—	1	3TY7 681-1G

For contactors		Version			Order No.
Size	Type				
Solenoid coils					
AC operation ¹⁾					
	14	3TF68	The solenoid coils are fitted as standard with varistors against overvoltage. The coil is supplied with switch-on electronics.		3TY7 683-0C..
		3TF69			3TY7 693-0C..
DC operation ¹⁾ · DC economy circuit					
	14	3TF68	Reversing contactors are required for size 14 contactors: <u>Contactor type</u> 3TF68 and 3TF69 <u>Reversing contactor type</u> 3TC44 (70 mm wide, 85 mm high)		3TY7 683-0D..
		3TF69			3TY7 693-0D..
The solenoid coils are supplied without reversing contactor.					

Vacuum interrupters					
In order to ensure reliable operation of the contactors, only original replacement interrupters should be used.					
14	3TF68	3 vacuum interrupters with components			3TY7 680-0B
	3TF69				3TY7 690-0B

1) For rated control supply voltages for solenoid coils see page 2/194. The 10th and 11th digit of the Order No. must be supplemented accordingly.

Accessories and Spare Parts

For 3T Contactors and Contactor Relays

Spare parts for 3TF6, 3TK1 contactors

For contactors	Version	Rated control supply voltage U_c	Auxiliary contacts	Order No.
Type		V AC		
Surge suppressors				
3TK10 ... 3TK13	RC elements	24 ... 48 110 ... 415		3TK19 30-0A 3TK19 30-0B
3TK14 ... 3TK17		48 ... 110 220 ... 600		3TK19 34-0C 3TK19 34-0D
Terminal covers				
3TK10, 3TK11 3TK12, 3TK13 3TK14, 3TK15 3TK17	For mounting onto contactors			3TK19 40-0A 3TK19 42-0A 3TK19 44-0A 3TK19 46-0A
Auxiliary switch blocks				
3TK1	For mounting on the side 1st block 1 NO + 1 NC 2nd block 1 NO + 1 NC			3TK19 10-3A 3TK19 10-3B
Locking devices				
3TK10, 3TK11 3TK12, 3TK13	For mechanical interlocking of two identical contactors, auxiliary contacts 2 NC			3TK19 20-0A 3TK19 22-0A
3TK14 ... 3TK17	Mechanical interlock including mounting plate			3TK19 24-0A
Contacts with fixing parts				
3TK10 3TK11 3TK12 3TK13	4 moving and 8 fixed contacts			3TK19 60-0A 3TK19 61-0A 3TK19 62-0A 3TK19 63-0A
3TK14 3TK15 3TK17				3TK19 64-0A 3TK19 65-0A 3TK19 67-0A
Arc chutes				
3TK10 3TK11 3TK12 3TK13	1 arc chute, 4-pole			3TK19 50-0A 3TK19 51-0A 3TK19 52-0A 3TK19 53-0A
3TK14 3TK15 3TK17				3TK19 54-0A 3TK19 55-0A 3TK19 57-0A
Magnetic coils				
AC operation¹⁾				
3TK10, 3TK11 3TK12, 3TK13 3TK14 ... 3TK17				3TK19 70-0A.. 3TK19 72-0A.. 3TK19 74-0A..

1) For rated control supply voltages for solenoid coils see page 2/194. The 10th and 11th digit of the Order No. must be supplemented accordingly.

Accessories and Spare Parts

For 3T Contactors and Contactor Relays

Spare parts for 3TF6, 3TK1 contactors

Rated control supply voltages (the 10th and 11th position of the order number must be changed)

For contactor type	3TC44	3TC48	3TC5	3TF68/69	3TK10/11/12/13
Solenoid coil type	3TY7 403-0A ..	3TY6 483-0A ..	3TY6 523-0A .. 3TY6 566-0A ..	3TY7 683-0C .. 3TY7 693-0C ..	3TK19 70-0A .. 3TK19 72-0A ..
Rated control supply voltage U_s					

AC operation

Solenoid coils for 50 Hz

24 V AC	B0	B0	—	—	B0 ³⁾
110 V AC	F0	F0	F0	—	F0 ³⁾
230/220 V AC	P0 ¹⁾	P0 ¹⁾	P0 ¹⁾	—	P0 ³⁾
240 V AC	U0	U0	—	—	U0 ³⁾

AC operation

Solenoid coils for 50/60 Hz

24 V AC	C2	—	—	—	—
110 V AC	G2	—	—	—	—
120 V AC	K2	—	—	—	—
220 V AC	N2	—	—	—	—
230 V AC	L2	—	—	—	—
110 ... 132 V AC	—	—	—	F7	—
200 ... 240 V AC	—	—	—	M7	—
230 ... 277 V AC	—	—	—	P7 ²⁾	—
380 ... 460 V AC	—	—	—	Q7	—
500 ... 600 V AC	—	—	—	S7	—

For contactor type	3TC4	3TB5, 3TC5	3TF68/69
Solenoid coil type	3TY6 443-0B .. 3TY6 483-0B ..	3TY6 503-0B .. 3TY6 523-0B .. 3TY6 543-0B .. 3TY6 563-0B ..	3TY7 683-0D .. 3TY7 693-0D ..
Rated control supply voltage U_s			

DC operation

24 V DC	B4	B4	B4
48 V DC	W4	—	—
60 V DC	E4	—	—
110 V DC	F4	F4	F4
125 V DC	G4	—	G4
220 V DC	M4	M4	M4
230 V DC	P4	—	P4

- Operating range at 220 V:
0.85 to 1.15 x U_s ;
lower operating range limit according to IEC 60947.
- Lower operating range limit at 220 V:
0.85 x U_s according to IEC 60947.
- Rated control supply voltage U_s :

50 Hz	60 Hz
B0: 24 V	—
F0: 110 V	120 V
P0: 220 V to 230 V	240 V (only 3TK1 974)
U0: 230 V to 240 V	—

SIRIUS 3RW Soft Starters



3/2	Introduction
3/3	SIRIUS 3RW Soft Starters
3/3	General data <u>3RW30, 3RW40</u> <u>for Standard Applications</u>
3/6	3RW30
3/16	3RW40 <u>3RW44</u> <u>for High-Feature Applications</u>
3/32	3RW44

SIRIUS 3RW Soft Starters

Introduction

Overview



3RW30



3RW40



3RW44

			Order No.	Page
3RW soft starters				
3RW soft starters for Standard applications				
3RW30 soft starters	• SIRIUS 3RW30 soft starters for soft starting of three-phase asynchronous motors • Performance range of up to 55 kW (at 400 V)		3RW30	3/6
3RW40 soft starters	• SIRIUS 3RW40 soft starters with the integral functions - Solid-state motor overload and intrinsic device protection and - Adjustable current limiting - for the soft starting and stopping of three-phase asynchronous motors • Performance range of up to 250 kW (at 400 V)		3RW40	3/16
3RW soft starters for High-Feature applications				
3RW44 soft starters	• In addition to soft starting and soft ramp-down, the SIRIUS 3RW44 solid-state soft starters provide numerous functions for higher-level requirements • Performance range - Up to 710 kW (at 400 V) in inline circuit and - Up to 1200 kW (at 400 V) in inside-delta circuit		3RW44	3/32

SIRIUS 3RW soft starters

SIRIUS 3RW soft starters permit soft starting and smooth rampdown of three-phase asynchronous motors. Depending on the scope of functions required it is possible to choose between:

- Soft starters for Standard applications
- Soft starters for High-Feature applications

SIRIUS 3RW – Service-proven in many applications

Functions of the SIRIUS soft starters include:

- Soft starting and smooth ramp-down
- Stepless starting
- Torque control and limitation

Cost-efficient operation

The advantages of SIRIUS soft starters at a glance:

- Reduction of current peaks
- Avoidance of mains voltage fluctuations during starting
- Reduced load on the power supply network
- Reduction of the mechanical load in the operating mechanism
- Considerable space savings and reduced wiring compared with conventional starters
- Maintenance-free switching
- Very easy handling
- Fits perfectly in the SIRIUS modular system

Overview



		SIRIUS 3RW30 Standard applications	SIRIUS 3RW40 Standard applications	SIRIUS 3RW44 High-Feature applications
Rated current at 40 °C	A	3 ... 106	12.5 ... 432	29 ... 1214
Rated operational voltage	V	200 ... 480	200 ... 600	200 ... 690
Motor rating at 400 V				
• Inline circuit	kW	1.5 ... 55	5.5 ... 250	15 ... 710
• Inside-delta circuit	kW	--	--	22 ... 1 200
Ambient temperature	°C	-25 ... +60	-25 ... +60	0 ... +60
Soft starting/ramp-down		✓ ¹⁾	✓	✓
Voltage ramp		✓	✓	✓
Starting/stopping voltage	%	40 ... 100	40 ... 100	20 ... 100
Starting and ramp-down time	s	0 ... 20 ¹⁾	0 ... 20	1 ... 360
Torque control	--	--	--	--
Starting/stopping torque	%	--	--	20 ... 100
Torque limit	%	--	--	20 ... 200
Ramp time	s	--	--	1 ... 360
Integral bypass contact system		✓	✓	✓
Intrinsic device protection		--	✓	✓
Motor overload protection		--	✓ ⁷⁾	✓
Thermistor motor protection		--	✓ ²⁾	✓
Integrated remote RESET		--	✓ ³⁾	✓
Adjustable current limiting		--	✓	✓
Inside-delta circuit		--	--	✓
Breakaway pulse		--	--	✓
Creep speed in both directions of rotation		--	--	✓
Pump ramp-down		--	--	✓ ⁴⁾
DC braking		--	--	✓ ⁴⁾ 5)
Combined braking		--	--	✓ ⁴⁾ 5)
Motor heating		--	--	✓
Communication		--	--	With PROFIBUS DP (optional)
External display and operator module		--	--	(optional)
Operating measured value display		--	--	✓
Error logbook		--	--	✓
Event list		--	--	✓
Slave pointer function		--	--	✓
Trace function		--	--	✓ ⁶⁾
Programmable control inputs and outputs		--	--	✓
Number of parameter sets		1	1	3
Parameterization software (Soft Starter ES)		--	--	✓
Power semiconductors (thyristors)		2 controlled phases	2 controlled phases	3 controlled phases
Screw terminals		✓	✓	✓
Spring-type terminals		✓	✓	✓
UL/CSA		✓	✓	✓
CE marking		✓	✓	✓
Soft starting under heavy starting conditions		--	--	✓ ⁴⁾

Configuring support

Win-Soft Starter, nearest Siemens sales office

✓ Function is available.

-- Function not available.

1) Only soft starting available for 3RW30.

2) Optional up to size S3 (device variant).

3) Available for 3RW40 2. to 3RW40 4.; optional for 3RW40 5. and 3RW40 7..

4) Calculate soft starter and motor with size allowance where required.

5) Not possible in inside-delta circuit.

6) Trace function with Soft Starter ES software.

7) When using the motor overload protection according to ATEX, an upstream contactor is required.

You can find further information on the Internet at:

www.siemens.com/softstarter

SIRIUS 3RW Soft Starters

General data

Selection aid for soft starters



Application	SIRIUS 3RW30 Standard applications	SIRIUS 3RW40 Standard applications	SIRIUS 3RW44 High-Feature applications
Normal starting (CLASS 10)			
Pumps	●	●	●
Pumps with special pump ramp-down (to prevent water hammer)			●
Heat pumps	●	●	●
Hydraulic pumps	○	●	●
Presses	○	●	●
Conveyor belts	○	●	●
Roller conveyors	○	●	●
Screw conveyors	○	●	●
Escalators		●	●
Piston compressors		●	●
Screw compressors		●	●
Small fans ¹⁾		●	●
Centrifugal blowers		●	●
Bow thrusters			
Heavy starting (CLASS 20)			
Stirrer			●
Extruders			●
Lathes			●
Milling machines			●
Very heavy starting (CLASS 30)			
Large fans ²⁾			●
Circular saws/bandsaws			●
Centrifuge			●
Mills			●
Breakers			●

● Recommended soft starter

○ Possible soft starter

1) The mass inertia of the fan is <10 times the mass inertia of the motor.

2) The mass inertia of the fan is ≥10 times the mass inertia of the motor.

Boundary conditions

Type	Maximum starting time	Current limiting	Starts per hour
	s	%	1/h
Normal starting (CLASS 10)			
• 3RW30	3	300	20
• 3RW40/44	10	300	5
Heavy starting (CLASS 20)			
• 3RW40 2., 3RW40 3., 3RW40 4.	20	300	5
• 3RW40 5., 3RW40 7., 3RW44	40	350	1
Very heavy starting (CLASS 30)			
• 3RW44	60	350	1

The motor ratings listed in the Selection and ordering data are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor. The 3RW soft starters are designed for easy starting conditions. In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding.

Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

Motor rating data are based on DIN 42973 (kW) and NEC 96/UL508 (hp).

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th		8th	9th	10th	11th	12th		13th	14th	15th	16th
	☐ ☐ ☐	☐	☐	☐	☐	-	☐	☐	☐	☐	☐	-	☐	☐	☐	☐
Soft starters	3	R	W													
SIRIUS soft starter generation			☐	☐												
Size					☐											
Rated operational current I_e						☐										
Connection type (screw terminals / spring-type terminals)							☐									
Soft starter functionality (bypass, thermistor, etc.)								☐	☐							
Rated control supply voltage U_s										☐						
Rated operational voltage U_e											☐					
Special versions													☐	☐	☐	☐
Example	3	R	W	4	0	2	4	-	1	B	B	1	4			

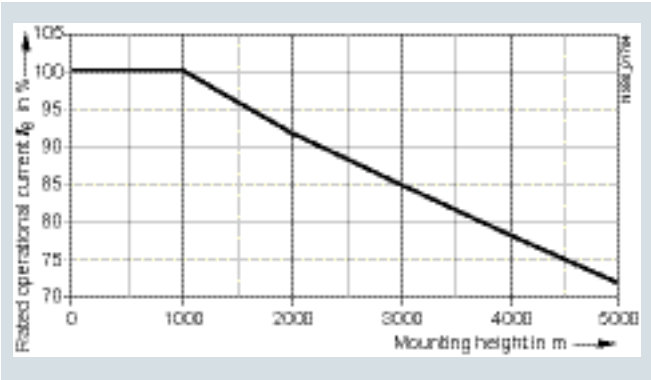
Note:
The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.
For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Benefits

- The advantages of the SIRIUS soft starters at a glance:
- Soft starting and smooth ramp-down (only soft starting available for 3RW30)
 - Stepless starting
 - Reduction of current peaks
 - Avoidance of mains voltage fluctuations during starting
 - Reduced load on the power supply network
 - Reduction of the mechanical load in the operating mechanism
 - Considerable space savings and reduced wiring compared with conventional starters
 - Maintenance-free switching
 - Very easy handling
 - Fits perfectly in the SIRIUS modular system

Technical specifications

Permissible installation altitude



At an installation altitude above 2 000 m, the max. permissible operational voltage is reduced to 460 V.

Overview

The SIRIUS 3RW30 soft starters reduce the motor voltage through variable phase control and increase it in ramp-like mode from a selectable starting voltage up to mains voltage. During starting, these devices limit the torque as well as the current and prevent the shocks which arise during direct starts or star-delta starts. In this way, mechanical loads and mains voltage dips can be reliably reduced.

Soft starting reduces the stress on the connected equipment and results in lower wear and therefore longer periods of troublefree production. The selectable start value means that the soft starters can be adjusted individually to the requirements of the application in question and unlike star-delta starters are not restricted to two-stage starting with fixed voltage ratios.

The SIRIUS 3RW30 soft starters are characterized above all by their small space requirements. Integrated bypass contacts mean that no power loss has to be taken into the bargain at the power semiconductors (thyristors) after the motor has started up. This cuts down on heat losses, enabling a more compact design and making external bypass circuits superfluous.

Various versions of the SIRIUS 3RW30 soft starters are available:

- Standard version for fixed-speed three-phase motors, sizes S00, S0, S2 and S3, with integrated bypass contact system
- Version for fixed-speed three-phase motors in a 22.5 mm enclosure without bypass

Soft starters rated up to 55 kW (at 400 V) for standard applications in three-phase networks are available. Extremely small sizes, low power losses and simple commissioning are just three of the many advantages of this soft starter.

Functionality

The space required by the compact SIRIUS 3RW30 soft starter is often only about one third of that required by a contactor assembly for star-delta starting of comparable rating. This not only saves space in the control cabinet and on the standard mounting rail but also does away completely with the wiring work needed for wye-delta starters. This is notable in particular for higher motor ratings which are only rarely available as fully wired solutions.

At the same time the number of cables from the starter to the motor is reduced from six to three. Compact dimensions, short start-up times, easy wiring and fast commissioning make themselves felt as clear-cut cost advantages.

The bypass contacts of these soft starters are protected during operation by an integrated solid-state arc quenching system. This prevents damage to the bypass contacts in the event of a fault, e. g. brief disconnection of the control voltage, mechanical shocks or life-related component defects on the coil operating mechanism or main contact spring.

The new series of devices comes with the "polarity balancing" control method, which is designed to prevent direct current components in two-phase controlled soft starters. On two-phase controlled soft starters the current resulting from superimposition of the two controlled phases flows in the uncontrolled phase. This results for physical reasons in an asymmetric distribution of the three phase currents during the motor ramp-up. This phenomenon cannot be influenced, but in most applications it is non-critical.

Controlling the power semiconductors results not only in this asymmetry, however, but also in the previously mentioned direct current components which can cause severe noise generation on the motor at starting voltages of less than 50 %. The control method used for these soft starters eliminates these direct current components during the ramp-up phase and prevents the braking torque which they can cause.

It creates a motor ramp-up that is uniform in speed, torque and current rise, thus permitting a particularly gentle, two-phase starting of the motors. At the same time the acoustic quality of the starting operation comes close to the quality of a three-phase controlled soft starter. This is made possible by the ongoing dynamic harmonizing and balancing of current half-waves of different polarity during the motor ramp-up. Hence the name "polarity balancing".

- Soft starting with voltage ramp; the starting voltage setting range U_s is 40 to 100 % and the ramp time t_R can be set from 0 to 20 s.
- Integrated bypass contact system to minimize power loss
- Setting with two potentiometers
- Simple mounting and commissioning
- Mains voltages 50/60 Hz, 200 to 480 V
- Two control voltage versions 24 V AC/DC and 110 to 230 V AC/DC
- Wide temperature range from -25 to +60 °C
- The built-in auxiliary contact ensures user-friendly control and possible further processing within the system ([for status graphs see page 3/15](#))

Application

The 3RW30 soft starters are suitable for soft starting of three-phase asynchronous motors.

Due to two-phase control, the current is kept at minimum values in all three phases throughout the entire starting time. Due to continuous voltage influencing, the current and torque peaks which are unavoidable in the case of star-delta starters for instance do not occur.

Application areas

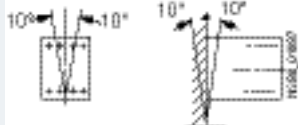
See "[Selection aid for soft starters](#)" on page 3/4.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW30

Technical specifications

Type		3RW30 1.	3RW30 2.	3RW30 3.	3RW30 4.
Mechanics and environment					
Mounting dimensions (WxHxD) • Screw terminals • Spring-type terminals		mm	45 x 95 x 151	45 x 125 x 151	55 x 144 x 168
		mm	45 x 117.2 x 151	45 x 150 x 151	55 x 144 x 168
Permissible ambient temperature					
Operation	°C	-25 ... +60; (derating from +40)			
Storage	°C	-40 ... +80			
Weight	kg	0.58	0.69	1.20	1.71
Permissible mounting position¹⁾ (auxiliary fan not available)					
Installation type¹⁾	Stand-alone installation				
Permissible installation altitude	m	5000 (derating from 1000, see characteristic curve page 3/5); higher on request			
Degree of protection		IP20		IP00	

1) In case of deviations, please note derating
(see Manual in Chapter "Configuration").

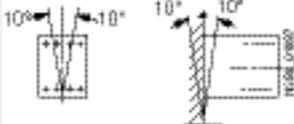
Type		3RW30 1. to 3RW30 4.
Control electronics		
Rated values	Terminal	
Rated control supply voltage	A1/A2 V	24 110 ... 230
• Tolerance	%	±20 -15/+10
Rated frequency	Hz	50/60
• Tolerance	%	±10

Type		3RW30 1. to 3RW30 4.
Power electronics		
Rated operational voltage	V AC	200 ... 480
Tolerance	%	-15/+10
Rated frequency	Hz	50/60
Tolerance	%	±10
Uninterrupted duty at 40 °C (% of I _e)	%	115
Minimum load (% of I _e)	%	10 (at least 2 A)
Maximum cable length between soft starter and motor	m	300

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW30

Type		3RW30 03-1CB54	3RW30 03-2CB54	
Mechanics and environment				
Mounting dimensions (WxHxD)				
• Screw terminals				mm
• Spring-type terminals				mm
		22.5 x 100 x 120	–	
		–	22.5 x 101.6 x 120	
Permissible ambient temperature				
Operation	°C	-25 ... +60; (derating from +40)		
Storage	°C	-40 ... +80		
Weight	kg	0.207	0.188	
Permissible mounting position				
Permissible installation altitude		m	5000 (derating from 1000, see characteristic curve page 3/5); higher on request	
Degree of protection acc. to IEC 60529		IP20 (IP00 terminal compartment)		
Control electronics				
Rated values				
Rated control supply voltage	V	24 ... 230 AC/DC		
• Tolerance	%	± 10		
Rated frequency at AC	Hz	50/60		
• Tolerance	%	± 10		
Power electronics				
Rated operational voltage	V AC	200 ... 400		
Tolerance	%	± 10		
Rated frequency	Hz	50/60		
Tolerance	%	±10		
Uninterrupted duty (% of Ie)	%	100		
Minimum load ¹⁾ (% of Ie); at 40 °C	%	9		
Maximum conductor length between soft starter and motor	m	100 ²⁾		

- 1) The rated motor current (specified on the motor's name plate) should at least amount to the specified percentage of the SIRIUS soft starter unit's rated operational current I_e.
- 2) If this value is exceeded, problems with line capacities may arise, which can result in false firing.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW30

Motor feeders with soft starters

The type of coordination to which the motor feeder with soft starter is mounted depends on the application-specific requirements. Normally, fuseless mounting (combination of motor starter protector/circuit breaker and soft starter) is sufficient.

If type of coordination "2" is to be fulfilled, semiconductor fuses must be fitted in the motor feeder.



Type of coordination "1" according to IEC 60947-4-1: After a short-circuit incident the unit is defective therefore unsuitable for further use (protection of persons and equipment guaranteed).

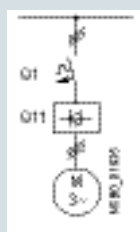


Type of coordination "2" according to IEC 60947-4-1: After a short-circuit incident the unit is suitable for further use (protection of persons and equipment guaranteed).

The type of coordination refers to soft starters in combination with the stipulated protective device (motor starter protector/circuit breaker/fuse), not to any additional components in the feeder.

The types of coordination are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Fuseless version



Soft starters		Motor starter protectors ¹⁾		
Q11	Rated current	400 V +10 %		
	A	Type	$I_{q \max}$ kA	Rated current A
Type of coordination "1"				
3RW30 03	3	3RV20 11-1EA..	50	4
3RW30 13	3.6	3RV20 11-1FA..	5	5
3RW30 14	6.5	3RV20 11-1HA..	5	8
3RW30 16	9	3RV20 11-1JA..	5	10
3RW30 17	12.5	3RV20 11-1KA..	5	12.5
3RW30 18	17.6	3RV20 21-4BA..	5	20
3RW30 26	25	3RV20 21-4DA..	55	25
3RW30 27	32	3RV20 21-4EA..	55	32
3RW30 28	38	3RV20 21-4FA..	55	40
3RW30 36	45	3RV10 31-4GA10	20	45
3RW30 37	63	3RV10 41-4JA10	20	63
3RW30 38	72	3RV10 41-4KA10	20	75
3RW30 46	80	3RV10 41-4LA10	11	90
3RW30 47	106	3RV10 41-4MA10	11	100

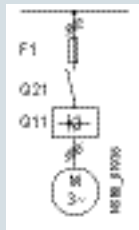
1) The rated motor current must be considered when selecting the devices.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW30

Fused version (line protection only)



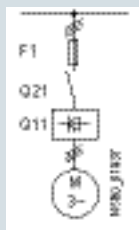
Soft starters		Line fuses, maximum			Line contactors (optional)
Q11 Type	Rated current A	F1 Type	Rated current A	Size	Q21
Type of coordination "1": $I_q = 65 \text{ kA at } 480 \text{ V} + 10 \%$					
3RW30 03 ²⁾	3	3NA3 805 ³⁾	20	000	3RT10 15
3RW30 13	3.6	3NA3 803-6	10	000	3RT10 15
3RW30 14	6.5	3NA3 805-6	16	000	3RT10 15
3RW30 16	9	3NA3 807-6	20	000	3RT10 16
3RW30 17	12.5	3NA3 810-6	25	000	3RT10 24
3RW30 18	17.6	3NA3 814-6	35	000	3RT10 26
3RW30 26	25	3NA3 822-6	63	00	3RT10 26
3RW30 27	32	3NA3 824-6	80	00	3RT10 34
3RW30 28	38	3NA3 824-6	80	00	3RT10 35
3RW30 36	45	3NA3 130-6	100	1	3RT10 36
3RW30 37	63	3NA3 132-6	125	1	3RT10 44
3RW30 38	72	3NA3 132-6	125	1	3RT10 45
3RW30 46	80	3NA3 136-6	160	1	3RT10 45
3RW30 47	106	3NA3 136-6	160	1	3RT10 46

1) The type of coordination "1" refers to soft starters in combination with the stipulated fuse, not to any additional components in the feeder.

2) $I_q = 50 \text{ kA at } 400 \text{ V}$.

3) 3NA3 805-1 (NH00), 5SB2 61 (DIAZED), 5SE2 201-6 (NEOZED).

Fused version with 3NE1 SITOR fuses (semiconductor and line protection)



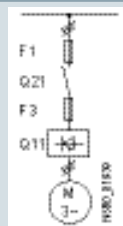
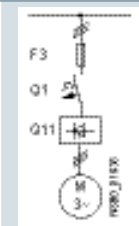
Soft starters		All-range fuses			Line contactors (optional)
Q11 Type	Rated current A	F1 Type	Rated current A	Size	Q21
Type of coordination "2": $I_q = 65 \text{ kA at } 480 \text{ V} + 10 \%$					
3RW30 03 ²⁾	3	3NE1 813-0 ³⁾	16	000	3RT10 15
3RW30 13	3.6	3NE1 813-0	16	000	3RT10 15
3RW30 14	6.5	3NE1 813-0	16	000	3RT10 15
3RW30 16	9	3NE1 813-0	16	000	3RT10 16
3RW30 17	12.5	3NE1 813-0	16	000	3RT10 24
3RW30 18	17.6	3NE1 814-0	20	000	3RT10 26
3RW30 26	25	3NE1 803-0	35	000	3RT10 26
3RW30 27	32	3NE1 020-2	80	00	3RT10 34
3RW30 28	38	3NE1 020-2	80	00	3RT10 35
3RW30 36	45	3NE1 020-2	80	00	3RT10 36
3RW30 37	63	3NE1 820-0	80	000	3RT10 44
3RW30 38	72	3NE1 820-0	80	000	3RT10 45
3RW30 46	80	3NE1 021-0	100	00	3RT10 45
3RW30 47	106	3NE1 022-0	125	00	3RT10 46

1) The type of coordination "2" refers to soft starters in combination with the stipulated fuse, not to any additional components in the feeder.

2) $I_q = 50 \text{ kA at } 400 \text{ V}$.

3) No SITOR fuse required!
Alternatively: 3NA3 803 (NH00), 5SB2 21 (DIAZED), 5SE2 206 (NEOZED).

Fused version with 3NE3 SITOR fuses (semiconductor protection by fuse, line and overload protection by motor starter protector; alternatively, installation with contactor and overload relay possible)



Soft starters 		Semiconductor fuses, minimum			Semiconductor fuses, maximum			Semiconductor fuses, minimum		
	Rated current		Rated current	Size		Rated current	Size		Rated current	Size
	F3 Type	A	F3 Type	A		F3 Type	A		F3 Type	A
Q11 Type	A	Type	A		Type	A		Type	A	
Type of coordination "2" ¹⁾ : I _q = 65 kA at 480 V + 10 %										
3RW30 03 ²⁾	3	—	—	—	—	—	—	—	—	—
3RW30 13	3.6	—	—	—	—	—	—	3NE4 101	32	0
3RW30 14	6.5	—	—	—	—	—	—	3NE4 101	32	0
3RW30 16	9	—	—	—	—	—	—	3NE4 101	32	0
3RW30 17	12.5	—	—	—	—	—	—	3NE4 101	32	0
3RW30 18	17.6	—	—	—	3NE3 221	100	1	3NE4 101	32	0
3RW30 26	25	—	—	—	3NE3 221	100	1	3NE4 102	40	0
3RW30 27	32	—	—	—	3NE3 222	125	1	3NE4 118	63	0
3RW30 28	38	—	—	—	3NE3 222	125	1	3NE4 118	63	0
3RW30 36	45	—	—	—	3NE3 224	160	1	3NE4 120	80	0
3RW30 37	63	—	—	—	3NE3 225	200	1	3NE4 121	100	0
3RW30 38	72	3NE3 221	100	1	3NE3 227	250	1	—	—	—
3RW30 46	80	3NE3 222	125	1	3NE3 225	200	1	—	—	—
3RW30 47	106	3NE3 224	160	1	3NE3 231	350	1	—	—	—

Soft starters 		Semiconductor fuses, max.			Semiconductor fuses, min.			Semiconductor fuses, max.			Cylindrical fuses	
	Rated current		Rated current	Size		Rated current	Size		Rated current	Size		Rated current
Q11 Type	A	F3 Type	A		F3 Type	A		F3 Type	A		F3 Type	A
Type of coordination "2" ¹⁾ : I _q = 65 kA at 480 V + 10 %												
3RW30 03 ²⁾	3	—	—	—	3NE8 015-1	25	00	3NE8 015-1	25	00	3NC1 010	10
3RW30 13	3.6	—	—	—	3NE8 015-1	25	00	3NE8 015-1	25	00	3NC2 220	20
3RW30 14	6.5	—	—	—	3NE8 015-1	25	00	3NE8 015-1	25	00	3NC2 220	20
3RW30 16	9	—	—	—	3NE8 015-1	25	00	3NE8 015-1	25	00	3NC2 220	20
3RW30 17	12.5	—	—	—	3NE8 015-1	25	00	3NE8 018-1	63	00	3NC2 250	50
3RW30 18	17.6	—	—	—	3NE8 003-1	35	00	3NE8 021-1	100	00	3NC2 263	63
3RW30 26	25	3NE4 117	50	0	3NE8 017-1	50	00	3NE8 021-1	100	00	3NC2 263	63
3RW30 27	32	3NE4 118	63	0	3NE8 018-1	63	00	3NE8 022-1	125	00	3NC2 280	80
3RW30 28	38	3NE4 118	63	0	3NE8 020-1	80	00	3NE8 022-1	125	00	3NC2 280	80
3RW30 36	45	3NE4 120	80	0	3NE8 020-1	80	00	3NE8 024-1	160	00	3NC2 280	80
3RW30 37	63	3NE4 121	100	0	3NE8 021-1	100	00	3NE8 024-1	160	00	—	—
3RW30 38	72	—	—	—	3NE8 022-1	125	00	3NE8 024-1	160	00	—	—
3RW30 46	80	—	—	—	3NE8 022-1	125	00	3NE8 024-1	160	00	—	—
3RW30 47	106	—	—	—	3NE8 024-1	160	00	3NE8 024-1	160	00	—	—

Soft starters 	Rated current	Line contactors (optional)	Motor starter protectors		Line fuses, maximum		
			400 V +10 %	Rated current		Rated current	Size
Q11 Type	A	Q21	Q1 Type	A	F1 Type	A	
Type of coordination "2" ¹⁾ : I _q = 65 kA at 480 V + 10 %							
3RW30 03 ²⁾	3	3RT10 15	3RV20 11-1EA..	4	3NA3 805 ³⁾	20	000
3RW30 13	3.6	3RT10 15	3RV20 11-1FA..	5	3NA3 803-6	10	000
3RW30 14	6.5	3RT10 15	3RV20 11-1HA..	8	3NA3 805-6	16	000
3RW30 16	9	3RT10 16	3RV20 11-1JA..	10	3NA3 807-6	20	000
3RW30 17	12.5	3RT10 24	3RV20 11-1KA..	12.5	3NA3 810-6	25	000
3RW30 18	17.6	3RT10 26	3RV20 21-4BA..	20	3NA3 814-6	35	000
3RW30 26	25	3RT10 26	3RV20 21-4DA..	25	3NA3 822-6	63	00
3RW30 27	32	3RT10 34	3RV20 21-4EA..	32	3NA3 824-6	80	00
3RW30 28	38	3RT10 35	3RV20 21-4FA..	40	3NA3 824-6	80	00
3RW30 36	45	3RT10 36	3RV10 31-4GA10	45	3NA3 130-6	100	1
3RW30 37	63	3RT10 44	3RV10 41-4JA10	63	3NA3 132-6	125	1
3RW30 38	72	3RT10 45	3RV10 41-4KA10	75	3NA3 132-6	125	1
3RW30 46	80	3RT10 45	3RV10 41-4LA10	90	3NA3 136-6	160	1
3RW30 47	106	3RT10 46	3RV10 41-4MA10	100	3NA3 136-6	160	1

1) The type of coordination "2" refers to soft starters in combination with the stipulated protective device (motor starter protector/fuse), not to any additional components in the feeder.

2) I_q = 50 kA at 400 V.

3) 3NA3 805-1 (NH00), 5SB2 61 (DIAZED).

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW30

Selection and ordering data



3RW30 1.



3RW30 2.



3RW30 3.



3RW30 4.



3RW30 03-2CB54

3RW ambient temperature 40 °C ¹⁾				3RW ambient temperature 50 °C ¹⁾					Size	Order No.
Rated values of induction motors				Rated values of induction motors						
Operational current I_e	Rating at operational voltage U_e			Operational current I_e	Rating at operational voltage U_e					
	230 V	400 V	500 V		200 V	230 V	460 V	575 V		
A	kW	kW	kW	A	hp	hp	hp	hp		
Rated operational voltage U_e 200 ... 480 V										
• With screw terminals										
3.6	0.75	1.5	—	3	0.5	0.5	1.5	—	S00	3RW30 13-1BB□4
6.5	1.5	3	—	4.8	1	1	3	—	S00	3RW30 14-1BB□4
9	2.2	4	—	7.8	2	2	5	—	S00	3RW30 16-1BB□4
12.5	3	5.5	—	11	3	3	7.5	—	S00	3RW30 17-1BB□4
17.6	4	7.5	—	17	3	3	10	—	S00	3RW30 18-1BB□4
• With spring-type terminals										
3.6	0.75	1.5	—	3	0.5	0.5	1.5	—	S00	3RW30 13-2BB□4
6.5	1.5	3	—	4.8	1	1	3	—	S00	3RW30 14-2BB□4
9	2.2	4	—	7.8	2	2	5	—	S00	3RW30 16-2BB□4
12.5	3	5.5	—	11	3	3	7.5	—	S00	3RW30 17-2BB□4
17.6	4	7.5	—	17	3	3	10	—	S00	3RW30 18-2BB□4
• With screw terminals										
25	5.5	11	—	23	5	5	15	—	S0	3RW30 26-1BB□4
32	7.5	15	—	29	7.5	7.5	20	—	S0	3RW30 27-1BB□4
38	11	18.5	—	34	10	10	25	—	S0	3RW30 28-1BB□4
• With spring-type terminals										
25	5.5	11	—	23	5	5	15	—	S0	3RW30 26-2BB□4
32	7.5	15	—	29	7.5	7.5	20	—	S0	3RW30 27-2BB□4
38	11	18.5	—	34	10	10	25	—	S0	3RW30 28-2BB□4
• With screw or spring-type terminals										
45	11	22	—	42	10	15	30	—	S2	3RW30 36-□BB□4
63	18.5	30	—	58	15	20	40	—	S2	3RW30 37-□BB□4
72	22	37	—	62	20	20	40	—	S2	3RW30 38-□BB□4
• With screw or spring-type terminals										
80	22	45	—	73	20	25	50	—	S3	3RW30 46-□BB□4
106	30	55	—	98	30	30	75	—	S3	3RW30 47-□BB□4
Order No. supplement for connection types										
• With screw terminals										
• With spring-type terminals ²⁾										
Order No. supplement for rated control supply voltage U_c										
• 24 V AC/DC										
• 110 ... 230 V AC/DC										

1

2

0

1

Soft starters for easy starting conditions and high switching frequency,
rated operational voltage U_e 200 ... 400 V,
rated control supply voltage U_c 24 ... 230 V AC/DC

3	0.55	1.1	—	2.6	0.5	0.5	—	—	22.5 mm	3RW30 03-1CB54 3RW30 03-2CB54
• With screw terminals										
• With spring-type terminals										

1) Stand-alone installation.

2) Main circuit connection: screw terminals.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW30 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were

determined for the following boundary conditions (see also the notes on page 3/4):

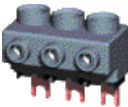
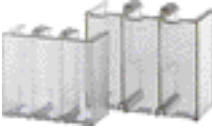
- Maximum starting time in s: 3
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 20

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW30

Accessories

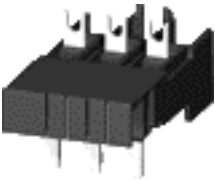
	Conductor cross-section		Tightening torque	For soft starters size	Order No.
	Solid or stranded	Finely stranded with end sleeve			
	mm ²	mm ²	Nm		
Three-phase feeder terminals					
	2.5 ... 16	2.5 ... 16	10 ... 4	3 ... 4	S00 (3RW30 1.), S0 (3RW30 2.)
					3RV29 25-5AB
	For soft starters Type	Size			Order No.
Auxiliary terminals					
Auxiliary terminals, 3-pole					
	3RW30 4 .	S3			3RT19 46-4F
Covers for soft starters					
	Terminal covers for box terminals				
	Additional touch protection to be fitted at the box terminals (2 units required per device)				
	3RW30 3 .	S2			3RT19 36-4EA2
	3RW30 4 .	S3			3RT19 46-4EA2
	Terminal covers for cable lugs and busbar connections				
	For complying with the phase clearances and as touch protection if box terminal is removed (2 units required per contactor)				
	3RW30 4 .	S3			3RT19 46-4EA1
Manuals 3RW30/3RW40¹⁾					
	3RW30 1 .	S00			3ZX10 12-0RW30-1AB1
	3RW30 2 .	S0			
	3RW30 3 .	S2			
	3RW30 4 .	S3			
Operating instructions¹⁾					
	3RW30 1 .	S00			3ZX10 12-0RW30-2DA1
	3RW30 2 .	S0			
	3RW30 3 .	S2			
	3RW30 4 .	S3			

1) The operating instructions are included in the scope of supply of the soft starter or are available – like the manual – as a PDF download from the Service&Support portal at www.siemens.com/industrial-controls/support —> SIRIUS 3RW Soft Starters.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

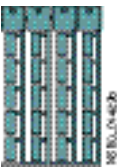
3RW30

For soft starters		Motor starter protectors		Order No.
Type	Size	Size		
Link modules to motor starter protectors ¹⁾				
	• With screw terminals			
	3RW30 1.	S00	S00	3RA29 21-1BA00
	3RW30 2.	S0	S00/S0	3RA29 21-1BA00
	3RW30 36.	S2	S2	3RA19 31-1AA00
	3RW30 46., 3RW30 47.	S3	S3	3RA19 41-1AA00
	• With spring-type terminals			
	3RW30 1.	S00	S00	3RA29 11-2GA00
	3RW30 2.	S0	S0	3RA29 21-2GA00

1) Can be used in size S0 up to maximum 32 A.
Can be used in size S00/S0 only for 3RV2 motor starter protectors.

Version		Functionality Functions	Order No.
Covers and push-in lugs (only for 3RW30 03)			
	Sealable covers		3RP1 902
	For securing against unauthorized adjustment of setting knobs		
	Push-in lugs		3RP1 903
	For screw fixing		

Version		Order No.
Tool for opening spring-type terminals for sizes S00 and S0		
	Screwdrivers For all SIRIUS devices with spring-type terminals length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	Spring-type terminals 
		3RA29 08-1A

Blank labels			
	Unit labeling plates¹⁾		3RT19 00-1SB20
	For SIRIUS devices 20 mm x 7 mm, pastel turquoise		

More information

Application examples for normal starting (CLASS 10)

Normal starting CLASS 10 (up to 20 s with 300 % I_n motor)

The soft starter rating can be selected to be as high as the rating of the motor used

Application	Conveyor belt	Roller conveyor	Compressor	Small fan ¹⁾	Pump	Hydraulic pump
Starting parameters						
• Voltage ramp and current limiting						
- Starting voltage %	70	60	50	40	40	40
- Starting time s	10	10	20	20	10	10

1) The mass inertia of the fan is <10 times the mass inertia of the motor.

Note:

These tables present sample set values and device sizes. They are intended only for the purposes of information and are not binding. The set values depend on the application in question and must be optimized during commissioning.

The soft starter dimensions should be checked where necessary with the Win-Soft Starter software or with the help of Technical Assistance.

Configuration

The 3RW solid-state motor controllers are designed for easy starting conditions. In the event of deviating conditions or increased switching frequency, it may be necessary to choose a larger device. For accurate dimensioning, use the Win-Soft Starter selection and simulation program.

If necessary, an overload relay for heavy starting must be selected where long starting times are involved. PTC sensors are recommended.

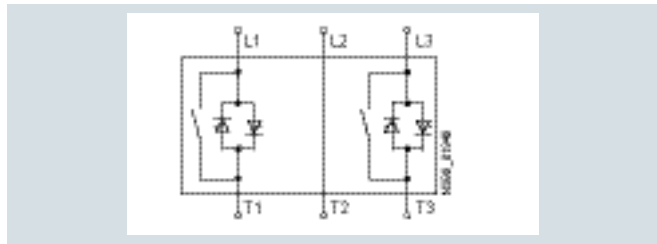
No capacitive elements are permitted in the motor feeder between the SIRIUS 3RW soft starter and the motor (e. g. no reactive-power compensation equipment). In addition, neither static systems for reactive-power compensation nor dynamic PFC (Power Factor Correction) must be operated in parallel during starting and ramp-down of the soft starter. This is important to prevent faults arising on the compensation equipment and/or the soft starter.

All elements of the main circuit (such as fuses, controls and overload relays) should be dimensioned for direct starting, following the local short-circuit conditions. Fuses, controls and overload relays must be ordered separately. Please observe the maximum switching frequencies specified in the technical specifications.

Note:

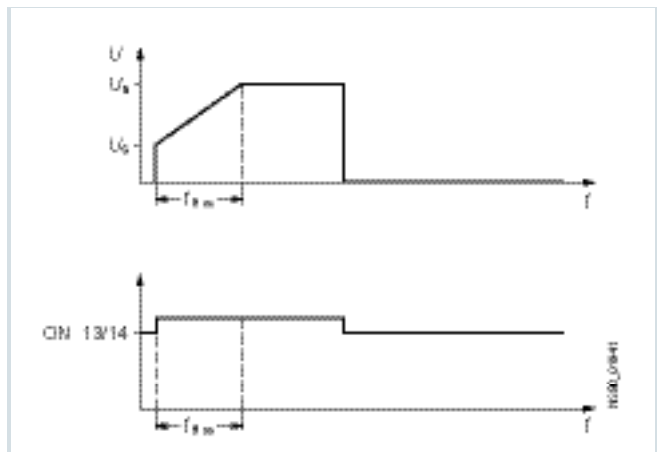
When induction motors are switched on, voltage drops occur as a rule on starters of all types (direct starters, star-delta starters, soft starters). The infeed transformer must always be dimensioned such that the voltage dip when starting the motor remains within the permissible tolerance. If the infeed transformer is dimensioned with only a small margin, it is best for the control voltage to be supplied from a separate circuit (independently of the main voltage) in order to avoid the potential switching off of the soft starter.

Schematic circuit diagram of power electronics



A bypass contact system is already integrated in the 3RW30 soft starter and therefore does not have to be ordered separately.

Status graphs



Manual for SIRIUS 3RW30/40

Besides containing all important information on configuring, commissioning and servicing, the manual also contains example circuits and the technical specifications for all devices.

Win-Soft Starter selection and simulation program

With this software, you can simulate and select all Siemens soft starters, taking into account various parameters such as mains properties, motor and load data, and special application requirements.

The software is a valuable tool, which makes complicated, lengthy manual calculations for determining the required soft starters superfluous.

The Win-Soft Starter selection and simulation program can be downloaded from:

www.siemens.com/softstarter --> Software

You can find more information about soft starters on the Internet likewise at:

www.siemens.com/softstarter

Overview

SIRIUS 3RW40 soft starters have all the same advantages as the 3RW30 soft starters.

The SIRIUS 3RW40 soft starters are characterized above all by their small space requirements. Integrated bypass contacts mean that no power loss has to be taken into the bargain at the power semiconductors (thyristors) after the motor has started up. This cuts down on heat losses, enabling a more compact design and making external bypass circuits superfluous.

At the same time this soft starter comes with additional integrated functions such as adjustable current limiting, motor overload and intrinsic device protection, and optional thermistor motor protection. The higher the motor rating, the more important these functions because they make it unnecessary to purchase and install protection equipment such as overload relays.

Internal intrinsic device protection prevents the thermal overloading of the thyristors and the power section defects this can cause. As an option the thyristors can also be protected by semiconductor fuses from short-circuiting.

Thanks to integrated status monitoring and fault monitoring, this compact soft starter offers many different diagnostics options. Up to four LEDs and relay outputs permit differentiated monitoring and diagnostics of the operating mechanism by indicating the operating state as well as for example mains or phase failure, missing load, non-permissible tripping time/class setting, thermal overloading or device faults.

Soft starters rated up to 250 kW (at 400 V) for standard applications in three-phase networks are available. Extremely small sizes, low power losses and simple start-up are just three of the many advantages of the SIRIUS 3RW40 soft starters.

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RW40 soft starter sizes S0 to S12 are suitable for the starting of explosion-proof motors with "increased safety" type of protection EEx e. See www.siemens.com/industrial-controls/atex.

Functionality

The space required by the compact SIRIUS 3RW40 soft starter is often only about one third of that required by a contactor assembly for star-delta starting of comparable rating. This not only saves space in the control cabinet and on the standard mounting rail but also does away completely with the wiring work needed for star-delta starters. This is notable in particular for higher motor ratings which are only rarely available as fully wired solutions.

At the same time the number of cables from the starter to the motor is reduced from six to three. Compact dimensions, short start-up times, easy wiring and fast commissioning make themselves felt as clear-cut cost advantages.

The bypass contacts of these soft starters are protected during operation by an integrated solid-state arc quenching system. This prevents damage to the bypass contacts in the event of a fault, e. g. brief disconnection of the control voltage, mechanical shocks or life-related component defects on the coil operating mechanism or main contact spring.

The starting current of particularly powerful operating mechanisms can place an unjustifiable load on the local supply system. Soft starters reduce this starting current by means of their voltage ramp. Thanks to the adjustable current limiting, the SIRIUS 3RW40 soft starter takes even more pressure off the supply system. It leaves the set start ramp during the ramp-up – the ramp gradient is fixed by the starting voltage and the ramp time – as soon as the selected current limit is reached. From this

moment the voltage of the soft starter is controlled so that the current supplied to the motor remains constant. This process is ended either by completion of the motor ramp-up or by tripping by the intrinsic device protection or the motor overload protection. As the result of this function the actual motor ramp-up can well take longer than the ramp time selected on the soft starter.

Thanks to the integrated motor overload protection according to IEC 60947-4-2 there is no need of an additional overload relay on the new soft starters. The rated motor current, the setting of the overload tripping time (CLASS times) and the reset of the motor overload protection function can be adjusted easily and quickly. Using a 4-step rotary potentiometer it is possible to set different overload tripping times on the soft starter. In addition to CLASS 10, 15 and 20 it is also possible to switch off the motor overload protection if a different motor management control device is to be used for this function, e. g. with connection to PROFIBUS.

Device versions with thermistor motor protection evaluation are available up to a rating of 55 kW (at 400 V). A "Thermoclick" measuring probe can be connected directly, as can a PTC of type A. Thermal overloading of the motor, open circuits and short circuits in the sensor circuit all result in the direct disconnection of the soft starter. And if ever the soft starter trips, various reset options are available the same as with intrinsic device protection and motor load protection: manually with the reset button, automatically or remotely through brief disconnection of the control voltage.

The new series of devices comes with the "polarity balancing" control method, which is designed to prevent direct current components in two-phase controlled soft starters. On two-phase controlled soft starters the current resulting from superimposition of the two controlled phases flows in the uncontrolled phase. This results for physical reasons in an asymmetric distribution of the three phase currents during the motor ramp-up. This phenomenon cannot be influenced, but in most applications it is non-critical.

Controlling the power semiconductors results not only in this asymmetry, however, but also in the previously mentioned direct current components which can cause severe noise generation on the motor at starting voltages of less than 50 %.

The control method used for these soft starters eliminates these direct current components during the ramp-up phase and prevents the braking torque which they can cause. It creates a motor ramp-up that is uniform in speed, torque and current rise, thus permitting a particularly gentle, two-phase starting of the motors. At the same time the acoustic quality of the starting operation comes close to the quality of a three-phase controlled soft starter. This is made possible by the on-going dynamic harmonizing and balancing of current half-waves of different polarity during the motor ramp-up. Hence the name "polarity balancing".

Application

The SIRIUS 3RW40 solid-state soft starters are used for the soft starting and stopping of three-phase asynchronous motors.

Due to two-phase control, the current is kept at minimum values in all three phases throughout the entire starting time and disturbing direct current components are eliminated in addition. This not only enables the two-phase starting of motors up to 250 kW (at 400 V) but also avoids the current and torque peaks which occur e. g. with star-delta starters.

Application areas

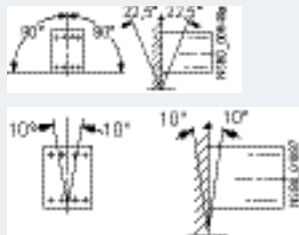
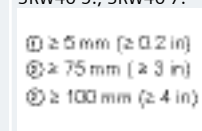
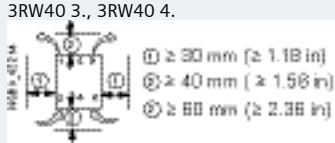
See "Selection aid for soft starters" on page 3/4.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

Technical specifications

Type		3RW40 2 .	3RW40 3 .	3RW40 4 .	3RW40 5 .	3RW40 7 .	
Mechanics and environment							
Mounting dimensions (WxHxD)							
- Screw terminals - Spring-type terminals		mm mm	45 x 125 x 154 45 x 150 x 154	55 x 144 x 170 55 x 144 x 170	70 x 160 x 188 70 x 160 x 188	120 x 198 x 250 120 x 198 x 250	160 x 230 x 278 160 x 230 x 278
Permissible ambient temperature							
Operation	°C	-25 ... +60; (derating from +40)					
Storage	°C	-40 ... +80					
Weight	kg	0.77	1.35	1.9	4.9 (3RW40 55), 6.9 (3RW40 56)	8.9	
Permissible mounting position ¹⁾							
- With auxiliary fan (for 3RW40 2 3RW40 4 .) - Without auxiliary fan (for 3RW40 2 3RW40 4 .)		— (fan integrated in the soft starter)					
Installation type ¹⁾	Stand-alone installation	3RW40 2. 			3RW40 5., 3RW40 7. 		
		3RW40 3., 3RW40 4. 					
Permissible installation altitude	m	5 000 (derating from 1000, see characteristic curve page 3/5); higher on request					
Degree of protection		IP20	IP00				

1) In case of deviations, please note derating
(see Manual in Chapter "Configuration").

Type		3RW40 2 . to 3RW40 4 .	3RW40 5 ., 3RW40 7 .
Control electronics			
Rated values	Terminal		
Rated control supply voltage	A1/A2	V	24 DC/AC
• Tolerance		%	110 ... 230 AC/DC -15/+10
Rated frequency		Hz	115 AC -15/+10
• Tolerance		%	230 AC

Type		3RW40 2 . - . B . 4, 3RW40 3 . - . B . 4, 3RW40 4 . - . B . 4	3RW40 2 . - . B . 5, 3RW40 3 . - . B . 5, 3RW40 4 . - . B . 5	3RW40 5 . - . BB . 4, 3RW40 7 . - . BB . 4	3RW40 5 . - . BB . 5, 3RW40 7 . - . BB . 5
Power electronics					
Rated operational voltage	V AC	200 ... 480	400 ... 600	200 ... 460	400 ... 600
Tolerance	%	-15/+10	-15/+10	-15/+10	-15/+10
Maximum blocking voltage (thyristor)	V AC	1 600		1 400	1 800
Rated frequency	Hz	50/60			
Tolerance	%	±10			
Uninterrupted duty at 40 °C (% of I_N)	%	115			
Minimum load (% of minimum selectable rated motor current I _N)	%	20 (at least 2 A)			
Maximum cable length between soft starter and motor	m	300			

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

Motor feeders with soft starters

The type of coordination to which the motor feeder with soft starter is mounted depends on the application-specific requirements. Normally, fuseless mounting (combination of motor starter protector/circuit breaker and soft starter) is sufficient.

If type of coordination "2" is to be fulfilled, semiconductor fuses must be fitted in the motor feeder.



Type of coordination "1" according to IEC 60947-4-1: After a short-circuit incident the unit is defective therefore unsuitable for further use (protection of persons and equipment guaranteed).

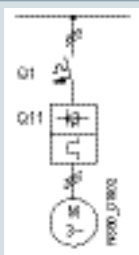


Type of coordination "2" according to IEC 60947-4-1: After a short-circuit incident the unit is suitable for further use (protection of persons and equipment guaranteed).

The type of coordination refers to soft starters in combination with the stipulated protective device (motor starter protector/circuit breaker/fuse), not to any additional components in the feeder.

The types of coordination are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Fuseless version



Soft starters 	Motor starter protectors/circuit breakers ¹⁾							
	Rated current	400 V +10 %	400 V +10 %		Rated current	575 V +10 %		Rated current
	Q11	Q1	Q1	$I_{q \max}$	Q1	Q1	$I_{q \max}$	Q1
Type	A	Type	Type	kA	A	Type	kA	A
Type of coordination "1"								
3RW40 24	12.5	3RV20 21-4AA.. (S0)/ 3RV20 11-4AA.. (S00)	3RV23 21-4AC.. (S0)/ 3RV23 11-4AC.. (S00)	55	16	—	—	—
3RW40 26	25	3RV20 21-4DA..	3RV23 21-4DC..	55	25	—	—	—
3RW40 27	32	3RV20 21-4EA..	3RV23 21-4EC..	55	32	—	—	—
3RW40 28	38	3RV20 21-4FA..	3RV23 21-4FC..	55	40	—	—	—
3RW40 36	45	3RV10 31-4GA10	3RV13 31-4GC10	20	45	—	—	—
3RW40 37	63	3RV10 41-4JA10	3RV13 41-4JC10	20	63	—	—	—
3RW40 38	72	3RV10 41-4KA10	3RV13 41-4KC10	20	75	—	—	—
3RW40 46	80	3RV10 41-4LA10	3RV13 41-4LC10	11	90	—	—	—
3RW40 47	106	3RV10 41-4MA10	3RV13 41-4MC10	11	100	—	—	—
3RW40 55	134	3VL3 720-2DC36	—	35	200	3VL3 720-1DC36	12	200
3RW40 56	162	3VL3 720-2DC36	—	35	200	3VL3 720-1DC36	12	200
3RW40 73	230	3VL4 731-2DC36	—	65	315	3VL5 731-3DC36	35	315
3RW40 74	280	3VL4 731-2DC36	—	65	315	3VL5 731-3DC36	35	315
3RW40 75	356	3VL4 740-2DC36	—	65	400	3VL5 740-3DC36	35	400
3RW40 76	432	3VL5 750-2DC36	—	65	500	3VL5 750-3DC36	35	500

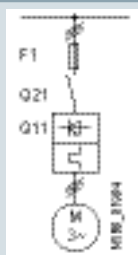
- 1) The rated motor current must be considered when selecting the devices.
3RV13 motor starter protectors are designed for starter combinations (without motor protection). Motor protection is provided in this case by the 3RW40 soft starter.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

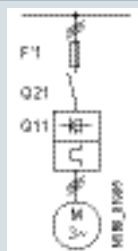
Fused version (line protection only)



Soft starters 	Rated current	Line fuses, maximum		Line contactors (optional)	
		F1	Rated current	Size	Q21
Q11 Type	A	Type	A		
Type of coordination "1" ¹⁾ : I _q = 65 kA at 600 V + 5 %					
3RW40 24	12.5	3NA3 820-6	50	00	3RT10 24
3RW40 26	25	3NA3 822-6	63	00	3RT10 26
3RW40 27	32	3NA3 824-6	80	00	3RT10 34
3RW40 28	38	3NA3 824-6	80	00	3RT10 35
3RW40 36	45	3NA3 130-6	100	1	3RT10 36
3RW40 37	63	3NA3 132-6	125	1	3RT10 44
3RW40 38	72	3NA3 132-6	125	1	3RT10 45
3RW40 46	80	3NA3 136-6	160	1	3RT10 45
3RW40 47	106	3NA3 136-6	160	1	3RT10 46
3RW40 55	134	3NA3 244-6	250	2	3RT10 55-6A.36
3RW40 56	162	3NA3 244-6	250	2	3RT10 56-6A.36
3RW40 73	230	2 x 3NA3 354-6	2 x 355	3	3RT10 65-6A.36
3RW40 74	280	2 x 3NA3 354-6	2 x 355	3	3RT10 66-6A.36
3RW40 75	356	2 x 3NA3 365-6	2 x 500	3	3RT10 75-6A.36
3RW40 76	432	2 x 3NA3 365-6	2 x 500	3	3RT10 76-6A.36

1) The type of coordination "1" refers to soft starters in combination with the stipulated fuse, not to any additional components in the feeder.

Fused version with 3NE1 SITOP fuses (semiconductor and line protection)



Soft starters 	Rated current	All-range fuses		Line contactors (optional)	
		F'1 Type	Rated current A	Size	Q21
Q11 Type	A				
Type of coordination "2" ¹⁾ : I _q = 65 kA at 600 V + 5 %					
3RW40 24	12.5	3NE1 814-0	20	000	3RT10 24
3RW40 26	25	3NE1 803-0	35	000	3RT10 26
3RW40 27	32	3NE1 020-2	80	00	3RT10 34
3RW40 28	38	3NE1 020-2	80	00	3RT10 35
3RW40 36	45	3NE1 020-2	80	00	3RT10 36
3RW40 37	63	3NE1 820-0	80	000	3RT10 44
3RW40 38	72	3NE1 820-0	80	000	3RT10 45
3RW40 46	80	3NE1 021-0	100	00	3RT10 45
3RW40 47	106	3NE1 022-0	125	00	3RT10 46
3RW40 55	134	3NE1 227-2	250	1	3RT10 55-6A.36
3RW40 56	162	3NE1 227-2	250	1	3RT10 56-6A.36
3RW40 73	230	3NE1 331-2	350	2	3RT10 65-6A.36
3RW40 74	280	3NE1 333-2	450	2	3RT10 66-6A.36
3RW40 75	356	3NE1 334-2	500	2	3RT10 75-6A.36
3RW40 76	432	3NE1 435-2	560	3	3RT10 76-6A.36

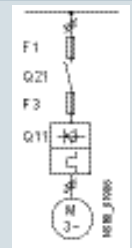
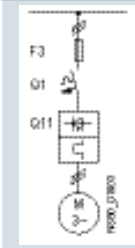
1) The type of coordination "2" refers to soft starters in combination with the stipulated fuse, not to any additional components in the feeder.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

Fused version with 3NE3 SITOP fuses (semiconductor protection by fuse, line and overload protection by motor starter protector; alternatively, installation with contactor and overload relay possible)



Soft starters 	Semiconductor fuses, minimum				Semiconductor fuses, maximum			Semiconductor fuses, minimum		
	Rated current	F3	Rated current	Size	F3	Rated current	Size	F3	Rated current	Size
Q11 Type	A	Type	A		Type	A		Type	A	
Type of coordination "2"): I _q = 65 kA at 600 V + 5 %										
3RW40 24	12.5	—	—	—	—	—	—	3NE4 101	32	0
3RW40 26	25	—	—	—	3NE3 221	100	1	3NE4 102	40	0
3RW40 27	32	—	—	—	3NE3 224	160	1	3NE4 118	63	0
3RW40 28	38	—	—	—	3NE3 224	160	1	3NE4 118	63	0
3RW40 36	45	—	—	—	3NE3 224	160	1	3NE4 120	80	0
3RW40 37	63	—	—	—	3NE3 225	200	1	3NE4 121	100	0
3RW40 38	72	3NE3 221	100	1	3NE3 227	250	1	—	—	—
3RW40 46	80	3NE3 222	125	1	3NE3 225	200	1	—	—	—
3RW40 47	106	3NE3 224	160	1	3NE3 231	350	1	—	—	—
3RW40 55	134	3NE3 227	250	1	3NE3 335	560	2	—	—	—
3RW40 56	162	3NE3 227	250	1	3NE3 335	560	2	—	—	—
3RW40 73	230	3NE3 232-0B	400	1	3NE3 333	450	2	—	—	—
3RW40 74	280	3NE3 233	450	1	3NE3 336	630	2	—	—	—
3RW40 75	356	3NE3 335	560	2	3NE3 336	630	2	—	—	—
3RW40 76	432	3NE3 337-8	710	2	3NE3 340-8	900	2	—	—	—

Soft starters 	Semiconductor fuses, max.				Semiconductor fuses, min.			Semiconductor fuses, max.			Cylindrical fuses	
	Rated current	F3	Rated current	Size	F3	Rated current	Size	F3	Rated current	Size	F3	Rated current
Q11 Type	A	Type	A		Type	A		Type	A		Type	A
Type of coordination “2” ⁽¹⁾ : I _q = 65 kA at 600 V + 5 %												
3RW40 24	12.5	3NE4 117	50	0	3NE8 015-1	25	00	3NE8 017-1	50	00	3NC2 240	40
3RW40 26	25	3NE4 117	50	0	3NE8 017-1	50	00	3NE8 021-1	100	00	3NC2 263	63
3RW40 27	32	3NE4 118	63	0	3NE8 018-1	63	00	3NE8 022-1	125	00	3NC2 280	80
3RW40 28	38	3NE4 118	63	0	3NE8 020-1	80	00	3NE8 024-1	160	00	3NC2 280	80
3RW40 36	45	3NE4 120	80	0	3NE8 020-1	80	00	3NE8 024-1	160	00	3NC2 280	80
3RW40 37	63	3NE4 121	100	0	3NE8 021-1	100	00	3NE8 024-1	160	00	—	—
3RW40 38	72	—	—	—	3NE8 022-1	125	00	3NE8 024-1	160	00	—	—
3RW40 46	80	—	—	—	3NE8 022-1	125	00	3NE8 024-1	160	00	—	—
3RW40 47	106	—	—	—	3NE8 024-1	160	00	3NE8 024-1	160	00	—	—
3RW40 55	134	—	—	—	—	—	—	—	—	—	—	—
3RW40 56	162	—	—	—	—	—	—	—	—	—	—	—
3RW40 73	230	—	—	—	—	—	—	—	—	—	—	—
3RW40 74	280	—	—	—	—	—	—	—	—	—	—	—
3RW40 75	356	—	—	—	—	—	—	—	—	—	—	—
3RW40 76	432	—	—	—	—	—	—	—	—	—	—	—

Soft starters 		Line contactors	Motor starter protectors/circuit breakers				Line fuses, maximum		
	Rated current	(optional)	400 V +10 %	Rated current	575 V +10 %	Rated current		Rated current	Size
Q11 Type	A	Q21	Q1 Type	A	Q1 Type	A	F1 Type	A	
Type of coordination “2” ¹⁾ : I _q = 65 kA at 600 V + 5 %									
3RW40 24	12.5	3RT10 24	3RV20 21-4AA.. (S0)/ 3RV20 11-4AA.. (S00)	55	—	—	3NA3 820-6	50	00
3RW40 26	25	3RT10 26	3RV20 21-4DA..	55	—	—	3NA3 822-6	63	00
3RW40 27	32	3RT10 34	3RV20 21-4EA..	55	—	—	3NA3 824-6	80	00
3RW40 28	38	3RT10 35	3RV20 21-4FA..	55	—	—	3NA3 824-6	80	00
3RW40 36	45	3RT10 36	3RV10 31-4GA10	20	—	—	3NA3 130-6	100	1
3RW40 37	63	3RT10 44	3RV10 41-4JA10	20	—	—	3NA3 132-6	125	1
3RW40 38	72	3RT10 45	3RV10 41-4KA10	20	—	—	3NA3 132-6	125	1
3RW40 46	80	3RT10 45	3RV10 41-4LA10	11	—	—	3NA3 136-6	160	1
3RW40 47	106	3RT10 46	3RV10 41-4MA10	11	—	—	3NA3 136-6	160	1
3RW40 55	134	3RT10 55-6A.36	3VL3 720	200	3VL3 720	200	3NA3 244-6	250	2
3RW40 56	162	3RT10 56-6A.36	3VL3 720	200	3VL3 720	200	3NA3 244-6	250	2
3RW40 73	230	3RT10 65-6A.36	3VL4 731	315	3VL5 731	315	2 x 3NA3 354-6	2 x 355	3
3RW40 74	280	3RT10 66-6A.36	3VL4 731	315	3VL5 731	315	2 x 3NA3 354-6	2 x 355	3
3RW40 75	356	3RT10 75-6A.36	3VL4 740	400	3VL5 740	400	2 x 3NA3 365-6	2 x 500	3
3RW40 76	432	3RT10 76-6A.36	3VL5 750	500	3VL5 750	500	2 x 3NA3 365-6	2 x 500	3

- 1) The type of coordination "2" refers to soft starters in combination with the stipulated protective device (motor starter protector/circuit breaker/fuse), not to any additional components in the feeder.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

Selection and ordering data

SIRIUS 3RW40 for normal starting (CLASS 10)



3RW40 2.



3RW40 3.



3RW40 4.

3RW ambient temperature 40 °C ¹⁾				3RW ambient temperature 50 °C ¹⁾					Size	Normal starting (CLASS 10)
Rated values of induction motors				Rated values of induction motors						
Operational current <i>I</i> _e	Rating at operational voltage <i>U</i> _e			Operational current <i>I</i> _e	Rating at operational voltage <i>U</i> _e					Order No.
	230 V	400 V	500 V		200 V	230 V	460 V	575 V		
A	kW	kW	kW	A	hp	hp	hp	hp		
Rated operational voltage <i>U</i> _e 200 ... 480 V										
• With screw terminals										
12.5	3	5.5	—	11	3	3	7.5	—	S0	3RW40 24-1BB□4
25	5.5	11	—	23	5	5	15	—	S0	3RW40 26-1BB□4
32	7.5	15	—	29	7.5	7.5	20	—	S0	3RW40 27-1BB□4
38	11	18.5	—	34	10	10	25	—	S0	3RW40 28-1BB□4
• With spring-type terminals										
12.5	3	5.5	—	11	3	3	7.5	—	S0	3RW40 24-2BB□4
25	5.5	11	—	23	5	5	15	—	S0	3RW40 26-2BB□4
32	7.5	15	—	29	7.5	7.5	20	—	S0	3RW40 27-2BB□4
38	11	18.5	—	34	10	10	25	—	S0	3RW40 28-2BB□4
• With screw or spring-type terminals										
45	11	22	—	42	10	15	30	—	S2	3RW40 36-□BB□4
63	18.5	30	—	58	15	20	40	—	S2	3RW40 37-□BB□4
72	22	37	—	62	20	20	40	—	S2	3RW40 38-□BB□4
• With screw or spring-type terminals										
80	22	45	—	73	20	25	50	—	S3	3RW40 46-□BB□4
106	30	55	—	98	30	30	75	—	S3	3RW40 47-□BB□4
Rated operational voltage <i>U</i> _e 400 ... 600 V										
• With screw terminals										
12.5	—	5.5	7.5	11	—	—	7.5	10	S0	3RW40 24-1BB□5
25	—	11	15	23	—	—	15	20	S0	3RW40 26-1BB□5
32	—	15	18.5	29	—	—	20	25	S0	3RW40 27-1BB□5
38	—	18.5	22	34	—	—	25	30	S0	3RW40 28-1BB□5
• With spring-type terminals										
12.5	—	5.5	7.5	11	—	—	7.5	10	S0	3RW40 24-2BB□5
25	—	11	15	23	—	—	15	20	S0	3RW40 26-2BB□5
32	—	15	18.5	29	—	—	20	25	S0	3RW40 27-2BB□5
38	—	18.5	22	34	—	—	25	30	S0	3RW40 28-2BB□5
• With screw or spring-type terminals										
45	—	22	30	42	—	—	30	40	S2	3RW40 36-□BB□5
63	—	30	37	58	—	—	40	50	S2	3RW40 37-□BB□5
72	—	37	45	62	—	—	40	60	S2	3RW40 38-□BB□5
• With screw or spring-type terminals										
80	—	45	55	73	—	—	50	60	S3	3RW40 46-□BB□5
106	—	55	75	98	—	—	75	75	S3	3RW40 47-□BB□5

Order No. supplement for connection types

- With screw terminals
- With spring-type terminals²⁾

Order No. supplement for rated control supply voltage U_c

- 24 V AC/DC
- 110 ... 230 V AC/DC

- 1) Stand-alone installation without auxiliary fan.
2) Main circuit connection: screw terminals.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor. The 3RW40 soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 10
- Maximum starting current in % of motor current I_e: 300
- Maximum number of starts per hour in 1/h: 5

Switching frequency can be increased by means of auxiliary fans.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40



3RW40 2.



3RW40 3.



3RW40 4.

3RW ambient temperature 40 °C ¹⁾				3RW ambient temperature 50 °C ¹⁾				Size	Normal starting (CLASS 10)
Rated values of induction motors				Rated values of induction motors					
Operational current <i>I</i> _e	Rating at operational voltage <i>U</i> _e			Operational current <i>I</i> _e	Rating at operational voltage <i>U</i> _e				Order No.
A	230 V	400 V	500 V	A	200 V	230 V	460 V		
	kW	kW	kW		hp	hp	hp	hp	
Rated operational voltage <i>U</i> _e 200 ... 480 V, with thermistor motor protection, rated control supply voltage <i>U</i> _c 24 V AC/DC									
• With screw terminals									
12.5	3	5.5	—	11	3	3	7.5	—	S0 3RW40 24-1TB04
25	5.5	11	—	23	5	5	15	—	S0 3RW40 26-1TB04
32	7.5	15	—	29	7.5	7.5	20	—	S0 3RW40 27-1TB04
38	11	18.5	—	34	10	10	25	—	S0 3RW40 28-1TB04
• With spring-type terminals									
12.5	3	5.5	—	11	3	3	7.5	—	S0 3RW40 24-2TB04
25	5.5	11	—	23	5	5	15	—	S0 3RW40 26-2TB04
32	7.5	15	—	29	7.5	7.5	20	—	S0 3RW40 27-2TB04
38	11	18.5	—	34	10	10	25	—	S0 3RW40 28-2TB04
• With screw or spring-type terminals									
45	11	22	—	42	10	15	30	—	S2 3RW40 36-□TB04
63	18.5	30	—	58	15	20	40	—	S2 3RW40 37-□TB04
72	22	37	—	62	20	20	40	—	S2 3RW40 38-□TB04
• With screw or spring-type terminals									
80	22	45	—	73	20	25	50	—	S3 3RW40 46-□TB04
106	30	55	—	98	30	30	75	—	S3 3RW40 47-□TB04
Rated operational voltage <i>U</i> _e 400 ... 600 V, with thermistor motor protection, rated control supply voltage <i>U</i> _c 24 V AC/DC									
• With screw terminals									
12.5	—	5.5	7.5	11	—	—	7.5	10	S0 3RW40 24-1TB05
25	—	11	15	23	—	—	15	20	S0 3RW40 26-1TB05
32	—	15	18.5	29	—	—	20	25	S0 3RW40 27-1TB05
38	—	18.5	22	34	—	—	25	30	S0 3RW40 28-1TB05
• With spring-type terminals									
12.5	—	5.5	7.5	11	—	—	7.5	10	S0 3RW40 24-2TB05
25	—	11	15	23	—	—	15	20	S0 3RW40 26-2TB05
32	—	15	18.5	29	—	—	20	25	S0 3RW40 27-2TB05
38	—	18.5	22	34	—	—	25	30	S0 3RW40 28-2TB05
• With screw or spring-type terminals									
45	—	22	30	42	—	—	30	40	S2 3RW40 36-□TB05
63	—	30	37	58	—	—	40	50	S2 3RW40 37-□TB05
72	—	37	45	62	—	—	40	60	S2 3RW40 38-□TB05
• With screw or spring-type terminals									
80	—	45	55	73	—	—	50	60	S3 3RW40 46-□TB05
106	—	55	75	98	—	—	75	75	S3 3RW40 47-□TB05
Order No. supplement for connection types									
• With screw terminals									
• With spring-type terminals ³⁾									

1) Stand-alone installation without auxiliary fan.

2) Main circuit connection: screw terminals.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor. The 3RW40 soft starters are designed for easy starting conditions.

The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 10
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

Switching frequency can be increased by means of auxiliary fans.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40



3RW40 5.



3RW40 7.

3RW ambient temperature 40 °C ¹⁾				3RW ambient temperature 50 °C ¹⁾					Size	Normal starting (CLASS 10)
Rated values of induction motors				Rated values of induction motors						
Operational current I_e	Rating at operational voltage U_e			Operational current I_e	Rating at operational voltage U_e					Order No.
	230 V	400 V	500 V		200 V	230 V	460 V	575 V		
A	kW	kW	kW	A	hp	hp	hp	hp		
Rated operational voltage U_e 200 ... 460 V										
• With screw or spring-type terminals										
134	37	75	—	117	30	40	75	—	S6	3RW40 55-□BB□4
162	45	90	—	145	40	50	100	—		3RW40 56-□BB□4
• With screw or spring-type terminals										
230	75	132	—	205	60	75	150	—	S12	3RW40 73-□BB□4
280	90	160	—	248	75	100	200	—		3RW40 74-□BB□4
356	110	200	—	315	100	125	250	—		3RW40 75-□BB□4
432	132	250	—	385	125	150	300	—		3RW40 76-□BB□4
Rated operational voltage U_e 400 ... 600 V										
• With screw or spring-type terminals										
134	—	75	90	117	—	—	75	100	S6	3RW40 55-□BB□5
162	—	90	110	145	—	—	100	150		3RW40 56-□BB□5
• With screw or spring-type terminals										
230	—	132	160	205	—	—	150	200	S12	3RW40 73-□BB□5
280	—	160	200	248	—	—	200	250		3RW40 74-□BB□5
356	—	200	250	315	—	—	250	300		3RW40 75-□BB□5
432	—	250	315	385	—	—	300	400		3RW40 76-□BB□5
Order No. supplement for connection types ²⁾										
• With spring-type terminals										2
• With screw terminals										6
Order No. supplement for the rated control supply voltage U_s ³⁾										3
• 115 V AC										4
• 230 V AC										

1) Stand-alone installation.

2) Main circuit connection: busbar connection.

3) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The 3RW40 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 10
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

SIRIUS 3RW40 for heavy starting (CLASS 20)



3RW40 2.



3RW40 3.



3RW40 4.

3RW ambient temperature 40 °C ¹⁾				3RW ambient temperature 50 °C ¹⁾					Size	Heavy starting (CLASS 20)
Rated values of induction motors				Rated values of induction motors						
Operational current I_e	Rating at operational voltage U_e			Operational current I_e	Rating at operational voltage U_e					Order No.
A	230 V	400 V	500 V	A	200 V	230 V	460 V	575 V		
	kW	kW	kW		hp	hp	hp	hp		
Rated operational voltage U_e 200 ... 480 V										
• With screw terminals										
12.5	3	5.5	—	11	3	3	7.5	—	S0	3RW40 26-1BB□4
25	5.5	11	—	23	5	5	15	—	S0	3RW40 27-1BB□4
• With spring-type terminals										
12.5	3	5.5	—	11	3	3	7.5	—	S0	3RW40 26-2BB□4
25	5.5	11	—	23	5	5	15	—	S0	3RW40 27-2BB□4
• With screw or spring-type terminals										
32	7.5	15	—	29	7.5	7.5	20	—	S2	3RW40 36-□BB□4
38	11	18.5	—	34	10	10	25	—	S2	3RW40 37-□BB□4
45	11	22	—	42	10	15	30	—	S2	3RW40 37-□BB□4
63	18.5	30	—	58	15	20	40	—	S3	3RW40 47-□BB□4
72	22	37	—	62	20	20	40	—	S3	3RW40 47-□BB□4
Rated operational voltage U_e 400 ... 600 V										
• With screw terminals										
12.5	—	5.5	7.5	11	—	—	7.5	10	S0	3RW40 26-1BB□5
25	—	11	15	23	—	—	15	20	S0	3RW40 27-1BB□5
• With spring-type terminals										
12.5	—	5.5	7.5	11	—	—	7.5	10	S0	3RW40 26-2BB□5
25	—	11	15	23	—	—	15	20	S0	3RW40 27-2BB□5
• With screw or spring-type terminals										
32	—	15	18.5	29	—	—	20	25	S2	3RW40 36-□BB□5
38	—	18.5	22	34	—	—	25	30	S2	3RW40 37-□BB□5
45	—	22	30	42	—	—	30	40	S2	3RW40 37-□BB□5
63	—	30	37	58	—	—	40	50	S3	3RW40 47-□BB□5
72	—	37	45	62	—	—	40	60	S3	3RW40 47-□BB□5
Order No. supplement for connection types										
• With screw terminals										
• With spring-type terminals ²⁾										
Order No. supplement for rated control supply voltage U_s										
• 24 V AC/DC										
• 110 ... 230 V AC/DC										

1) Stand-alone installation without auxiliary fan.

2) Main circuit connection: screw terminals.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The 3RW40 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 20
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

Switching frequency can be increased by means of auxiliary fans.

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40



3RW40 2.



3RW40 3.



3RW40 4.

3RW ambient temperature 40 °C ¹⁾				3RW ambient temperature 50 °C ¹⁾					Size	Heavy starting (CLASS 20)
Rated values of induction motors				Rated values of induction motors						
Operational current I_e	Rating at operational voltage U_e			Operational current I_e	Rating at operational voltage U_e					Order No.
	230 V	400 V	500 V		200 V	230 V	460 V	575 V		
A	kW	kW	kW	A	hp	hp	hp	hp		
Rated operational voltage U_e 200 ... 480 V, with thermistor motor protection, rated control supply voltage U_s 24 V AC/DC										
• With screw terminals										
12.5	3	5.5	—	11	3	3	7.5	—	S0	3RW40 26-1TB04
25	5.5	11	—	23	5	5	15	—	S0	3RW40 27-1TB04
• With spring-type terminals										
12.5	3	5.5	—	11	3	3	7.5	—	S0	3RW40 26-2TB04
25	5.5	11	—	23	5	5	15	—	S0	3RW40 27-2TB04
• With screw or spring-type terminals										
32	7.5	15	—	29	7.5	7.5	20	—	S2	3RW40 36-□TB04
38	11	18.5	—	34	10	10	25	—	S2	3RW40 37-□TB04
45	11	22	—	42	10	15	30	—	S2	3RW40 37-□TB04
63	18.5	30	—	58	15	20	40	—	S3	3RW40 47-□TB04
72	22	37	—	62	20	20	40	—	S3	3RW40 47-□TB04
Rated operational voltage U_e 400 ... 600 V, with thermistor motor protection, rated control supply voltage U_s 24 V AC/DC										
• With screw terminals										
12.5	—	5.5	7.5	11	—	—	7.5	10	S0	3RW40 26-1TB05
25	—	11	15	23	—	—	15	20	S0	3RW40 27-1TB05
• With spring-type terminals										
12.5	—	5.5	7.5	11	—	—	7.5	10	S0	3RW40 26-2TB05
25	—	11	15	23	—	—	15	20	S0	3RW40 27-2TB05
• With screw or spring-type terminals										
32	—	15	18.5	29	—	—	20	25	S2	3RW40 36-□TB05
38	—	18.5	22	34	—	—	25	30	S2	3RW40 37-□TB05
45	—	22	30	42	—	—	30	40	S2	3RW40 37-□TB05
63	—	30	37	58	—	—	40	50	S3	3RW40 47-□TB05
72	—	37	45	62	—	—	40	60	S3	3RW40 47-□TB05
Order No. supplement for connection types										
• With screw terminals										1
• With spring-type terminals ²⁾										2

1) Stand-alone installation without auxiliary fan.

2) Main circuit connection: screw terminals.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The 3RW40 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 20
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

Switching frequency can be increased by means of auxiliary fans.

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40



3RW40 5.



3RW40 7.

3RW ambient temperature 40 °C ¹⁾				3RW ambient temperature 50 °C ¹⁾				Size	Heavy starting (CLASS 20)
Rated values of induction motors				Rated values of induction motors					
Operational current <i>I</i> _e	Rating at operational voltage <i>U</i> _e			Operational current <i>I</i> _e	Rating at operational voltage <i>U</i> _e				Order No.
	230 V	400 V	500 V		200 V	230 V	460 V		
A	kW	kW	kW	A	hp	hp	hp	hp	
Rated operational voltage <i>U</i> _e 200 ... 460 V									
• With screw or spring-type terminals									
80	22	45	—	73	20	25	50	—	S6 3RW40 55-□BB□4
106	30	55	—	98	25	30	60	—	S6 3RW40 55-□BB□4
134	37	75	—	117	30	40	75	—	S6 3RW40 56-□BB□4
162	45	90	—	145	40	50	100	—	S12 3RW40 73-□BB□4
230	75	132	—	205	60	75	150	—	S12 3RW40 74-□BB□4
280	90	160	—	248	75	100	200	—	S12 3RW40 75-□BB□4
356	110	200	—	315	100	125	250	—	S12 3RW40 76-□BB□4
Rated operational voltage <i>U</i> _e 400 ... 600 V									
• With screw or spring-type terminals									
80	—	45	55	73	—	—	50	60	S6 3RW40 55-□BB□5
106	—	55	75	98	—	—	60	75	S6 3RW40 55-□BB□5
134	—	75	90	117	—	—	75	100	S6 3RW40 56-□BB□5
162	—	90	110	145	—	—	100	150	S12 3RW40 73-□BB□5
230	—	132	160	205	—	—	150	200	S12 3RW40 74-□BB□5
280	—	160	200	248	—	—	200	250	S12 3RW40 75-□BB□5
356	—	200	250	315	—	—	250	300	S12 3RW40 76-□BB□5
Order No. supplement for connection types ²⁾									
• With spring-type terminals									
• With screw terminals									
Order No. supplement for the rated control supply voltage <i>U</i> _s ³⁾									
• 115 V AC									
• 230 V AC									

1) Stand-alone installation.

2) Main circuit connection: busbar connection.

3) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The 3RW40 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 40
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding.

Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

Accessories

		Conductor cross-section		Tightening torque	For soft starters size	Order No.
		Solid or stranded	Finely stranded with end sleeve	AWG cables, solid or stranded		
		mm²	mm²	AWG	Nm	
Three-phase feeder terminals						
	2.5 ... 16	2.5 ... 16	10 ... 4	3 ... 4	S0 (3RW40 2.)	3RV29 25-5AB
3RV29 25-5AB						
		For soft starters		Version		Order No.
		Type	Size			
Box terminal blocks for soft starters						
	For round and ribbon cables (2 units required for each device)					
	3RW40 5 .	S6	• Up to 70 mm² • Up to 120 mm²			3RT19 55-4G 3RT19 56-4G
	Auxiliary conductor connection for box terminals				3TX7 500-0A	
	3RW40 7 .	S12	• Up to 240 mm² (with auxiliary conductor connection)			3RT19 66-4G
Auxiliary terminals						
Auxiliary terminals, 3-pole						
3RW40 4 .		S3				3RT19 46-4F
Covers for soft starters						
	Terminal covers for box terminals					
	Additional touch protection to be fitted at the box terminals (2 units required per device)					
	3RW40 3 .	S2				3RT19 36-4EA2
	3RW40 4 .	S3				3RT19 46-4EA2
	3RW40 5 .	S6				3RT19 56-4EA2
	3RW40 7 .	S12				3RT19 66-4EA2
	Terminal covers for cable lugs and busbar connections					
	3RW40 4 .	S3	For complying with the phase clearances and as touch protection if box terminal is removed (2 units required per device)			3RT19 46-4EA1
	3RW40 5 .	S6				3RT19 56-4EA1
	3RW40 7 .	S12				3RT19 66-4EA1
Also fits in case of S6 and S12 on mounted box terminals						
	Sealing covers					
	3RW40 2 .	S0				3RW49 00-0PB10
	3RW40 3 .	S2				
	3RW40 4 .	S3				
	3RW40 5 .	S6				3RW49 00-0PB00
	3RW40 7 .	S12				

3RW30, 3RW40 for Standard Applications

For soft starters		Version	Order No.
Type	Size		

Operating range $0.85 \dots 1.1 \times U_s$, power consumption AC 80 VA, DC 70 W, ON period 0.2 ... 4 s, switching frequency 60/h

3RU19 00-2AB71
3RU19 00-2AF71
3RU19 00-2AM71



3RW40 5 .	S6	• Resetting plungers, holders and formers
3RW40 7 .	S12	• Suitable pushbutton IP65, Ø 22 mm, 12 mm stroke
		• Extension plungers

3RW40 5 .	S6	• Resetting plungers, holders and formers
3RW40 7 .	S12	• Suitable pushbutton IP65, Ø 22 mm, 12 mm stroke
		• Extension plungers

3RU19 00-1A
3SB30 00-0EA11
3SX13 35



For Ø 6.5 mm holes in the control panel; max. control panel thickness 8 mm

3RW40 5 .	S6	• Length 400 mm
3RW40 7 .	S12	• Length 600 mm

3RU19 00-1B
3RU19 00-1C

For soft starters		Version	Order No.
Type	Size		

3RW40 2 .	S0
3RW40 3 .	S2
3RW40 4 .	S3

3RW49 28-8VB00
3RW49 47-8VB00

3RW40 2 .	S0
3RW40 3 .	S2
3RW40 4 .	S3
3RW40 5 .	S6
3RW40 7 .	S12

3ZX10 12-0RW30-1AB1

3RW40 2 .	S0
3RW40 3 .	S2
3RW40 4 .	S3
3RW40 5 .	S6
3RW40 7 .	S12

3ZX10 12-0RW40-1AA1

3ZX10 12-0RW40-2DA1

3/28

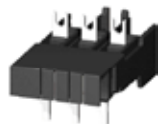
SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

For soft starters		Motor starter protectors	Order No.
Type	Size	Size	

Link modules to motor starter protectors¹⁾



• With screw terminals

3RW40 2.	S0	S00/S0
3RW40 36.	S2	S2
3RW40 46., 3RW40 47.	S3	S3

• With spring-type terminals

3RW40 2.	S0	S0

3RA29 21-1BA00
3RA19 31-1AA00
3RA19 41-1AA00
3RA29 21-2GA00

- 1) Can be used in size S0 up to maximum 32 A.
Can be used in size S0 only for 3RV2 motor starter protectors.

Version	Order No.

Tools for opening spring-type terminals for sizes S00 and S0



Screwdrivers

for all SIRIUS devices with spring-type terminals length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated

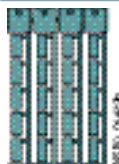
Spring-type terminals



3RA29 08-1A

3RA29 08-1A

Blank labels



Unit labeling plates¹⁾

for SIRIUS devices 20 mm x 7 mm, pastel turquoise

3RT19 00-1SB20

3RT19 00-1SB20

Spare parts

For soft starters		Version	Order No.
Type	Size	Rated control supply voltage U_s	

Fans



Fans

3RW40 5 . - . BB3 .	S6	115 V AC
3RW40 5 . - . BB4 .	S6	230 V AC
3RW40 7 . - . BB3 .	S12	115 V AC
3RW40 7 . - . BB4 .	S12	230 V AC

3RW49 36-8VX30
3RW49 36-8VX40
3RW49 47-8VX30
3RW49 47-8VX40

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

More information

Application examples for normal starting (CLASS 10)

Normal starting CLASS 10 (up to 20 s with 350 % $I_{n \text{ motor}}$)

The soft starter rating can be selected to be as high as the rating of the motor used.

Application		Conveyor belt	Roller conveyor	Compressor	Small fan ¹⁾	Pump	Hydraulic pump
Starting parameters							
• Voltage ramp and current limiting							
- Starting voltage	%	70	60	50	40	40	40
- Starting time	s	10	10	10	10	10	10
- Current limit value		$5 \times I_M$	$5 \times I_M$	$4 \times I_M$	$4 \times I_M$	$4 \times I_M$	$4 \times I_M$
Ramp-down time	s	5	5	0	0	10	0

1) The mass inertia of the fan is <10 times the mass inertia of the motor.

Application examples for heavy starting (CLASS 20)

Heavy starting CLASS 20 (up to 40 s with 350 % $I_{n \text{ motor}}$)

The soft starter has to be selected at least one performance class higher than the motor used.

Application		Stirrer	Centrifuge
Starting parameters			
• Voltage ramp and current limiting			
- Starting voltage	%	40	40
- Starting time	s	20	20
- Current limit value		$4 \times I_M$	$4 \times I_M$
Ramp-down time	0	0	

Note:

These tables present sample set values and device sizes. They are intended only for the purposes of information and are not binding. The set values depend on the application in question and must be optimized during commissioning.

The soft starter dimensions should be checked where necessary with the Win-Soft Starter software or with the help of nearest Siemens sales office.

SIRIUS 3RW Soft Starters

3RW30, 3RW40 for Standard Applications

3RW40

Configuration

The 3RW solid-state soft starters are designed for easy starting conditions. In the event of deviating conditions or increased switching frequency, it may be necessary to choose a larger device. For accurate dimensioning, use the Win-Soft Starter selection and simulation program.

Where long starting times are involved, the integrated solid-state overload relay for heavy starting should not be disconnected. PTC sensors are recommended. This also applies for the smooth ramp-down because during the ramp-down time an additional current loading applies in contrast to free ramp-down.

In the case of high switching frequencies in S4 mode, Siemens recommends the use of PTC sensors. For corresponding device versions with integrated thermistor motor protection or separate thermistor evaluation devices see Chapter 5 "Monitoring and Control Devices".

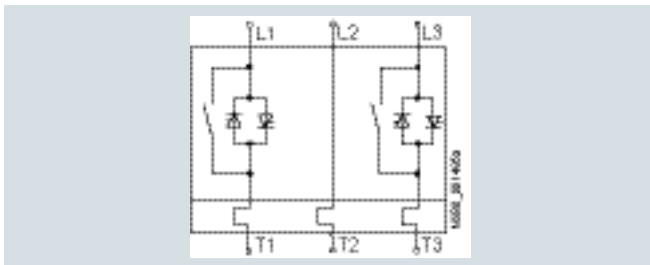
No capacitive elements are permitted in the motor feeder between the SIRIUS 3RW soft starter and the motor (e. g. no reactive-power compensation equipment). In addition, neither static systems for reactive-power compensation nor dynamic PFC (Power Factor Correction) must be operated in parallel during starting and ramp-down of the soft starter. This is important to prevent faults arising on the compensation equipment and/or the soft starter.

All elements of the main circuit (such as fuses and controls) should be dimensioned for direct starting, following the local short-circuit conditions. Fuses, controls and overload relays must be ordered separately. Please observe the maximum switching frequencies specified in the technical specifications.

Note:

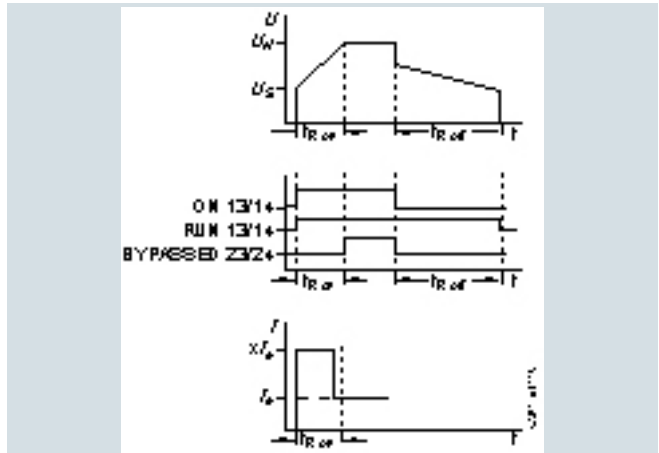
When induction motors are switched on, voltage drops occur as a rule on starters of all types (direct starters, star-delta starters, soft starters). The infeed transformer must always be dimensioned such that the voltage dip when starting the motor remains within the permissible tolerance. If the infeed transformer is dimensioned with only a small margin, it is best for the control voltage to be supplied from a separate circuit (independently of the main voltage) in order to avoid the potential switching off of the soft starter.

Schematic circuit diagram of power electronics



A bypass contact system and solid-state overload relay are already integrated in the 3RW40 soft starter and therefore do not have to be ordered separately.

Status graphs



Manual for SIRIUS 3RW30/40

Besides containing all important information on configuring, commissioning and servicing, the manual also contains example circuits and the technical specifications for all devices.

Win-Soft Starter selection and simulation program

With this software, you can simulate and select all Siemens soft starters, taking into account various parameters such as mains properties, motor and load data, and special application requirements.

The software is a valuable tool, which makes complicated, lengthy manual calculations for determining the required soft starters superfluous.

The Win-Soft Starter selection and simulation program can be downloaded from:

www.siemens.com/softstarter —> Software

More information about soft starters can be found on the Internet at:

www.siemens.com/softstarter

Overview

In addition to soft starting and soft ramp-down, the solid-state SIRIUS 3RW44 soft starters provide numerous functions for higher-level requirements. They cover a performance range up to 710 kW (at 400 V) in the inline circuit and up to 1200 kW (at 400 V) in the inside-delta circuit.

The 3RW44 soft starters are characterized by a compact design for space-saving and clearly arranged control cabinet layouts. For optimized motor starting and stopping the innovative

SIRIUS 3RW44 soft starters are an attractive alternative with considerable savings potential compared to applications with a frequency converter. The new torque control and adjustable current limiting enable the High-Feature soft starters to be used in nearly every conceivable task. They guarantee the reliable avoidance of sudden torque applications and current peaks during motor starting and stopping. This creates savings potential when calculating the size of the switchgear and when servicing the machinery installed. Be it for inline circuits or inside-delta circuits – the SIRIUS 3RW44 soft starter offers savings especially in terms of size and equipment costs.

The bypass contacts already integrated in the soft starter bypass the thyristors after a motor ramp-up is detected. This results in a further great reduction in the heat loss occurring during operation of the soft starter at rated value.

Combinations of various starting, operating and ramp-down possibilities ensure an optimum adaptation to the application-specific requirements. Operation and commissioning can be performed with the menu-controlled keypad and a menu-prompted, multi-line graphic display with background lighting. The optimized motor ramp-up and ramp-down can be effected quickly, easily and reliably by means of just a few settings with a previously selected language. Four-key operation and plain-text displays for each menu point guarantee full clarity at every moment of the parameterization and operation.

Applicable standards

- IEC 60947-4-2
- UL/CSA

Functionality

Equipped with modern, ergonomic user prompting the 3RW44 soft starters can be commissioned quickly and easily using a keypad and a menu-prompted, multi-line graphic display with background lighting. The optimized motor ramp-up and ramp-down can be effected quickly, easily and reliably by means of just a few settings with a selectable language. Four-key operation and plain-text displays for each menu point guarantee full clarity at every moment of the parameterization and operation. During operation and when control voltage is applied, the display field continuously presents measured values and operating values as well as warnings and fault messages. An external display and operator module can be connected by means of a connection cable to the soft starter, thus enabling active indications and the like to be read directly from the control cabinet door.

The SIRIUS 3RW44 soft starters are equipped with optimum functionality. An integral bypass contact system reduces the power loss of the soft starter during operation.

This reliably prevents heating of the switchgear environment. The SIRIUS 3RW44 soft starters have internal intrinsic device protection. This prevents thermal overloading of the power section's thyristors, e. g. due to unacceptably high closing operations.

Wiring outlay for installing an additional motor overload relay is no longer needed as the SIRIUS 3RW44 soft starters perform this function too. In addition they offer adjustable trip classes and a

thermistor motor protection function. As an option the thyristors can also be protected by SITOR semiconductor fuses from short-circuiting so that the soft starter is still functional after a short circuit (coordination type "2"). And even inrush current peaks are reliably avoided thanks to adjustable current limiting.

As a further option the SIRIUS 3RW44 soft starters can be upgraded with a PROFIBUS DP module. Thanks to their communication capability and their programmable control inputs and relay outputs the SIRIUS 3RW44 soft starters can be very easily and quickly integrated in higher-level controllers.

In addition a creep speed function is available for positioning and setting jobs. With this function the motor can be controlled in both directions of rotation with reduced torque and an adjustable, low speed.

On the other hand the SIRIUS 3RW44 soft starters offer a new, combined DC braking function for the fast stopping of driving loads.

Highlights

- Soft starting with breakaway pulse, torque control or voltage ramp, adjustable torque or current limiting as well as any combination of these, depending on load type
- Integrated bypass contact system to minimize power loss
- Various setting options for the starting parameters such as starting torque, starting voltage, ramp-up and ramp-down time, and much more in three separate parameter sets
- Start-up detection
- Inside-delta circuit for savings in terms of size and equipment costs
- Various ramp-down modes selectable: free ramp-down, torque-controlled pump ramp-down, combined DC braking
- Solid-state motor overload and intrinsic device protection
- Thermistor motor protection
- Keypad with a menu-prompted, multi-line graphic display with background lighting
- Interface for communication with the PC for more accurate setting of the parameters as well as for control and monitoring
- Simple adaptation to the motor feeder
- Simple mounting and commissioning
- Display of operating states and fault messages
- Connection to PROFIBUS with optional PROFIBUS DP module
- External display and operator module
- Mains voltages from 200 to 690 V, 50 to 60 Hz
- Can be used up to 60 °C (derating from 40 °C)

Soft Starter ES parameterization software

Soft Starter ES software is used for the parameterization, monitoring and service diagnostics of SIRIUS 3RW44 High Feature soft starters.

SIRIUS 3RW44 Soft Starter Function Block Library for SIMATIC PCS 7

The SIRIUS 3RW44 soft starter PCS 7 function block library can be used for simple and easy integration of SIRIUS 3RW44 soft starters into the SIMATIC PCS 7 process control system.

Application

The SIRIUS 3RW44 solid-state soft starters are suitable for the torque-controlled soft starting and smooth ramp-down as well as braking of three-phase asynchronous motors.

Application areas

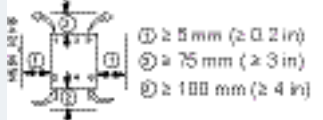
See "Selection aid for soft starters" on page 3/4.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Technical specifications

Type		3RW44 2 .	3RW44 3 .	3RW44 4 .	3RW44 5 .	3RW44 6 .
Mechanics and environment						
Mounting dimensions (WxHxD)						
- Screw terminals - Spring-type terminals		mm	170 x 184 x 270	170 x 198 x 270	210 x 230 x 298	510 x 638.5 x 290
		mm	170 x 184 x 270	170 x 198 x 270	210 x 230 x 298	510 x 638.5 x 290
Permissible ambient temperature						
Operation	°C	0 ... +60; (derating from +40)				
Storage	°C	-25 ... +80				
Weight	kg	6.5	7.9	11.5	50	78
Permissible mounting position						
Installation type		Stand-alone installation 				
Permissible installation altitude	m	5 000 (derating from 1000, see characteristic curve page 3/5); higher on request				
Degree of protection		IP00				

Type			3RW44 . . . BC3 .	3RW44 . . . BC4 .
	Terminal			
Control electronics				
Rated values				
Rated control supply voltage	A1/A2/PE	V	115 AC	230 AC
• Tolerance		%	-15/+10	-15/+10
Rated frequency		Hz	50 ... 60	50 ... 60
• Tolerance		%	±10	±10

Type		3RW44 . . . BC . 4	3RW44 . . . BC . 5	3RW44 . . . BC . 6
Power electronics				
Rated operational voltage for inline circuit	V AC	200 ... 460	400 ... 600	400 ... 690
Tolerance	%	-15/+10	-15/+10	-15/+10
Maximum blocking voltage (thyristor)	V AC	1 400	1 800	1 800
Rated operational voltage for inside-delta circuit	V AC	200 ... 460	400 ... 600	400 ... 600
Tolerance	%	-15/+10	-15/+10	-15/+10
Rated frequency	Hz	50 ... 60		
Tolerance	%	±10		
Uninterrupted duty at 40 °C (% of I_N)	%	115		
Minimum load (% of set motor current I_M)	%	8		
Maximum cable length between soft starter and motor	m	500 ¹⁾		

1) At the project configuration stage, it is important to make allowance for the voltage drop on the motor cable up to the motor connection. If necessary, higher values for the rated operational voltage or current must be calculated accordingly for the soft starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Motor feeders with soft starters

The type of coordination to which the motor feeder with soft starter is mounted depends on the application-specific requirements. Normally, fuseless mounting (combination of motor starter protector/circuit breaker and soft starter) is sufficient.

If type of coordination "2" is to be fulfilled, semiconductor fuses must be fitted in the motor feeder.



Type of coordination "1" according to IEC 60947-4-1: After a short-circuit incident the unit is defective therefore unsuitable for further use (protection of persons and equipment guaranteed).

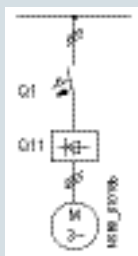


Type of coordination "2" according to IEC 60947-4-1: After a short-circuit incident the unit is suitable for further use (protection of persons and equipment guaranteed).

The type of coordination refers to soft starters in combination with the stipulated protective device (motor starter protector/circuit breaker/fuse), not to any additional components in the feeder.

The types of coordination are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Inline circuit fuseless version



Soft starters		Motor starter protectors/circuit breakers ¹⁾	
Q11	Rated current	Q1	Rated current
Type	A	Type	A
Type of coordination "1": 3RW44 22 ... 3RW44 27: $I_q = 32$ kA; 3RW44 34 and 3RW44 35: $I_q = 16$ kA; 3RW44 36 ... 3RW44 66: $I_q = 65$ kA			
3RW44 22	29	3RV10 42-4HA10	50
3RW44 23	36	3RV10 42-4JA10	63
3RW44 24	47	3RV10 42-4KA10	75
3RW44 25	57	3RV10 42-4LA10	90
3RW44 26	77	3RV10 42-4MA10	100
3RW44 27	93	3RV10 42-4MA10	100
3RW44 34	113	3VL17 16-2DD36	160
3RW44 35	134	3VL17 16-2DD36	160
3RW44 36	162	3VL37 25-2DC36	250
3RW44 43	203	3VL47 31-3DC36	315
3RW44 44	250	3VL47 31-3DC36	315
3RW44 45	313	3VL47 40-3DC36	400
3RW44 46	356	3VL47 40-3DC36	400
3RW44 47	432	3VL57 50-3DC36	500
3RW44 53	551	3VL67 80-3AB36	800
3RW44 54	615	3VL67 80-3AB36	800
3RW44 55	693	3VL67 80-3AB36	800
3RW44 56	780	3VL77 10-3AB36	1 000
3RW44 57	880	3VL77 10-3AB36	1 000
3RW44 58	970	3VL77 12-3AB36	1 250
3RW44 65	1 076	3VL77 12-3AB36	1 250
3RW44 66	1 214	3VL77 12-3AB36	1 250

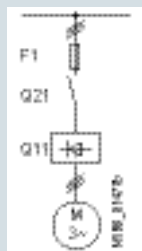
1) The rated motor current must be considered when selecting the devices.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Inline circuit fused version (line protection only)



Soft starters 	Rated current	Line fuses, maximum			Line contactor up to 400 V (optional)	Braking contactors ¹⁾²⁾ (for example circuit see the 3RW44 manual)	
		F1 Type	Rated current A	Size		Q91 Type	Q92 Type
Q11 Type	A	F1 Type	A		Q21 Type		
Type of coordination "1" ³⁾ : I _q = 65 kA							
3RW44 22	29	3NA3 820-6	50	00	3RT10 34	3RT15 26	—
3RW44 23	36	3NA3 822-6	63	00	3RT10 35	3RT15 26	—
3RW44 24	47	3NA3 824-6	80	00	3RT10 36	3RT15 35	—
3RW44 25	57	3NA3 830-6	100	00	3RT10 44	3RT15 35	—
3RW44 26	77	3NA3 132-6	125	1	3RT10 45	3RT10 24	3RT10 35
3RW44 27	93	3NA3 136-6	160	1	3RT10 46	3RT10 25	3RT10 36
3RW44 34	113	3NA3 244-6	250	2	3RT10 54	3RT10 34	3RT10 44
3RW44 35	134	3NA3 244-6	250	2	3RT10 55	3RT10 36	3RT10 45
3RW44 36	162	3NA3 365-6	500	3	3RT10 56	3RT10 44	3RT10 45
3RW44 43	203	2 x 3NA3 354-6	2 x 355	3	3RT10 64	3RT10 44	3RT10 54
3RW44 44	250	2 x 3NA3 354-6	2 x 355	3	3RT10 65	3RT10 44	3RT10 55
3RW44 45	313	2 x 3NA3 365-6	2 x 500	3	3RT10 75	3RT10 54	3RT10 56
3RW44 46	356	2 x 3NA3 365-6	2 x 500	3	3RT10 75	3RT10 54	3RT10 56
3RW44 47	432	2 x 3NA3 365-6	2 x 500	3	3RT10 76	3RT10 55	3RT10 64
3RW44 53	551	2 x 3NA3 365-6	2 x 500	3	3TF68	3RT10 64	3RT10 66
3RW44 54	615	2 x 3NA3 365-6	2 x 500	3	3TF68	3RT10 64	3RT10 75
3RW44 55	693	2 x 3NA3 365-6	2 x 500	3	3TF69	3RT10 65	3RT10 75
3RW44 56	780	2 x 3NA3 365-6	2 x 500	3	3TF69	3RT10 65	3RT10 75
3RW44 57	880	2 x 3NA3 365-6	2 x 500	3	—	3RT10 75	3RT10 76
3RW44 58	970	3 x 3NA3 365-6	3 x 500	3	—	3RT10 75	3RT10 76
3RW44 65	1 076	3 x 3NA3 365-6	3 x 500	3	—	3RT10 75	3TF68
3RW44 66	1 214	3 x 3NA3 365-6	3 x 500	3	—	3RT10 76	3TF68

- 1) If the ramp-down function "Combined braking" is selected, no braking contactor is required.
If the ramp-down function "DC braking" is selected, a braking contactor must be used in addition (see table for type).
For applications with large centrifugal masses ($J_{\text{Load}} > J_{\text{Motor}}$) we recommend the function "DC braking".

- 2) Additional auxiliary relay K4:
LZX:RT4A4T30
(3RW44 soft starter with rated control supply voltage 230 V AC),
LZX:RT4A4S15
(3RW44 soft starter with rated control supply voltage 115 V AC).

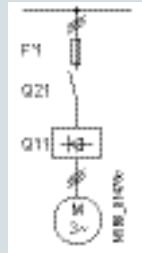
- 3) The type of coordination "1" refers to soft starters in combination with the stipulated fuse, not to any additional components in the feeder.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Inline circuit fused version with 3NE1 SITOR all-range fuse (semiconductor and line protection)



Soft starters 	All-range fuses		Line contactor up to 400 V			Braking contactors ¹⁾²⁾		
	Rated current		Rated current	Voltage	Size	(optional)	(for example circuit see the 3RW44 manual)	
Q11 Type	A	F ¹ Type	A	V		Q21 Type	Q91 Type	Q92 Type
Type of coordination "2" ³⁾ : I _q = 65 kA								
3RW44 22	29	3NE1 020-2	80	690 +5 %	00	3RT10 34	3RT15 26	—
3RW44 23	36	3NE1 020-2	80	690 +5 %	00	3RT10 35	3RT15 26	—
3RW44 24	47	3NE1 021-2	100	690 +5 %	00	3RT10 36	3RT15 35	—
3RW44 25	57	3NE1 022-2	125	690 +5 %	00	3RT10 44	3RT15 35	—
3RW44 26	77	3NE1 022-2	125	690 +5 %	00	3RT10 45	3RT10 24	3RT10 35
3RW44 27	93	3NE1 224-2	160	690 +5 %	1	3RT10 46	3RT10 25	3RT10 36
3RW44 34	113	3NE1 225-2	200	690 +5 %	1	3RT10 54	3RT10 34	3RT10 44
3RW44 35	134	3NE1 227-2	250	690 +5 %	1	3RT10 55	3RT10 36	3RT10 45
3RW44 36	162	3NE1 227-2	250	690 +5 %	1	3RT10 56	3RT10 44	3RT10 45
3RW44 43	203	3NE1 230-2	315	600 +10 %	1	3RT10 64	3RT10 44	3RT10 54
3RW44 44	250	3NE1 331-2	350	460 +10 %	2	3RT10 65	3RT10 44	3RT10 55
3RW44 45	313	3NE1 333-2	450	690 +5 %	2	3RT10 75	3RT10 54	3RT10 56
3RW44 46	356	3NE1 334-2	500	690 +5 %	2	3RT10 75	3RT10 54	3RT10 56
3RW44 47	432	3NE1 435-2	560	690 +5 %	3	3RT10 76	3RT10 55	3RT10 64
3RW44 53	551	2 x 3NE1 334-2	500	690 +10 %	2	3TF68	3RT10 64	3RT10 66
3RW44 54	615	2 x 3NE1 334-2	500	690 +10 %	2	3TF68	3RT10 64	3RT10 75
3RW44 55	693	2 x 3NE1 334-2	500	690 +10 %	2	3TF69	3RT10 65	3RT10 75
3RW44 56	780	2 x 3NE1 435-2	560	690 +10 %	3	3TF69	3RT10 65	3RT10 75
3RW44 57	880	2 x 3NE1 435-2	560	690 +10 %	3	—	3RT10 75	3RT10 76
3RW44 58	970	2 x 3NE1 435-2	560	690 +10 %	3	—	3RT10 75	3RT10 76
3RW44 65	1 076	3 x 3NE1 334-2	500	690 +10 %	2	—	3RT10 75	3TF68
3RW44 66	1 214	3 x 3NE1 435-2	560	690 +10 %	3	—	3RT10 76	3TF68

- 1) If the ramp-down function "Combined braking" is selected, no braking contactor is required.
If the ramp-down function "DC braking" is selected, a braking contactor must be used in addition (see table for type).
For applications with large centrifugal masses ($J_{\text{Load}} > J_{\text{Motor}}$) we recommend the function "DC braking".
- 2) Additional auxiliary relay K4:
LZX:RT4A4T30
(3RW44 soft starter with rated control supply voltage 230 V AC),
LZX:RT4A4S15
(3RW44 soft starter with rated control supply voltage 115 V AC).
- 3) The type of coordination "2" refers to soft starters in combination with the stipulated fuse, not to any additional components in the feeder.

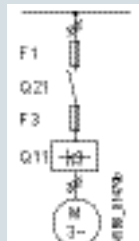
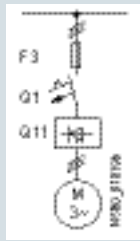
SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Inline circuit fused version with 3NE or 3NC SITOR semiconductor fuse

(semiconductor protection by fuse, line and overload protection by motor starter protector/circuit breaker)



Soft starters 		Semiconductor fuses, minimum			Semiconductor fuses, maximum			Semiconductor fuses (cylinder)		
	Rated current	690 V +10 %	Rated current	Size	690 V +10 %	Rated current	Size		Rated current	Size
Q11 Type	A	F3 Type	A		F3 Type	A		F3 Type	A	
Type of coordination "2" ³⁾ : I _q = 65 kA										
3RW44 22	29	3NE4 120	80	0	3NE4 121	100	0	3NC2 280	80	22 x 58
3RW44 23	36	3NE4 121	100	0	3NE4 121	100	0	3NC2 200	100	22 x 58
3RW44 24	47	3NE4 121	100	0	3NE4 122	125	0	3NC2 200	100	22 x 58
3RW44 25	57	3NE4 122	125	0	3NE4 124	160	0	—	—	—
3RW44 26	77	3NE4 124	160	0	3NE4 124	160	0	—	—	—
3RW44 27	93	3NE3 224	160	1	3NE3 332-0B	400	2	—	—	—
3RW44 34	113	3NE3 225	200	1	3NE3 335	560	2	—	—	—
3RW44 35	134	3NE3 225	200	1	3NE3 335	560	2	—	—	—
3RW44 36	162	3NE3 227	250	1	3NE3 333	450	2	—	—	—
3RW44 43	203	3NE3 230-0B	315	1	3NE3 333	450	2	—	—	—
3RW44 44	250	3NE3 230-0B	315	1	3NE3 333	450	2	—	—	—
3RW44 45	313	3NE3 233	450	1	3NE3 336	630	2	—	—	—
3RW44 46	356	3NE3 333	450	2	3NE3 336	630	2	—	—	—
3RW44 47	432	3NE3 335	560	2	3NE3 338-8	800	2	—	—	—
3RW44 53	551	2 x 3NE3 335	560	2	3 x 3NE3 334-0B	500	2	—	—	—
3RW44 54	615	2 x 3NE3 335	560	2	3 x 3NE3 334-0B	500	2	—	—	—
3RW44 55	693	2 x 3NE3 335	560	2	3 x 3NE3 334-0B	500	2	—	—	—
3RW44 56	780	2 x 3NE3 336	630	2	2 x 3NE3 340-8	900	2	—	—	—
3RW44 57	880	2 x 3NE3 336	630	2	2 x 3NE3 340-8	900	2	—	—	—
3RW44 58	970	2 x 3NE3 336	630	2	2 x 3NE3 340-8	900	2	—	—	—
3RW44 65	1 076	2 x 3NE3 340-8	900	2	3 x 3NE3 338-8	800	2	—	—	—
3RW44 66	1 214	2 x 3NE3 340-8	900	2	3 x 3NE3 338-8	800	2	—	—	—

Soft starters 		Line contactor up to 400 V	Braking contactors ¹⁾²⁾		Motor starter protectors/ circuit breakers		Line fuses, maximum		
	Rated current	(optional)	(for example circuit see the 3RW44 manual)		440 V +10 %	Rated current	690 V +5 %	Rated current	Size
	A	Q21 Type	Q91 Type	Q92 Type	Q1 Type	A	F1 Type		
Q11 Type									
Type of coordination "2" ²⁾ : I _q = 65 kA									
3RW44 22	29	3RT10 34	3RT15 26	—	3RV10 41-4HA10	50	3NA3 820-6	50	00
3RW44 23	36	3RT10 35	3RT15 26	—	3RV10 41-4JA10	63	3NA3 822-6	63	00
3RW44 24	47	3RT10 36	3RT15 35	—	3RV10 41-4KA10	75	3NA3 824-6	80	00
3RW44 25	57	3RT10 44	3RT15 35	—	3RV10 41-4LA10	90	3NA3 830-6	100	00
3RW44 26	77	3RT10 45	3RT10 24	3RT10 35	3RV10 41-4MA10	100	3NA3 132-6	125	1
3RW44 27	93	3RT10 46	3RT10 25	3RT10 36	3RV10 41-4MA10	100	3NA3 136-6	160	1
3RW44 34	113	3RT10 54	3RT10 34	3RT10 44	3VL17 16	160	3NA3 244-6	250	2
3RW44 35	134	3RT10 55	3RT10 36	3RT10 45	3VL17 16	160	3NA3 244-6	250	2
3RW44 36	162	3RT10 56	3RT10 44	3RT10 45	3VL37 25	250	3NA3 365-6	500	3
3RW44 43	203	3RT10 64	3RT10 44	3RT10 54	3VL47 31	315	2 x 3NA3 354-6	2 x 355	3
3RW44 44	250	3RT10 65	3RT10 44	3RT10 55	3VL47 31	315	2 x 3NA3 354-6	2 x 355	3
3RW44 45	313	3RT10 75	3RT10 54	3RT10 56	3VL47 40	400	2 x 3NA3 365-6	2 x 500	3
3RW44 46	356	3RT10 75	3RT10 54	3RT10 56	3VL47 40	400	2 x 3NA3 365-6	2 x 500	3
3RW44 47	432	3RT10 76	3RT10 55	3RT10 64	3VL57 50	500	2 x 3NA3 365-6	2 x 500	3
3RW44 53	551	3TF68	3RT10 64	3RT10 66	3VL67 80	800	2 x 3NA3 365-6	2 x 500	3
3RW44 54	615	3TF68	3RT10 64	3RT10 75	3VL67 80	800	2 x 3NA3 365-6	2 x 500	3
3RW44 55	693	3TF69	3RT10 65	3RT10 75	3VL67 80	800	2 x 3NA3 365-6	2 x 500	3
3RW44 56	780	3TF69	3RT10 65	3RT10 75	3VL77 10	1 000	2 x 3NA3 365-6	2 x 500	3
3RW44 57	880	—	3RT10 75	3RT10 76	3VL77 10	1 000	2 x 3NA3 365-6	2 x 500	3
3RW44 58	970	—	3RT10 75	3RT10 76	3VL77 12	1 250	3 x 3NA3 365-6	3 x 500	3
3RW44 65	1 076	—	3RT10 75	3TF68	3VL77 12	1 250	3 x 3NA3 365-6	3 x 500	3
3RW44 66	1 214	—	3RT10 76	3TF68	3VL77 12	1 250	3 x 3NA3 365-6	3 x 500	3

1) If the ramp-down function "Combined braking" is selected, no braking contactor is required. If the ramp-down function "DC braking" is selected, a braking contactor must be used in addition (see table for type).
For applications with large centrifugal masses ($J_{\text{Load}} > J_{\text{Motor}}$) we recommend the function "DC braking".

2) Additional auxiliary relay K4:
LX:RT4A4T30 (3RW44 soft starter with rated control supply voltage 230 V AC),
LX:RT4A4S15 (3RW44 soft starter with rated control supply voltage 115 V AC).
3) The type of coordination "2" refers to soft starters in combination with the stipulated protective device (motor starter protector/circuit breaker/fuse), not to any additional components in the feeder.

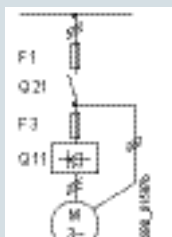
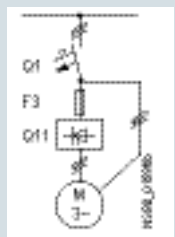
SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Inside-delta circuit fused version with 3NE or 3NC SITOR fuses

(semiconductor protection by fuse, lead and overload protection by motor starter protector/circuit breaker)



Soft starters 		Semiconductor fuses, minimum			Semiconductor fuses, maximum			Semiconductor fuses (cylinder)		
	Rated current	690 V +10 %	Rated current	Size	690 V +10 %	Rated current	Size		Rated current	Size
	A	F3 Type	A		F3 Type	A		F3 Type	A	
Q11 Type	A	F3 Type	A		F3 Type	A		F3 Type	A	
Type of coordination “2” ¹⁾										
3RW44 22	50	3NE4 120	80	0	3NE4 121	100	0	3NC2 280	80	22 x 58
3RW44 23	62	3NE4 121	100	0	3NE4 121	100	0	3NC2 200	100	22 x 58
3RW44 24	81	3NE4 121	100	0	3NE4 122	125	0	3NC2 200	100	22 x 58
3RW44 25	99	3NE4 122	125	0	3NE4 124	160	0	—	—	—
3RW44 26	133	3NE4 124	160	0	3NE4 124	160	0	—	—	—
3RW44 27	161	3NE3 224	160	1	3NE3 332-0B	400	2	—	—	—
3RW44 34	196	3NE3 225	200	1	3NE3 335	560	2	—	—	—
3RW44 35	232	3NE3 225	200	1	3NE3 335	560	2	—	—	—
3RW44 36	281	3NE3 227	250	1	3NE3 333	450	2	—	—	—
3RW44 43	352	3NE3 230-0B	315	1	3NE3 333	450	2	—	—	—
3RW44 44	433	3NE3 230-0B	315	1	3NE3 333	450	2	—	—	—
3RW44 45	542	3NE3 233	450	1	3NE3 336	630	2	—	—	—
3RW44 46	617	3NE3 333	450	2	3NE3 336	630	2	—	—	—
3RW44 47	748	3NE3 335	560	2	3NE3 338-8	800	2	—	—	—
3RW44 53	954	2 x 3NE3 335	560	2	3 x 3NE3 334-0B	500	2	—	—	—
3RW44 54	1 065	2 x 3NE3 335	560	2	3 x 3NE3 334-0B	500	2	—	—	—
3RW44 55	1 200	2 x 3NE3 335	560	2	3 x 3NE3 334-0B	500	2	—	—	—
3RW44 56	1 351	2 x 3NE3 336	630	2	2 x 3NE3 340-8	900	2	—	—	—
3RW44 57	1 524	2 x 3NE3 336	630	2	3 x 3NE3 340-8	900	2	—	—	—
3RW44 58	1 680	2 x 3NE3 336	630	2	3 x 3NE3 340-8	900	2	—	—	—
3RW44 65	1 864	2 x 3NE3 340-8	900	2	3 x 3NE3 338-8	800	2	—	—	—
3RW44 66	2 103	2 x 3NE3 340-8	900	2	3 x 3NE3 338-8	800	2	—	—	—

Soft starters 		Line contactor up to 400 V	Motor starter protectors/circuit breakers		Line fuses, maximum		
	Rated current	(optional)	440 V +10 %	Rated current	690 V +5 %	Rated current	Size
Q11 Type	A	Q21 Type	Q1 Type	A	F1 Type		
Type of coordination "2" ⁽¹⁾							
3RW44 22	50	3RT10 36-1AP04	3RV10 42 -4KA10	75	3NA3 824-6	80	00
3RW44 23	62	3RT10 44-1AP04	3RV10 4 2 -4LA10	90	3NA3 830-6	100	00
3RW44 24	81	3RT10 46-1AP04	3RV10 42 -4MA10	100	3NA3 132-6	125	1
3RW44 25	99	3RT10 54-1AP36	3VL27 16	160	3NA3 136-6	160	1
3RW44 26	133	3RT10 55-6AP36	3VL27 16	160	3NA3 240-6	200	2
3RW44 27	161	3RT10 56-6AP36	3VL37 20	200	3NA3 244-6	250	2
3RW44 34	196	3RT10 64-6AP36	3VL37 25	250	3NA3 360-6	400	3
3RW44 35	232	3RT10 65-6AP36	3VL47 31	315	3NA3 360-6	400	3
3RW44 36	281	3RT10 66-6AP36	3VL47 40	400	2 x 3NA3 360-6	2 x 400	3
3RW44 43	352	3RT10 75-6AP36	3VL47 40	400	2 x 3NA3 365-6	2 x 500	3
3RW44 44	433	3RT10 76-6AP36	3VL57 50	500	2 x 3NA3 365-6	2 x 500	3
3RW44 45	542	3TF68 44-OCM7	3VL57 63	800	3 x 3NA3 365-6	3 x 500	3
3RW44 46	617	3TF68 44-OCM7	3VL67 80	800	3 x 3NA3 365-6	3 x 500	3
3RW44 47	748	3TF69	3VL67 80	800	3 x 3NA3 365-6	3 x 500	3
3RW44 53	954	—	3VL77 10	1 000	3 x 3NA3 365-6	3 x 500	3
3RW44 54	1 065	—	3VL77 12	1 250	3 x 3NA3 365-6	3 x 500	3
3RW44 55	1 200	—	3VL87 16	1 600	3 x 3NA3 365-6	3 x 500	3
3RW44 56	1 351	—	3VL87 16	1 600	3 x 3NA3 372	3 x 630	3
3RW44 57	1 524	—	3VL87 16	1 600	3 x 3NA3 372	3 x 630	3
3RW44 58	1 680	—	3WL12 20	2 000	2 x 3NA3 480	2 x 1000	4
3RW44 65	1 864	—	3WL12 25	2 500	2 x 3NA3 482	2 x 1250	4
3RW44 66	2 103	—	3WL12 25	2 500	2 x 3NA3 482	2 x 1250	4

1) The type of coordination "2" refers to soft starters in combination with the stipulated protective device (motor starter protector/circuit breaker/fuse), not to any additional components in the feeder.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Selection and ordering data

SIRIUS 3RW44 for normal starting (CLASS 10) in inline circuit



3RW44 2.

3RW44 3.

3RW44 4.

3RW44 5.

3RW44 6.

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Normal starting (CLASS 10) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
A	230 V kW	400 V kW	500 V kW	690 V kW	1000 V kW	A	200 V hp	230 V hp	460 V hp	575 V hp	
Inline circuit, rated operational voltage 200 ... 460 V											Order No.
29	5.5	15	—	—	—	26	7.5	7.5	15	—	3RW44 22-□BC□4
36	7.5	18.5	—	—	—	32	10	10	20	—	3RW44 23-□BC□4
47	11	22	—	—	—	42	10	15	25	—	3RW44 24-□BC□4
57	15	30	—	—	—	51	15	15	30	—	3RW44 25-□BC□4
77	18.5	37	—	—	—	68	20	20	50	—	3RW44 26-□BC□4
93	22	45	—	—	—	82	25	25	60	—	3RW44 27-□BC□4
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
113	30	55	—	—	—	100	30	30	75	—	3RW44 34-□BC□4
134	37	75	—	—	—	117	30	40	75	—	3RW44 35-□BC□4
162	45	90	—	—	—	145	40	50	100	—	3RW44 36-□BC□4
203	55	110	—	—	—	180	50	60	125	—	3RW44 43-□BC□4
250	75	132	—	—	—	215	60	75	150	—	3RW44 44-□BC□4
313	90	160	—	—	—	280	75	100	200	—	3RW44 45-□BC□4
356	110	200	—	—	—	315	100	125	250	—	3RW44 46-□BC□4
432	132	250	—	—	—	385	125	150	300	—	3RW44 47-□BC□4
551	160	315	—	—	—	494	150	200	400	—	3RW44 53-□BC□4
615	200	355	—	—	—	551	150	200	450	—	3RW44 54-□BC□4
693	200	400	—	—	—	615	200	250	500	—	3RW44 55-□BC□4
780	250	450	—	—	—	693	200	250	600	—	3RW44 56-□BC□4
880	250	500	—	—	—	780	250	300	700	—	3RW44 57-□BC□4
970	315	560	—	—	—	850	300	350	750	—	3RW44 58-□BC□4
1 076	355	630	—	—	—	970	350	400	850	—	3RW44 65-□BC□4
1 214	400	710	—	—	—	1 076	350	450	950	—	3RW44 66-□BC□4

Order No. supplement for connection types

- With spring-type terminals
- With screw terminals

Order No. supplement for the rated control supply voltage U_c ¹⁾

- 115 V AC
- 230 V AC

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 10
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Normal starting (CLASS 10) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	Order No.
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	
Inline circuit, rated operational voltage 400 ... 600 V											
29	—	15	18.5	—	—	26	—	—	15	20	3RW44 22-□BC□5
36	—	18.5	22	—	—	32	—	—	20	25	3RW44 23-□BC□5
47	—	22	30	—	—	42	—	—	25	30	3RW44 24-□BC□5
57	—	30	37	—	—	51	—	—	30	40	3RW44 25-□BC□5
77	—	37	45	—	—	68	—	—	50	50	3RW44 26-□BC□5
93	—	45	55	—	—	82	—	—	60	75	3RW44 27-□BC□5
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
113	—	55	75	—	—	100	—	—	75	75	3RW44 34-□BC□5
134	—	75	90	—	—	117	—	—	75	100	3RW44 35-□BC□5
162	—	90	110	—	—	145	—	—	100	125	3RW44 36-□BC□5
203	—	110	132	—	—	180	—	—	125	150	3RW44 43-□BC□5
250	—	132	160	—	—	215	—	—	150	200	3RW44 44-□BC□5
313	—	160	200	—	—	280	—	—	200	250	3RW44 45-□BC□5
356	—	200	250	—	—	315	—	—	250	300	3RW44 46-□BC□5
432	—	250	315	—	—	385	—	—	300	400	3RW44 47-□BC□5
551	—	315	355	—	—	494	—	—	400	500	3RW44 53-□BC□5
615	—	355	400	—	—	551	—	—	450	600	3RW44 54-□BC□5
693	—	400	500	—	—	615	—	—	500	700	3RW44 55-□BC□5
780	—	450	560	—	—	693	—	—	600	750	3RW44 56-□BC□5
880	—	500	630	—	—	780	—	—	700	850	3RW44 57-□BC□5
970	—	560	710	—	—	850	—	—	750	900	3RW44 58-□BC□5
1 076	—	630	800	—	—	970	—	—	850	1 100	3RW44 65-□BC□5
1 214	—	710	900	—	—	1 076	—	—	950	1 200	3RW44 66-□BC□5
Order No. supplement for connection types											
• With spring-type terminals											2
• With screw terminals											6
Order No. supplement for the rated control supply voltage U_c ¹⁾											
• 115 V AC											3
• 230 V AC											4

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 10
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Normal starting (CLASS 10) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	Order No.
Inline circuit, rated operational voltage 400 ... 690 V											
29	—	15	18.5	30	—	26	—	—	15	20	3RW44 22-□BC□6
36	—	18.5	22	37	—	32	—	—	20	25	3RW44 23-□BC□6
47	—	22	30	45	—	42	—	—	25	30	3RW44 24-□BC□6
57	—	30	37	55	—	51	—	—	30	40	3RW44 25-□BC□6
77	—	37	45	75	—	68	—	—	50	50	3RW44 26-□BC□6
93	—	45	55	90	—	82	—	—	60	75	3RW44 27-□BC□6
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
113	—	55	75	110	—	100	—	—	75	75	3RW44 34-□BC□6
134	—	75	90	132	—	117	—	—	75	100	3RW44 35-□BC□6
162	—	90	110	160	—	145	—	—	100	125	3RW44 36-□BC□6
203	—	110	132	200	—	180	—	—	125	150	3RW44 43-□BC□6
250	—	132	160	250	—	215	—	—	150	200	3RW44 44-□BC□6
313	—	160	200	315	—	280	—	—	200	250	3RW44 45-□BC□6
356	—	200	250	355	—	315	—	—	250	300	3RW44 46-□BC□6
432	—	250	315	400	—	385	—	—	300	400	3RW44 47-□BC□6
551	—	315	355	560	—	494	—	—	400	500	3RW44 53-□BC□6
615	—	355	400	630	—	551	—	—	450	600	3RW44 54-□BC□6
693	—	400	500	710	—	615	—	—	500	700	3RW44 55-□BC□6
780	—	450	560	800	—	693	—	—	600	750	3RW44 56-□BC□6
880	—	500	630	900	—	780	—	—	700	850	3RW44 57-□BC□6
970	—	560	710	1 000	—	850	—	—	750	900	3RW44 58-□BC□6
1 076	—	630	800	1 100	—	970	—	—	850	1 100	3RW44 65-□BC□6
1 214	—	710	900	1 200	—	1 076	—	—	950	1 200	3RW44 66-□BC□6
Order No. supplement for connection types											
• With spring-type terminals											2
• With screw terminals											6
Order No. supplement for the rated control supply voltage U_c ¹⁾											
• 115 V AC											3
• 230 V AC											4

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 10
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

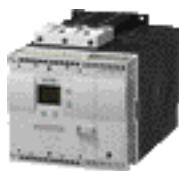
In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

SIRIUS 3RW44 for heavy starting (CLASS 20) in inline circuit



3RW44 2.



3RW44 3.



3RW44 4.



3RW44 5.



3RW44 6.

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Heavy starting (CLASS 20) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	Order No.
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	
Inline circuit, rated operational voltage 200 ... 460 V											
29	5.5	15	—	—	—	26	7.5	7.5	15	—	3RW44 22-□BC□4
36	7.5	18.5	—	—	—	32	10	10	20	—	3RW44 23-□BC□4
47	11	22	—	—	—	42	10	15	25	—	3RW44 24-□BC□4
57	15	30	—	—	—	51	15	15	30	—	3RW44 25-□BC□4
77	18.5	37	—	—	—	68	20	20	50	—	3RW44 27-□BC□4
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
93	22	45	—	—	—	82	25	25	60	—	3RW44 34-□BC□4
113	30	55	—	—	—	100	30	30	75	—	3RW44 35-□BC□4
134	37	75	—	—	—	117	30	40	75	—	3RW44 36-□BC□4
162	45	90	—	—	—	145	40	50	100	—	3RW44 43-□BC□4
203	55	110	—	—	—	180	50	60	125	—	3RW44 45-□BC□4
250	75	132	—	—	—	215	60	75	150	—	3RW44 46-□BC□4
313	90	160	—	—	—	280	75	100	200	—	3RW44 47-□BC□4
356	110	200	—	—	—	315	100	125	250	—	3RW44 47-□BC□4
432	132	250	—	—	—	385	125	150	300	—	3RW44 53-□BC□4
551	160	315	—	—	—	494	150	200	400	—	3RW44 53-□BC□4
615	200	355	—	—	—	551	150	200	450	—	3RW44 55-□BC□4
693	200	400	—	—	—	615	200	250	500	—	3RW44 57-□BC□4
780	250	450	—	—	—	693	200	250	600	—	3RW44 65-□BC□4
880	250	500	—	—	—	780	250	300	700	—	3RW44 65-□BC□4
970	315	560	—	—	—	850	300	350	750	—	3RW44 65-□BC□4

Order No. supplement for connection types

- With spring-type terminals
- With screw terminals

Order No. supplement for the rated control supply voltage $U_s^{1)}$

- 115 V AC
- 230 V AC

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 40
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Heavy starting (CLASS 20) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	Order No.
Inline circuit, rated operational voltage 400 ... 600 V											
29	—	15	18.5	—	—	26	—	—	15	20	3RW44 22-□BC□5
36	—	18.5	22	—	—	32	—	—	20	25	3RW44 23-□BC□5
47	—	22	30	—	—	42	—	—	25	30	3RW44 24-□BC□5
57	—	30	37	—	—	51	—	—	30	40	3RW44 25-□BC□5
77	—	37	45	—	—	68	—	—	50	50	3RW44 27-□BC□5
Order No. supplement for connection types											
• With screw terminals											
• With spring-type terminals											
93	—	45	55	—	—	82	—	—	60	75	3RW44 34-□BC□5
113	—	55	75	—	—	100	—	—	75	75	3RW44 35-□BC□5
134	—	75	90	—	—	117	—	—	75	100	3RW44 36-□BC□5
162	—	90	110	—	—	145	—	—	100	125	3RW44 43-□BC□5
203	—	110	132	—	—	180	—	—	125	150	3RW44 45-□BC□5
250	—	132	160	—	—	215	—	—	150	200	3RW44 46-□BC□5
313	—	160	200	—	—	280	—	—	200	250	3RW44 47-□BC□5
356	—	200	250	—	—	315	—	—	250	300	3RW44 47-□BC□5
432	—	250	315	—	—	385	—	—	300	400	3RW44 53-□BC□5
551	—	315	355	—	—	494	—	—	400	500	3RW44 53-□BC□5
615	—	355	400	—	—	551	—	—	450	600	3RW44 54-□BC□5
693	—	400	500	—	—	615	—	—	500	700	3RW44 57-□BC□5
780	—	450	560	—	—	693	—	—	600	750	3RW44 65-□BC□5
880	—	500	630	—	—	780	—	—	700	850	3RW44 65-□BC□5
970	—	560	710	—	—	850	—	—	750	900	3RW44 65-□BC□5
Order No. supplement for connection types											
• With spring-type terminals											
• With screw terminals											
Order No. supplement for the rated control supply voltage U_c ¹⁾											
• 115 V AC											
• 230 V AC											

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 40
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Heavy starting (CLASS 20) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	Order No.
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	
Inline circuit, rated operational voltage 400 ... 690 V											
29	—	15	18.5	30	—	26	—	—	15	20	3RW44 22-□BC□6
36	—	18.5	22	37	—	32	—	—	20	25	3RW44 23-□BC□6
47	—	22	30	45	—	42	—	—	25	30	3RW44 24-□BC□6
57	—	30	37	55	—	51	—	—	30	40	3RW44 25-□BC□6
77	—	37	45	75	—	68	—	—	50	50	3RW44 27-□BC□6
Order No. supplement for connection types											1 3
• With screw terminals • With spring-type terminals											
93	—	45	55	90	—	82	—	—	60	75	3RW44 34-□BC□6
113	—	55	75	110	—	100	—	—	75	75	3RW44 35-□BC□6
134	—	75	90	132	—	117	—	—	75	100	3RW44 36-□BC□6
162	—	90	110	160	—	145	—	—	100	125	3RW44 43-□BC□6
203	—	110	132	200	—	180	—	—	125	150	3RW44 45-□BC□6
250	—	132	160	250	—	215	—	—	150	200	3RW44 46-□BC□6
313	—	160	200	315	—	280	—	—	200	250	3RW44 47-□BC□6
356	—	200	250	355	—	315	—	—	250	300	3RW44 47-□BC□6
432	—	250	315	400	—	385	—	—	300	400	3RW44 53-□BC□6
551	—	315	355	560	—	494	—	—	400	500	3RW44 53-□BC□6
615	—	355	400	630	—	551	—	—	450	600	3RW44 55-□BC□6
693	—	400	500	710	—	615	—	—	500	700	3RW44 57-□BC□6
780	—	450	560	800	—	693	—	—	600	750	3RW44 65-□BC□6
880	—	500	630	900	—	780	—	—	700	850	3RW44 65-□BC□6
970	—	560	710	1 000	—	850	—	—	750	900	3RW44 65-□BC□6

Order No. supplement for connection types

- With spring-type terminals
- With screw terminals

Order No. supplement for the rated control supply voltage U_c ¹⁾

- 115 V AC
- 230 V AC

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 40
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

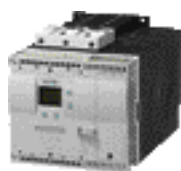
In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

SIRIUS 3RW44 for very heavy starting (CLASS 30) in inline circuit



3RW44 2.



3RW44 3.



3RW44 4.



3RW44 5.



3RW44 6.

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Very heavy starting (CLASS 30) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	Order No.
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	
Inline circuit, rated operational voltage 200 ... 460 V											
29	5.5	15	—	—	—	26	7.5	7.5	15	—	3RW44 22-□BC□4
36	7.5	18.5	—	—	—	32	10	10	20	—	3RW44 24-□BC□4
47	11	22	—	—	—	42	10	15	25	—	3RW44 25-□BC□4
57	15	30	—	—	—	51	15	15	30	—	3RW44 25-□BC□4
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
77	18.5	37	—	—	—	68	20	20	50	—	3RW44 34-□BC□4
93	22	45	—	—	—	82	25	25	60	—	3RW44 35-□BC□4
113	30	55	—	—	—	100	30	30	75	—	3RW44 43-□BC□4
134	37	75	—	—	—	117	30	40	75	—	3RW44 43-□BC□4
162	45	90	—	—	—	145	40	50	100	—	3RW44 43-□BC□4
203	55	110	—	—	—	180	50	60	125	—	3RW44 46-□BC□4
250	75	132	—	—	—	215	60	75	150	—	3RW44 47-□BC□4
313	90	160	—	—	—	280	75	100	200	—	3RW44 53-□BC□4
356	110	200	—	—	—	315	100	125	250	—	3RW44 53-□BC□4
432	132	250	—	—	—	385	125	150	300	—	3RW44 53-□BC□4
551	160	315	—	—	—	494	150	200	400	—	3RW44 55-□BC□4
615	200	355	—	—	—	551	150	200	450	—	3RW44 58-□BC□4
693	200	400	—	—	—	615	200	250	500	—	3RW44 65-□BC□4
780	250	450	—	—	—	693	200	250	600	—	3RW44 65-□BC□4
880	250	500	—	—	—	780	250	300	700	—	3RW44 65-□BC□4
970	315	560	—	—	—	850	300	350	750	—	3RW44 66-□BC□4

Order No. supplement for connection types

- With spring-type terminals
- With screw terminals

Order No. supplement for the rated control supply voltage U_c ¹⁾

- 115 V AC
- 230 V AC

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:
The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 60
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Very heavy starting (CLASS 30) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
A	230 V kW	400 V kW	500 V kW	690 V kW	1000 V kW	A	200 V hp	230 V hp	460 V hp	575 V hp	Order No.
Inline circuit, rated operational voltage 400 ... 600 V											
29	—	15	18.5	—	—	26	—	—	15	20	3RW44 22-□BC□5
36	—	18.5	22	—	—	32	—	—	20	25	3RW44 24-□BC□5
47	—	22	30	—	—	42	—	—	25	30	3RW44 25-□BC□5
57	—	30	37	—	—	51	—	—	30	40	3RW44 25-□BC□5
Order No. supplement for connection types											
• With screw terminals											
• With spring-type terminals											
77	—	37	45	—	—	68	—	—	50	50	3RW44 34-□BC□5
93	—	45	55	—	—	82	—	—	60	75	3RW44 35-□BC□5
113	—	55	75	—	—	100	—	—	75	75	3RW44 43-□BC□5
134	—	75	90	—	—	117	—	—	75	100	3RW44 43-□BC□5
162	—	90	110	—	—	145	—	—	100	125	3RW44 43-□BC□5
203	—	110	132	—	—	180	—	—	125	150	3RW44 46-□BC□5
250	—	132	160	—	—	215	—	—	150	200	3RW44 47-□BC□5
313	—	160	200	—	—	280	—	—	200	250	3RW44 53-□BC□5
356	—	200	250	—	—	315	—	—	250	300	3RW44 53-□BC□5
432	—	250	315	—	—	385	—	—	300	400	3RW44 53-□BC□5
551	—	315	355	—	—	494	—	—	400	500	3RW44 55-□BC□5
615	—	355	400	—	—	551	—	—	450	600	3RW44 58-□BC□5
693	—	400	500	—	—	615	—	—	500	700	3RW44 65-□BC□5
780	—	450	560	—	—	693	—	—	600	750	3RW44 65-□BC□5
880	—	500	630	—	—	780	—	—	700	850	3RW44 65-□BC□5
—	—	—	—	—	—	850	—	—	750	900	3RW44 66-□BC□5
Order No. supplement for connection types											
• With spring-type terminals											
• With screw terminals											
Order No. supplement for the rated control supply voltage U_c ¹⁾											
• 115 V AC											
• 230 V AC											

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 60
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

3RW ambient temperature 40 °C						3RW ambient temperature 50 °C					Very heavy starting (CLASS 30) in inline circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	Order No.
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	
Inline circuit, rated operational voltage 400 ... 690 V											
29	—	15	18.5	30	—	26	—	—	15	20	3RW44 22-□BC□6
36	—	18.5	22	37	—	32	—	—	20	25	3RW44 24-□BC□6
47	—	22	30	45	—	42	—	—	25	30	3RW44 25-□BC□6
57	—	30	37	55	—	51	—	—	30	40	3RW44 25-□BC□6
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
77	—	37	45	75	—	68	—	—	50	50	3RW44 34-□BC□6
93	—	45	55	90	—	82	—	—	60	75	3RW44 35-□BC□6
113	—	55	75	110	—	100	—	—	75	75	3RW44 43-□BC□6
134	—	75	90	132	—	117	—	—	75	100	3RW44 43-□BC□6
162	—	90	110	160	—	145	—	—	100	125	3RW44 43-□BC□6
203	—	110	132	200	—	180	—	—	125	150	3RW44 46-□BC□6
250	—	132	160	250	—	215	—	—	150	200	3RW44 47-□BC□6
313	—	160	200	315	—	280	—	—	200	250	3RW44 53-□BC□6
356	—	200	250	355	—	315	—	—	250	300	3RW44 53-□BC□6
432	—	250	315	400	—	385	—	—	300	400	3RW44 53-□BC□6
551	—	315	355	560	—	494	—	—	400	500	3RW44 55-□BC□6
615	—	355	400	630	—	551	—	—	450	600	3RW44 58-□BC□6
693	—	400	500	710	—	615	—	—	500	700	3RW44 65-□BC□6
780	—	450	560	800	—	693	—	—	600	750	3RW44 65-□BC□6
880	—	500	630	900	—	780	—	—	700	850	3RW44 65-□BC□6
—	—	—	—	—	—	850	—	—	750	900	3RW44 66-□BC□6
Order No. supplement for connection types											
• With spring-type terminals											2
• With screw terminals											6
Order No. supplement for the rated control supply voltage U_c ¹⁾											
• 115 V AC											3
• 230 V AC											4

1) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 60
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

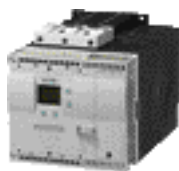
In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

SIRIUS 3RW44 for normal starting (CLASS 10) in inside-delta circuit



3RW44 2.



3RW44 3.



3RW44 4.



3RW44 5.



3RW44 6.

3RW ambient temperature 40 °C ¹⁾						3RW ambient temperature 50 °C ¹⁾					Normal starting (CLASS 10) in inside-delta circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	Order No.
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	
Inside-delta circuit, rated operational voltage 200 ... 460 V											
50	15	22	—	—	—	45	10	15	30	—	3RW44 22-□BC□4
62	18.5	30	—	—	—	55	15	20	40	—	3RW44 23-□BC□4
81	22	45	—	—	—	73	20	25	50	—	3RW44 24-□BC□4
99	30	55	—	—	—	88	25	30	60	—	3RW44 25-□BC□4
133	37	75	—	—	—	118	30	40	75	—	3RW44 26-□BC□4
161	45	90	—	—	—	142	40	50	100	—	3RW44 27-□BC□4
Order No. supplement for connection types											
• With screw terminals											
• With spring-type terminals											
196	55	110	—	—	—	173	50	60	125	—	3RW44 34-□BC□4
232	75	132	—	—	—	203	60	75	150	—	3RW44 35-□BC□4
281	90	160	—	—	—	251	75	100	200	—	3RW44 36-□BC□4
352	110	200	—	—	—	312	100	125	250	—	3RW44 43-□BC□4
433	132	250	—	—	—	372	125	150	300	—	3RW44 44-□BC□4
542	160	315	—	—	—	485	150	200	400	—	3RW44 45-□BC□4
617	200	355	—	—	—	546	150	200	450	—	3RW44 46-□BC□4
748	250	400	—	—	—	667	200	250	600	—	3RW44 47-□BC□4
954	315	560	—	—	—	856	300	350	750	—	3RW44 53-□BC□4
1 065	355	630	—	—	—	954	350	400	850	—	3RW44 54-□BC□4
1 200	400	710	—	—	—	1 065	350	450	950	—	3RW44 55-□BC□4
1 351	450	800	—	—	—	1 200	450	500	1 050	—	3RW44 56-□BC□4
1 524	500	900	—	—	—	1 351	450	600	1 200	—	3RW44 57-□BC□4
1 680	560	1 000	—	—	—	1 472	550	650	1 300	—	3RW44 58-□BC□4
1 864	630	1 100	—	—	—	1 680	650	750	1 500	—	3RW44 65-□BC□4
2 103	710	1 200	—	—	—	1 864	700	850	1 700	—	3RW44 66-□BC□4

Order No. supplement for connection types

- With spring-type terminals
- With screw terminals

Order No. supplement for the rated control supply voltage U_c ²⁾

- 115 V AC
- 230 V AC

- 1) In the selection table, the unit rated current I_e refers to the induction motor's rated operational current in the inside-delta circuit. The actual current of the device is approx. 58 % of this value.
- 2) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 10
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

3RW ambient temperature 40 °C ¹⁾						3RW ambient temperature 50 °C ¹⁾					Normal starting (CLASS 10) in inside-delta circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	Order No.
Inside-delta circuit, rated operational voltage 400 ... 600 V											
50	—	22	30	—	—	45	—	—	30	40	3RW44 22-□BC□5
62	—	30	37	—	—	55	—	—	40	50	3RW44 23-□BC□5
81	—	45	45	—	—	73	—	—	50	60	3RW44 24-□BC□5
99	—	55	55	—	—	88	—	—	60	75	3RW44 25-□BC□5
133	—	75	90	—	—	118	—	—	75	100	3RW44 26-□BC□5
161	—	90	110	—	—	142	—	—	100	125	3RW44 27-□BC□5
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
196	—	110	132	—	—	173	—	—	125	150	3RW44 34-□BC□5
232	—	132	160	—	—	203	—	—	150	200	3RW44 35-□BC□5
281	—	160	200	—	—	251	—	—	200	250	3RW44 36-□BC□5
352	—	200	250	—	—	312	—	—	250	300	3RW44 43-□BC□5
433	—	250	315	—	—	372	—	—	300	350	3RW44 44-□BC□5
542	—	315	355	—	—	485	—	—	400	500	3RW44 45-□BC□5
617	—	355	450	—	—	546	—	—	450	600	3RW44 46-□BC□5
748	—	400	500	—	—	667	—	—	600	750	3RW44 47-□BC□5
954	—	560	630	—	—	856	—	—	750	950	3RW44 53-□BC□5
1 065	—	630	710	—	—	954	—	—	850	1 050	3RW44 54-□BC□5
1 200	—	710	800	—	—	1 065	—	—	950	1 200	3RW44 55-□BC□5
1 351	—	800	900	—	—	1 200	—	—	1 050	1 350	3RW44 56-□BC□5
1 524	—	900	1 000	—	—	1 351	—	—	1 200	1 500	3RW44 57-□BC□5
1 680	—	1 000	1 200	—	—	1 472	—	—	1 300	1 650	3RW44 58-□BC□5
1 864	—	1 100	1 350	—	—	1 680	—	—	1 500	1 900	3RW44 65-□BC□5
2 103	—	1 200	1 500	—	—	1 864	—	—	1 700	2 100	3RW44 66-□BC□5
Order No. supplement for connection types											
• With spring-type terminals											2
• With screw terminals											6
Order No. supplement for the rated control supply voltage U_c ²⁾											
• 115 V AC											3
• 230 V AC											4

- 1) In the selection table, the unit rated current I_e refers to the induction motor's rated operational current in the inside-delta circuit. The actual current of the device is approx. 58 % of this value.
- 2) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 10
- Maximum starting current in % of motor current I_e : 300
- Maximum number of starts per hour in 1/h: 5

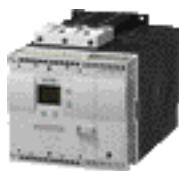
In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

SIRIUS 3RW44 for heavy starting (CLASS 20) in inside-delta circuit



3RW44 2.



3RW44 3.



3RW44 4.



3RW44 5.



3RW44 6.

3RW ambient temperature 40 °C ¹⁾						3RW ambient temperature 50 °C ¹⁾					Heavy starting (CLASS 20) in inside-delta circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	Order No.
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	
Inside-delta circuit, rated operational voltage 200 ... 460 V											
50	15	22	—	—	—	45	10	15	30	—	3RW44 23-□BC□4
62	18.5	30	—	—	—	55	15	20	40	—	3RW44 24-□BC□4
81	22	45	—	—	—	73	20	25	50	—	3RW44 25-□BC□4
99	30	55	—	—	—	88	25	30	60	—	3RW44 25-□BC□4
133	37	75	—	—	—	118	30	40	75	—	3RW44 27-□BC□4
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
161	45	90	—	—	—	142	40	50	100	—	3RW44 34-□BC□4
196	55	110	—	—	—	173	50	60	125	—	3RW44 35-□BC□4
232	75	132	—	—	—	203	60	75	150	—	3RW44 36-□BC□4
281	90	160	—	—	—	251	75	100	200	—	3RW44 43-□BC□4
352	110	200	—	—	—	312	100	125	250	—	3RW44 44-□BC□4
433	132	250	—	—	—	372	125	150	300	—	3RW44 45-□BC□4
542	160	315	—	—	—	485	150	200	400	—	3RW44 47-□BC□4
617	200	355	—	—	—	546	150	200	450	—	3RW44 47-□BC□4
748	250	400	—	—	—	667	200	250	600	—	3RW44 53-□BC□4
954	315	560	—	—	—	856	300	350	750	—	3RW44 53-□BC□4
1 065	355	630	—	—	—	954	350	400	850	—	3RW44 55-□BC□4
1 200	400	710	—	—	—	1 065	350	450	950	—	3RW44 57-□BC□4
1 351	450	800	—	—	—	1 200	450	500	1 050	—	3RW44 65-□BC□4
1 524	500	900	—	—	—	1 351	450	600	1 200	—	3RW44 65-□BC□4
1 680	560	1 000	—	—	—	1 472	550	650	1 300	—	3RW44 65-□BC□4
—	—	—	—	—	—	1 680	650	750	1 500	—	3RW44 66-□BC□4

Order No. supplement for connection types

- With spring-type terminals
- With screw terminals

Order No. supplement for the rated control supply voltage U_c ²⁾

- 115 V AC
- 230 V AC

1) In the selection table, the unit rated current I_e refers to the induction motor's rated operational current in the inside-delta circuit. The actual current of the device is approx. 58 % of this value.

2) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 40
- Maximum starting current in % of motor current I_e : 350

- Maximum number of starts per hour in 1/h: 1

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

3RW ambient temperature 40 °C ¹⁾						3RW ambient temperature 50 °C ¹⁾					Heavy starting (CLASS 20) in inside-delta circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
	230 V	400 V	500 V	690 V	1000 V		200 V	230 V	460 V	575 V	
A	kW	kW	kW	kW	kW	A	hp	hp	hp	hp	Order No.
Inside-delta circuit, rated operational voltage 400 ... 600 V											
50	—	22	30	—	—	45	—	—	30	40	3RW44 23-□BC□5
62	—	30	37	—	—	55	—	—	40	50	3RW44 24-□BC□5
81	—	45	45	—	—	73	—	—	50	60	3RW44 25-□BC□5
99	—	55	55	—	—	88	—	—	60	75	3RW44 25-□BC□5
133	—	75	90	—	—	118	—	—	75	100	3RW44 27-□BC□5
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
161	—	90	110	—	—	142	—	—	100	125	3RW44 34-□BC□5
196	—	110	132	—	—	173	—	—	125	150	3RW44 35-□BC□5
232	—	132	160	—	—	203	—	—	150	200	3RW44 36-□BC□5
281	—	160	200	—	—	251	—	—	200	250	3RW44 43-□BC□5
352	—	200	250	—	—	312	—	—	250	300	3RW44 44-□BC□5
433	—	250	315	—	—	372	—	—	300	350	3RW44 45-□BC□5
542	—	315	355	—	—	485	—	—	400	500	3RW44 47-□BC□5
617	—	355	450	—	—	546	—	—	450	600	3RW44 47-□BC□5
748	—	400	500	—	—	667	—	—	600	750	3RW44 53-□BC□5
954	—	560	630	—	—	856	—	—	750	950	3RW44 53-□BC□5
1 065	—	630	710	—	—	954	—	—	850	1 050	3RW44 55-□BC□5
1 200	—	710	800	—	—	1 065	—	—	950	1 200	3RW44 57-□BC□5
1 351	—	800	900	—	—	1 200	—	—	1 050	1 350	3RW44 65-□BC□5
1 524	—	900	1 000	—	—	1 351	—	—	1 200	1 500	3RW44 65-□BC□5
1 680	—	1 000	1 200	—	—	1 472	—	—	1 300	1 650	3RW44 65-□BC□5
—	—	—	—	—	—	1 680	—	—	1 500	1 900	3RW44 66-□BC□5

Order No. supplement for connection types

- With spring-type terminals
- With screw terminals

Order No. supplement for the rated control supply voltage U_c ²⁾

- 115 V AC
- 230 V AC

- 1) In the selection table, the unit rated current I_e refers to the induction motor's rated operational current in the inside-delta circuit.
The actual current of the device is approx. 58 % of this value.
- 2) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 40
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

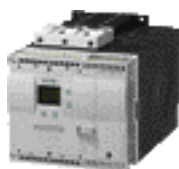
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SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

SIRIUS 3RW44 for very heavy starting (CLASS 30) in inside-delta circuit



3RW44 2.



3RW44 3.



3RW44 4.



3RW44 5.



3RW44 6.

3RW ambient temperature 40 °C ¹⁾						3RW ambient temperature 50 °C ¹⁾					Very heavy starting (CLASS 30) in inside-delta circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
A	230 V kW	400 V kW	500 V kW	690 V kW	1000 V kW	A	200 V hp	230 V hp	460 V hp	575 V hp	
Inside-delta circuit, rated operational voltage 200 ... 460 V											Order No.
50	15	22	—	—	—	45	10	15	30	—	3RW44 23-□BC□4
62	18.5	30	—	—	—	55	15	20	40	—	3RW44 24-□BC□4
81	22	45	—	—	—	73	20	25	50	—	3RW44 25-□BC□4
99	30	55	—	—	—	88	25	30	60	—	3RW44 25-□BC□4
133	37	75	—	—	—	118	30	40	75	—	3RW44 27-□BC□4
Order No. supplement for connection types											1 3
• With screw terminals											
• With spring-type terminals											
161	45	90	—	—	—	142	40	50	100	—	3RW44 35-□BC□4
196	55	110	—	—	—	173	50	60	125	—	3RW44 36-□BC□4
232	75	132	—	—	—	203	60	75	150	—	3RW44 43-□BC□4
281	90	160	—	—	—	251	75	100	200	—	3RW44 43-□BC□4
352	110	200	—	—	—	312	100	125	250	—	3RW44 45-□BC□4
433	132	250	—	—	—	372	125	150	300	—	3RW44 47-□BC□4
542	160	315	—	—	—	485	150	200	400	—	3RW44 53-□BC□4
617	200	355	—	—	—	546	150	200	450	—	3RW44 53-□BC□4
748	250	400	—	—	—	667	200	250	600	—	3RW44 53-□BC□4
954	315	560	—	—	—	856	300	350	750	—	3RW44 55-□BC□4
1 065	355	630	—	—	—	954	350	400	850	—	3RW44 58-□BC□4
1 200	400	710	—	—	—	1 065	350	450	950	—	3RW44 65-□BC□4
1 351	450	800	—	—	—	1 200	450	500	1 050	—	3RW44 65-□BC□4
1 524	500	900	—	—	—	1 351	450	600	1 200	—	3RW44 65-□BC□4
—	—	—	—	—	—	1 472	550	650	1 300	—	3RW44 66-□BC□4

1) In the selection table, the unit rated current I_e refers to the induction motor's rated operational current in the inside-delta circuit.
The actual current of the device is approx. 58 % of this value.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 60
- Maximum starting current in % of motor current I_e : 350

2) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

- Maximum number of starts per hour in 1/h: 1

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

3RW ambient temperature 40 °C ¹⁾						3RW ambient temperature 50 °C ¹⁾					Very heavy starting (CLASS 30) in inside-delta circuit
Rated values of induction motors						Rated values of induction motors					
Operational current I_e	Rating at operational voltage U_e					Operational current I_e	Rating at operational voltage U_e				
A	230 V kW	400 V kW	500 V kW	690 V kW	1000 V kW	A	200 V hp	230 V hp	460 V hp	575 V hp	
Inside-delta circuit, rated operational voltage 400 ... 600 V											Order No.
50	—	22	30	—	—	45	—	—	30	40	3RW44 23-□BC□5
62	—	30	37	—	—	55	—	—	40	50	3RW44 24-□BC□5
81	—	45	45	—	—	73	—	—	50	60	3RW44 25-□BC□5
99	—	55	55	—	—	88	—	—	60	75	3RW44 25-□BC□5
133	—	75	90	—	—	118	—	—	75	100	3RW44 27-□BC□5
Order No. supplement for connection types											
• With screw terminals											1
• With spring-type terminals											3
161	—	90	110	—	—	142	—	—	100	125	3RW44 35-□BC□5
196	—	110	132	—	—	173	—	—	125	150	3RW44 36-□BC□5
232	—	132	160	—	—	203	—	—	150	200	3RW44 43-□BC□5
281	—	160	200	—	—	251	—	—	200	250	3RW44 43-□BC□5
352	—	200	250	—	—	312	—	—	250	300	3RW44 45-□BC□5
433	—	250	315	—	—	372	—	—	300	350	3RW44 47-□BC□5
542	—	315	355	—	—	485	—	—	400	500	3RW44 53-□BC□5
617	—	355	450	—	—	546	—	—	450	600	3RW44 53-□BC□5
748	—	400	500	—	—	667	—	—	600	750	3RW44 53-□BC□5
954	—	560	630	—	—	856	—	—	750	950	3RW44 55-□BC□5
1 065	—	630	710	—	—	954	—	—	850	1 050	3RW44 58-□BC□5
1 200	—	710	800	—	—	1 065	—	—	950	1 200	3RW44 65-□BC□5
1 351	—	800	900	—	—	1 200	—	—	1 050	1 350	3RW44 65-□BC□5
1 524	—	900	1 000	—	—	1 351	—	—	1 200	1 500	3RW44 65-□BC□5
—	—	—	—	—	—	1 472	—	—	1 300	1 650	3RW44 66-□BC□5
Order No. supplement for connection types											
• With spring-type terminals											2
• With screw terminals											6
Order No. supplement for the rated control supply voltage U_c ²⁾											
• 115 V AC											3
• 230 V AC											4

1) In the selection table, the unit rated current I_e refers to the induction motor's rated operational current in the inside-delta circuit. The actual current of the device is approx. 58 % of this value.

2) Control by way of the internal 24 V DC supply and direct control by means of PLC possible.

Note:

The listed motor ratings are rough guide values. The soft starter should always be designed on the basis of the required rated operational current of the motor.

The SIRIUS 3RW44 solid-state soft starters are designed for easy starting conditions. The selection and ordering data were determined for the following boundary conditions (see also the notes on page 3/4):

- Maximum starting time in s: 60
- Maximum starting current in % of motor current I_e : 350
- Maximum number of starts per hour in 1/h: 1

In the event of more exacting requirements, it may be necessary to choose a larger device. However, in some cases the designed-in safety reserves also permit the listed units to be used in boundary conditions which are slightly more demanding. Detailed technical information for a configuration which is tailored exactly to the application can be found in the manuals. Siemens recommends the use of the selection and simulation program Win-Soft Starter.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Accessories

	Version	Order No.
Soft Starter ES 2007 PC communication program ¹		
	Soft Starter ES 2007 Basic Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through system interface • License key on USB stick, Class A, including CD	3ZS1 313-4CC10-0YA5
	Soft Starter ES 2007 Standard Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through system interface • License key on USB stick, Class A, including CD	3ZS1 313-5CC10-0YA5
	Soft Starter ES 2007 Premium Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through system interface or PROFIBUS • License key on USB stick, Class A, including CD	3ZS1 313-6CC10-0YA5
SIRIUS 3RW44 Soft Starter Function Block Library for SIMATIC PCS 7		
	Scope of supply: AS modules and faceplates for integrating SIRIUS 3RW44 into the PCS 7 process control system, for PCS 7, version V 6.1/V 7.0	
	Engineering software for one engineering station (single license) including runtime software for execution of the AS module in an automation system (single license), German/English/French, Type of delivery: on CD incl. electronic documentation in German/English/Portuguese	3ZS1 633-1XX00-0YA0
	Runtime software for execution of the AS module in an automation system (single license), Type of delivery: License without software and documentation	3ZS1 633-2XX00-0YB0

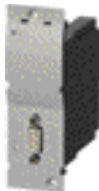
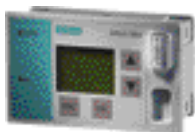
3ZS1 633-1XX00-0YA0

3ZS1 633-1XX00-0YA0

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Version		Order No.
PC cables		
 3UF7 940-0AA00-0	For PC/PG communication with SIRIUS 3RW44 soft starters Through the system interface, for connecting to the serial interface of the PC/PG	3UF7 940-0AA00-0
USB/serial adapters		
	For connecting the PC cable to the USB interface of a PC We recommend, in conjunction with 3RW44 soft starter, using SIMOCODE pro 3UF7, 3RK3 modular safety system, ET 200S/ECOFASST/ET 200pro motor starters, AS-i safety monitor, AS-i analyzer	3UF7 946-0AA00-0
PROFIBUS communication modules		
 3RW49 00-0KC00	Modules can be plugged into the soft starters for integrating the starters in the PROFIBUS network with DPV1 slave functionality. On Y-link the soft starter has only DPV0 slave functionality.	3RW49 00-0KC00
External display and operator modules		
 3RW49 00-0AC00	For indicating and operating the functions provided by the soft starter using an externally mounted display and operator module in degree of protection IP54 (e. g. in the control cabinet door)	3RW49 00-0AC00
	Connection cable From the device interface (serial) of the 3RW44 soft starter to the external display and operator module • Length 0.5 m, flat • Length 0.5 m, round • Length 1.0 m, round • Length 2.5 m, round	3UF7 932-0AA00-0 3UF7 932-0BA00-0 3UF7 937-0BA00-0 3UF7 933-0BA00-0

3

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

	For soft starters	Version	Order No.
	Type		
Box terminal blocks for soft starters			
 3RT19	Box terminal blocks (2 units are required for each device)		
	3RW44 2.	Included in the scope of supply	
	3RW44 3.	- Up to 70 mm² - Up to 120 mm²	3RT19 55-4G 3RT19 56-4G
	Auxiliary conductor connection for box terminals		3TX7 500-0A
	3RW44 4.	Up to 240 mm² (with auxiliary conductor connection)	3RT19 66-4G
Covers for soft starters			
	Terminal covers for box terminals		
	Additional touch protection to be fitted at the box terminals (2 units required per device)		
	3RW44 2. and 3RW44 3.		3RT19 56-4EA2
	3RW44 4.		3RT19 66-4EA2
 3RT19 . 6-4EA1	Terminal covers for cable lugs and busbar connections		
	3RW44 2. and 3RW44 3.	For complying with the phase clearances and as touch protection (2 units required per contactor)	3RT19 56-4EA1
	3RW44 4.	Also fits on mounted box terminals.	3RT19 66-4EA1
Manuals 3RW44 ¹⁾			
	3RW44	3ZX10 12-0RW44-1AB1	
Operating instructions ¹⁾			
	3RW44	3ZX10 12-0RW44-0AA0	

- 1) The operating instructions are included in the scope of supply of the soft starter or are available – like the manual – as a PDF download from the Service&Support portal at www.siemens.com/industrial-controls/support —> Controls —> Soft Starters and Solid-State Switching Devices —> SIRIUS 3RW Soft Starters.

Spare parts

	For soft starters	Version	Order No.
	Type		
Fans			
 3RW49	Fans		
	3RW44 2. and 3RW44 3.	115 V AC 230 V AC	3RW49 36-8VX30 3RW49 36-8VX40
	3RW44 4.	115 V AC 230 V AC	3RW49 47-8VX30 3RW49 47-8VX40
	3RW44 5. and 3RW44 6. ¹⁾	115 V AC 230 V AC	3RW49 57-8VX30 3RW49 57-8VX40
	3RW44 6. ²⁾	115 V AC 230 V AC	3RW49 66-8VX30 3RW49 66-8VX40

- 1) 3RW44 6. mounting on output side.
2) For mounting on front side.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

More information

Application examples for normal starting (CLASS 10)

Normal starting CLASS 10 (up to 20 s with 350 % $I_{n, motor}$)

The soft starter rating can be selected to be as high as the rating of the motor used

Application	Conveyor belt	Roller conveyor	Compressor	Small fan ¹⁾	Pump	Hydraulic pump
Starting parameters						
• Voltage ramp and current limiting						
- Starting voltage %	70	60	50	30	30	30
- Starting time s	10	10	10	10	10	10
- Current limit value	Deactivated	Deactivated	$4 \times I_M$	$4 \times I_M$	Deactivated	Deactivated
• Torque ramp						
- Starting torque	60	50	40	20	10	10
- End torque	150	150	150	150	150	150
- Starting time	10	10	10	10	10	10
• Breakaway pulse	Deactivated (0 ms)	Deactivated (0 ms)	Deactivated (0 ms)	Deactivated (0 ms)	Deactivated (0 ms)	Deactivated (0 ms)
Ramp-down mode	Smooth ramp-down	Smooth ramp-down	Free ramp-down	Free ramp-down	Pump ramp-down	Free ramp-down

Application examples for heavy starting (CLASS 20)

Heavy starting CLASS 20 (up to 40 s with 350 % $I_{n, motor}$)

The soft starter has to be selected one performance class higher than the motor used

Application	Stirrer	Centrifuge	Milling machines
Starting parameters			
• Voltage ramp and current limiting			
- Starting voltage %	30	30	30
- Starting time s	30	30	30
- Current limit value	$4 \times I_M$	$4 \times I_M$	$4 \times I_M$
• Torque ramp			
- Starting torque	30	30	30
- End torque	150	150	150
- Starting time	30	30	30
• Breakaway pulse	Deactivated (0 ms)	Deactivated (0 ms)	Deactivated (0 ms)
Ramp-down mode	Free ramp-down	Free ramp-down	Free ramp-down or DC braking

Application examples for very heavy starting (CLASS 30)

Very heavy starting CLASS 30 (up to 60 s with 350 % $I_{n, motor}$)

The soft starter has to be selected two performance classes higher than the motor used

Application	Large fans ²⁾	Mills	Breakers	Circular saws/bandsaws
Starting parameters				
• Voltage ramp and current limiting				
- Starting voltage %	30	50	50	30
- Starting time s	60	60	60	60
- Current limit value	$4 \times I_M$	$4 \times I_M$	$4 \times I_M$	$4 \times I_M$
• Torque ramp				
- Starting torque	20	50	50	20
- End torque	150	150	150	150
- Starting time	60	60	60	60
• Breakaway pulse	Deactivated (0 ms)	80 %; 300 ms	80 %; 300 ms	Deactivated (0 ms)
Ramp-down mode	Free ramp-down	Free ramp-down	Free ramp-down	Free ramp-down

1) The mass inertia of the fan is <10 times the mass inertia of the motor.

2) The mass inertia of the fan is ³10 times the mass inertia of the motor.

Note:

These tables present sample set values and device sizes. They are intended only for the purposes of information and are not binding. The set values depend on the application in question and must be optimized during commissioning.

The soft starter dimensions should be checked where necessary with the Win-Soft Starter software or with the help of nearest Siemens sales office.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

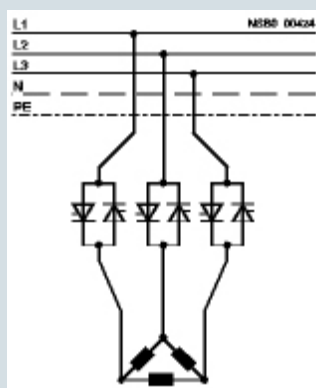
3RW44

Circuit concept

The SIRIUS 3RW44 soft starters can be operated in two different types of circuit.

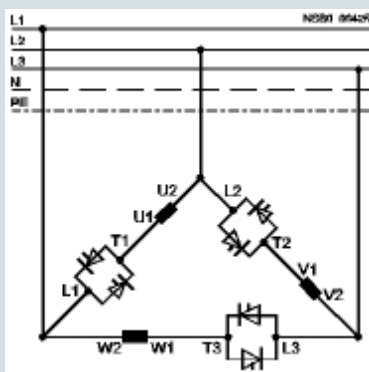
- **Inline circuit**
The controls for isolating and protecting the motor are simply connected in series with the soft starter. The motor is connected to the soft starter with three cables.
- **Inside-delta circuit**
The wiring is similar to that of wye-delta starters. The phases of the soft starter are connected in series with the individual motor windings. The soft starter then only has to carry the phase current, amounting to about 58 % of the rated motor current (conductor current).

Comparison of the types of circuit



Inline circuit:

Rated current I_n corresponds to the rated motor current I_n ,
3 cables to the motor



Inside-delta circuit:

Rated current I_n corresponds to approx. 58 % of the rated motor current I_n ,
6 cables to the motor (as with wye-delta starters)

Which circuit?

Using the inline circuit involves the lowest wiring outlay. If the soft starter to motor connections are long, this circuit is preferable. With the inside-delta circuit there is double the wiring complexity but a smaller size of device can be used at the same rating.

Thanks to the choice of operating mode between the inline circuit and inside-delta circuit, it is always possible to select the most favorable solution.

The braking function is possible only in the inline circuit.

Configuration

The 3RW44 solid-state soft starters are designed for normal starting. In case of heavy starting or increased starting frequency, a larger device must be selected.

For long starting times it is recommended to have a PTC sensor in the motor. This also applies for the ramp-down modes smooth ramp-down, pump ramp-down and DC braking, because during the ramp-down time in these modes, an additional current loading applies in contrast to free ramp-down.

No capacitive elements are permitted in the motor feeder between the SIRIUS 3RW soft starter and the motor (e. g. no reactive-power compensation equipment). In addition, neither static systems for reactive-power compensation nor dynamic PFC (Power Factor Correction) must be operated in parallel during starting and ramp-down of the soft starter. This is important to prevent faults arising on the compensation equipment and/or the soft starter.

All elements of the main circuit (such as fuses and controls) should be dimensioned for direct starting, following the local short-circuit conditions. Fuses, controls and overload relays must be ordered separately.

A bypass contact system and solid-state overload relay are already integrated in the 3RW44 soft starter and therefore do not have to be ordered separately.

The harmonic component load for starting currents must be taken into consideration for the selection of motor starter protectors (selection of release).

Note:

When induction motors are switched on, voltage drops occur as a rule on starters of all types (direct starters, star-delta starters, soft starters). The infeed transformer must always be dimensioned such that the voltage dip when starting the motor remains within the permissible tolerance. If the infeed transformer is dimensioned with only a small margin, it is best for the control voltage to be supplied from a separate circuit (independently of the main voltage) in order to avoid the potential switching off of the soft starter.

Device interface, PROFIBUS DP communication module, Soft Starter ES parameterizing and operating software

The 3RW44 electronic soft starters have a PC interface for communicating with the Soft Starter ES software or for connecting the external display and operator module. If the optional PROFIBUS communication module is used, the 3RW44 soft starter can be integrated in the PROFIBUS network and communicate using the GSD file or Soft Starter ES Premium software.

SIRIUS 3RW44 Soft Starter Function Block Library for SIMATIC PCS 7

The SIRIUS 3RW44 soft starter PCS 7 function block library can be used for simple and easy integration of SIRIUS 3RW44 soft starters into the SIMATIC PCS 7 process control system. The SIRIUS 3RW44 soft starter PCS 7 function block library contains the diagnostics and driver blocks corresponding with the SIMATIC PCS 7 diagnostics and driver concept as well as the elements (symbols and faceplates) required for operator control and process monitoring.

SIRIUS 3RW Soft Starters

3RW44 for High-Feature Applications

3RW44

Manual for SIRIUS 3RW44

Besides containing all important information on configuring, commissioning and servicing, the manual also contains example circuits and the technical specifications for all devices.

Win-Soft Starter selection and simulation program

With this software, you can simulate and select all Siemens soft starters, taking into account various parameters such as mains properties, motor and load data, and special application requirements.

The software is a valuable tool, which makes complicated, lengthy manual calculations for determining the required soft starters superfluous.

The Win-Soft Starter selection and simulation program can be downloaded from:

www.siemens.com/softstarter —> Software

You can find more information about soft starters on the Internet likewise at:

www.siemens.com/softstarter

SIRIUS 3RW Soft Starters

Notes

3

Protection Equipment



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	Motor Protection Circuit Breakers	
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4/14	For transformer protection	
4/15	For system protection according to UL 489/CSA C22.2 No. 5-02	
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	<u>Accessories</u>	
4/17	Mountable accessories	
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4/31	Enclosures and front plates	
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4/56	General Data	
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4/79	Accessories	
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4/81	3RB30, 3RB31 up to 40 A for Standard applications	
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4/90	3RB20, 3RB21 up to 630 A for Standard applications	
4/99	Accessories for 3RB20, 3RB21	
4/100	3RB22, 3RB23, 3RB24 new up to 630 A High-Feature applications	
4/110	Accessories for 3RB22, 3RB23, 3RB24 new	

Introduction

Overview



Type		3RV20	3RV21	3RV23	3RV24	3RV27	3RV28
SIRIUS 3RV2 motor protection circuit breakers up to 40 A							
Applications							
System protection		✓ ¹⁾	✓ ¹⁾	—	—	✓	✓
Motor protection		✓	—	—	—	—	—
Motor protection with overload relay function		—	✓	—	—	—	—
Starter combinations		—	—	✓	—	—	—
Transformer protection		—	—	—	✓	✓	✓
Size		S00, S0	S00, S0	S00, S0	S00, S0	S00	S00
Rated current I_n							
• Size S00	A	Up to 16	Up to 16	Up to 16	Up to 16	Up to 15	Up to 15
• Size S0	A	Up to 40	Up to 32	Up to 40	Up to 25	—	—
Rated operational voltage U_e according to IEC	V	690 AC ²⁾	690 AC ²⁾	690 AC ²⁾	690 AC ²⁾	690 AC	690 AC
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60
Trip class		CLASS 10	CLASS 10	—	CLASS 10	—	—
Thermal overload release	A	0.11 ... 0.16 to 34 ... 40	0.11 ... 0.16 to 27 ... 32	None ³⁾	0.11 ... 0.16 to 20 ... 25	0.16 ... 15 non-adjustable	0.16 ... 15 non-adjustable
Electronic release							
A multiple of the rated current		13 times	13 times	13 times	20 times	13 times	20 times
Short-circuit breaking capacity I_{cu} at 400 V AC	kA	20/55/100	55/100	20/55/100	55/100	⁴⁾	⁴⁾
Accessories							
For sizes		S00 S0	S00 S0	S00 S0	S00 S0	S00	S00
Auxiliary switches		✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓	✓
Signaling switches		✓ ✓	✓ ✓	✓ ✓	✓ ✓	—	—
Undervoltage releases		✓ ✓	— —	✓ ✓	✓ ✓	✓	✓
Shunt releases		✓ ✓	— —	✓ ✓	✓ ✓	✓	✓
Isolator modules		✓ ✓	✓ ✓	✓ ✓	✓ ✓	—	—
Insulated three-phase busbar system		✓ ✓	— —	✓ ✓	✓ ✓	—	—
Busbar adapters		✓ ✓	✓ ✓	✓ ✓	✓ ✓	—	—
Door-coupling rotary operating mechanisms		✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓	✓
Link modules		✓ ✓	✓ ✓	✓ ✓	✓ ✓	—	—
Enclosures for surface mounting		✓ ✓	✓ ✓	✓ ✓	✓ ✓	—	—
Enclosures for flush mounting		✓ ✓	✓ ✓	✓ ✓	✓ ✓	—	—
Front plates		✓ ✓	✓ ✓	✓ ✓	✓ ✓	—	—
Infeed system		✓ ✓	— —	✓ ✓	✓ ✓	—	—
Sealable scale covers for setting knobs		✓ ✓	✓ ✓	— —	✓ ✓	—	—

✓ Has this function or can use this accessory
 — Does not have this function or cannot use this accessory

1) For symmetrical loading of the three phases.

2) With molded-plastic enclosure 500 V AC. For DC applications, see "Technical specifications" -> "DC short circuit breaking capacity" on page 4/7.

3) For overload protection of the motors, appropriate overload relays must be used.

4) According to UL 489 at 480 Y/277 V AC: 65 kA.



Type	3RV10	3RV11	3RV13	3RV14	3RV16	3RV16	3RV17
SIRIUS 3RV1 motor protection circuit breakers up to 100 A							
Applications							
System protection	✓ ¹⁾	✓ ¹⁾	—	—	—	—	✓
Motor protection	✓	—	—	—	—	—	—
Motor protection with overload relay function	—	✓	—	—	—	—	—
Starter combinations	—	—	✓	—	—	—	—
Transformer protection	—	—	—	✓	—	—	✓
Fuse monitoring	—	—	—	—	✓	—	—
Voltage transformer circuit breaker for distance protection	—	—	—	—	—	✓	—
Size	S2, S3	S2, S3	S2, S3	S2	S00	S00	S3
Rated current I_n							
• Size S00	A —	—	—	—	0.2	Up to 3	—
• Size S2	A Up to 50	Up to 50	Up to 50	Up to 40	—	—	—
• Size S3	A Up to 100	Up to 100	Up to 100	—	—	—	Up to 70
Rated operational voltage U_e according to IEC	V 690 AC ²⁾	690 AC ²⁾	690 AC ²⁾	690 AC ²⁾	690 AC ²⁾	400 AC	690 AC
Rated frequency	Hz 50/60	50/60	50/60	50/60	50/60	16 ²⁾ / ₃ ... 60	50/60
Trip class	CLASS 10, 20	CLASS 10	—	CLASS 10	—	—	—
Thermal overload release	A 11 ... 16 to 80 ... 100	None ³⁾	11 ... 16 to 80 ... 100	11 ... 16 to 28 ... 40	0.2	1.4 ... 3	10 ... 70 non-adjustable
Electronic release							
A multiple of the rated current	13 times	13 times	13 times	20 times	6 times	4 ... 7 times	13 times
Short-circuit breaking capacity I_{cu} at 400 V AC	kA 50/100	50/100	50/100	50/100	100	50	⁴⁾
Accessories							
For sizes	S2 S3	S2 S3	S2 S3	S2	S00	S00	S3
Auxiliary switches	✓ ✓	✓ ✓	✓ ✓	✓	✓	✓	✓ ⁵⁾
Signaling switches	✓ ✓	✓ ✓	✓ ✓	✓	—	—	—
Undervoltage releases	✓ ✓	— —	✓ ✓	✓	—	—	✓
Shunt releases	✓ ✓	— —	✓ ✓	✓	—	—	✓
Isolator modules	✓ —	✓ —	✓ —	✓	—	—	—
Insulated three-phase busbar system	✓ —	✓ —	✓ —	✓	—	—	—
Busbar adapters	✓ ✓	✓ ✓	✓ ✓	✓	—	—	—
Door-coupling rotary operating mechanisms	✓ ✓	✓ ✓	✓ ✓	✓	—	—	✓
Remote motorized operating mechanisms	✓ ✓	✓ ✓	✓ ✓	✓	—	—	—
Link modules	✓ ✓	✓ ✓	✓ ✓	✓	—	—	—
Enclosures for surface mounting	✓ —	✓ —	✓ —	✓	—	—	—
Front plates	✓ ✓	✓ ✓	✓ ✓	✓	—	—	—

- ✓ Has this function or can use this accessory
 — Does not have this function or cannot use this accessory

- 1) For symmetrical loading of the three phases.
 2) With molded-plastic enclosure 500 V AC. For DC applications, see "Technical specifications" -> "DC short circuit breaking capacity" on page 4/7.

- 3) For overload protection of the motors, appropriate overload relays must be used.
 4) According to UL 489
 - At 480 Y/277 V AC: 65 kA;
 - At 480 V AC: 65 kA (10 A to 30 A).
 5) Only lateral auxiliary switches can be fitted.

Protection Equipment

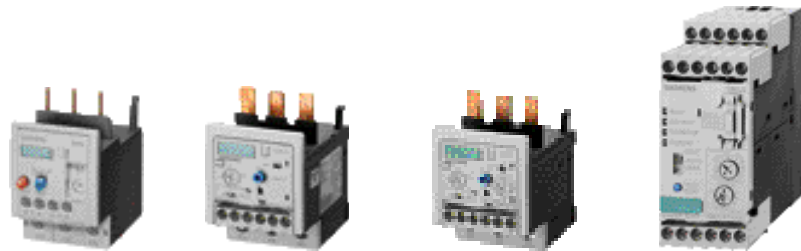
Introduction



Type		3RU21	3RB30	3RB31
SIRIUS overload relays up to 40 A				
Applications				
System protection		✓ ¹⁾	✓ ¹⁾	✓ ¹⁾
Motor protection		✓	✓	✓
Alternating current, three-phase		✓	✓	✓
Alternating current, single-phase		✓	—	—
Direct current		✓	—	—
Size of contactor		S00, S0	S00, S0	S00, S0
Rated operational current I_e	• Size S00	A	Up to 16	Up to 16
	• Size S0	A	Up to 40	Up to 40
Rated operational voltage U_e	V	690 AC	690 AC	690 AC
Rated frequency	Hz	50/60	50/60	50/60
Trip class		CLASS 10	CLASS 10, 20	CLASS 5, 10, 20, 30 Adjustable
Thermal overload release	A	0.11 ... 0.16	—	—
	A	to 34 ... 40		
Electronic overload release	A	—	0.1 ... 0.4	0.1 ... 0.4
	A		to 10 ... 40	to 10 ... 40
Rating for induction motor at 400 V AC	kW	0.04 ... 18.5	0.04 ... 18.5	0.04 ... 18.5
Accessories				
For sizes		S00 S0	S00 S0	S00 S0
Terminal brackets for stand-alone installation		✓ ✓	✓ ✓	✓ ✓
Mechanical RESET		✓ ✓	✓ ✓	✓ ✓
Cable releases for RESET		✓ ✓	✓ ✓	✓ ✓
Electrical remote RESET		✓ ✓	— —	Integrated in the unit
Terminal covers for ring terminal lug connections		✓ ²⁾ ✓ ²⁾	— —	— —
Sealable covers for setting knobs		✓ ✓	✓ ✓	✓ ✓

- ✓ Has this function or can use this accessory
 — Does not have this function or cannot use this accessory

- 1) The units are responsible in the main circuit for overload protection of the assigned electrical loads (e.g. motors), feeder cable and other switching and protection devices in the respective load feeder.
 2) Terminal covers for ensuring finger-safe touch protection are available for 3RU21 overload relays with ring terminal lug connections for mounting onto contactors.



Type		3RU11	3RB20	3RB21	3RB22 to 3RB24
SIRIUS overload relays up to 630 A					
Applications					
System protection		✓ ¹⁾	✓ ¹⁾	✓ ¹⁾	✓ ¹⁾
Motor protection		✓	✓	✓	✓
Alternating current, three-phase		✓	✓	✓	✓
Alternating current, single-phase		✓	--	--	✓
Direct current		✓	--	--	--
Size of contactor		S2, S3	S2 ... S12	S2 ... S12	S00 ... S12
Rated operational current I_e					
• Size S2	A	Up to 50	Up to 50	Up to 50	Up to 100 ²⁾
• Size S3	A	Up to 100	Up to 100	Up to 100	Up to 100 ²⁾
• Size S6	A	--	Up to 200	Up to 200	Up to 200
• Size S10/S12, size 14 (3TF68/3TF69)	A	--	Up to 630	Up to 630	Up to 630
Rated operational voltage U_e	V	690/1000 ³⁾ AC	690/1000 ⁴⁾ AC	690/1000 ⁴⁾ AC	690/1000 ⁵⁾ AC
Rated frequency	Hz	50/60	50/60	50/60	50/60
Trip class		CLASS 10	CLASS 10, 20	CLASS 5, 10, 20, 30 Adjustable	CLASS 5, 10, 20, 30 Adjustable
Thermal overload release	A	5.5 ... 8 to 80 ... 100	--	--	--
Electronic overload release	A	--	6 ... 25 to 160 ... 630	6 ... 25 to 160 ... 630	0.3 ... 3 to 63 ... 630
Rating for induction motor at 400 V AC	kW	3 to 45	3 ... 11 to 90 ... 450	3 ... 11 to 90 ... 450	0.09 ... 1.1 to 37 ... 450
Pages					
Accessories					
For sizes		S2 S3	S2 S3 S6 S10/S12	S2 S3 S6 S10/S12	S00 S0 S2 S3 S6 S10/S12
Terminal brackets for stand-alone installation		✓ ✓	6) 6) 6) 6)	6) 6) 6) 6)	6) 6) 6) 6) 6) 6)
Mechanical RESET		✓ ✓	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	-- -- -- -- -- --
Cable releases for RESET		✓ ✓	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	-- -- -- -- -- --
Electrical remote RESET		✓ ✓	-- -- -- --	Integrated in the unit	Integrated in the unit
Terminal covers		✓ ✓	-- ✓ ✓ ✓ ✓	-- ✓ ✓ ✓ ✓	-- -- -- ✓ ✓ ✓
Sealable covers for setting knobs		Integrated in the unit	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓
Pages					

- ✓ Has this function or can use this accessory
 -- Does not have this function or cannot use this accessory

- 1) The units are responsible in the main circuit for overload protection of the assigned electrical loads (e.g. motors), feeder cable and other switching and protection devices in the respective load feeder.
- 2) Selection of current measuring modules according to the respective operational current.
- 3) Size S3 up to 1000 V AC.
- 4) Size S2 (only with straight-through transformer), S3, S6, S10, S12 up to 1000 V AC.
- 5) With reference to the 3RB29 .6 current measuring modules.
- 6) Stand-alone installation without accessories is possible.

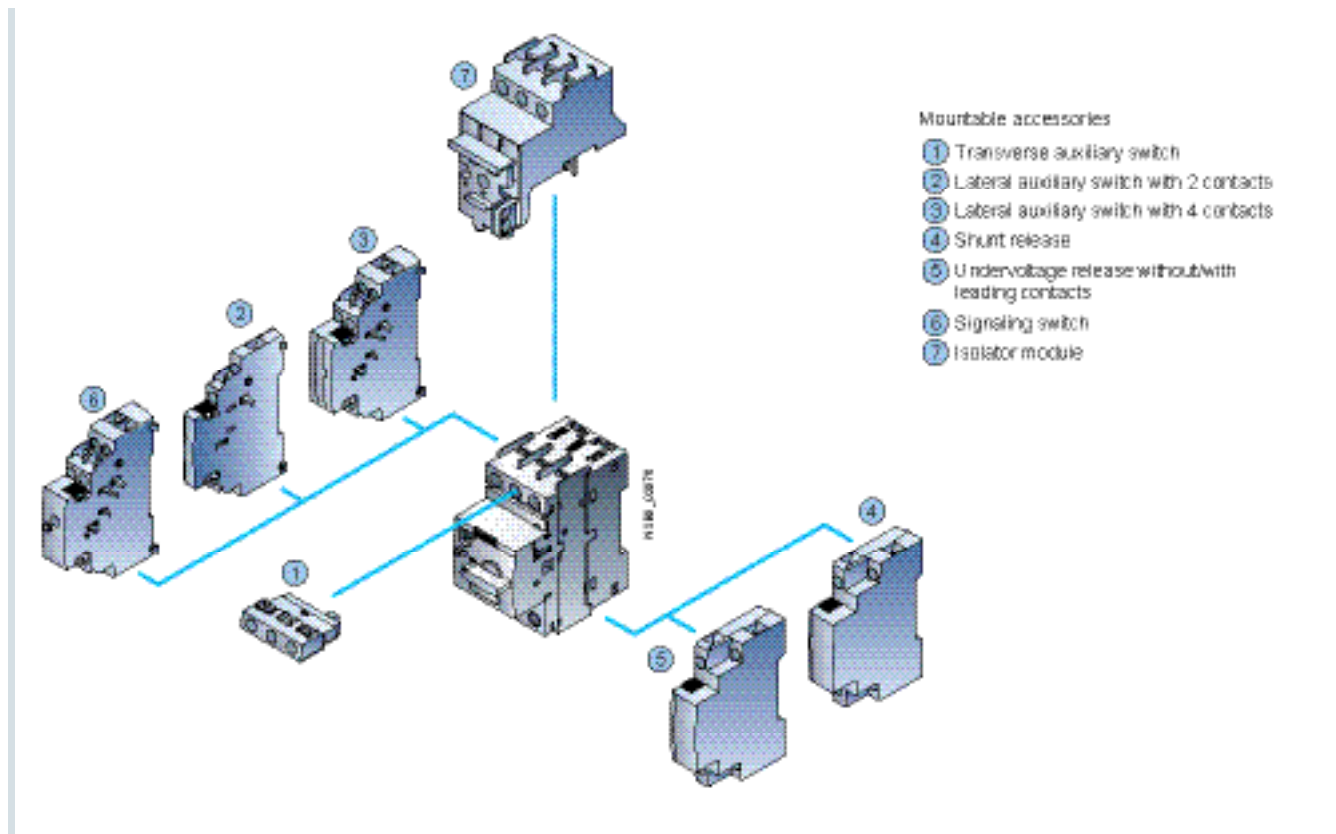
Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

General data

Overview

The following illustration shows our 3RV2 motor protection circuit breakers with the accessories which can be mounted for the sizes S00 and S0,



Mountable accessories for SIRIUS 3RV2 motor protection circuit breakers



Motor protection circuit breaker with spring-type terminals, size S0 (left) and motor protection circuit breaker with screw terminals, size S00 (right)

The new 3RV2 motor protection circuit breakers are compact, current limiting motor protection circuit breakers which are optimized for load feeders. The motor protection circuit breakers are used for switching and protecting three-phase induction motors of up to 18.5 kW at 415 V AC and for other loads with rated currents of up to 40 A.

For 3RV1 motor protection circuit breakers in sizes S2 and S3 up to 100 A see page 4/40 onwards.

Type of construction

The 3RV2 motor protection circuit breakers are available in two sizes:

- Size S00 - width 45 mm, max. rated current 16 A, at 415 V AC suitable for induction motors up to 7.5 kW
- Size S0 - width 45 mm, max. rated current 40 A, at 415 V AC suitable for induction motors up to 18.5 kW

For sizes S2 and S3 of the 3RV1 motor protection circuit breakers up to 100 A see page 4/33 onwards.

Connection methods

The 3RV2 motor protection circuit breakers are available with screw terminals, spring-type terminals and ring terminal lug connection.



Screw terminals



Spring-type terminals

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

General data

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RV20 motor protection circuit breakers are suitable for the overload protection of explosion-proof motors with "increased safety" type of protection EEx e;

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
	□ □ □	□	□	□	-	□	□	□	□	□	-	□	□	□
Motor protection circuit breakers	3 R V													
SIRIUS Innovation		2												
Type of motor protection circuit breakers			□											
Size				□										
Switching capacity					□									
Setting range for overload release						□	□							
Trip class (CLASS)								□						
Connection methods									□					
With or without auxiliary switch										□				
Special versions											□	□	□	□
Example	3 R V	2	0	1	1	-	1	A	A	1	0			

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Application

Operating conditions

3RV2 motor protection circuit breakers are suitable for use in any climate. They are intended for use in enclosed rooms in which no severe operating conditions (such as dust, caustic vapors, hazardous gases) prevail. When installed in dusty and damp areas, suitable enclosures must be provided.

3RV2 motor protection circuit breakers can optionally be fed from the top or from below.

The permissible ambient temperatures, the maximum switching capacities, the tripping currents and other boundary conditions can be found in the technical specifications.

3RV2 motor protection circuit breakers are suitable for operation in IT systems (IT networks). In this case, the different short-circuit breaking capacity in the IT system must be taken into account.

Since operational currents, starting currents and current peaks are different even for motors with identical power ratings due to the inrush current, the motor ratings in the selection tables are only guide values. The specific rated and start-up data of the motor to be protected is always paramount to the choice of the most suitable motor protection circuit breaker. This also applies to motor protection circuit breakers for transformer protection.

Possible uses

The 3RV2 motor protection circuit breakers can be used:

- For short-circuit protection
- For motor protection (also with overload relay function)
- For system protection
- For short-circuit protection for starter combinations
- For transformer protection
- As main control and EMERGENCY-STOP switches
- For operation in IT systems (IT networks)
- For switching of DC currents
- In areas subject to explosion hazard (ATEX)

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

General data

Technical specifications

General data				
Type			3RV2. 1.	3RV27 11, 3RV28 11
Size			S00	S00
Dimensions (W x H x D)				
• Screw terminals			45 x 97 x 91	45 x 144 x 92
• Spring-type terminals			45 x 109 x 91	—
Standards				3RV2. 2.
• IEC 60947-1, EN 60947-1			Yes	S0
• IEC 60947-2, EN 60947-2			Yes	
• IEC 60947-4-1, EN 60947-4-1			Yes	45 x 97 x 91
• UL 489, CSA C22.2 No.5-02			Yes	45 x 119 x 91
Number of poles			3	
Max. rated current $I_{n \max}$ (= max. rated operational current I_n)	A		16	40
Permissible ambient temperature				
• Storage/transport	°C		–50 ... +80	
• Operation	°C		–20 ... +70 (current reduction above +60 °C)	
	°C		–20 ... +40 (The devices must not be mounted side-by-side and they must not be assembled with link modules with contactors. A lateral clearance of 9 mm is required.)	
Permissible rated current at inside temperature of control cabinet				
• +60 °C	%		100	
• +70 °C	%		87	
Permissible rated current at ambient temperature of enclosure (applies for motor protection circuit breaker inside enclosure ≤ 32 A)				
• +35 °C	%		100	
• +60 °C	%		87	
Rated operational voltage U_e				
• Acc. to IEC	V AC		690 (with molded-plastic enclosure 500 V)	
• Acc. to UL/CSA	V AC		600	
Rated frequency	Hz		50/60	
Rated insulation voltage U_i	V		690	
Rated impulse withstand voltage U_{imp}	kV		6	
Utilization categories				
• IEC 60947-2 (motor protection circuit breaker)	A			
• IEC 60947-4-1 (motor starter)	AC-3			
Trip class CLASS	Acc. to IEC 60947-4-1		10	
DC short-circuit breaking capacity (time constant $t = 5$ ms)				
• 1 conducting path 150 V DC	kA		10	
• 2 conducting paths in series 300 V DC	kA		10	
• 3 conducting paths in series 450 V DC	kA		10	
Power loss P_v for each motor protection circuit breaker				
Dependent on the rated current I_n				
(upper setting range)				
	$I_n: 0.16 \dots 0.63$ A	W	5	
	$I_n: 0.8 \dots 6.3$ A	W	6	
	$I_n: 8 \dots 16$ A	W	7	
	$I_n: 16$ A	W	—	7
	$I_n: 20 \dots 25$ A	W	—	8
	$I_n: 28 \dots 32$ A	W	—	11
	$I_n: 36 \dots 40$ A	W	—	14
Shock resistance	Acc. to IEC 60068-2-27	g/ms	25/11 (square and sine pulse)	
Degree of protection	Acc. to IEC 60529		IP20	
Touch protection	Acc. to EN 50274		Finger-safe	
Temperature compensation	Acc. to IEC 60947-4-1	°C	–20 ... +60	
Phase failure sensitivity	Acc. to IEC 60947-4-1		Yes	
Explosion protection – safe operation of motors with “increased safety” type of protection			Yes for 3RV20	
EC type test certificate number according to directive 94/9/EC (ATEX)			On request	
Isolating function	Acc. to IEC 60947-2		Yes	
Main and EMERGENCY-STOP switch characteristics (with corresponding accessories)	Acc. to IEC 60204-1		Yes	
Protective separation between main and auxiliary circuits, required for PELV applications	Acc. to EN 60947-1			
• Up to 400 V + 10 %			Yes	
• Up to 415 V + 5 % (higher voltages on request)			Yes	
Permissible mounting positions			Any, acc. to IEC 60447 start command “I” right-hand side or top	
Mechanical endurance	Operating cycles		100 000	
Electrical endurance	Operating cycles		100 000	
Max. switching frequency per hour (motor starts)	1/h		15	

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

General data

Rated data of the auxiliary switches and signaling switches		Lateral auxiliary switch with 1 NO + 1 NC, 2 NO, 2 NC, 2 NO + 2 NC	Signaling switch	Transverse auxiliary switch with 1 CO		1 NO + 1 NC, 2 NO
Max. Rated voltage						
• Acc. to NEMA (UL)	V AC	600				250
• Acc. to NEMA (CSA)	V AC	600				250
Uninterrupted current	A	10	10	5		2.5
Switching capacity		1 NO + 1 NC, 2 NO, 2 NC: A600, Q300; 2 NO + 2 NC: A300, Q300	A600, Q300	B600, R300		C300, R300

Front transverse auxiliary switches		Switching capacity for different voltages	
		1 CO	1 NO + 1 NC, 2 NO
Rated operational current I_e			
• At AC-15, alternating voltage			
- 24 V	A	4	2
- 230 V	A	3	0.5
- 400 V	A	1.5	—
- 690 V	A	0.5	—
• At AC-12 = I_{th} , alternating voltage			
- 24 V	A	10	2.5
- 230 V	A	10	2.5
- 400 V	A	10	—
- 690 V	A	10	—
• At DC-13, direct voltage L/R 200 ms			
- 24 V	A	1	1
- 48 V	A	—	0.3
- 60 V	A	—	0.15
- 110 V	A	0.22	—
- 220 V	A	0.1	—
Minimum load capacity	V	17	
	mA	1	

Front transverse solid-state compatible auxiliary switches		Switching capacity for different voltages	
		1 CO	
Rated operational voltage U_e	Alternating voltage	V	125
Rated operational current I_e/AC-14	at $U_e = 125$ V	A	0.1
Rated operational voltage U_e	Direct voltage L/R 200 ms	V	60
Rated operational current I_e/DC-13	at $U_e = 60$ V	A	0.3
Minimum load capacity	V	5	
	mA	1	

Lateral auxiliary switches with signaling switch		Switching capacity for different voltages: Lateral auxiliary switch with 1 NO + 1 NC, 2 NO, 2 NC, 2 NO + 2 NC Signaling switch	
Rated operational current I_e			
• At AC-15, alternating voltage			
- 24 V	A	6	
- 230 V	A	4	
- 400 V	A	3	
- 690 V	A	1	
• At AC-12 = I_{th} , alternating voltage			
- 24 V	A	10	
- 230 V	A	10	
- 400 V	A	10	
- 690 V	A	10	
• At DC-13, direct voltage L/R 200 ms			
- 24 V	A	2	
- 110 V	A	0.5	
- 220 V	A	0.25	
- 440 V	A	0.1	
Minimum load capacity	V	17	
	mA	1	

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

General data

Auxiliary releases				
		Undervoltage releases	Shunt releases	
Power consumption				
• During pick-up				
- AC voltages	VA/W	20.2/13	20.2/13	
- DC voltages	W	20	13 ... 80	
• During uninterrupted duty				
- AC voltages	VA/W	7.2/2.4	—	
- DC voltages	W	2.1	—	
Response voltage				
• Tripping	V	0.35 ... 0.7 x U _s	0.7 ... 1.1 x U _s	
• Pickup	V	0.85 ... 1.1 x U _s	—	
Opening time maximum	ms	20		
Short-circuit protection for auxiliary and control circuits				
Melting fuses operational class gG	A	10		
Miniature circuit breakers C characteristic	A	6 (prospective short-circuit current < 0.4 kA)		
Conductor cross-sections of main circuit				
Type		3RV2. 11	3RV2. 21	3RV27 11, 3RV28 11
Size		S00	S0	S00
Connection type		 Screw terminals		
Terminal screw		M3, Pozidriv size 2	M4, Pozidriv size 2	M4, Pozidriv size 2
Operating devices	mm	ø 5 ... 6	ø 5 ... 6	ø 5 ... 6
Prescribed tightening torque	Nm	0.8 ... 1.2	2 ... 2.5	2.5 ... 3
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected				
• Solid	mm ²	2 x (0.75 ... 2.5) ¹⁾ , 2 x 4	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 10) ¹⁾	1 ... 10, max. 2 x 10
• Stranded	mm ²	2 x (0.75 ... 2.5) ¹⁾ , 2 x 4	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 10) ¹⁾	1.5 ... 25, max. 10 + 25
• Finely stranded with end sleeves (DIN 46228 T1)	mm ²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 6) ¹⁾ , 1 x 10	1 ... 16, max. 6 + 16
• AWG cables, solid or stranded	AWG	2 x (18 ... 14) ¹⁾ , 2 x 12	2 x (16 ... 12) ¹⁾ , 2 x (14 ... 8) ¹⁾	2 x (14 ... 10)
Connection type		 Spring-type terminals		
Operating devices	mm	3.0 x 0.5 and 3.5 x 0.5		
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected				
• Solid	mm ²	2 x (0.5 ... 4)	2 x (1 ... 10)	—
• Finely stranded without end sleeve	mm ²	2 x (0.5 ... 2.5)	2 x (1 ... 6)	—
• Finely stranded with end sleeves (DIN 46228 T1)	mm ²	2 x (0.5 ... 2.5)	2 x (1 ... 6)	—
• AWG cables, solid or stranded	AWG	2 x (20 ... 12)	2 x (18 ... 8)	—
Max. external diameter of the conductor insulation	mm	3.6	3.6	—
Conductor cross-sections for auxiliary and control circuits				
Connection type		 Screw terminals		
Terminal screw		M3, Pozidriv size 2		
Operating devices	mm	ø 5 ... 6		
Prescribed tightening torque	Nm	0.8 ... 1.2		
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected				
• Solid or stranded	mm ²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾		
• Finely stranded with end sleeves (DIN 46228 T1)	mm ²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾		
• AWG cables, solid or stranded	AWG	2 x (18 ... 14) ¹⁾ ; 2 x (20 ... 16) ¹⁾		
Connection type		 Spring-type terminals		
Operating devices	mm	3.0 x 0.5 and 3.5 x 0.5		
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected				
• Solid	mm ²	2 x (0.5 ... 2.5)		
• Finely stranded without end sleeve	mm ²	2 x (0.5 ... 1.5)		
• Finely stranded with end sleeves (DIN 46228 T1)	mm ²	2 x (0.5 ... 1.5)		
• AWG cables, solid or stranded	AWG	2 x (20 ... 14)		
Max. external diameter of the conductor insulation	mm	3.6		

- 1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

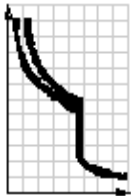
Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

For motor protection

Selection and ordering data

CLASS 10, without auxiliary switches



Rated current	Suitable for three-phase induction motors ¹⁾ with P	Setting range for thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals 	Spring-type terminals 
I_n				I_{cu}	Order No.	Order No.
A	kW	A	A	kA		
Size S00						
0.16	0.04	0.11 ... 0.16	2.1	100	3RV20 11-0AA10	3RV20 11-0AA20
0.2	0.06	0.14 ... 0.2	2.6	100	3RV20 11-0BA10	3RV20 11-0BA20
0.25	0.06	0.18 ... 0.25	3.3	100	3RV20 11-0CA10	3RV20 11-0CA20
0.32	0.09	0.22 ... 0.32	4.2	100	3RV20 11-0DA10	3RV20 11-0DA20
0.4	0.09	0.28 ... 0.4	5.2	100	3RV20 11-0EA10	3RV20 11-0EA20
0.5	0.12	0.35 ... 0.5	6.5	100	3RV20 11-0FA10	3RV20 11-0FA20
0.63	0.18	0.45 ... 0.63	8.2	100	3RV20 11-0GA10	3RV20 11-0GA20
0.8	0.18	0.55 ... 0.8	10	100	3RV20 11-0HA10	3RV20 11-0HA20
1	0.25	0.7 ... 1	13	100	3RV20 11-0JA10	3RV20 11-0JA20
1.25	0.37	0.9 ... 1.25	16	100	3RV20 11-0KA10	3RV20 11-0KA20
1.6	0.55	1.1 ... 1.6	21	100	3RV20 11-1AA10	3RV20 11-1AA20
2	0.75	1.4 ... 2	26	100	3RV20 11-1BA10	3RV20 11-1BA20
2.5	0.75	1.8 ... 2.5	33	100	3RV20 11-1CA10	3RV20 11-1CA20
3.2	1.1	2.2 ... 3.2	42	100	3RV20 11-1DA10	3RV20 11-1DA20
4	1.5	2.8 ... 4	52	100	3RV20 11-1EA10	3RV20 11-1EA20
5	1.5	3.5 ... 5	65	100	3RV20 11-1FA10	3RV20 11-1FA20
6.3	2.2	4.5 ... 6.3	82	100	3RV20 11-1GA10	3RV20 11-1GA20
8	3	5.5 ... 8	104	100	3RV20 11-1HA10	3RV20 11-1HA20
10	4	7 ... 10	130	100	3RV20 11-1JA10	3RV20 11-1JA20
12.5	5.5	9 ... 12.5	163	100	3RV20 11-1KA10	3RV20 11-1KA20
16	7.5	11 ... 16	208	55	3RV20 11-4AA10	3RV20 11-4AA20
Size S0						
16	7.5	11 ... 16	208	55	3RV20 21-4AA10	3RV20 21-4AA20
20	7.5	14 ... 20	260	55	3RV20 21-4BA10	3RV20 21-4BA20
22	11	17 ... 22	286	55	3RV20 21-4CA10	3RV20 21-4CA20
25	11	20 ... 25	325	55	3RV20 21-4DA10	3RV20 21-4DA20
28	15	23 ... 28	364	55	3RV20 21-4NA10	3RV20 21-4NA20
32	15	27 ... 32	400	55	3RV20 21-4EA10	3RV20 21-4EA20
36	18.5	30 ... 36	432	20	3RV20 21-4PA10	—
40	18.5	34 ... 40	480	20	3RV20 21-4FA10	—

1) Guide value for 4-pole standard motors at 50 Hz 415 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

Auxiliary switches can be ordered separately (see "Mountable accessories").

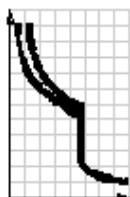
Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Formotorprotectionwithoverloadrelayfunction

Selection and ordering data

CLASS 10, with overload relay function (automatic RESET), without auxiliary switches



3RV21 11-0FA10



3RV21 21-4BA10

Rated current	Suitable for induction motors ¹⁾ with P	Setting range for thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals 
I_n				I_{cu}	Order No.
A	kW	A	A	kA	
Size S00²⁾					
0.16	0.04	0.11 ... 0.16	2.1	100	3RV21 11-0AA10
0.2	0.06	0.14 ... 0.2	2.6	100	3RV21 11-0BA10
0.25	0.06	0.18 ... 0.25	3.3	100	3RV21 11-0CA10
0.32	0.09	0.22 ... 0.32	4.2	100	3RV21 11-0DA10
0.4	0.09	0.28 ... 0.4	5.2	100	3RV21 11-0EA10
0.5	0.12	0.35 ... 0.5	6.5	100	3RV21 11-0FA10
0.63	0.18	0.45 ... 0.63	8.2	100	3RV21 11-0GA10
0.8	0.18	0.55 ... 0.8	10	100	3RV21 11-0HA10
1	0.25	0.7 ... 1	13	100	3RV21 11-0JA10
1.25	0.37	0.9 ... 1.25	16	100	3RV21 11-0KA10
1.6	0.55	1.1 ... 1.6	21	100	3RV21 11-1AA10
2	0.75	1.4 ... 2	26	100	3RV21 11-1BA10
2.5	0.75	1.8 ... 2.5	33	100	3RV21 11-1CA10
3.2	1.1	2.2 ... 3.2	42	100	3RV21 11-1DA10
4	1.5	2.8 ... 4	52	100	3RV21 11-1EA10
5	1.5	3.5 ... 5	65	100	3RV21 11-1FA10
6.3	2.2	4.5 ... 6.3	82	100	3RV21 11-1GA10
8	3	5.5 ... 8	104	100	3RV21 11-1HA10
10	4	7 ... 10	130	100	3RV21 11-1JA10
12.5	5.5	9 ... 12.5	163	100	3RV21 11-1KA10
16	7.5	11 ... 16	208	55	3RV21 11-4AA10
Size S0²⁾					
16	7.5	11 ... 16	208	55	3RV21 21-4AA10
20	7.5	14 ... 20	260	55	3RV21 21-4BA10
22	11	17 ... 22	286	55	3RV21 21-4CA10
25	11	20 ... 25	325	55	3RV21 21-4DA10
28	15	23 ... 28	364	55	3RV21 21-4NA10
32	15	27 ... 32	400	55	3RV21 21-4EA10

1) Guide value for 4-pole standard motors at 50 Hz 415 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) Accessories for mounting on the right and 3RV29 15 three-phase busbars cannot be used.

Auxiliary switches can be ordered separately (see "Mountable accessories").

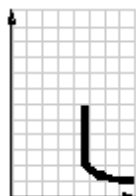
Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

For starter combinations

Selection and ordering data

Without auxiliary switches



3RV23 11-4AC10



3RV23 11-0JC20



3RV23 21-4AC10



3RV23 21-4AC20

Rated current	Suitable for induction motors ¹⁾ with P	Thermal overload release ²⁾	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals	Spring-type terminals
I_n				I_{cu}	Order No.	Order No.
A	kW	A	A	kA		
Size S00						
0.16	0.04	Without	2.1	100	3RV23 11-0AC10	3RV23 11-0AC20
0.2	0.06	Without	2.6	100	3RV23 11-0BC10	3RV23 11-0BC20
0.25	0.06	Without	3.3	100	3RV23 11-0CC10	3RV23 11-0CC20
0.32	0.09	Without	4.2	100	3RV23 11-0DC10	3RV23 11-0DC20
0.4	0.09	Without	5.2	100	3RV23 11-0EC10	3RV23 11-0EC20
0.5	0.12	Without	6.5	100	3RV23 11-0FC10	3RV23 11-0FC20
0.63	0.18	Without	8.2	100	3RV23 11-0GC10	3RV23 11-0GC20
0.8	0.18	Without	10	100	3RV23 11-0HC10	3RV23 11-0HC20
1	0.25	Without	13	100	3RV23 11-0JC10	3RV23 11-0JC20
1.25	0.37	Without	16	100	3RV23 11-0KC10	3RV23 11-0KC20
1.6	0.55	Without	21	100	3RV23 11-1AC10	3RV23 11-1AC20
2	0.75	Without	26	100	3RV23 11-1BC10	3RV23 11-1BC20
2.5	0.75	Without	33	100	3RV23 11-1CC10	3RV23 11-1CC20
3.2	1.1	Without	42	100	3RV23 11-1DC10	3RV23 11-1DC20
4	1.5	Without	52	100	3RV23 11-1EC10	3RV23 11-1EC20
5	1.5	Without	65	100	3RV23 11-1FC10	3RV23 11-1FC20
6.3	2.2	Without	82	100	3RV23 11-1GC10	3RV23 11-1GC20
8	3	Without	104	100	3RV23 11-1HC10	3RV23 11-1HC20
10	4	Without	130	100	3RV23 11-1JC10	3RV23 11-1JC20
12.5	5.5	Without	163	100	3RV23 11-1KC10	3RV23 11-1KC20
16	7.5	Without	208	55	3RV23 11-4AC10	3RV23 11-4AC20
Size S0						
16	7.5	Without	208	55	3RV23 21-4AC10	3RV23 21-4AC20
20	7.5	Without	260	55	3RV23 21-4BC10	3RV23 21-4BC20
22	11	Without	286	55	3RV23 21-4CC10	3RV23 21-4CC20
25	11	Without	325	55	3RV23 21-4DC10	3RV23 21-4DC20
28	15	Without	364	55	3RV23 21-4NC10	3RV23 21-4NC20
32	15	Without	400	55	3RV23 21-4EC10	3RV23 21-4EC20
36	18.5	Without	432	20	3RV23 21-4PC10	—
40	18.5	Without	480	20	3RV23 21-4FC10	—

1) Guide value for 4-pole standard motors at 50 Hz 415 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) For overload protection of the motors, appropriate overload relays must be used.

Auxiliary switches can be ordered separately (see "Mountable accessories").

Motor Protection Circuit Breakers

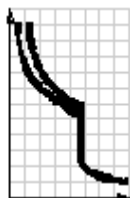
SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

For transformer protection

Selection and ordering data

CLASS 10, without auxiliary switches

Motor protection circuit breakers for the protection of transformers with high inrush current



3RV24 11-0AA10



3RV24 11-0AA20



3RV24 21-4AA10



3RV24 21-4AA20

Rated current	Setting range for thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals	Spring-type terminals
I_n			I_{cu}	Order No.	Order No.
A	A	A	kA		
Size S00					
0.16	0.11 ... 0.16	3.3	100	3RV24 11-0AA10	3RV24 11-0AA20
0.2	0.14 ... 0.2	4.2	100	3RV24 11-0BA10	3RV24 11-0BA20
0.25	0.18 ... 0.25	5.2	100	3RV24 11-0CA10	3RV24 11-0CA20
0.32	0.22 ... 0.32	6.5	100	3RV24 11-0DA10	3RV24 11-0DA20
0.4	0.28 ... 0.4	8.2	100	3RV24 11-0EA10	3RV24 11-0EA20
0.5	0.35 ... 0.5	10	100	3RV24 11-0FA10	3RV24 11-0FA20
0.63	0.45 ... 0.63	13	100	3RV24 11-0GA10	3RV24 11-0GA20
0.8	0.55 ... 0.8	16	100	3RV24 11-0HA10	3RV24 11-0HA20
1	0.7 ... 1	21	100	3RV24 11-0JA10	3RV24 11-0JA20
1.25	0.9 ... 1.25	26	100	3RV24 11-0KA10	3RV24 11-0KA20
1.6	1.1 ... 1.6	33	100	3RV24 11-1AA10	3RV24 11-1AA20
2	1.4 ... 2	42	100	3RV24 11-1BA10	3RV24 11-1BA20
2.5	1.8 ... 2.5	52	100	3RV24 11-1CA10	3RV24 11-1CA20
3.2	2.2 ... 3.2	65	100	3RV24 11-1DA10	3RV24 11-1DA20
4	2.8 ... 4	82	100	3RV24 11-1EA10	3RV24 11-1EA20
5	3.5 ... 5	104	100	3RV24 11-1FA10	3RV24 11-1FA20
6.3	4.5 ... 6.3	130	100	3RV24 11-1GA10	3RV24 11-1GA20
8	5.5 ... 8	163	100	3RV24 11-1HA10	3RV24 11-1HA20
10	7 ... 10	208	100	3RV24 11-1JA10	3RV24 11-1JA20
12.5	9 ... 12.5	260	100	3RV24 11-1KA10	3RV24 11-1KA20
16	11 ... 16	286	55	3RV24 11-4AA10	3RV24 11-4AA20
Size S0					
16	11 ... 16	286	55	3RV24 21-4AA10	3RV24 21-4AA20
20	14 ... 20	325	55	3RV24 21-4BA10	3RV24 21-4BA20
22	17 ... 22	364	55	3RV24 21-4CA10	3RV24 21-4CA20
25	20 ... 25	400	55	3RV24 21-4DA10	3RV24 21-4DA20

Auxiliary switches can be ordered separately (see "Mountable accessories").

Motor Protection Circuit Breakers

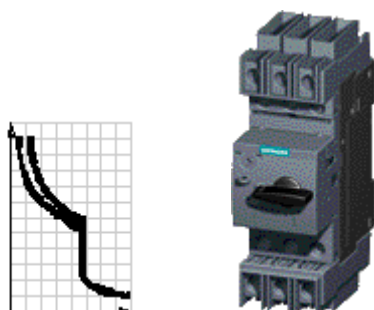
SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

For system protection
according to UL 489/CSA C22.2 No. 5-02

Selection and ordering data

Without auxiliary switches

Circuit breakers for system protection and non-motor loads according to UL/CSA



3RV27 11-0AD10

Rated current ¹⁾	Thermal overload release (non-adjustable)	Instantaneous overcurrent release	Short-circuit breaking capacity at 480 Y/277 V AC	Screw terminals
$I_n^{1)}$			I_{bc}	Order No.
A	A	A	kA	
Size S00				
0.16	0.16	2.1	65	3RV27 11-0AD10
0.2	0.2	2.6	65	3RV27 11-0BD10
0.25	0.25	3.3	65	3RV27 11-0CD10
0.32	0.32	4.2	65	3RV27 11-0DD10
0.4	0.4	5.2	65	3RV27 11-0ED10
0.5	0.5	6.5	65	3RV27 11-0FD10
0.63	0.63	8.2	65	3RV27 11-0GD10
0.8	0.8	10	65	3RV27 11-0HD10
1	1	13	65	3RV27 11-0JD10
1.25	1.25	16	65	3RV27 11-0KD10
1.6	1.6	21	65	3RV27 11-1AD10
2	2	26	65	3RV27 11-1BD10
2.5	2.5	33	65	3RV27 11-1CD10
3.2	3.2	42	65	3RV27 11-1DD10
4	4	52	65	3RV27 11-1ED10
5	5	65	65	3RV27 11-1FD10
6.3	6.3	82	65	3RV27 11-1GD10
8	8	104	65	3RV27 11-1HD10
10	10	130	65	3RV27 11-1JD10
12.5	12.5	163	65	3RV27 11-1KD10
15	15	208	65	3RV27 11-4AD10

1) Rated value 100 % according to UL 489 and IEC 60947-2 ("100 % rated breaker").

Lateral and transverse auxiliary switches can be ordered separately (see "Mountable accessories").

Motor Protection Circuit Breakers

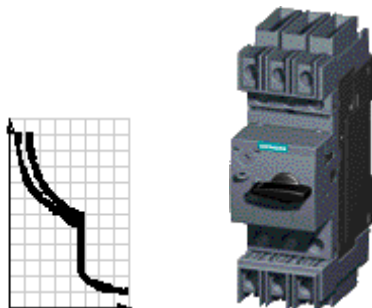
SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

For transformer protection
according to UL 489/CSA C22.2 No. 5-02

Selection and ordering data

Without auxiliary switches

Circuit breakers for system and transformer protection according to UL/CSA, specially designed for transformers with high inrush current



3RV28 11-0AD10

Rated current ¹⁾	Thermal overload release (non-adjustable)	Instantaneous overcurrent release	Short-circuit breaking capacity at 480 Y/277 V AC	Screw terminals
$I_n^{1)}$			I_{bc}	Order No.
A	A	A	kA	
Size S00				
0.16	0.16	3.3	65	3RV28 11-0AD10
0.2	0.2	4.2	65	3RV28 11-0BD10
0.25	0.25	5.2	65	3RV28 11-0CD10
0.32	0.32	6.5	65	3RV28 11-0DD10
0.4	0.4	8.2	65	3RV28 11-0ED10
0.5	0.5	10	65	3RV28 11-0FD10
0.63	0.63	13	65	3RV28 11-0GD10
0.8	0.8	16	65	3RV28 11-0HD10
1	1	21	65	3RV28 11-0JD10
1.25	1.25	26	65	3RV28 11-0KD10
1.6	1.6	33	65	3RV28 11-1AD10
2	2	42	65	3RV28 11-1BD10
2.5	2.5	52	65	3RV28 11-1CD10
3.2	3.2	65	65	3RV28 11-1DD10
4	4	82	65	3RV28 11-1ED10
5	5	104	65	3RV28 11-1FD10
6.3	6.3	130	65	3RV28 11-1GD10
8	8	163	65	3RV28 11-1HD10
10	10	208	65	3RV28 11-1JD10
12.5	12.5	260	65	3RV28 11-1KD10
15	15	286	65	3RV28 11-4AD10

1) Rated value 100 % according to UL 489 and IEC 60947-2
("100 % rated breaker").

Lateral and transverse auxiliary switches can be ordered
separately (see "Mountable accessories").

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories Mountable accessories

Overview

Mounting location and function

The 3RV2 motor protection circuit breakers have three main contact -elements. In order to achieve maximum flexibility, auxiliary switches, signaling switches, auxiliary releases and isolator modules can be supplied separately.

These components can be fitted as required on the motor protection circuit breakers without using tools.

For overview graphic see [page 4/6](#).

Front side <u>Notes:</u> A maximum of 4 auxiliary contacts with auxiliary switches can be attached to each motor protection circuit breaker.	Transverse auxiliary switches, solid-state compatible transverse auxiliary switches 1 NO + 1 NC or 2 NO or 1 CO	An auxiliary switch block can be inserted transversely on the front. The overall width of the motor protection circuit breakers remains unchanged.
Left-hand side <u>Notes:</u> - A maximum of 4 auxiliary contacts with auxiliary switches can be attached to each motor protection circuit breaker. - Auxiliary switches (2 contacts) and signal switches can be mounted separately or together. - The signaling switch cannot be used for the 3RV27 and 3RV28 circuit breakers.	Lateral auxiliary switches (2 contacts) 1 NO + 1 NC or 2 NO or 2 NC Lateral auxiliary switches (4 contacts) 2 NO + 2 NC Signaling switches Tripping 1 NO + 1 NC Short-circuit 1 NO + 1 NC	One of the three lateral auxiliary switches can be mounted on the left side per motor protection circuit breaker. The contacts of the auxiliary switch close and open together with the main contacts of the motor protection circuit breaker. The width of the lateral auxiliary switch with 2 contacts is 9 mm. One lateral auxiliary switch with four contacts can be mounted on the left side per motor protection circuit breaker. The contacts of the auxiliary switch close and open together with the main contacts of the motor protection circuit breaker. The width of the lateral auxiliary switch with 4 contacts is 18 mm. One signaling switch can be mounted on the left side of each motor protection circuit breaker. The signaling switch has two contact systems. One contact system always signals <u>tripping</u> irrespective of whether this was caused by a short-circuit, an overload or an auxiliary release. The other contact system only switches in the event of a short-circuit. There is no signaling as a result of <u>switching off</u> with the handle. In order to be able to switch on the motor protection circuit breaker again after a short-circuit, the signaling switch must be reset manually after the error cause has been eliminated. The overall width of the signaling switch is 18 mm.
Right-hand side <u>Notes:</u> - One auxiliary release can be mounted per motor protection circuit breaker. - Accessories cannot be mounted at the right-hand side of the 3RV21 motor protection circuit breakers for motor protection with overload relay function.	Auxiliary releases Shunt releases or Undervoltage releases or Undervoltage releases with leading auxiliary contacts 2 NO	For remote-controlled tripping of the motor protection circuit breaker. The release coil should only be energized for short periods (see circuit diagrams). Trips the motor protection circuit breaker when the voltage is interrupted and prevents the motor from being restarted accidentally when the voltage is restored. Used for remote-controlled tripping of the motor protection circuit breaker. Particularly suitable for EMERGENCY-STOP disconnection by way of the corresponding EMERGENCY-STOP pushbutton according to EN 60204-1. Function and use as for the undervoltage release without leading auxiliary contacts, but with the following additional function: the auxiliary contacts will open in switch position OFF to deenergize the coil of the undervoltage release, thus interrupting energy consumption. In the "tripped" position, these auxiliary contacts are not guaranteed to open. The leading contacts permit the motor protection circuit breaker to reclose. The overall width of the auxiliary release is 18 mm.
Top <u>Notes:</u> - The isolator module cannot be used for the 3RV27 and 3RV28 circuit breakers. - The isolator module covers the terminal screws of the transverse auxiliary switch. If the isolator module is used, we therefore recommend that either the lateral auxiliary switches be fitted or that the isolator module not be mounted until the auxiliary switch has been wired.	Isolator modules	Isolator modules can be mounted to the upper terminal end of the motor protection circuit breakers. The supply cable is connected to the motor protection circuit breaker through the isolator module. The plug can only be unplugged when the motor protection circuit breaker is open and isolates all 3 poles of the motor protection circuit breaker from the network. The shock-protected isolation point is clearly visible and secured with a padlock to prevent reinsertion of the plug.

For a complete overview of which accessories can be used for the various motor protection circuit breakers see [page 4/2](#).

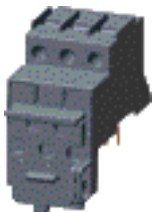
Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories

Mountable accessories

Selection and ordering data

Version		For motor protection circuit breakers	Screw terminals 	Spring-type terminals 
Size			Order No.	Order No.
Auxiliary switches ¹⁾				
 3RV29 01-1E	Transverse auxiliary switches for front mounting 1 CO 1 NO + 1 NC 2 NO	S00, S0	3RV29 01-1D 3RV29 01-1E 3RV29 01-1F	— 3RV29 01-2E 3RV29 01-2F
 3RV29 01-2E	Solid-state compatible transverse auxiliary switches mountable on the front, for operation in dusty atmosphere and in solid-state circuits with low operating currents 1 CO	S00, S0	3RV29 01-1G	—
 3RV29 01-1G				
 3RV29 01-0H	Covers for transverse auxiliary switches	S00, S0	3RV29 01-0H	—
 3RV29 01-1A	Lateral auxiliary switches mountable on the left 1 NO + 1 NC 2 NO 2 NC 2 NO + 2 NC	S00, S0	3RV29 01-1A 3RV29 01-1B 3RV29 01-1C 3RV29 01-1J	3RV29 01-2A 3RV29 01-2B 3RV29 01-2C —
 3RV29 01-2A				
Signaling switches ²⁾				
 3RV29 21-1M	Signaling switches One signaling switch can be mounted on the left per motor protection circuit breaker. Separate tripped and short-circuit alarms, 1 NO + 1 NC each	S00, S0	3RV29 21-1M	3RV29 21-2M
 3RV29 21-2M				
Isolator modules ²⁾				
 3RV29 28-1A with padlock	Isolator modules Visible isolating distance for isolating individual motor protection circuit breakers from the network, lockable in disconnected position	S00, S0	3RV29 28-1A	—

1) Each motor protection circuit breaker can be fitted with one transverse and one lateral auxiliary switch. The lateral auxiliary switch with 2 NO + 2 NC is used without a transverse auxiliary switch.

2) This accessory cannot be used for the 3RV27 and 3RV28 circuit breakers.

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories
Mountable accessories



3RV29 02-1AV0



3RV29 02-2AV0



3RV29 22-1CP0



3RV29 02-2DB0

Rated control supply voltage U_s					For motor protection circuit breaker	Screw terminals 	Spring-type terminals 
AC 50 Hz	AC 60 Hz	AC 50/60 Hz 100 % ON period ¹⁾	AC/DC 50/60 Hz, DC 5 s ON period ²⁾	DC			
V	V	V	V	V	Size	Order No.	Order No.
Auxiliary releases³⁾							
Undervoltage releases							
—	—	—	—	24	S00, S0	3RV29 02-1AB4	—
24	—	—	—	—	S00, S0	3RV29 02-1AB0	—
110	120	—	—	—	S00, S0	3RV29 02-1AF0	—
—	208	—	—	—	S00, S0	3RV29 02-1AM1	—
230	240	—	—	—	S00, S0	3RV29 02-1AP0	3RV29 02-2AP0
400	440	—	—	—	S00, S0	3RV29 02-1AV0	3RV29 02-2AV0
415	480	—	—	—	S00, S0	3RV29 02-1AV1	—
500	600	—	—	—	S00, S0	3RV29 02-1AS0	—
Undervoltage releases with leading auxiliary contacts 2 NO							
230	240	—	—	—	S00, S0	3RV29 22-1CP0	3RV29 22-2CP0
400	440	—	—	—	S00, S0	3RV29 22-1CV0	3RV29 22-2CV0
415	480	—	—	—	S00, S0	3RV29 22-1CV1	3RV29 22-2CV1
Shunt releases							
—	—	20 ... 24	20 ... 70	—	S00, S0	3RV29 02-1DB0	3RV29 02-2DB0
—	—	90 ... 110	70 ... 190	—	S00, S0	3RV29 02-1DF0	3RV29 02-2DF0
—	—	210 ... 240	190 ... 330	—	S00, S0	3RV29 02-1DP0	3RV29 02-2DP0
—	—	350 ... 415	330 ... 500	—	S00, S0	3RV29 02-1DV0	—
—	—	500	500	—	S00, S0	3RV29 02-1DS0	—

- 1) The voltage range is valid for 100 % (infinite) ON period. The response voltage lies at 0.9 of the lower limit of the voltage range.
- 2) The voltage range is valid for 5 s ON period at AC 50/60 Hz and DC. The response voltage lies at 0.85 of the lower limit of the voltage range.
- 3) One auxiliary release can be mounted on the right per motor protection circuit breaker (does not apply to 3RV21 motor protection circuit breakers with overload relay function).

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories

Busbar accessories

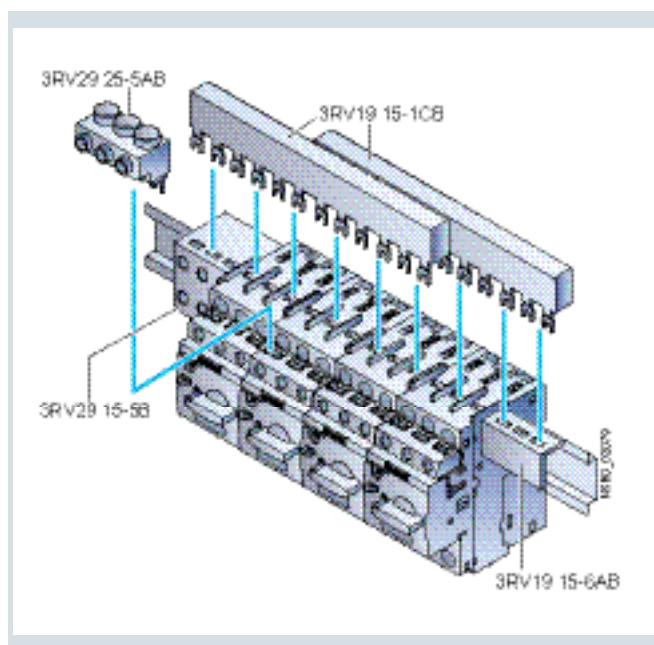
Overview

Insulated three-phase busbar system

Three-phase busbar systems provide an easy, time-saving and clearly arranged means of feeding 3RV2 motor protection circuit breakers with screw terminals. They can be used for the different types of motor protection circuit breakers up to 32 A. The 3RV19 15 three-phase busbar systems are generally unsuitable for the 3RV21 motor protection circuit breakers for motor protection with overload relay function and for the 3RV27 and 3RV28 circuit breakers according to UL 489 / CSA C22.2 No.5-02.

The busbars are suitable for between 2 and 5 motor protection circuit breakers. However, any kind of extension is possible by clamping the tags of an additional busbar (rotated by 180°) underneath the terminals of the respective last motor protection circuit breaker.

A combination of motor protection circuit breakers of different sizes is possible. The motor protection circuit breakers are supplied by appropriate feeder terminals.



SIRIUS three-phase busbar system size S00/S0

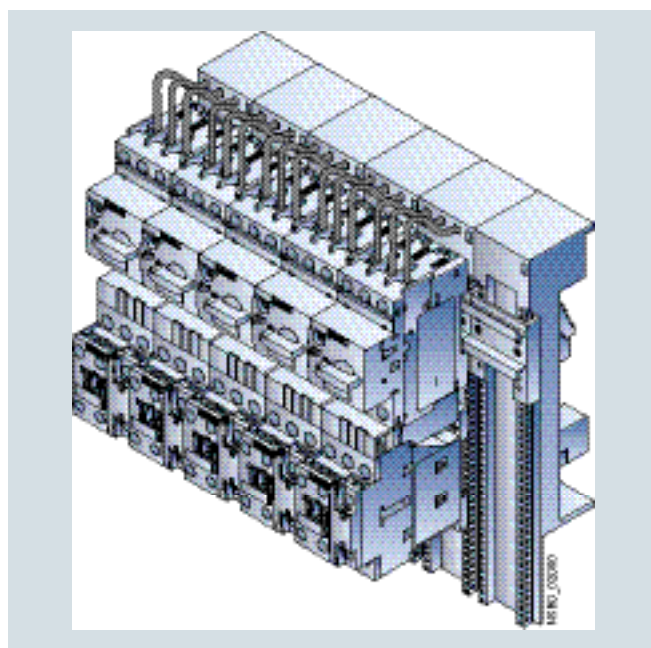
The three-phase busbar systems are finger-safe. They are designed for any short-circuit stress which can occur at the output side of connected motor protection circuit breakers.

8US busbar adapters for 60 mm systems

The motor protection circuit breakers are mounted directly with the aid of busbar adapters on busbar systems with 60 mm center-to-center clearance in order to save space and to reduce infeed times and costs.

The busbar adapters for busbar systems with 60 mm center-to-center clearance are suitable for copper busbars with a width of 12 mm to 30 mm. The busbars can be 5 mm or 10 mm thick.

The motor protection circuit breakers are snapped onto the adapter and connected on the line side. This prepared unit is then plugged directly onto the busbar system, and is thus connected both mechanically and electrically at the same time.



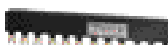
SIRIUS load feeders with busbar adapters snapped onto busbars

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

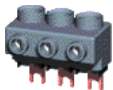
Accessories Busbar accessories

Selection and ordering data

	Modular spacing	Number of motor protection circuit breakers that can be connected			Rated current I_n at 690 V	For motor protection circuit breakers	Order No.
	mm	Without lateral accessories	Including lateral auxiliary switch	Including auxiliary release	A	Size	
Three-phase busbars ¹⁾²⁾							
For feeding several motor protection circuit breakers with screw terminals, mounted side by side on standard mounting rails, insulated, with touch protection							
 3RV19 15-1AB	45	2 3 4 5	—	—	63	S00, S0 ¹⁾ S00, S0 ¹⁾ S00, S0 ¹⁾ S00, S0 ¹⁾	3RV19 15-1AB 3RV19 15-1BB 3RV19 15-1CB 3RV19 15-1DB
 3RV19 15-1BB	55	—	2 3 4 5	—	63	S00, S0 ¹⁾ S00, S0 ¹⁾ S00, S0 ¹⁾ S00, S0 ¹⁾	3RV19 15-2AB 3RV19 15-2BB 3RV19 15-2CB 3RV19 15-2DB
 3RV19 15-1CB	63	—	—	2 4	63	S00, S0 ¹⁾ S00, S0 ¹⁾	3RV19 15-3AB 3RV19 15-3CB
 3RV19 15-1DB							

1) Not suitable for 3RV21 motor protection circuit breakers for motor protection with overload relay function and for 3RV27 and 3RV28 circuit breakers according to UL 489 / CSA C22.2 No.5-02.

2) Approved for motor protection circuit breakers with $I_n \leq 32$ A.

	Conductor cross-section			Tightening torque	For motor protection circuit breakers	Order No.
	Solid or stranded	Finely stranded with end sleeve	AWG cables, solid or stranded			
	mm²	mm²	AWG	Nm	Size	
Three-phase feeder terminals						
	Connection from top					
	2.5 ... 16	2.5 ... 16	10 ... 4	3 ... 4	S00, S0	3RV29 25-5AB
	Connection from below					
	This terminal is connected in place of a switch, please take the space requirement into account.					
	2.5 ... 16	2.5 ... 16	10 ... 4	Input: 4, Output: 2 ... 2.5	S00, S0	3RV29 15-5B

Version	For motor protection circuit breakers	Order No.
	Size	
Covers for connection tags		
 3RV19 15-6AB	Touch protection for empty positions	S00, S0
		3RV19 15-6AB

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories

Busbar accessories

Busbar adapters



8US12 51-5DS10



8US12 51-5DT11



8US12 50-5AS10



8US12 50-5AT10

For motor protection circuit breaker	Rated current	Connecting cable	Adapter length	Adapter width	Rated voltage	Order No.
Size	A	AWG	mm	mm	V	
Busbar adapters for 60 mm systems						
For flat copper profiles according to DIN 46433 Width: 12 mm and 30 mm Thickness: 5 mm and 10 mm also for T and double-T special profiles						
• For motor protection circuit breakers with screw terminals						Screw terminals 
S00/S0	25	12	200	45	690	8US12 51-5DS10
S0	32	10	260	45	690	8US12 51-5NT10
• For motor protection circuit breakers with spring-type terminals						Spring-type terminals 
S00/S0	25	12	200	45	690	8US12 51-5DS11
S00/S0	25	12	260	45	690	8US12 51-5DT11
S0	32	10	260	45	690	8US12 51-5NT11
Accessories						
Device holders	—	—	200	45	—	8US12 50-5AS10
For lateral attachment to busbar adapters	—	—	260	45	—	8US12 50-5AT10
Side modules	—	—	200	9	—	8US19 98-2BJ10
For widening of busbar adapters						
Spacers	—	—	—	—	—	8US19 98-1BA10
For fixing the load feeder onto the busbar adapter						
Vibration and shock kits	—	—	—	—	—	8US19 98-1CA10
For high vibration and shock loads						

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories
3RV29 infeed system

Overview

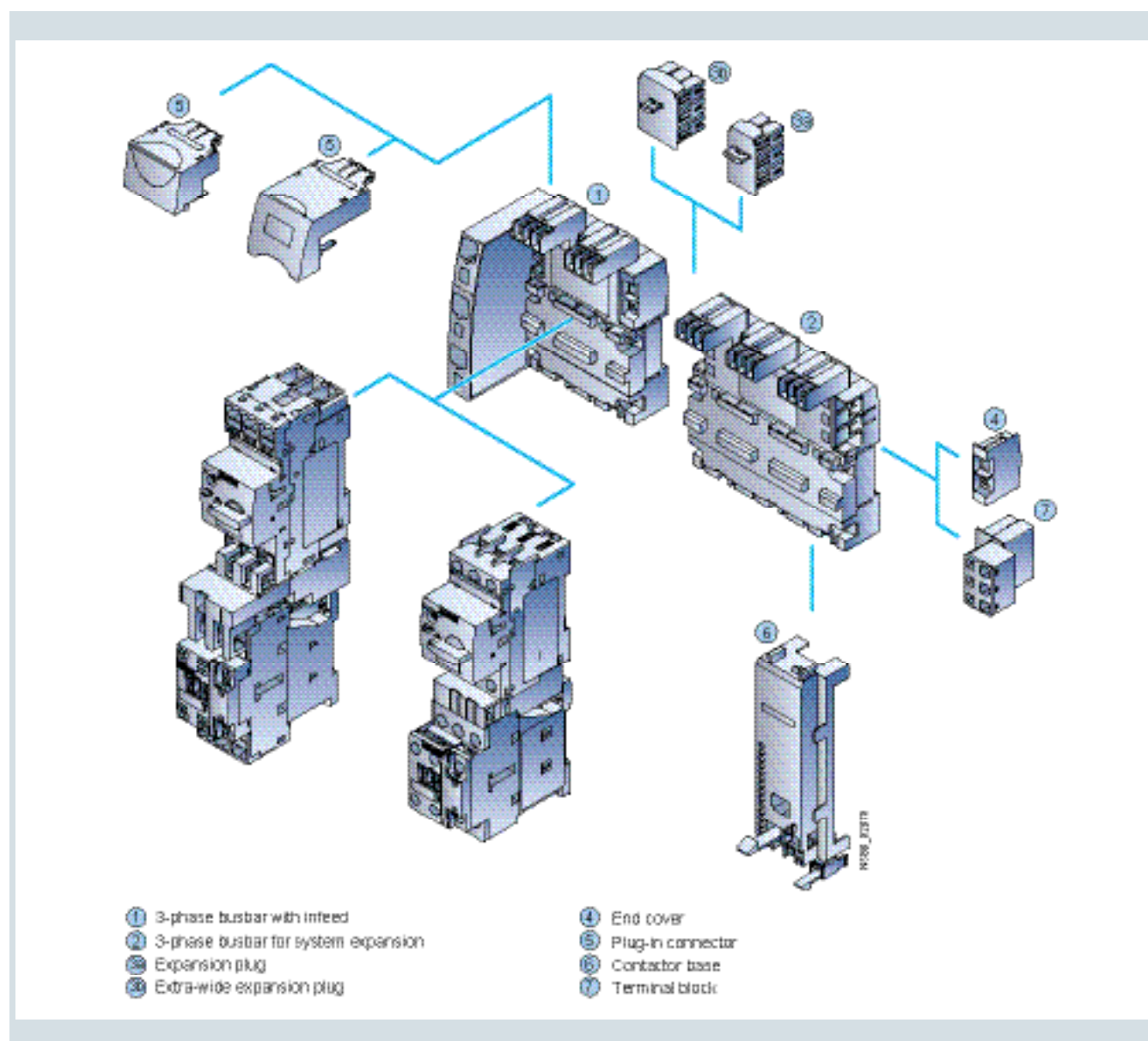
The 3RV29 infeed system is a convenient means of energy supply and distribution for a group of several motor protection circuit breakers or complete load feeders with a screw or spring-type connection in sizes S00 and S0 (exception: this system cannot be used for the 3RV21 motor protection circuit breakers, 3RV27 and 3RV28 circuit breakers).

The system is based on a basic module complete with a lateral incoming unit (three-phase busbar with infeed). This infeed with spring-type terminals is mounted on the right or left depending on the version and can be supplied with a maximum conductor cross-section of 25 mm² (with end sleeve). A basic module has two sockets onto each of which a motor protection circuit breaker can be snapped.

Expansion modules are available for extending the system (three-phase busbars for system expansion). The individual modules are connected through an expansion plug.

The electrical connection between the three-phase busbars and the motor protection circuit breakers is implemented through plug-in connectors. The complete system can be mounted on a TH 35 standard mounting rail to EN 60715 and can be expanded as required up to a maximum current carrying capacity of 63 A.

The system is mounted extremely quickly and easily thanks to the simple plug-in technique. Thanks to the lateral infeed, the system also saves space in the control cabinet. The additional overall height required for the infeed unit is only 30 mm. The alternative infeed possibilities on each side offer a high degree of flexibility for configuring the control cabinet: Infeed on left-hand or right-hand side as well as infeed on one side and outfeed on the other side to supply further loads are all possible. A terminal block with spring-type connections in combination with a standard mounting rail enables the integration of not only SIRIUS motor protection circuit breakers but also single-phase, 2-phase and 3-phase components such as 5SY miniature circuit breakers or SIRIUS relay components.



SIRIUS 3RV29 infeed system

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories 3RV29 infeed system

① Three-phase busbars with infeed

A three-phase busbar with infeed unit is required for connecting the incoming supply. This module comprises one infeed module and 2 sockets which each accept one motor protection circuit breaker. A choice of two versions with infeed on the left or right is available. The infeed is connected using spring-type terminals. The spring-type terminals permit conductor cross-sections of up to 25 mm² with end sleeves. An end cover is supplied with each module.

② Three-phase busbars for system expansion

The three-phase busbars for system expansion support expansion of the system. There is a choice of modules with 2 or 3 sockets. The system can be expanded as required up to a maximum current carrying capacity of 63 A. An expansion plug is supplied with each module.

③a Expansion plug

The expansion plug is used for electrical connection of adjacent three-phase busbars. The current carrying capacity of this plug equals 63 A. One expansion plug is supplied with each three-phase busbar for system expansion. Additional expansion plugs are therefore only required as spare parts.

③b Extra-wide expansion plug

The wide expansion plug makes the electrical connection between two three-phase busbars, thus performing the same function as the 3RV29 17-5BA00 expansion plug; the electrical characteristics (e.g. a current carrying capacity of 63 A) are identical.

The 3RV29 17-5E expansion plug is 10 mm wider than the 3RV29 17-5BA00 expansion plug, hence in the plugged state there is a distance of 10 mm between the connected three-phase busbars. This distance can be used to lay the auxiliary current and control current wiring ("wiring duct"). The motor protection circuit breaker and contactor can be wired from underneath, which means that the complete cable duct above the system can be omitted.

④ End cover

The end cover is used to cover the three-phase busbar at the open end of the system. This cover is therefore only required once for each system. An end cover is supplied with each three-phase busbar system with infeed. Further end covers are therefore only required as spare parts.

⑤ Plug-in connector

The plug-in connector is used for the electrical connection between the three-phase busbar and the 3RV2 motor protection circuit breaker. These plug-in connectors are available in versions for screw or spring-type terminals.

⑥ Contactor base

Load feeders can be assembled in the system using the contactor base. The contactor bases are suitable for contactors sizes S00 and S0 with spring-type and screw terminals and are simply snapped onto the three-phase busbars. Direct-on-line starters and reversing starters are possible. One contactor base is required for direct-on-line starters and two are required for reversing starters.

To assemble load feeders for reversing starters, the contactor bases can be arranged alongside each other (90 mm overall width). In this case the mechanical interlocking of the contactors is possible. The contactor bases are also suitable for soft starters size S00 and S0 with screw connection.

The infeed system is designed for mounting on a 35 mm standard mounting rail with 7.5 mm overall depth. This standard mounting rail gives the contactor base a stable mounting surface to sit on. If standard mounting rails with a depth of 15 mm are used, the spacer connected to the bottom of the contactor base must be knocked out and plugged into the mating piece that is also on the underside. Then the contactor base also has a stable mounting surface. When standard mounting rails with a depth of 7.5 mm are used, the spacer has no function and can be removed.

The link modules are used for direct start load feeders, in which case the use of a contactor base is not absolutely necessary. Motor protection circuit breaker and contactor assemblies can then be directly snapped onto the sockets of the three-phase busbars. For feeders of size S00 and S0, the corresponding 3RA19 21-1..., 3RA29 11-2..., 3RA29 21-1... or 3RA29 21-2.... link modules should generally be used.

⑦ Terminal block

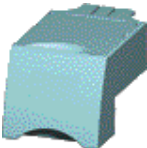
The 3RV29 17-5D terminal block enables the integration of not only SIRIUS motor protection circuit breakers but also single-phase, 2-phase and 3-phase components. Using the terminal block the 3 phases can be fed out of the system; which means that single-phase loads can also be integrated in the system. The terminal block is plugged into the slot of the expansion plug and thus enables outfeeder from the middle or end of the infeed system. The terminal block can be rotated through 180° and be locked to the support modules of the infeed system. The 3RV19 17-7B 45 mm standard mounting rail for screwing onto the support plate is available in addition in order to be able to plug the single-phase, 2-phase and 3-phase components onto the infeed system.

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories
3RV29 infeed system

Selection and ordering data

Type	Version	For 3RV20, 3RV23, 3RV24 motor protection circuit breakers	Order No.
		Size	
Three-phase busbars with infeed			
 3RV29 17-1A	Three-phase busbars with infeed incl. 3RV29 17-6A end cover	For 2 motor protection circuit breakers with screw terminals or spring-type terminals	
		• With infeed on the left • With infeed on the right	S00, S0 S00, S0
			3RV29 17-1A 3RV29 17-1E
Three-phase busbars for system expansion			
 3RV29 17-4A	Three-phase busbars incl. 3RV29 17-5BA00 expansion plug	For motor protection circuit breakers with screw terminals or spring-type terminals	
		• For 2 motor protection circuit breakers • For 3 motor protection circuit breakers	S00, S0 S00, S0
			3RV29 17-4A 3RV29 17-4B
Plug-in connectors			
 3RV29 17-5AA00	Plug-in connectors to make contact with the motor protection circuit breakers	• For spring-type terminals	Spring-type terminals 
		- Single-unit packaging - Multi-unit packaging	S00 ¹⁾ S0 ²⁾ S00 ¹⁾ S0 ²⁾
			3RV29 17-5AA00 3RV29 27-5AA00 3RV29 17-5A 3RV29 27-5A
 3RV29 17-5CA00		• For screw terminals	Screw terminals 
		- Single-unit packaging - Multi-unit packaging	S00 ¹⁾ S0 ²⁾ S00 ¹⁾ S0 ²⁾
			3RV29 17-5CA00 3RV19 27-5AA00 3RV29 17-5C 3RV19 27-5A
Type	Version	For contactors	Order No.
		Size	
Contactor bases			
 3RV29 27-7AA00	Contactor bases for mounting direct-on-line or reversing starters	Single-unit packaging	
			S00, S0
			3RV29 27-7AA00

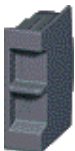
1) I > 14 A, please note derating; see system manual "SIRIUS Innovations", Chapter "Motor Starter Protectors".

2) I > 16 A, please note derating; see system manual "SIRIUS Innovations", Chapter "Motor Starter Protectors".

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories 3RV29 infeed system

Type	Version	Order No.
Terminal blocks		
 3RV29 17-5D	Terminal blocks For integration of single-phase, two-phase and three-phase components	Single-unit packaging 3RV29 17-5D
45 mm standard mounting rails		
 3RV19 17-7B	45 mm standard mounting rails for mounting onto three-phase busbars	Single-unit packaging 3RV19 17-7B
Extra-wide expansion plugs		
 3RV29 17-5E	Extra-wide expansion plugs as accessory	Single-unit packaging 3RV29 17-5E
Expansion plugs		
 3RV29 17-5BA00	Expansion plugs¹⁾ as spare part	Single-unit packaging 3RV29 17-5BA00
End covers		
 3RV29 17-6A	End covers²⁾ as spare part	Multi-unit packaging 3RV29 17-6A

- 1) The expansion plug is included in the scope of supply of the 3RV29 17-4. three-phase busbars for system expansion.
- 2) The end cover is included in the scope of supply of the 3RV29 17-1. three-phase busbars with infeed system.

Motor Protection Circuit Breakers

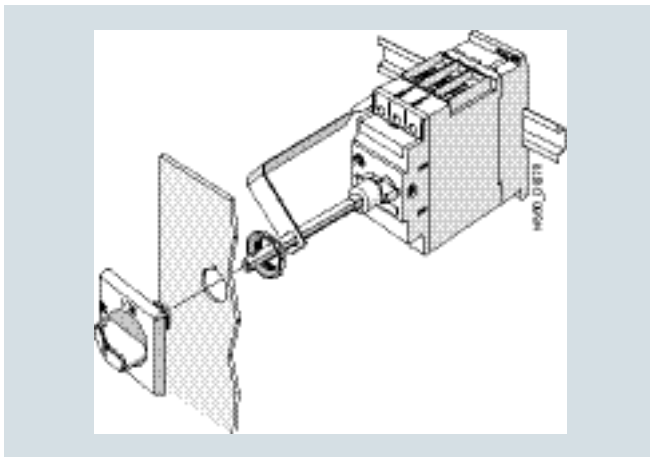
SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories Rotary operating mechanisms

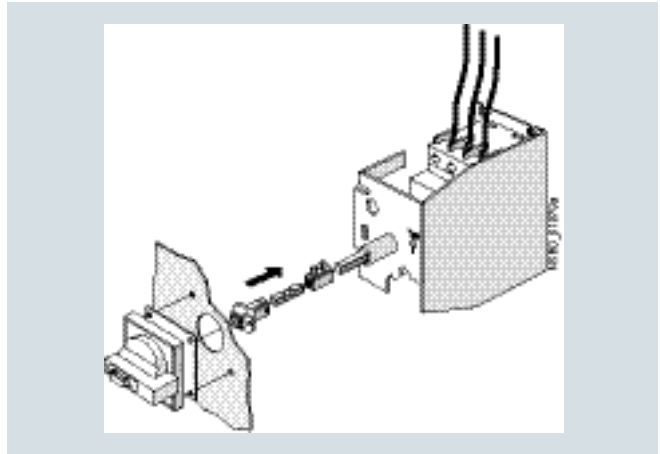
Overview

Door-coupling rotary operating mechanisms

Motor protection circuit breakers with a rotary operating mechanism can be mounted in a control cabinet and operated externally by means of a door-coupling rotary operating mechanism. When the cabinet door with motor protection circuit breaker is closed, the operating mechanism is coupled. When the motor protection circuit breaker closes, the coupling is locked which prevents the door from being opened unintentionally. This interlock can be defeated by the maintenance personnel. In the OPEN position, the rotary operating mechanism can be secured against reclosing with padlock. Inadvertent opening of the door is not possible in this case either.



SIRIUS 3RV29 26-OK door-coupling rotary operating mechanism



SIRIUS 3RV29 26-2B door-coupling rotary operating mechanism for arduous conditions

Selection and ordering data

Version	Color of handle	Version of extensionshaft mm	For motor protection circuit breaker Size	Order No.

Door-coupling rotary operating mechanisms for arduous conditions



3RV19 26-1B-Z

The door-coupling rotary operating mechanisms consist of a knob, a coupling driver, an extension shaft of 300 mm in length (8 mm x 8 mm), a spacer and two metal brackets, into which the motor protection circuit breaker is inserted.

The door-coupling rotary operating mechanisms are designed to degree of protection IP65. The door interlocking reliably prevents opening of the control cabinet door in the ON position of the motor protection circuit breaker. The OFF position can be locked with up to 3 padlocks.

Laterally mountable auxiliary releases and two-pole auxiliary switches can be used. The door-coupling rotary operating mechanisms thus meet the requirements for isolating functions according to IEC 60947-2.

**Door-coupling rotary
operating mechanisms**

Gray & Black

300

S00, S0

3RV19 26-1B-Z

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories

Mounting accessories

Link modules

Feeders can be easily assembled from single devices with the help of the link modules. The following table shows the various possible combinations for devices with screw connection or spring-type terminals.

Combination device	3RV2 motor protection circuit breakers	3RT2 contactors; 3RW30, 3RW40 soft starters; 3RF34 solid-state contactors	Link modules	
	Size	Size	Screw terminals	Spring-type terminals
Link modules for connecting switching devices to 3RV2 motor protection circuit breakers¹⁾				
3RT2 contactors with AC or DC coil	S00	S00	3RA19 21-1DA00	3RA29 11-2AA00
	S0	S00		—
3RT2 contactors with AC coil	S0	S0	3RA29 21-1AA00	3RA29 21-2AA00
	S00	S0		—
3RT2 contactors with DC coil	S0	S0	3RA29 21-1BA00	3RA29 21-2AA00
	S00	S0		—
3RW30 soft starters	S00	S00	3RA29 21-1BA00	3RA29 11-2GA00
	S0	S00		—
3RW30/3RW40 soft starters	S0	S0	3RA29 21-1BA00	3RA29 21-2GA00
	S00	S0		—
3RF34 solid-state contactors	S00/S0	S00	3RA29 21-1BA00	—
Hybrid link modules for connecting contactors with spring-type terminals to 3RV2 motor protection circuit breakers with screw connection¹⁾				
3RT2 contactors with AC or DC coil	S00	S00	3RA29 11-2FA00	—
3RT2 contactors with AC or DC coil	S0	S0	3RA29 21-2FA00	—

Note:

Link modules and hybrid link modules up to max. 32 A can be used.

- 1) The link modules and the hybrid link modules cannot be used for the 3RV2. 21-4PA1., 3RV2. 21-4FA1. motor protection circuit breakers and 3RV27, 3RV28 circuit breakers.

Selection and ordering data

Accessories

Version		For motor protection circuit breakers	Order No.
		Size	
Covers			
	Scale covers	3RV20, 3RV21, 3RV24: S00, S0	3RV29 08-0P
	Sealable, for covering the current setting scale		
3RV29 08-0P			
Mounting material			
	Push-in lugs	S00, S0	3RV29 28-0B
	For screwing the motor protection circuit breaker onto mounting plates		
	For each motor protection circuit breaker, 2 units are required.		
3RV29 28-0B			
Tools for opening spring-type terminals by hand			
	Screwdrivers		Spring-type terminals 
	for all SIRIUS devices with spring-type terminals		
	Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	S00, S0	3RA29 08-1A
3RA29 08-1A			

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories
Mounting accessories

Link modules

Actuating voltage of contactor		Size		Order No.
		3RT2 contactors	3RV2 motor protection circuit breakers	
Link modules for motor protection circuit breaker to contactor ¹⁾				
	For mechanical and electrical connection between motor protection circuit breaker and contactor with screw terminals			Screw terminals 
	Single-unit packaging			
	AC/DC	S00	S00/S0	3RA19 21-1DA00 3RA29 21-1AA00 3RA29 21-1BA00
	AC	S0	S00/S0	
	DC	S0	S00/S0	
3RA29 21-1AA00				
	For mechanical and electrical connection between motor protection circuit breaker and contactor with spring-type terminals			Spring-type terminals 
	Single-unit packaging			
	AC/DC	S00	S00	3RA29 11-2AA00 3RA29 21-2AA00 3RA29 21-2AA00
	AC ²⁾	S0	S0	
	DC	S0	S0	
3RA29 11-2AA00				
Spacers²⁾				
for compensating the height on AC contactors				
Single-unit packaging		S0	S0	3RA29 11-1CA00

1) The link modules for motor protection circuit breaker to contactor cannot be used for the 3RV2. 21-4PA1. and 3RV2. 21-4FA1. motor protection circuit breakers, 3RV27 and 3RV28 circuit breakers.

2) A spacer for height compensation on AC contactors size S0 is optionally available.

Note:

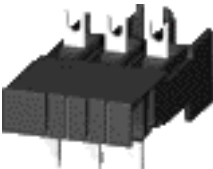
Link modules up to max. 32 A can be used.

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories

Mounting accessories

Size		3RV2 motor protection circuit breakers		Order No.
3RW30, 3RW40 soft starters; 3RF34 solid-state contactors				
Link modules for motor protection circuit breaker to soft starter ¹⁾ and motor protection circuit breaker to solid-state contactor				
 3RA29 21-1BA00	Connection between motor protection circuit breaker and soft starter / solid-state contactor with screw terminals		Screw terminals	
	Single-unit packaging			
	S00	S00/S0	3RA29 21-1BA00	
	S0	S00/S0	3RA29 21-1BA00	
 3RA29 21-2GA00	Connection between motor protection circuit breaker and soft starter spring-type terminals		Spring-type terminals	
	Single-unit packaging			
	S00	S00	3RA29 11-2GA00	
	S0	S0	3RA29 21-2GA00	

- 1) The link modules for motor protection circuit breaker to soft starter and for motor protection circuit breaker to solid-state contactor cannot be used for the 3RV2. 21-4PA1., 3RV2. 21-4FA1. motor protection circuit breakers and 3RV27, 3RV28 circuit breakers.

Note:

Link modules up to max. 32 A can be used.

Actuating voltage of contactor		Size		Order No.
		3RT2 contactors	3RV2 motor protection circuit breakers	
Hybrid link modules for motor protection circuit breaker to contactor ¹⁾				
 3RA29 11-2FA00	For mechanical and electrical connection between motor protection circuit breaker with screw terminals and contactor with spring-type terminals			3RA29 11-2FA00 3RA29 21-2FA00
	Single-unit packaging			
	AC/DC	S00	S00	
	AC ²⁾ /DC	S0	S0	
 3RA29 21-2FA00	Spacers ²⁾ for compensating the height on AC contactors			3RA29 11-1CA00
	Single-unit packaging			
		S0	S0	

- 1) The link modules for motor protection circuit breaker to contactor cannot be used for the 3RV2. 21-4PA1., 3RV2. 21-4FA1. motor protection circuit breakers and 3RV27, 3RV28 circuit breakers.

- 2) A spacer for height compensation on AC contactors size S0 is optionally available.

Note:

Hybrid link modules up to max. 32 A can be used.

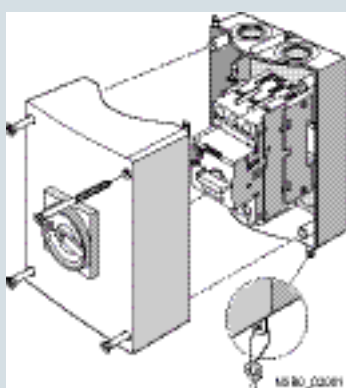
Overview

Enclosures

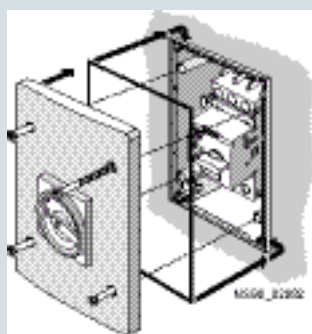
For stand-alone installation of 3RV20 to 3RV24 motor protection circuit breakers size S00 ($I_{n\max} = 16\text{ A}$) and S0 ($I_{n\max} = 32\text{ A}$), cast aluminum enclosures for surface mounting and molded-plastic enclosures for flush mounting are available in various dimensions.

When installed in a molded-plastic enclosure the motor protection circuit breakers have a rated operational voltage U_e of 500 V.

The enclosures for surface mounting have the degree of protection IP55; the enclosures for flush mounting also comply with the degree of protection IP55 at the front (the flush-mounted section complies with IP20).



Enclosure for surface mounting



Enclosure for flush mounting

All enclosures are equipped with N and PE terminals. There are two knock-out cable entries for cable glands at the top and two at the bottom; also on the rear corresponding cable entries are scored. There is a knockout on the top of the enclosure for indicator lights that are available as accessories.

The narrow enclosure can accommodate a motor protection circuit breaker without accessories, with transverse auxiliary switch and with lateral auxiliary switch. There is no provision for installing a motor protection circuit breaker with a signaling switch.

With the motor protection circuit breakers size S00 and S0, the molded-plastic enclosures are equipped with a rotary operating mechanism.

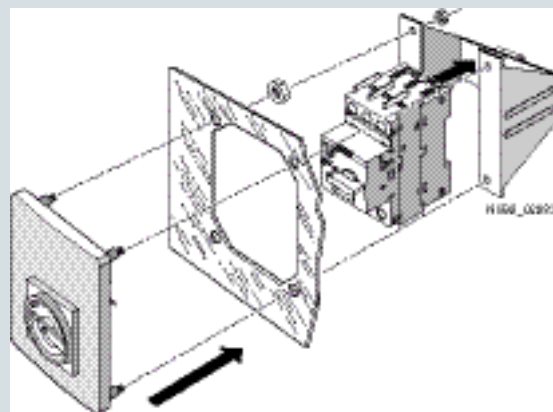
The enclosures can be supplied with either a black rotary operating mechanism or with an EMERGENCY-STOP rotary operating mechanism with a red/yellow knob.

All rotary operating mechanisms can be locked in the Open position with up to 3 padlocks.

Front plates

Motor protection circuit breakers are frequently required to be actuated in any enclosure. Front plates equipped with a rotary operating mechanism for 3RV20 to 3RV24 motor protection circuit breakers size S00 and S0 are available for this purpose.

A holder for the motor protection circuit breakers size S00 and S0, into which the motor protection circuit breakers can be snapped, is available for the front plates.



Front plate (including holder) for sizes S00 and S0

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories

Enclosures and front plates

Selection and ordering data

	Version	Degree of protection	Integrated terminals	Width	For 3RV20 to 3RV24 motor protection circuit breakers	Order No.
				mm	Size	
Molded-plastic enclosures for surface mounting						
	With EMERGENCY-STOP rotary operating mechanism, lockable in 0 position	IP55	N and PE/ground	54 (for motor protection circuit breakers + lateral auxiliary switch)	S00, S0	3RV19 23-1FA00
				72 (for motor protection circuit breakers + lateral auxiliary switch + auxiliary release)	S00, S0	3RV19 23-1GA00
3RV19 23-1FA00						
Cast aluminum enclosures for surface mounting						
	With EMERGENCY-STOP rotary operating mechanism, lockable in 0 position	IP65	PE ¹⁾	72 (for motor protection circuit breakers + lateral auxiliary switch + auxiliary release)	S00, S0	3RV19 23-1GA01
3RV19 23-1DA01						
Molded-plastic enclosures for flush mounting						
	With rotary operating mechanism, lockable in 0 position	IP55 (front side)	N and PE/ground	72 (for motor protection circuit breakers + lateral auxiliary switch + auxiliary release)	S00, S0	3RV19 23-2DA00
	With EMERGENCY-STOP rotary operating mechanism, lockable in 0 position	IP55 (front side)	N and PE/ground	72 (for motor protection circuit breakers + lateral auxiliary switch + auxiliary release)	S00, S0	3RV19 23-2GA00
3RV19 23-2DA00						

1) If required, an additional N terminal can be mounted (e.g. 8WA1 011-1BG11).

Motor Protection Circuit Breakers

SIRIUS 3RV2 Motor Protection Circuit Breakers up to 40 A

Accessories Enclosures and front plates

Version	Degree of protection	For 3RV20 to 3RV24 motor protection circuit breakers	Order No.
		Size	
Front plates			
 3RV19 23-4B + 3RV19 23-4G	Molded-plastic front plates with rotary operating mechanism, lockable in 0 position For actuation of 3RV2 motor protection circuit breakers in any enclosure	IP55 (front side) S00, S0	3RV19 23-4B
	Molded-plastic front plates with EMERGENCY-STOP rotary operating mechanism, red/yellow, lockable in 0 position EMERGENCY-STOP actuation of 3RV2 motor protection circuit breakers in any enclosure	IP55 (front side) S00, S0	3RV19 23-4E
	Holders for front plates Holder is mounted on front plate, motor protection circuit breaker with and without accessories is snapped in.	— S00, S0	3RV19 23-4G
Version	Rated control supply voltage U_s	For 3RV20 to 3RV24 motor protection circuit breakers	Order No.
		Size	
Indicator lights			
 3RV19 03-5B	Indicator lights for all enclosures and front plates	110 ... 120	3RV19 03-5B
	220 ... 240	S00, S0	3RV19 03-5C
	With glow lamp and colored lenses red, green, yellow-orange and clear	380 ... 415	3RV19 03-5E
	480 ... 500		3RV19 03-5G

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

General data

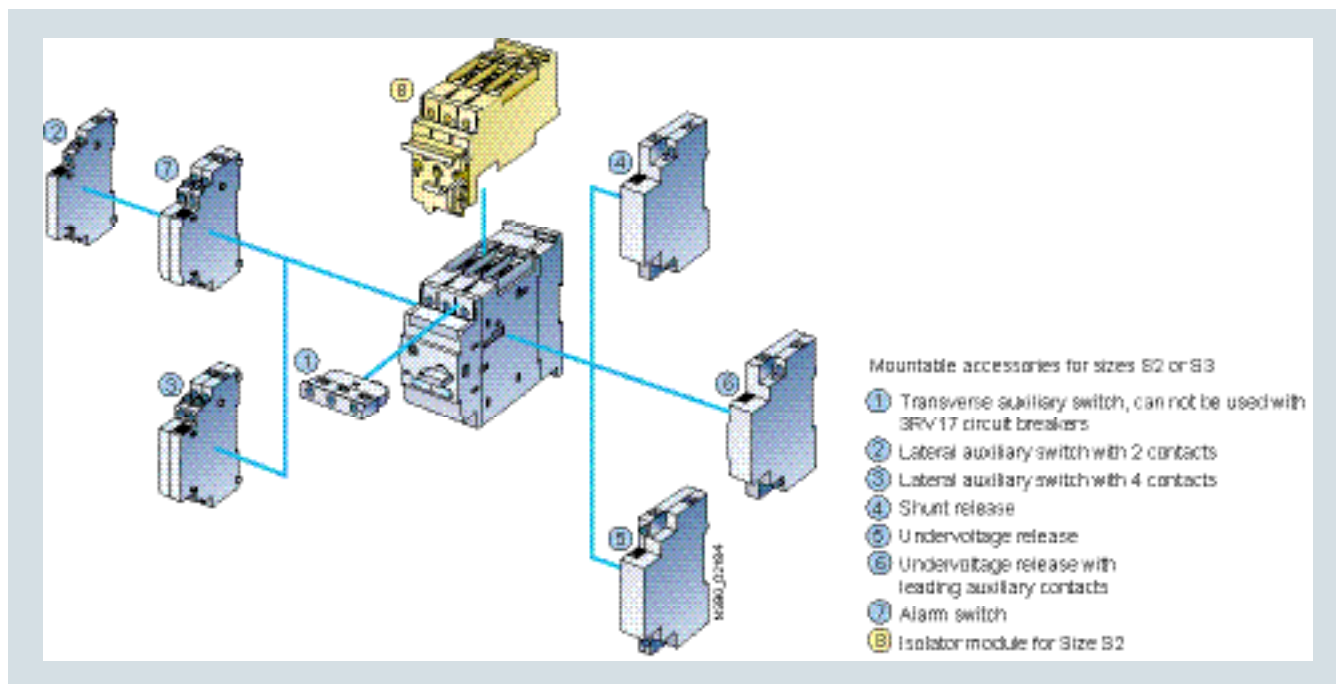
Overview

The following illustration shows our 3RV1 motor protection circuit breakers with the accessories which can be mounted for the sizes S2 and S3.

For "Accessories" see page 4/46 onwards.

Note:

The 3RV1 devices (sizes S00, S0 to S3) please contact the nearest Sales office.



SIRIUS 3RV1 motor protection circuit breaker sizes S2 and S3 with mountable accessories



SIRIUS motor protection circuit breaker size S2

3RV1 motor protection circuit breakers are compact, current limiting motor protection circuit breakers which are optimized for load feeders. The motor protection circuit breakers are used for switching and protecting three-phase induction motors of up to 45 kW at 400 V AC and for other loads with rated currents of up to 100 A.

For 3RV2 motor protection circuit breaker sizes S00 and S0 up to 40 A see page 4/6 onwards.

Type of construction

The 3RV1 motor protection circuit breakers are available in four sizes:

- Size S00 - width 45 mm, max. rated current 12 A, at 400 V AC suitable for induction motors up to 5.5 kW.
- Size S0 - width 45 mm, max. rated current 25 A, at 400 V AC suitable for induction motors up to 11 kW.
- Size S2 - width 55 mm, max. rated current 50 A, at 400 V AC suitable for induction motors up to 22 kW.
- Size S3 - width 70 mm, max. rated current 100 A, at 400 V AC suitable for induction motors up to 45 kW.

For sizes S00 and S0 of the 3RV2 motor protection circuit breakers up to 40 A see page 4/6 onwards.

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

General data

Connection methods

SIRIUS 3RV1 motor protection circuit breakers are available with screw terminals, spring-type terminals and ring terminal lug connection.



Screw terminals

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RV10 motor protection circuit breakers are suitable for the overload protection of explosion-proof motors with "increased safety" type of protection EEx e;

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th
	□□□	□	□	□	-	□	□	□	□	□	-	□	□	□
Motor protection circuit breakers	3 R V													
SIRIUS 1st generation		1												
Type of motor protection circuit breaker			□											
Size				□										
Switching capacity					□									
Setting range for overload release						□	□							
Trip class (CLASS)								□						
Connection methods									□					
With or without auxiliary switch										□				
Special versions											□	□	□	□
Example	3 R V	1	0	3	1	-	4	A	A	1	0			

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Application

Operating conditions

3RV1 motor protection circuit breakers are suitable for use in any climate. They are intended for use in enclosed rooms in which no severe operating conditions (such as dust, caustic vapors, hazardous gases) prevail. When installed in dusty and damp areas, suitable enclosures must be provided.

3RV1 motor protection circuit breakers can optionally be fed from the top or from below.

The permissible ambient temperatures, the maximum switching capacities, the tripping currents and other boundary conditions can be found in the technical specifications.

3RV1 motor protection circuit breakers are suitable for operation in IT systems (IT networks). In this case, the different short-circuit breaking capacity in the IT system must be taken into account.

Since operational currents, starting currents and current peaks are different even for motors with identical power ratings due to the inrush current, the motor ratings in the selection tables are only guide values. The specific rated and start-up data of the motor to be protected is always paramount to the choice of the most suitable motor protection circuit breaker. This also applies to motor protection circuit breakers for transformer protection.

Possible uses

The 3RV1 motor protection circuit breakers can be used:

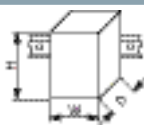
- For short-circuit protection
- For motor protection (also with overload relay function)
- For system protection
- For short-circuit protection for starter combinations
- For transformer protection
- As main control and EMERGENCY-STOP switches
- For fuse monitoring
- For operation in IT systems (IT networks)
- For switching of DC currents
- As voltage transformer circuit breakers
- In areas subject to explosion hazard (ATEX)

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

General data

Technical specifications

General data				
Type		3RV16 1.	3RV1. 3.	3RV1. 4.
Size		S00	S2	S3
Dimensions (W x H x D)		45 x 90 x 70	55 x 140 x 144	70 x 165 x 169
Standards		Yes		
• IEC 60947-1, EN 60947-1		Yes		
• IEC 60947-2, EN 60947-2		Yes		
• IEC 60947-4-1, EN 60947-4-1		Yes		No
• UL 489, CSA C22.2 No.5-02		No		Yes
Number of poles		3		
Max. rated current $I_{n,max}$ (= max. rated operational current I_n)	A	12	50	100
Permissible ambient temperature				
• Storage/transport	°C	-50 ... +80		
• Operation	°C	-20 ... +70 (current reduction above +60 °C)		
Permissible rated current at inside temperature of control cabinet				
• +60 °C	%	100		
• +70 °C	%	87		
Permissible rated current at ambient temperature of enclosure (applies for motor protection circuit breaker inside enclosure)				
• +35 °C	%	100		
• +60 °C	%	87		
Rated operational voltage U_e				
• Acc. to IEC	V AC	690 (with molded-plastic enclosure 500 V)		
• Acc. to UL/CSA	V AC	600		
Rated frequency	Hz	50/60		
Rated insulation voltage U_i	V	690		
Rated impulse withstand voltage U_{imp}	kV	6		
Utilization categories				
• IEC 60947-2 (motor protection circuit breaker)	A			
• IEC 60947-4-1 (motor starter)	AC-3			—
Trip class CLASS	Acc. to IEC 60947-4-1	10	10/20	—
DC short-circuit breaking capacity (time constant $t = 5$ ms)				
• 1 conducting path 150 V DC	kA	10		
• 2 conducting paths in series 300 V DC	kA	10		
• 3 conducting paths in series 450 V DC	kA	10		
Power loss P_v per motor protection circuit breaker				
dependent on				
rated current I_n				
(upper setting range)				
$R_{per\ conducting\ path} = P/I^2 \times 3$				
Shock resistance	Acc. to IEC 60068-2-27	g/ms	25/11 (square and sine pulse)	
Degree of protection	Acc. to IEC 60529		IP20 (IP00 terminal compartment)	
Touch protection	Acc. to EN 50274		Finger-safe	
Temperature compensation	Acc. to IEC 60947-4-1	°C	-20 ... +60	
Phase failure sensitivity	Acc. to IEC 60947-4-1		Yes	No
Explosion protection – safe operation of motors with “increased safety” type of protection			Yes, for 3RV10 (CLASS 10)	No
EC type test certificate number according to directive 94/9/EC (ATEX)			DMT 02 ATEX F 001 II (2) GD, DMT 02 ATEX F 001 N1 II (2) GD	
Isolating function	Acc. to IEC 60947-2		Yes	
Main and EMERGENCY-STOP switch characteristics (with corresponding accessories)	Acc. to IEC 60204-1		Yes	
Protective separation between main and auxiliary circuits, required for PELV applications	Acc. to EN 60947-1			
• Up to 400 V + 10 %			Yes	
• Up to 415 V + 5% (higher voltages on request)			Yes	
Permissible mounting positions			Any, acc. to IEC 60447 start command “I” right-hand side or top	
Mechanical endurance	Operating cycles		100 000	50 000
Electrical endurance	Operating cycles		100 000	25 000
Max. switching frequency per hour (motor starts)	1/h		15	

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

General data

Conductor cross-sections of main circuit				
Type		3RV16 11	3RV1. 3.	3RV1. 4./ 3RV17 42
Connection type		 Screw terminals	 Screw terminals with box terminal	
Terminal screw		Pozidriv size 2	Pozidriv size 2	4 mm Allen screw
Prescribed tightening torque	Nm	0.8 ... 1.2	3 ... 4.5	4 ... 6
Conductor cross-sections (1 or 2 conductors connectable)				
• Solid	mm ²	2 x (0.5 ... 1.5) ⁴⁾ , 2 x (0.75 ... 2.5) ⁴⁾	2 x (0.75 ... 16)	2 x (2.5 ... 16)
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5) ⁴⁾ , 2 x (0.75 ... 2.5) ⁴⁾	2 x (0.75 ... 16), 1 x (0.75 ... 25)	2 x (2.5 ... 35), 1 x (2.5 ... 50)
• Stranded	mm ²	2 x (0.5 ... 1.5) ⁴⁾ , 2 x (0.75 ... 2.5) ⁴⁾	2 x (0.75 ... 25), 1 x (0.75 ... 35)	2 x (10 ... 50), 1 x (10 ... 70)
• AWG cables, solid or stranded	AWG	2 x (18 ... 14)	2 x (18 ... 2), 1 x (18 ... 2)	2 x (10 ... 1/0), 1 x (10 ... 2/0)
Ribbon cable conductors (number x width x thickness)	mm	—	2 x (6 x 9 x 0.8)	
Removable box terminals ¹⁾				
• With copper bars ²⁾		—		18 x 10
• With cable lugs ³⁾		—		Up to 2 x 70

1) Cable lug and busbar connection possible after removing the box terminals.

2) If bars larger than 12 mm x 10 mm are connected, a 3RT19 46-4EA1 terminal cover is needed to comply with the phase clearance.

3) When connecting conductors which are larger than 25 mm², the 3RT19 46-4EA1 terminal cover must be used to keep the phase clearance.

4) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Rated data of the auxiliary switches and signaling switches				
Type 3RV19		Lateral auxiliary switch with 1 NO + 1 NC, 2 NO, 2 NC, 2 NO + 2 NC; Signaling switches	Transverse auxiliary switch with 1 CO 1 NO + 1 NC, 2 NO	
Max. rated voltage				
• Acc. to NEMA (UL)	V AC	600		250
• Acc. to NEMA (CSA)	V AC	600		250
Uninterrupted current	A	10	5	2.5
Switching capacity		A600 Q300	B600 R300	C300 R300

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

General data

Mountable accessories

Front transverse auxiliary switches			Switching capacity for different voltages	
			1 CO	1 NO + 1 NC, 2 NO
Rated operational current I_e				
• At AC-15, alternating voltage				
- 24 V	A	4	2	
- 230 V	A	3	0.5	
- 400 V	A	1.5	—	
- 690 V	A	0.5	—	
• At AC-12 = I_{th} , alternating voltage				
- 24 V	A	10	2.5	
- 230 V	A	10	2.5	
- 400 V	A	10	—	
- 690 V	A	10	—	
• At DC-13, direct voltage L/R 200 ms				
- 24 V	A	1	1	
- 48 V	A	—	0.3	
- 60 V	A	—	0.15	
- 110 V	A	0.22	—	
- 220 V	A	0.1	—	
Minimum load capacity			V	17
			mA	1

Front transverse solid-state compatible auxiliary switches			Switching capacity for different voltages	
			1 CO	
Rated operational voltage U_e	Alternating voltage	V	250	
Rated operational current $I_e/AC-14$	At $U_e = 250$ V	A	0.5	
	At $U_e = 125$ V	A	1	
Rated operational voltage U_e	Direct voltage L/R 200 ms	V	250	
Rated operational current $I_e/DC-13$	At $U_e = 250$ V	A	0.27	
	At $U_e = 125$ V	A	0.44	
Minimum load capacity			V	5
			mA	1

Lateral auxiliary switches with signaling switch			Switching capacity for different voltages: Lateral auxiliary switch with 1 NO + 1 NC, 2 NO, 2 NC, 2 NO + 2 NC Signaling switch
Rated operational current I_e			
• At AC-15, alternating voltage			
- 24 V	A	6	
- 230 V	A	4	
- 400 V	A	3	
- 690 V	A	1	
• At AC-12 = I_{th} , alternating voltage			
- 24 V	A	10	
- 230 V	A	10	
- 400 V	A	10	
- 690 V	A	10	
• At DC-13, direct voltage L/R 200 ms			
- 24 V	A	2	
- 110 V	A	0.5	
- 220 V	A	0.25	
- 440 V	A	0.1	
Minimum load capacity		V	17
		mA	1

Auxiliary releases			
		Undervoltage releases	Shunt releases
Power consumption			
• During pick-up			
- AC voltages	VA/W	20.2/13	20.2/13
- DC voltages	W	20	13 ... 80
• During uninterrupted duty			
- AC voltages	VA/W	7.2/2.4	—
- DC voltages	W	2.1	—
Response voltage			
• Tripping	V	0.35 ... 0.7 x U_s	0.7 ... 1.1 x U_s
• Pickup	V	0.85 ... 1.1 x U_s	—
Opening time maximum	ms	20	

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

General data

Short-circuit protection for auxiliary and control circuits		
Melting fuses operational class gG	A	10
Miniature circuit breakers C characteristic	A	6 (prospective short-circuit current < 0.4 kA)
Conductor cross-sections for auxiliary and control circuits		
Connection type	 Screw terminals	
Terminal screw	Pozidriv size 2	
Prescribed tightening torque	Nm	0.8 ... 1.2
Conductor cross-sections (1 or 2 conductors connectable)		
• Solid	mm ²	2 x (0.5 ... 1.5) ¹⁾ /2 x (0.75 ... 2.5) ¹⁾
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5) ¹⁾ /2 x (0.75 ... 2.5) ¹⁾
• Stranded	mm ²	2 x (0.5 ... 1.5) ¹⁾ /2 x (0.75 ... 2.5) ¹⁾
• AWG cables	AWG	2 x (18 ... 14)

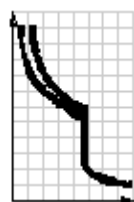
Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

For motor protection

Selection and ordering data

CLASS 10, without auxiliary switches



Rated current	Suitable for three-phase induction motors ¹⁾ with P	Setting range for thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals
I_n				I_{cu}	Order No.
A	kW	A	A	kA	

Size S2



16	7.5	11 ... 16	208	50	3RV10 31-4AA10
20	7.5	14 ... 20	260	50	3RV10 31-4BA10
25	11	18 ... 25	325	50	3RV10 31-4DA10
32	15	22 ... 32	416	50	3RV10 31-4EA10
40	18.5	28 ... 40	520	50	3RV10 31-4FA10
45	22	36 ... 45	585	50	3RV10 31-4GA10
50	22	40 ... 50	650	50	3RV10 31-4HA10

3RV10 31-4HA10

Size S3



40	18.5	28 ... 40	520	50	3RV10 41-4FA10
50	22	36 ... 50	650	50	3RV10 41-4HA10
63	30	45 ... 63	819	50	3RV10 41-4JA10
75	37	57 ... 75	975	50	3RV10 41-4KA10
90	45	70 ... 90	1170	50	3RV10 41-4LA10
100	45	80 ... 100	1235	50	3RV10 41-4MA10

3RV10 41-4LA10

Size S3, with increased switching capacity



16	7.5	11 ... 16	208	100	3RV10 42-4AA10
20	7.5	14 ... 20	260	100	3RV10 42-4BA10
25	11	18 ... 25	325	100	3RV10 42-4DA10
32	15	22 ... 32	416	100	3RV10 42-4EA10
40	18.5	28 ... 40	520	100	3RV10 42-4FA10
50	22	36 ... 50	650	100	3RV10 42-4HA10
63	30	45 ... 63	819	100	3RV10 42-4JA10
75	37	57 ... 75	975	100	3RV10 42-4KA10
90	45	70 ... 90	1170	100	3RV10 42-4LA10
100	45	80 ... 100	1235	100	3RV10 42-4MA10

3RV10 42-4JA10

CLASS 20, without auxiliary switches

Size S2



16	7.5	11 ... 16	208	50	3RV10 31-4AB10
20	7.5	14 ... 20	260	50	3RV10 31-4BB10
25	11	18 ... 25	325	50	3RV10 31-4DB10
32	15	22 ... 32	416	50	3RV10 31-4EB10
40	18.5	28 ... 40	520	50	3RV10 31-4FB10
45	22	36 ... 45	585	50	3RV10 31-4GB10
50	22	40 ... 50	650	50	3RV10 31-4HB10

3RV10 31-4AB10

Size S3, with increased switching capacity



40	18.5	28 ... 40	520	100	3RV10 42-4FB10
50	22	36 ... 50	650	100	3RV10 42-4HB10
63	30	45 ... 63	819	100	3RV10 42-4JB10
75	37	57 ... 75	975	100	3RV10 42-4KB10
90	45	70 ... 90	1170	100	3RV10 42-4LB10
100	45	80 ... 100	1235	100	3RV10 42-4MB10

3RV10 42-4KB10

1) Guide value for 4-pole standard motors at 50 Hz 415 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

Auxiliary switches can be ordered separately (see "Mountable accessories").

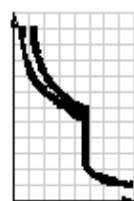
Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

For motor protection with overload relay function

Selection and ordering data

CLASS 10, with overload relay function (automatic RESET), without auxiliary switches



Rated current	Suitable for three-phase induction motors ¹⁾ with P	Setting range for thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals 
I_n				I_{cu}	Order No.
A	kW	A	A	kA	

Size S2²⁾



16	7.5	11 ... 16	208	50	3RV11 31-4AA10
20	7.5	14 ... 20	260	50	3RV11 31-4BA10
25	11	18 ... 25	325	50	3RV11 31-4DA10
32	15	22 ... 32	416	50	3RV11 31-4EA10
40	18.5	28 ... 40	520	50	3RV11 31-4FA10
45	22	36 ... 45	585	50	3RV11 31-4GA10
50	22	40 ... 50	650	50	3RV11 31-4HA10

3RV11 31-4EA10

Size S3, with increased switching capacity²⁾



16	7.5	11 ... 16	208	100	3RV11 42-4AA10
20	7.5	14 ... 20	260	100	3RV11 42-4BA10
25	11	18 ... 25	325	100	3RV11 42-4DA10
32	15	22 ... 32	416	100	3RV11 42-4EA10
40	18.5	28 ... 40	520	100	3RV11 42-4FA10
50	22	36 ... 50	650	100	3RV11 42-4HA10
63	30	45 ... 63	819	100	3RV11 42-4JA10
75	37	57 ... 75	975	100	3RV11 42-4KA10
90	45	70 ... 90	1170	100	3RV11 42-4LA10
100	45	80 ... 100	1235	100	3RV11 42-4MA10

3RV11 42-4AA10

1) Guide value for 4-pole standard motors at 50 Hz 415 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

2) Accessories (auxiliary releases) for mounting on the right cannot be used.

Auxiliary switches can be ordered separately (see "Mountable accessories").

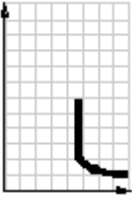
Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

For starter combinations

Selection and ordering data

Without auxiliary switches

	Rated current	Suitable for three-phase induction motors ¹⁾ with P	Thermal overload release ²⁾	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals 
	I_n A	kW			I_{cu} kA	Order No.
Size S2						
	16	7.5	Without	208	50	3RV13 31-4AC10
	20	7.5	Without	260	50	3RV13 31-4BC10
	25	11	Without	325	50	3RV13 31-4DC10
	32	15	Without	416	50	3RV13 31-4EC10
	40	18.5	Without	520	50	3RV13 31-4FC10
	45	22	Without	585	50	3RV13 31-4GC10
	50	22	Without	650	50	3RV13 31-4HC10
3RV13 31-4AC10						
Size S3						
	40	18.5	Without	520	50	3RV13 41-4FC10
	50	22	Without	650	50	3RV13 41-4HC10
	63	30	Without	819	50	3RV13 41-4JC10
	75	37	Without	975	50	3RV13 41-4KC10
	90	45	Without	1170	50	3RV13 41-4LC10
	100	45	Without	1235	50	3RV13 41-4MC10
3RV13 41-4JC10						
Size S3, with increased switching capacity						
	16	7.5	Without	208	100	3RV13 42-4AC10
	20	7.5	Without	260	100	3RV13 42-4BC10
	25	11	Without	325	100	3RV13 42-4DC10
	32	15	Without	416	100	3RV13 42-4EC10
	40	18.5	Without	520	100	3RV13 42-4FC10
	50	22	Without	650	100	3RV13 42-4HC10
	63	30	Without	819	100	3RV13 42-4JC10
	75	37	Without	975	100	3RV13 42-4KC10
	90	45	Without	1170	100	3RV13 42-4LC10
	100	45	Without	1235	100	3RV13 42-4MC10
3RV13 42-4JC10						

- 1) Guide value for 4-pole standard motors at 50 Hz 415 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.
- 2) For overload protection of the motors, appropriate overload relays must be used.

Auxiliary switches can be ordered separately (see "Mountable accessories").

Motor Protection Circuit Breakers

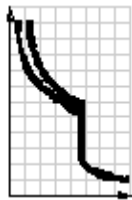
SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

For transformer protection

Selection and ordering data

CLASS 10, without auxiliary switches

Motor protection circuit breakers for the protection of transformers with high inrush current



Rated current	Setting range for thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals
I_n			I_{cu}	Order No.
A	A	A	kA	

Size S2



3RV14 31-4DA10

16	11 ... 16	325	50	3RV14 31-4AA10
20	14 ... 20	416	50	3RV14 31-4BA10
25	18 ... 25	520	50	3RV14 31-4DA10
32	22 ... 32	660	50	3RV14 31-4EA10
40	28 ... 40	836	50	3RV14 31-4FA10

Auxiliary switches can be ordered separately (see "Mountable accessories").

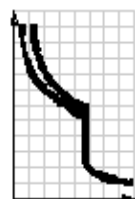
Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

For fuse monitoring

Selection and ordering data

Without auxiliary switches



Rated current	Thermal overload release	Instantaneous overcurrent release	Short-circuit breaking capacity at 415 V AC	Screw terminals
I_n A	 A	 A	I_{cu} kA	Order No.

Size S00



3RV16 11-0BD10

0.2

0.2

1.2

100

3RV16 11-0BD10

Note:

The auxiliary switch required for signaling must be ordered separately.

Accessories

Version	Contacts	Screw terminals
		Order No.

Mountable auxiliary switches (essential accessories)



3RV19 01-1E

Transverse auxiliary switches

With screw terminals, mountable on front

1 NO + 1 NC

3RV19 01-1E



3RV19 01-1A

Lateral auxiliary switches

With screw terminals, mountable on the left

1 NO + 1 NC

3RV19 01-1A

Additional auxiliary switches and other accessories see "Mountable accessories".

Motor Protection Circuit Breakers

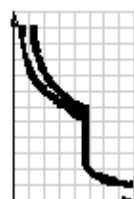
SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

For system protection
according to UL 489/CSA C22.2 No. 5-02

Selection and ordering data

Without auxiliary switches

Circuit breakers for system protection and non-motor loads according to UL/CSA



Rated current ¹⁾	Thermal overload release (non-adjustable)	Instantaneous overcurrent release	Short-circuit breaking capacity at 480 Y/277 V AC480 V AC		Screw terminals 
$I_n^{1)}$ A	 A	 A	I_{bc} kA	I_{bc} kA	Order No.
10	10	150	65	65	3RV17 42-5AD10
15	15	225	65	65	3RV17 42-5BD10
20	20	260	65	65	3RV17 42-5CD10
25	25	325	65	65	3RV17 42-5DD10
30	30	390	65	65	3RV17 42-5ED10
35	35	455	65	—	3RV17 42-5FD10
40	40	520	65	—	3RV17 42-5GD10
45	45	585	65	—	3RV17 42-5HD10
50	50	650	65	—	3RV17 42-5JD10
60	60	780	65	—	3RV17 42-5LD10
70	70	910	65	—	3RV17 42-5QD10

1) Rated value 100 % according to UL 489 and IEC 60947-2
("100 % rated breaker").

Transverse auxiliary switches must not be mounted, lateral
auxiliary switches can be ordered separately
(see "Mountable accessories").

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

Accessories Mountable accessories

Overview

Mounting location and function

The 3RV1 motor protection circuit breakers have three main contact-elements. In order to achieve maximum flexibility, auxiliary switches, signaling switches, auxiliary releases and isolator modules can be supplied separately.

These components can be fitted as required on the motor protection circuit breakers without using tools.

For overview graphic see page 4/34.

Front side <u>Notes:</u> - A maximum of 4 auxiliary contacts with auxiliary switches can be attached to each motor protection circuit breaker. - Transverse auxiliary switches must not be used for the 3RV17 circuit breakers.	Transverse auxiliary switches, solid-state compatible transverse auxiliary switches 1 NO + 1 NC or 2 NO or 1 CO	An auxiliary switch block can be inserted transversely on the front. The overall width of the motor protection circuit breakers remains unchanged.
Left-hand side <u>Notes:</u> - A maximum of 4 auxiliary contacts with auxiliary switches can be attached to each motor protection circuit breaker. - Auxiliary switches (2 contacts) and signal switches can be mounted separately or together. - The signaling switch cannot be used for the 3RV17 circuit breakers.	Lateral auxiliary switches (2 contacts) 1 NO + 1 NC or 2 NO or 2 NC Lateral auxiliary switches (4 contacts) 2 NO + 2 NC Signaling switches for sizes S2 and S3 Tripping 1 NO + 1 NC Short-circuit 1 NO + 1 NC	One of the three lateral auxiliary switches can be mounted on the left side per motor protection circuit breaker. The contacts of the auxiliary switch close and open together with the main contacts of the motor protection circuit breaker. The width of the lateral auxiliary switch with 2 contacts is 9 mm. One lateral auxiliary switch with four contacts can be mounted on the left side per motor protection circuit breaker. The contacts of the auxiliary switch close and open together with the main contacts of the motor protection circuit breaker. The width of the lateral auxiliary switch with 4 contacts is 18 mm. One signaling switch can be mounted on the left side of each motor protection circuit breaker. The signaling switch has two contact systems. One contact system always signals <u>tripping</u> irrespective of whether this was caused by a short-circuit, an overload or an auxiliary release. The other contact system only switches in the event of a short-circuit. There is no signaling as a result of <u>switching off</u> with the handle. In order to be able to switch on the motor protection circuit breaker again after a short-circuit, the signaling switch must be reset manually after the error cause has been eliminated. The overall width of the signaling switch is 18 mm.
Right-hand side <u>Notes:</u> - One auxiliary release can be mounted per motor protection circuit breaker. - Accessories cannot be mounted at the right-hand side of the 3RV11 motor protection circuit breakers for motor protection with overload relay function.	Auxiliary releases Shunt releases or Undervoltage releases or Undervoltage releases with leading auxiliary contacts 2 NO	For remote-controlled tripping of the motor protection circuit breaker. The release coil should only be energized for short periods (see circuit diagrams). Trips the motor protection circuit breaker when the voltage is interrupted and prevents the motor from being restarted accidentally when the voltage is restored. Used for remote-controlled tripping of the motor protection circuit breaker. Particularly suitable for EMERGENCY-STOP disconnection by way of the corresponding EMERGENCY-STOP pushbutton according to EN 60204-1 (VDE 0113). Function and use as for the undervoltage release without leading auxiliary contacts, but with the following additional function: the auxiliary contacts will open in switch position OFF to deenergize the coil of the undervoltage release, thus interrupting energy consumption. In the "tripped" position, these auxiliary contacts are not guaranteed to open. The leading contacts permit the motor protection circuit breaker to reclose. The overall width of the auxiliary release is 18 mm.
Top <u>Notes:</u> - The isolator module cannot be used for the 3RV17 circuit breakers. - The isolator module covers the terminal screws of the transverse auxiliary switch. If the isolator module is used, we therefore recommend that either the lateral auxiliary switches be fitted or that the isolator module not be mounted until the auxiliary switch has been wired.	Isolator modules for size S2	Isolator modules can be mounted to the upper terminal end of the size S2 motor protection circuit breakers. The supply cable is connected to the motor protection circuit breaker through the isolator module. The plug can only be unplugged when the motor protection circuit breaker is open and isolates all 3 poles of the motor protection circuit breaker from the network. The shock-protected isolation point is clearly visible and secured with a padlock to prevent reinsertion of the plug.

For a complete overview of which accessories can be used for the various motor protection circuit breakers see page 4/2.

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

Accessories
Mountable accessories

Selection and ordering data

Version	Contacts	For motor protection circuit breakers	Screw terminals 
Size			Order No.
Auxiliary switches¹⁾			
 3RV19 01-1E	Transverse auxiliary switches With screw terminals, mountable on front	1 CO 1 NO + 1 NC 2 NO	500, S2, S3
 3RV19 01-1G	Solid-state compatible transverse auxiliary switches With screw terminals, front mountable, for operation in dusty atmosphere and in solid-state circuits with low operating currents	1 CO	500, S2, S3
 3RV19 01-0H	Covers for transverse auxiliary switches	—	500, S2, S3
 3RV19 01-1A	Lateral auxiliary switches With screw terminals, mountable on the left	1 NO + 1 NC 2 NO	500, S2, S3
 3RV19 01-1J		2 NC 2 NO + 2 NC	500, S2, S3

1) Each motor protection circuit breaker can be fitted with one transverse and one lateral auxiliary switch. The lateral auxiliary switch with 2 NO + 2 NC is used without a transverse auxiliary switch. Transverse auxiliary switches must not be used for the 3RV17 circuit breakers.

Version	Contacts	For motor protection circuit breakers	Spring-type terminals 
Size			Order No.
Auxiliary switches¹⁾			
 3RV19 01-2E	Transverse auxiliary switches With spring-type terminals, mountable on front	1 NO + 1 NC 2 NO	500, S0, S2, S3
 3RV19 01-2A	Lateral auxiliary switches With spring-type terminals, mountable on left	1 NO + 1 NC 2 NO 2 NC	500, S0, S2, S3

1) Each motor protection circuit breaker can be fitted with one transverse and one lateral auxiliary switch. Transverse auxiliary switches must not be used for the 3RV17 circuit breakers.

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

Accessories

Mountable accessories

Version		For motor protection circuit breakers	Screw terminals 
		Size	Order No.
Signaling switches¹⁾			
	Signaling switches	Separate tripped and short-circuit alarms, 1 NO + 1 NC each	S2, S3
	One signaling switch can be mounted on the left per motor protection circuit breaker.		
3RV19 21-1M			3RV19 21-1M
Isolator modules¹⁾			
	Isolator modules	Visible isolating distance for isolating individual motor protection circuit breakers from the network, lockable in disconnected position	S2
3RV19 38-1A with padlock			3RV19 38-1A

1) These accessories cannot be used for the 3RV17 circuit breakers.

Rated control supply voltage U_s					For motor protection circuit breakers	Screw terminals 
AC 50 Hz	AC 60 Hz	AC 50/60 Hz	AC/DC 50/60 Hz, DC 5 s ON period ²⁾	DC	Size	Order No.
V	V	V	V	V	Size	Order No.
Auxiliary releases³⁾						
	Undervoltage releases					
	—	—	—	—	24	S2, S3
	24	—	—	—	—	S2, S3
	110	120	—	—	—	S2, S3
	—	208	—	—	—	S2, S3
	230	240	—	—	—	S2, S3
	400	440	—	—	—	S2, S3
	415	480	—	—	—	S2, S3
	500	600	—	—	—	S2, S3
	Undervoltage releases with leading auxiliary contacts 2 NO					
	230	240	—	—	—	S2, S3
	400	440	—	—	—	S2, S3
	415	480	—	—	—	S2, S3
Shunt releases						
—	—	20 ... 24	20 ... 70	—	S2, S3	3RV19 02-1DB0
—	—	90 ... 110	70 ... 190	—	S2, S3	3RV19 02-1DF0
—	—	210 ... 240	190 ... 330	—	S2, S3	3RV19 02-1DP0
—	—	350 ... 415	330 ... 500	—	S2, S3	3RV19 02-1DV0
—	—	500	500	—	S2, S3	3RV19 02-1DS0

- 1) The voltage range is valid for 100 % (infinite) ON period. The response voltage lies at 0.9 of the lower limit of the voltage range.
- 2) The voltage range is valid for 5 s ON period at AC 50 Hz/60Hz and DC. The response voltage lies at 0.85 of the lower limit of the voltage range.
- 3) One auxiliary release can be mounted on the right per motor protection circuit breaker (does not apply to 3RV11 motor protection circuit breakers with overload relay function).

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

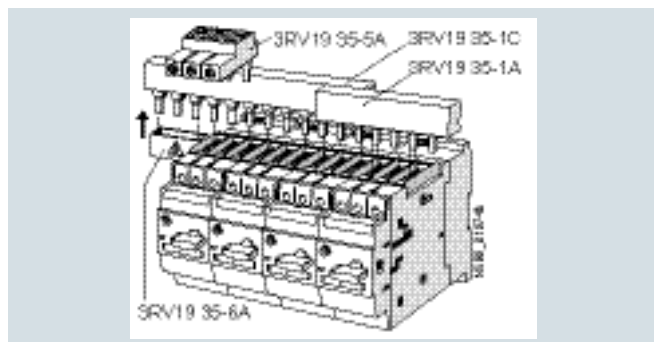
Accessories
Busbar accessories

Overview

Insulated three-phase busbar system

Three-phase busbar systems provide an easy, time-saving and clearly arranged means of feeding 3RV1 motor protection circuit breakers with screw terminals. Different versions are available for size S2 and can be used for the various different types of motor protection circuit breakers.

The busbars are suitable for between 2 and 4 motor protection circuit breakers. However, any kind of extension is possible by clamping the tags of an additional busbar (rotated by 180°) underneath the terminals of the respective last motor protection circuit breaker.



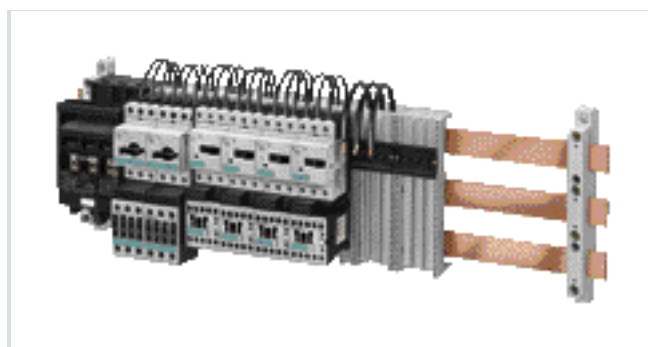
SIRIUS three-phase busbar system size S2

The three-phase busbar systems are finger-safe. They are designed for any short-circuit stress which can occur at the output side of connected motor protection circuit breakers.

8US busbar adapters for 40 and 60 mm systems

The motor protection circuit breakers are mounted directly with the aid of busbar adapters on busbar systems with 40 mm and 60 mm center-to-center clearance in order to save space and to reduce infeed times and costs. Busbar adapters for busbar systems with 40 mm center-to-center clearance are suitable for copper busbars with a width of 12 mm to 15 mm, while those with 60 mm center-to-center clearance are suitable for copper busbars with a width of 12 to 30 mm. The busbars can be 4 to 5 mm or 10 mm thick.

The motor protection circuit breakers are snapped onto the adapter and connected on the line side. This prepared unit is then plugged directly onto the busbar system, and is thus connected both mechanically and electrically at the same time.



SIRIUS load feeders with busbar adapters snapped onto busbars

Selection and ordering data

Modular spacing	Number of motor protection circuit breakers that can be connected			Rated current I_n at 690 V	For motor protection circuit breakers	Order No.
	Without lateral accessories	Including lateral auxiliary switch	With auxiliary release			
mm				A	Size	
Three-phase busbar systems						
For feeding several motor protection circuit breakers with screw terminals, mounted side by side on standard mounting rails, insulated, with touch protection						
55	2 3 4	—	—	108	S2 ¹⁾ S2 ¹⁾ S2 ¹⁾	3RV19 35-1A 3RV19 35-1B 3RV19 35-1C
75	—	2 3 4	2 3 4	108	S2 ²⁾ S2 ²⁾ S2 ²⁾	3RV19 35-3A 3RV19 35-3B 3RV19 35-3C

1) Not suitable for 3RV11 motor protection circuit breakers for motor protection with overload relay function.

2) Auxiliary releases and lateral auxiliary switches cannot be used in combination.

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

Accessories

Busbar accessories

Conductor cross-section		Tightening torque	For motor protection circuit breakers	Order No.	
Solid or stranded	Finely stranded with end sleeve				AWG cables, solid or stranded
mm²	mm²	AWG	Nm	Size	
Three-phase feeder terminals					
Connection from top					
2.5 ... 50	1.5 ... 35	14 ... 0	4	S2	3RV19 35-5A
Version		For motor protection circuit breakers		Order No.	
		Size			
Covers for connection tags					
Touch protection for empty positions		S2		3RV19 35-6A	

8US busbar adapters



8US10 61-5FK08



8US11 11-4SM00



8US12 61-5FM08



8US12 11-4TR00

For motor protection circuit breakers	Rated current	Connecting cable	Adapter length	Adapter width	Rated voltage	Order No.
Size	A	AWG	mm	mm	V	
Busbar adapters for 40 mm systems						
For flat copper profiles according to DIN 46433						
Width: 12 mm and 15 mm						
Thickness: 5 mm and 10 mm						
S2	56	8	139	55	690	8US10 61-5FK08
S3	100	4	182	70	400 ¹⁾	8US11 11-4SM00
S3	100	4	182	72	415 ... 690 ²⁾	8US10 11-4TM00
Busbar adapters for 60 mm systems						
For flat copper profiles according to DIN 46433						
Width: 12 mm and 30 mm						
Thickness: 5 mm and 10 mm						
also for T and double-T special profiles						
S2	56	8	182	55	690	8US12 61-5FM08
S3	100	4	182	70	400 ¹⁾	8US11 11-4SM00
S3	100	4	182	72	415 ... 690 ²⁾	8US12 11-4TM00
S3 ³⁾	70 ⁴⁾	4	215	72	600 ⁴⁾	8US12 11-4TR00

- 1) At rated voltage
 ≤ 400 V: short-circuit breaking capacity 50 kA,
 > 400 to 460 V: short-circuit breaking capacity 25 kA.

- 2) Short-circuit breaking capacity 415/500/525 V AC
 - Up to $I_n = 25$ A: max. 30 kA
 - Up to $I_n = 90$ A: max. 16 kA
 - Up to $I_n = 100$ A: max. 6 kA
 Short-circuit breaking capacity 690 V AC:
 - Max. 12 kA.

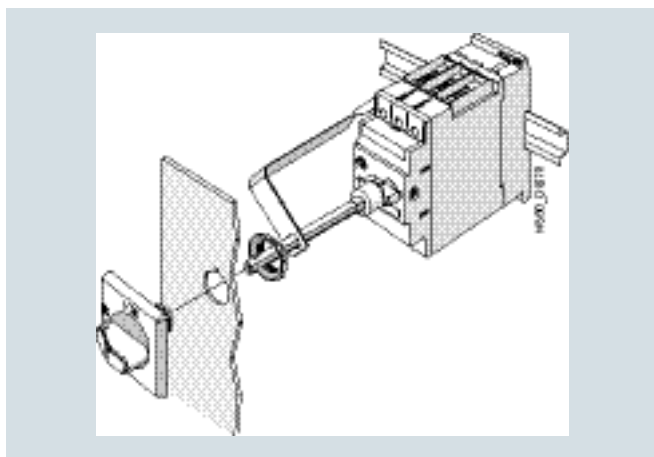
- 3) This busbar adapter is approved specially for 3RV17 42 circuit breakers for applications according to UL/CSA.

- 4) Values according to UL/CSA
 - Rated current: 70 A at 600 V AC;
 - Short-circuit breaking capacity:
 480 V AC: 65 kA, up to $I_n = 30$ A;
 480 Y/277 V AC: 65 kA;
 600 Y/347 V AC: 20 kA.

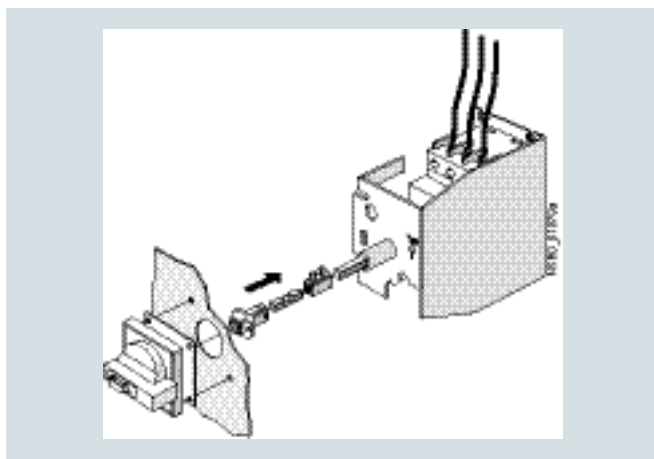
Overview

Door-coupling rotary operating mechanisms

Motor protection circuit breakers with a rotary operating mechanism can be mounted in a control cabinet and operated externally by means of a door-coupling rotary operating mechanism. When the cabinet door with motor protection circuit breaker is closed, the operating mechanism is coupled. When the motor protection circuit breaker closes, the coupling is locked which prevents the door from being opened unintentionally. This interlock can be defeated by the maintenance personnel. In the OPEN position, the rotary operating mechanism can be secured against reclosing with up to 3 padlocks. Inadvertent opening of the door is not possible in this case either.



SIRIUS 3RV19 26-0K door-coupling rotary operating mechanism



SIRIUS 3RV19 36-1B-Z door-coupling rotary operating mechanism for arduous conditions

Remote motorized operating mechanisms

3RV1 motor protection circuit breakers are manually operated controls. They automatically trip in case of an overload or short-circuit. Intentional remote-controlled tripping is possible by means of a shunt release or an undervoltage release. Reclosing is only possible directly at the motor protection circuit breaker.

The remote motorized operating mechanism allows the motor protection circuit breakers to be opened and closed by electrical commands. This enables a load or an installation to be isolated from the network or reconnected to it from an operator panel.

If the motor protection circuit breaker is tripped as a result of overload or short-circuit, it will be in tripped position. For reclosing, the remote motorized operating mechanism must first be set manually or electrically to the 0 position (electrically by means of the Open command). Then it can be reclosed.

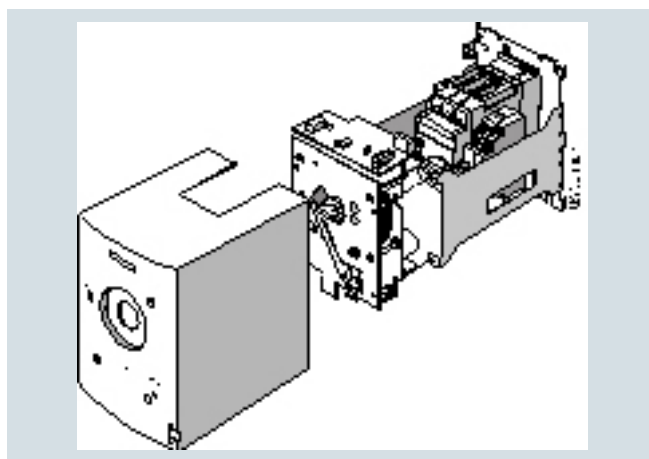
The remote motorized operating mechanism is available for motor protection circuit breakers of size S2 ($I_{n\max} = 50\text{ A}$) and S3

($I_{n\max} = 100\text{ A}$) that are designed for control voltages of 230 V AC and 24 V DC. The motor protection circuit breaker is fitted into the remote motorized operating mechanism as shown in the drawing.

In the "MANUAL" position, the motor protection circuit breaker in the remote motorized operating mechanism can continue to be switched manually on site. In the "AUTOMATIC" position, the motor protection circuit breaker is switched by means of electrical commands. The switching command must be applied for a minimum of 100 ms. The remote motorized operating mechanism closes the motor protection circuit breaker after a maximum of 1 second. On voltage failure during the switching operation it is ensured that the motor protection circuit breaker remains in the OPEN or CLOSED position. In the "MANUAL" and "OFF" position, the remote motorized operating mechanism can be locked with a padlock.

RESET function

The RESET button on the motorized operating mechanism serves to reset any 3RV19 21-1M signaling switch that might be installed.



SIRIUS 3RV19 .6-3A.. remote motorized operating mechanism

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

Accessories

Rotary operating mechanisms

Technical specifications

Remote motorized operating mechanisms			
Type			3RV19 36, 3RV19 46
Max. power consumption			
• At $U_s = 24$ V DC	W	48	
• At $U_s = 230$ V AC	VA	170	
Operating range			0.85 ... 1.1 x U_s
Minimum command duration at U_s	s	0.1	
Max. command duration			Unlimited (uninterrupted operation)
Max. total break time, remote-controlled	s	2	
Ready to reclose after approx.	s	2.5	
Switching frequency	1/h	25	
Internal back-up fuse			
• 230 V AC	A	0.8	
• 24 V DC	A	1.6	
Connection type of control cables			Plug-in connectors with screw terminals
Shock resistance acc. to IEC 60068-2-27	g/ms	25/11 (square and sine pulse)	

Selection and ordering data

Version	Color of handle	Version of extension shaft	For motor protection circuit breakers	Order No.
		mm	Size	

Door-coupling rotary operating mechanisms for arduous conditions



3RV19 36-1B

The door-coupling rotary operating mechanisms consist of a knob, a coupling driver, an extension shaft of 300 mm in length (8 mm x 8 mm), a spacer and two metal brackets, into which the motor protection circuit breaker is inserted. The door-coupling rotary operating mechanisms are designed to degree of protection IP65. The door interlocking reliably prevents opening of the control cabinet door in the ON position of the motor protection circuit breaker. The OFF position can be locked with up to 3 padlocks. Laterally mountable auxiliary releases and two-pole auxiliary switches can be used. The door-coupling rotary operating mechanisms thus meet the requirements for isolating functions according to IEC 60947-2.

Door-coupling rotary operating mechanisms

Gray & Black

300

S2
S3

3RV19 36-1B-Z
3RV19 46-1B-Z

Version	Rated control supply voltage U_s	For motor protection circuit breakers	Order No.
		Size	

Remote motorized operating mechanisms



3RV19 .6-3A..

Remote motorized operating mechanisms

50/60 Hz, 230 V AC
24 V DC
50/60 Hz, 230 V AC
24 V DC

S2
S2
S3
S3

3RV19 36-3AP0
3RV19 36-3AB4
3RV19 46-3AP0
3RV19 46-3AB4

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

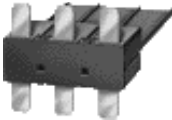
Accessories
Mounting accessories

Selection and ordering data

Accessories

Version		For motor protection circuit breakers	Order No.
Size			
Covers			
3RV1 (size S3) with 3RT19 46-4EA1 (left) 3RV19 08-0P (right)	Terminal covers for box terminals	S2	3RT19 36-4EA2
	Additional touch protection to be fitted at the box terminals (2 units mountable per device)	S3	3RT19 46-4EA2
	Terminal covers	S3	3RT19 46-4EA1
	for cable lug and busbar connection for maintaining the required voltage clearance and as touch protection if box terminal is removed (2 units can be mounted per motor protection circuit breaker)		
	Scale covers	S2, S3	3RV19 08-0P
	Sealable, for covering the set current scale		
Mounting material			
3RB19 00-0B	Push-in lugs	S00	3RB19 00-0B
	for screwing the motor protection circuit breaker onto mounting plates For each motor protection circuit breaker, 2 units are required.		
Auxiliary terminals, 3-pole			
3RT19 46-4F	For connection of auxiliary and control cables to the main conductor connections (for one side)	S3	3RT19 46-4F

Link modules

Actuating voltage of contactor		Size	Screw terminals	
		Contactors	Motor protection circuit breakers	
				Order No.
Link modules for motor protection circuit breaker to contactor				
For mechanical and electrical connection between motor protection circuit breaker and contactor with screw terminals				
Single-unit packaging				
	AC	S2	S2	3RA19 31-1AA00
		S3	S3	3RA19 41-1AA00
	DC	S2	S2	3RA19 31-1BA00
		S3	S3	3RA19 41-1BA00
				
3RA19 41-1AA00				

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

Accessories

Enclosures and front plates

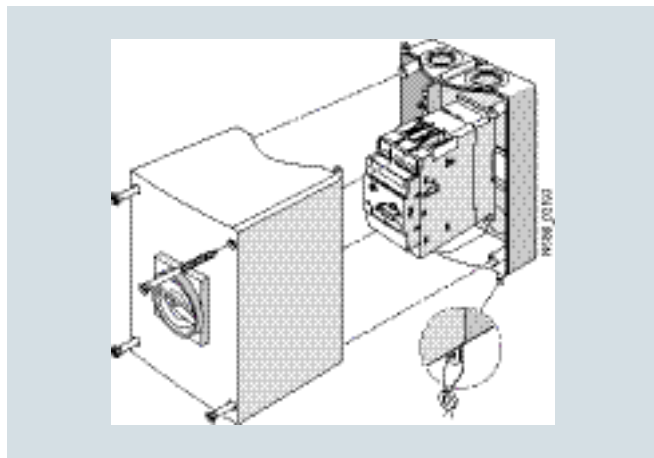
Overview

Enclosures

For stand-alone installation of motor protection circuit breaker size S2 ($I_{n\max} = 50\text{ A}$), molded-plastic enclosures for surface mounting are available.

When installed in a molded-plastic enclosure the motor protection circuit breakers have a rated operational voltage U_e of 500 V.

The molded-plastic enclosures are designed to degree of protection IP55.



Enclosure for surface mounting

All enclosures are equipped with N and PE terminals. There are two knock-out cable entries for cable glands at the top and two at the bottom; also on the rear corresponding cable entries are scored. There is a knockout on the top of the enclosure for indicator lights that are available as accessories.

In the enclosure for motor protection circuit breaker size S2 there is also room for the laterally mounted auxiliary release. There is no provision for installing a motor protection circuit breaker with a signaling switch.

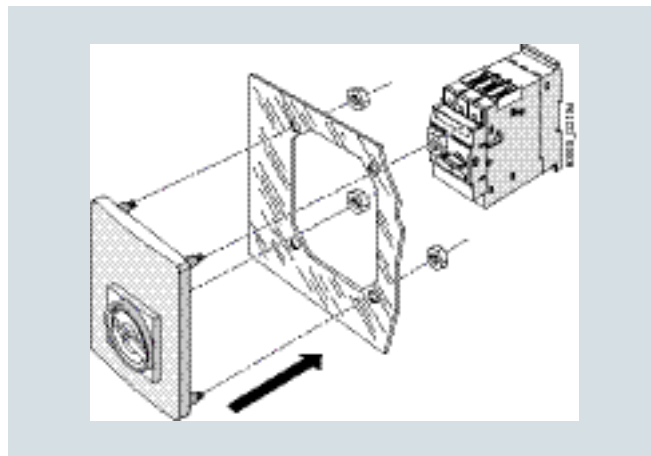
The molded-plastic enclosures of the size S2 motor protection circuit breakers are fitted with a rotary operating mechanism.

The enclosures can be supplied with either a black rotary operating mechanism or with an EMERGENCY-STOP rotary operating mechanism with a red/yellow knob.

The rotary operating mechanisms can be locked in the Open position with up to 3 padlocks.

Front plates

Motor protection circuit breakers are frequently required to be actuated in any enclosure. Front plates equipped with a rotary operating mechanism for motor protection circuit breaker sizes S2 and S3 are available for this purpose.



Front plate for size S2

Motor Protection Circuit Breakers

SIRIUS 3RV1 Motor Protection Circuit Breakers up to 100 A

Accessories Enclosures and front plates

Selection and ordering data

	Version	Degree of protection	Integrated terminals	Width mm	For motor protection circuit breakers Size	Order No.
Molded-plastic enclosures for surface mounting						
	With rotary operating mechanism, lockable in 0 position	IP55	N and PE/ground	82 (for motor protection circuit breakers + lateral auxiliary switch + auxiliary release)	S2	3RV19 33-1DA00
	With EMERGENCY-STOP rotary operating mechanism, lockable in 0 position	IP55	N and PE/ground	82 (for motor protection circuit breakers + lateral auxiliary switch + auxiliary release)	S2	3RV19 33-1GA00

	Version	Degree of protection	For motor protection circuit breakers Size	Order No.
Front plates				
	Molded-plastic front plates with rotary operating mechanism, lockable in 0 position For actuation of 3RV1 motor protection circuit breakers in any enclosure	IP55 (front side)	S2, S3	3RV19 23-4B
	Molded-plastic front plates with EMERGENCY-STOP rotary operating mechanism, red/yellow, lockable in 0 position EMERGENCY-STOP actuation of 3RV1 motor protection circuit breakers in any enclosure	IP55 (front side)	S2, S3	3RV19 23-4E

	Version	Rated control supply voltage U_c V	For motor protection circuit breakers Size	Order No.
Indicator lights				
	Indicator lights for all enclosures and front plates With glow lamp and colored lenses red, green, yellow-orange and clear	110 ... 120 220 ... 240 380 ... 415 480 ... 500	S2	3RV19 03-5B 3RV19 03-5C 3RV19 03-5E 3RV19 03-5G

Overload Relays

General data

Overview



Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23/3RB24	Benefits
General data						
Sizes	S00, S0	S2, S3	S00, S0	S2 ... S12	S00 ... S12	- Are coordinated with the dimensions, connections and technical characteristics of the other devices in the SIRIUS modular system (contactors, etc., ...) - Permit the mounting of slim and compact load feeders in widths of 45 mm (S00), 45 mm (S0), 55 mm (S2), 70 mm (S3), 120 mm (S6) and 145 mm (S10/S12); this does not include the current measuring modules for the 3RB22 to 3RB24 evaluation modules sizes S00 to S3 - Simplify configuration
Seamless current range	0.11 ... 40 A	5.5 ... 100 A	0.1 ... 40 A	6 ... 630 A	0.3 ... 630 A (up to 820 A) ¹⁾	Allows easy and consistent configuration with one series of overload relays (for small to large loads)
Protection functions						
Tripping in the event of overload	✓	✓	✓	✓	✓	Provides optimum inverse-time delayed protection of loads against excessive temperature rises due to overload
Tripping in the event of phase unbalance	✓	(✓)	✓	✓	✓	Provides optimum inverse-time delayed protection of loads against excessive temperature rises due to phase unbalance
Tripping in the event of phase failure	✓	✓	✓	✓	✓	Minimizes heating of induction motors during phase failure
Protection of single-phase loads	✓	✓	✓	—	✓	Enables the protection of single-phase loads
Tripping in the event of overheating	— ²⁾	— ²⁾	— ²⁾	— ²⁾	✓	- Provides optimum temperature-dependent protection of loads against excessive temperature rises e.g. for stator-critical motors or in the event of insufficient coolant flow, contamination of the motor surface or for long starting or braking operations - Eliminates the need for additional special equipment - Saves space in the control cabinet - Reduces wiring outlay and costs
by						
integrated thermistor motor protection function						
Tripping in the event of a ground fault	—	—	✓ (only 3RB31)	✓ (only 3RB21)	✓	- Provides optimum protection of loads against high-resistance short-circuits or ground faults due to moisture, condensed water, damage to the insulation material, etc. - Eliminates the need for additional special equipment - Saves space in the control cabinet - Reduces wiring outlay and costs
by						
internal ground-fault detection (activatable)						

✓ Available
— Not available

1) Motor currents up to 820 A can be recorded and evaluated by a current measuring module, e.g. 3RB29 06-2BG1 (0.3 to 3 A), in combination with a 3UF18 68-3GA00 (820 A/1 A) series transformer.

2) The SIRIUS 3RN thermistor motor protection devices can be used to provide additional temperature-dependent protection.



Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23/3RB24	Benefits
Features						
RESET function	✓	✓	✓	✓	✓	Allows manual or automatic resetting of the device
Remote RESET function	✓ (by means of separate module)	✓ (by means of separate module)	✓ (only 3RB31 with 24 V DC)	✓ (only 3RB21 with 24 V DC)	✓	Allows the remote resetting of the device
TEST function for auxiliary contacts	✓	✓	✓	✓	✓	Allows easy checking of the function and wiring
TEST function for electronics	—	—	✓	✓	✓	Allows checking of the electronics
Status display	✓	✓	✓	✓	✓	Displays the current operating state
Large current adjustment button	✓	✓	✓	✓	✓	Makes it easier to set the relay exactly to the correct current value
Integrated auxiliary contacts (1 NO + 1 NC)	✓	✓	✓	✓	✓ (2 × only 3RB22, 3RB23)	- Allows the load to be switched off if necessary - Can be used to output signals
Integrated auxiliary contacts (1 CO)	—	—	—	—	✓ (only 3RB24)	Enables the controlling of contactors directly from the higher-level control system through IO-Link
Communication capability through IO-Link						
Reading out diagnostics functions	—	—	—	—	✓ (only 3RB24)	Enables the reading out of diagnostics information such as overload, open circuit, ground fault, etc.
Reading out of current values	—	—	—	—	✓ (only 3RB24)	Enables the reading out of current values and their direct processing in the higher-level control system
Reading out all set parameters	—	—	—	—	✓ (only 3RB24)	Enables the reading out of all set parameters, e.g. for plant documentation

✓ Available
— Not available

Overload Relays

General data



Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23/3RB24	Benefits
Design of load feeders						
Short-circuit strength up to 100 kA at 690 V (in conjunction with the corresponding fuses or the corresponding Motor Protection Circuit Breakers)	✓	✓	✓	✓	✓	Provides optimum protection of the loads and operating personnel in the event of short-circuits due to insulation faults or faulty switching operations
Electrical and mechanical matching to 3RT contactors	✓	✓	✓	✓	✓ ¹⁾	- Simplifies configuration - Reduces wiring outlay and costs - Enables stand-alone installation as well as space-saving direct mounting
Straight-through transformers for main circuit²⁾ (in this case the cables are routed through the feed-through openings of the overload relay and connected directly to the box terminals of the contactor)	—	—	—	✓ (S2 ... S6)	✓ (S00 ... S6)	- Reduces the contact resistance (only one point of contact) - Saves wiring costs (easy, no need for tools, and fast) - Saves material costs - Reduces installation costs
Spring-type terminal connection system for main circuit²⁾	✓	—	✓	—	—	- Enables fast connections - Permits vibration-resistant connections - Enables maintenance-free connections
Spring-type terminal connection system for auxiliary circuits²⁾	3	✓	✓	✓	✓	- Enables fast connections - Permits vibration-resistant connections - Enables maintenance-free connections
Full starter functionality through IO-Link	—	—	—	—	✓ (only 3RB24)	Enables in combination with the SIRIUS 3RT contactors the assembly of communication-capable motor starters (direct-on-line, reversing and wye-delta starting)

✓ Available
— Not available

1) Exception: up to size S3, only stand-alone installation is possible.
2) Alternatively available for screw terminals.



Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23/3RB24	Benefits
Other features						
Temperature compensation	✓	✓	✓	✓	✓	- Allows the use of the relays at high temperatures without derating - Prevents premature tripping - Allows compact installation of the control cabinet without distance between the devices/load feeders - Simplifies configuration - Enables space to be saved in the control cabinet
Very high long-term stability	✓	✓	✓	✓	✓	Provides safe protection for the loads even after years of use in severe operating conditions
Wide setting ranges	—	—	✓ (1:4)	✓ (1:4)	✓ (1:10)	- Minimize the configuration outlay and costs - Minimize storage overheads, storage costs, tied-up capital
Trip class CLASS 5	—	—	✓ (only 3RB31)	✓ (only 3RB21)	✓	Enables solutions for very fast starting motors requiring special protection (e.g. Ex motors)
Trip classes > CLASS 10	—	—	✓	✓	✓	Enables heavy starting solutions
Low power loss	—	—	✓	✓	✓	- Reduces power consumption and energy costs (up 98 % less power is used than for thermal overload relays). - Minimizes temperature rises of the contactor and control cabinet – in some cases this may eliminate the need for controlgear cabinet cooling - Direct mounting to contactor saves space, even for high motor currents (i.e. no heat decoupling is required)
Internal power supply	— ¹⁾	— ¹⁾	✓	✓	—	Eliminates the need for configuration and connecting an additional control circuit
Supplied from an external voltage directly through IO-Link	—	—	—	—	✓ (only 3RB24)	Eliminates the need for configuration and connecting an additional control circuit
Variable adjustment of the trip classes (The required trip class can be adjusted by means of a rotary switch depending on the current start-up condition.)	—	—	✓ (only 3RB31)	✓ (only 3RB21)	✓	- Reduces the number of variants - Minimizes the configuring outlay and costs - Minimizes storage overhead, storage costs, and tied-up capital

✓ Available
— Not available

1) The SIRIUS 3RU11 thermal overload relays use a bimetal contactor and therefore do not require a control supply voltage.

Overload Relays

General data



Features	3RU21	3RU11	3RB30/3RB31	3RB20/3RB21	3RB22/3RB23/3RB24	Benefits
Further characteristics (continued)						
Overload warning	—	—	—	—	✓	• Indicates imminent tripping of the relay directly on the device due to overload, phase unbalance or phase failure • Allows the imminent tripping of the relay to be signaled • Allows measures to be taken in time in the event of inverse-time delayed overloading of the load for an extended period over the current limit • Eliminates the need for an additional device • Saves space in the control cabinet • Reduces wiring outlay and costs
Analog output	—	—	—	—	✓	• Allows the output of an analog output signal for actuating moving-coil instruments, feeding programmable logic controllers or transfer to bus systems • Eliminates the need for an additional measuring transducer and signal converter • Saves space in the control cabinet • Reduces wiring outlay and costs

✓ Available
— Not available

Overview of overload relays – matching contactors

	Overload relays	Current measurement	Current range	Contactors (type, size, rating in kW)							
				3RT20 1.	3RT20 2.	3RT10 3.	3RT10 4.	3RT10 5.	3RT10 6.	3RT10 7.	3TF68/3TF69
	Type	Type	A	S00	S0	S2	S3	S6	S10	S12	Size 14
				3/4/5.5/7.5	5.5/7.5/11/15/18.5	15/18.5/22	30/37/45	55/75/90	110/132/160	200/250	375/450
SIRIUS 3RU21 thermal overload relays											
	3RU21 1	Integrated	0.11 ... 16	✓	—	—	—	—	—	—	—
	3RU21 2	Integrated	1.8 ... 40	—	✓	—	—	—	—	—	—
SIRIUS 3RU11 thermal overload relays											
	3RU11 3	Integrated	5.5 ... 50	—	—	✓	—	—	—	—	—
	3RU11 4	Integrated	18 ... 100	—	—	—	✓	—	—	—	—
SIRIUS 3RB30 solid-state overload relays											
	3RB30 1	Integrated	0.1 ... 16	✓	—	—	—	—	—	—	—
	3RB30 2	Integrated	0.1 ... 40	—	✓	—	—	—	—	—	—
SIRIUS 3RB31 solid-state overload relays											
	3RB31 1	Integrated	0.1 ... 16	✓	—	—	—	—	—	—	—
	3RB31 2	Integrated	0.1 ... 40	—	✓	—	—	—	—	—	—
SIRIUS 3RB20 solid-state overload relays											
	3RB20 3	Integrated	6 ... 50	—	—	✓	—	—	—	—	—
	3RB20 4	Integrated	12.5 ... 100	—	—	—	✓	—	—	—	—
	3RB20 5	Integrated	50 ... 200	—	—	—	—	✓	—	—	—
	3RB20 6	Integrated	55 ... 630	—	—	—	—	—	✓	✓	✓
	3RB20 1 + 3UF18	Integrated	630 ... 820	—	—	—	—	—	—	—	✓
SIRIUS 3RB21 solid-state overload relays											
	3RB21 3	Integrated	6 ... 50	—	—	✓	—	—	—	—	—
	3RB21 4	Integrated	12.5 ... 100	—	—	—	✓	—	—	—	—
	3RB21 5	Integrated	50 ... 200	—	—	—	—	✓	—	—	—
	3RB21 6	Integrated	55 ... 630	—	—	—	—	—	✓	✓	✓
	3RB21 1 + 3UF18	Integrated	630 ... 820	—	—	—	—	—	—	—	✓
SIRIUS 3RB22/3RB23/3RB24 solid-state overload relays											
	3RB22/ 3RB23/ 3RB24 +	3RB29 0	0.3 ... 25	✓	✓	—	—	—	—	—	—
		3RB29 0	10 ... 100	✓	✓	✓	✓	—	—	—	—
		3RB29 5	20 ... 200	—	—	—	—	✓	—	—	—
		3RB29 6	63 ... 630	—	—	—	—	—	✓	✓	✓
		3RB29 0 + 3UF18	630 ... 820	—	—	—	—	—	—	—	✓

✓ Can be used
— Cannot be used

Overload Relays

General data

Connection methods

Depending on the device version of the 3RU2 and 3RB3 overload relays, the terminals for screw, spring-type connection are configured for both the main and auxiliary circuit.

The 3RU11 thermal overload relays come with screw terminals.

The 3RB20 and 3RB21 solid-state overload relays are available with screw terminals (box terminals) or spring-type terminals on the auxiliary current side; the same applies for the evaluation modules of the 3RB22 to 3RB24 solid-state overload relays for high-feature applications.



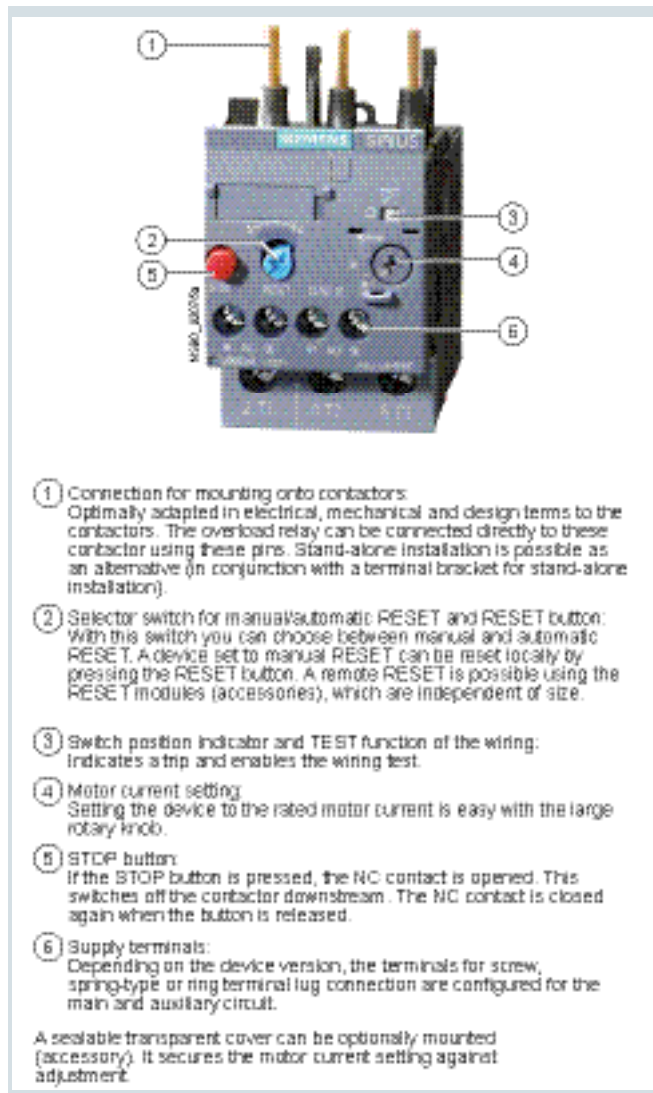
Screw terminals



Spring-type terminals

The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

Overview



SIRIUS 3RU21 26-4FB00 thermal overload relay

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th
	□□□	□	□	□	-	□	□	□	□
Thermal overload relays	3 R U								
Innovations		2							
Device series			□						
Size, rated operational current and power				□	□				
Setting range of the overload release						□	□		
Connection methods								□	
Installation type									□
Example	3 R U	2	1	1	6	-	0	A	B 0

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

The 3RU21 thermal overload relays up to 40 A have been designed for inverse-time delayed protection of loads with normal starting against excessive temperature rises due to overload or phase failure.

An overload or phase failure results in an increase of the motor current beyond the set rated motor current. Via heating elements, this current rise heats up the bimetal strips inside the device which then bend and as a result trigger the auxiliary contacts by means of a tripping mechanism. The auxiliary contacts then switch off the load by means of a contactor. The break time depends on the ratio between the tripping current and current setting I_e and is stored in the form of a long-term stable tripping characteristic.

The "tripped" status is signaled by means of a switch position indicator. Resetting takes place either manually or automatically after a recovery time has elapsed.

The devices are manufactured in accordance with environmental guidelines and contain environmentally friendly and reusable materials.

They comply with all important worldwide standards and approvals.

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RU21 thermal overload relays are suitable for the overload protection of explosion-proof motors with "increased safety" type of protection EEx e. The relays meet the requirements of EN 60079-7 (Electrical apparatus for areas subject to explosion hazards – Increased safety "e");

EC prototype test certificate for Category (2)G/D has been submitted. More details on request.

Overload Relays

SIRIUS 3RU2 Thermal Overload Relays

3RU2 up to 40 A
for standard applications

Benefits

The most important features and benefits of the 3RU21 thermal overload relays are listed in the overview table

Application

Industries

The 3RU21 thermal overload relays are suitable for customers from all industries who want to guarantee optimum inverse-time delayed protection of their electrical loads (e.g. motors) under normal starting conditions (CLASS 10).

Application

The 3RU21 thermal overload relays have been designed for the protection of three-phase and single-phase AC and DC motors.

If single-phase AC or DC loads are to be protected by the 3RU21 thermal overload relays, all three bimetal strips must be heated. For this purpose, all main current paths of the relay must be connected in series.

Ambient conditions

The 3RU21 thermal overload relays have temperature compensation in accordance with IEC 60947-4-1 for the temperature range of –40 to +60 °C. For temperatures from +60 to +80 °C the upper set value of the setting range must be reduced by the factor listed in the table below.

Ambient temperature °C	Derating factor for the upper set value Current ranges	
	0.11 ... 20 A	17 ... 40 A
+60	1.0	1.0
+65	0.94	0.97
+70	0.87	0.94
+75	0.81	0.90
+80	0.73	0.86

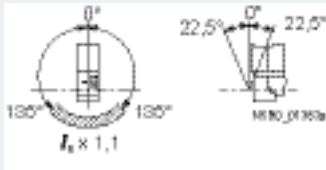
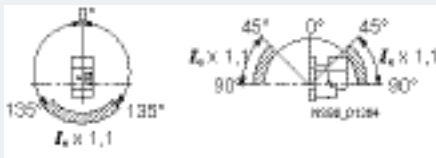
Technical specifications

Type		3RU21 16	3RU21 26
Size		S00	S0
Dimensions (W x H x D) (overload relay with stand-alone installation support)			
- Screw terminals - Spring-type terminals			
			
	mm	45 x 89 x 79	45 x 97 x 95
	mm	45 x 102 x 80	45 x 114 x 97
General data			
Trips in the event of		Overload, phase failure	
Trip class acc. to IEC 60947-4-1		CLASS	10
Phase failure sensitivity		Yes	
Overload warning		No	
Reset and recovery			
Reset options after tripping		Manual, Automatic and Remote RESET (Remote RESET in combination with the corresponding accessories)	
- Recovery time - For automatic RESET - For manual RESET - For remote RESET		min min min	Depends on the strength of the tripping current and characteristic Depends on the strength of the tripping current and characteristic Depends on the strength of the tripping current and characteristic
Features			
- Display of operating state on device - TEST function - RESET button - STOP button		Yes, by means of TEST function/switch position indicator slide Yes Yes Yes	
Safe operation of motors with "increased safety" type of protection			
EC type test certificate number acc. to directive 94/9/EC (ATEX)		On request	
Ambient temperature			
- Storage/transport - Operation - Temperature compensation - Permissible rated current at - Temperature inside control cabinet 60 °C - Temperature inside control cabinet 70 °C		°C °C °C % %	-55 ... +80 -40 ... +70 Up to 60 100 (over +60 °C current reduction is not required) 87
Repeat terminals			
- Coil repeat terminals - Auxiliary contact repeat terminal		Yes Yes	Not required Not required
Degree of protection acc. to IEC 60529		IP20	
Touch protection acc. to IEC 61140		Screw and spring-type terminals	
Shock resistance with sine acc. to IEC 60068-2-27		g/ms	15/11 (auxiliary contacts 95/96 and 97/98; 8g/11 ms)

Overload Relays

SIRIUS 3RU2 Thermal Overload Relays

3RU2 up to 40 A
for standard applications

Type		3RU21 16	3RU21 26
Size		S00	S0
Dimensions (W x H x D) (overload relay with stand-alone installation support)			
• Screw terminals	mm	45 x 89 x 79	45 x 97 x 95
• Spring-type terminals	mm	45 x 102 x 80	45 x 114 x 97
General data (continued)			
Electromagnetic compatibility (EMC) – Interference immunity			
• Conductor-related interference		EMC interference immunity is not relevant for thermal overload relays	
- Burst acc. to IEC 61000-4-4 (corresponds to degree of severity 3)	kV		
- Surge acc. to IEC 61000-4-5 (corresponds to degree of severity 3)	kV	EMC interference immunity is not relevant for thermal overload relays	
• Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)	kV	EMC interference immunity is not relevant for thermal overload relays	
• Field-related interference acc. to IEC 61000-4-3 (corresponds to degree of severity 3)	V/m	EMC interference immunity is not relevant for thermal overload relays	
Electromagnetic compatibility (EMC) – Emitted interference		EMC interference immunity is not relevant for thermal overload relays	
Resistance to extreme climates – air humidity	%	90	
Dimensions		See “Dimensional drawings”	
Installation altitude above sea level	m	Up to 2 000; above this, please enquire	
Mounting position		The diagrams show the permissible mounting positions for mounting onto contactors and stand-alone installation. For installation in the hatched area, a setting correction of 10 % must be implemented. Stand-alone installation:  Contactor + overload relay: 	
Type of mounting		Mounting onto contactor/stand-alone installation with terminal bracket (For screw and snap-on mounting on TH 35 standard mounting rail.	

Overload Relays

SIRIUS 3RU2 Thermal Overload Relays

3RU2 up to 40 A
for standard applications

Type		3RU21 16	3RU21 26
Size		S00	S0
Main circuit			
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated operational voltage U_e	V	690	
Type of current		Yes	
• Direct current		Yes, frequency range up to 400 Hz	
• Alternating current			
Current setting	AA	0.11 ... 0.16 to 11 ... 16	1.8 ... 2.5 to 34 ... 40
Power loss per unit (max.)	W	3.9 ... 6.6	3.9 ... 6
Short-circuit protection		See “Selection and ordering data”	
• With fuse without contactor		See “Technical specifications” —> “Short-circuit protection with fuses/	
• With fuse and contactor		Motor Protection Circuit Breakers for motor feeders”	
Protective separation between main and auxiliary conducting path acc. to IEC 60947-1	V	≥ 440	
Conductor cross-sections of main circuit			
Connection type		 Screw terminals	
Terminal screw		M3, Pozidriv size 2	M4, Pozidriv size 2
Operating devices	mm	ø 5 ... 6	ø 5 ... 6
Prescribed tightening torque	Nm	0.8 ... 1.2	2 ... 2.5
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾ , 2 x (0.5 ... 4) ¹⁾	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 10) ¹⁾
• Finely stranded with end sleeves (DIN 46228 T1)	mm²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 6) ¹⁾ ; max. 1 x 10
• AWG cables, solid or stranded	AWG	2 x (20 ... 16) ¹⁾ , 2 x (18 ... 14) ¹⁾ , 2 x 12	2 x (16 ... 12) ¹⁾ , 2 x (14 ... 8) ¹⁾
Connection type			
		 Spring-type terminals	
Operating devices	mm	3.0 x 0.5 and 3.5 x 0.5	
Conductor cross-sections (min./max.)			
• Solid	mm²	1 x (0.5 ... 4)	1 x (1 ... 10)
• Finely stranded without end sleeve	mm²	1 x (0.5 ... 2.5)	1 x (1 ... 6)
• Finely stranded with end sleeves (DIN 46228 T1)	mm²	1 x (0.5 ... 2.5)	1 x (1 ... 6)
• AWG cables, solid or stranded	AWG	1 x (20 ... 12)	1 x (18 ... 8)

Type		3RU21 16	3RU21 26
Size		S00	S0
Auxiliary circuit			
Number of NO contacts	1		
Number of NC contacts	1		
Auxiliary contacts – assignment		1 NO for the signal “tripped”; 1 NC for disconnecting the contactor	
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}	kV	6	
Contact rating of the auxiliary contacts			
• NC contact with alternating current AC-14/AC-15, rated operational current I_e at U_e :			
- 24 V	A	4	
- 120 V	A	4	
- 125 V	A	4	
- 230 V	A	3	
- 400 V	A	2	
- 600 V	A	0.75	
- 690 V	A	0.75	
• NO contact with alternating current AC-14/AC-15, rated operational current I_e at U_e :			
- 24 V	A	3	
- 120 V	A	3	
- 125 V	A	3	
- 230 V	A	2	
- 400 V	A	1	
- 600 V	A	0.75	
- 690 V	A	0.75	
• NC contact, NO contact with direct current DC-13, rated operational current I_e at U_e :			
- 24 V	A	1	
- 60 V	A	On request	
- 110 V	A	0.22	
- 125 V	A	0.22	
- 220 V	A	0.11	
• Conventional thermal current I_{th}	A	6	
• Contact reliability (suitability for PLC control; 17 V, 5 mA)		Yes	
Short-circuit protection			
• With fuse			
- Operational class gG	A	6	
- Quick	A	10	
• With miniature circuit breaker (C characteristic)	A	6 ¹⁾	
Protective separation between auxiliary conducting paths acc. to IEC 60947-1	V	≥ 440	
CSA, UL, UR rated data			
Auxiliary circuit – switching capacity		B600, R300	
Conductor cross-sections for auxiliary circuit			
Connection type		 Screw terminals	
Terminal screw		M3, Pozidriv size 2	
Operating devices		mm	ø 5 ... 6
Prescribed tightening torque		Nm	0.8 ... 1.2
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	
• Finely stranded with end sleeves (DIN 46228 T1)	mm²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	
• AWG cables, solid or stranded	AWG	2 x (20 ... 16) ¹⁾ ; 2 x (18 ... 14) ¹⁾	
Connection type		 Spring-type terminals	
Operating devices		mm	3.0 x 0.5 and 3.5 x 0.5
Conductor cross-sections (min./max.)			
• Solid	mm²	2 x (0.5 ... 2.5)	
• Finely stranded without end sleeve	mm²	2 x (0.5 ... 1.5)	
• Finely stranded with end sleeves (DIN 46228 T1)	mm²	2 x (0.5 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 x (20 ... 14)	

1) Up to $I_k \leq 0.5$ kA; $U \leq 260$ V.

Overload Relays

SIRIUS 3RU2 Thermal Overload Relays

3RU2 up to 40 A
for standard applications

Selection and ordering data

3RU21 thermal overload relays for mounting onto contactor¹⁾, CLASS 10

Features and technical specifications:

- Screw and spring-type terminals
- Overload and phase failure protection
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function
- STOP button
- Sealable covers (optional accessory)



3RU21 16-4AB0



3RU21 16-4AC0



3RU21 26-4FB0



3RU21 26-4AC0

Size contactor ²⁾	Rating for induction motor, rated value ³⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁴⁾	 Screw terminals	 Spring-type terminals
				Order No.	Order No.
	kW	A	A		
Size S00					
S00	0.04	0.11 ... 0.16	0.5	3RU21 16-0AB0	3RU21 16-0AC0
	0.06	0.14 ... 0.2	1	3RU21 16-0BB0	3RU21 16-0BC0
	0.06	0.18 ... 0.25	1	3RU21 16-0CB0	3RU21 16-0CC0
	0.09	0.22 ... 0.32	1.6	3RU21 16-0DB0	3RU21 16-0DC0
	0.09	0.28 ... 0.4	2	3RU21 16-0EB0	3RU21 16-0EC0
	0.12	0.35 ... 0.5	2	3RU21 16-0FB0	3RU21 16-0FC0
	0.18	0.45 ... 0.63	2	3RU21 16-0GB0	3RU21 16-0GC0
	0.18	0.55 ... 0.8	4	3RU21 16-0HB0	3RU21 16-0HC0
	0.25	0.7 ... 1	4	3RU21 16-0JB0	3RU21 16-0JC0
	0.37	0.9 ... 1.25	4	3RU21 16-0KB0	3RU21 16-0KC0
	0.55	1.1 ... 1.6	6	3RU21 16-1AB0	3RU21 16-1AC0
	0.75	1.4 ... 2	6	3RU21 16-1BB0	3RU21 16-1BC0
	0.75	1.8 ... 2.5	10	3RU21 16-1CB0	3RU21 16-1CC0
	1.1	2.2 ... 3.2	10	3RU21 16-1DB0	3RU21 16-1DC0
	1.5	2.8 ... 4	16	3RU21 16-1EB0	3RU21 16-1EC0
	1.5	3.5 ... 5	20	3RU21 16-1FB0	3RU21 16-1FC0
	2.2	4.5 ... 6.3	20	3RU21 16-1GB0	3RU21 16-1GC0
	3	5.5 ... 8	25	3RU21 16-1HB0	3RU21 16-1HC0
	4	7 ... 10	35	3RU21 16-1JB0	3RU21 16-1JC0
	5.5	9 ... 12.5	35	3RU21 16-1KB0	3RU21 16-1KC0
7.5	11 ... 16	40	3RU21 16-4AB0	3RU21 16-4AC0	
Size S0					
S0	0.75	1.8 ... 2.5	10	3RU21 26-1CB0	3RU21 26-1CC0
	1.1	2.2 ... 3.2	10	3RU21 26-1DB0	3RU21 26-1DC0
	1.5	2.8 ... 4	16	3RU21 26-1EB0	3RU21 26-1EC0
	1.5	3.5 ... 5	20	3RU21 26-1FB0	3RU21 26-1FC0
	2.2	4.5 ... 6.3	20	3RU21 26-1GB0	3RU21 26-1GC0
	3	5.5 ... 8	25	3RU21 26-1HB0	3RU21 26-1HC0
	4	7 ... 10	35	3RU21 26-1JB0	3RU21 26-1JC0
	5.5	9 ... 12.5	35	3RU21 26-1KB0	3RU21 26-1KC0
	7.5	11 ... 16	40	3RU21 26-4AB0	3RU21 26-4AC0
	7.5	14 ... 20	50	3RU21 26-4BB0	3RU21 26-4BC0
	11	17 ... 22	63	3RU21 26-4CB0	3RU21 26-4CC0
	11	20 ... 25	63	3RU21 26-4DB0	3RU21 26-4DC0
	15	23 ... 28	63	3RU21 26-4NB0	3RU21 26-4NC0
	15	27 ... 32	80	3RU21 26-4EB0	3RU21 26-4EC0
	18.5	30 ... 36	80	3RU21 26-4PB0	3RU21 26-4PC0
	18.5	34 ... 40	80	3RU21 26-4FB0	3RU21 26-4FC0

1) For matching terminal brackets see "Accessories".

2) Observe maximum rated operational current of the devices.

3) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

4) Maximum protection by fuse for overload relay, type of coordination "2".

3RU21 thermal overload relays for stand-alone installation¹⁾, CLASS 10

Features and technical specifications:

- Screw or spring-type terminals
- Overload and phase failure protection
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function
- STOP button
- Sealable covers (optional accessory)



3RU21 16-4AB1



3RU21 16-4AC1



3RU21 26-4FB1



3RU21 26-4FC1

Size contactor ²⁾	Rating for induction motor, rated value ³⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁴⁾	Screw terminals 	Spring-type terminals 
	kW	A	A	Order No.	Order No.
Size S00					
S00	0.04	0.11 ... 0.16	0.5	3RU21 16-0AB1	3RU21 16-0AC1
	0.06	0.14 ... 0.2	1	3RU21 16-0BB1	3RU21 16-0BC1
	0.06	0.18 ... 0.25	1	3RU21 16-0CB1	3RU21 16-0CC1
	0.09	0.22 ... 0.32	1.6	3RU21 16-0DB1	3RU21 16-0DC1
	0.09	0.28 ... 0.4	2	3RU21 16-0EB1	3RU21 16-0EC1
	0.12	0.35 ... 0.5	2	3RU21 16-0FB1	3RU21 16-0FC1
	0.18	0.45 ... 0.63	2	3RU21 16-0GB1	3RU21 16-0GC1
	0.18	0.55 ... 0.8	4	3RU21 16-0HB1	3RU21 16-0HC1
	0.25	0.7 ... 1	4	3RU21 16-0JB1	3RU21 16-0JC1
	0.37	0.9 ... 1.25	4	3RU21 16-0KB1	3RU21 16-0KC1
	0.55	1.1 ... 1.6	6	3RU21 16-1AB1	3RU21 16-1AC1
	0.75	1.4 ... 2	6	3RU21 16-1BB1	3RU21 16-1BC1
	0.75	1.8 ... 2.5	10	3RU21 16-1CB1	3RU21 16-1CC1
	1.1	2.2 ... 3.2	10	3RU21 16-1DB1	3RU21 16-1DC1
	1.5	2.8 ... 4	16	3RU21 16-1EB1	3RU21 16-1EC1
	1.5	3.5 ... 5	20	3RU21 16-1FB1	3RU21 16-1FC1
	2.2	4.5 ... 6.3	20	3RU21 16-1GB1	3RU21 16-1GC1
	3	5.5 ... 8	25	3RU21 16-1HB1	3RU21 16-1HC1
	4	7 ... 10	35	3RU21 16-1JB1	3RU21 16-1JC1
	5.5	9 ... 12.5	35	3RU21 16-1KB1	3RU21 16-1KC1
	7.5	11 ... 16	40	3RU21 16-4AB1	3RU21 16-4AC1
Size S0					
S0	7.5	14 ... 20	50	3RU21 26-4BB1	3RU21 26-4BC1
	11	17 ... 22	63	3RU21 26-4CB1	3RU21 26-4CC1
	11	20 ... 25	63	3RU21 26-4DB1	3RU21 26-4DC1
	15	23 ... 28	63	3RU21 26-4NB1	3RU21 26-4NC1
	15	27 ... 32	80	3RU21 26-4EB1	3RU21 26-4EC1
	18.5	30 ... 36	80	3RU21 26-4PB1	3RU21 26-4PC1
	18.5	34 ... 40	80	3RU21 26-4FB1	3RU21 26-4FC1

1) Screw and snap-on mounting onto TH 35 standard mounting rail.

2) Observe maximum rated operational current of the devices.

3) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

4) Maximum protection by fuse for overload relay, type of coordination "2".

Overload Relays

SIRIUS 3RU2 Thermal Overload Relays

Accessories

Overview

Overload relays for standard applications

The following optional accessories are available for the 3RU21 thermal overload relays:

- Terminal bracket for stand-alone installation with screw or spring-type terminals for every size
- Mechanical RESET (for all sizes)
- Cable release for resetting devices which are difficult to access (for all sizes)
- Electrical remote RESET module in three voltage variants (for all sizes)
- Sealable cover (for all sizes)

Selection and ordering data

	Version	Size	Order No.
Terminal brackets for stand-alone installation			
 3RU29 16-3AA01  3RU29 26-3AA01	Terminal brackets for overload relays with screw terminals For separate mounting of the overload relays; screw and snap-on mounting onto TH 35 standard mounting rail		 Screw terminals 3RU29 16-3AA01 3RU29 26-3AA01
	S00 S0		
 3RU29 16-3AC01  3RU29 26-3AC01	Terminal brackets for overload relays with spring-type terminals For separate mounting of the overload relays; screw and snap-on mounting onto TH 35 standard mounting rail		 Spring-type terminals 3RU29 16-3AC01 3RU29 26-3AC01
	S00 S0		
Mechanical RESET			
 3RU29 00-1A with pushbutton and extension plunger	Resetting plungers, holders and formers		3RU29 00-1A
	Pushbuttons with extended stroke (12 mm), IP65, Ø 22 mm		3SB30 00-0EA11
	Extension plungers For compensation of the distance between the pushbutton and the unlatching button of the relay		3SX1 335
	S00, S0	S00, S0	
Cable releases with holder for RESET			
 3RU29 00-1.	For Ø 6.5 mm holes in the control panel; max. control panel thickness 8 mm • Length 400 mm • Length 600 mm		3RU29 00-1B 3RU29 00-1C
		S00, S0 S00, S0	

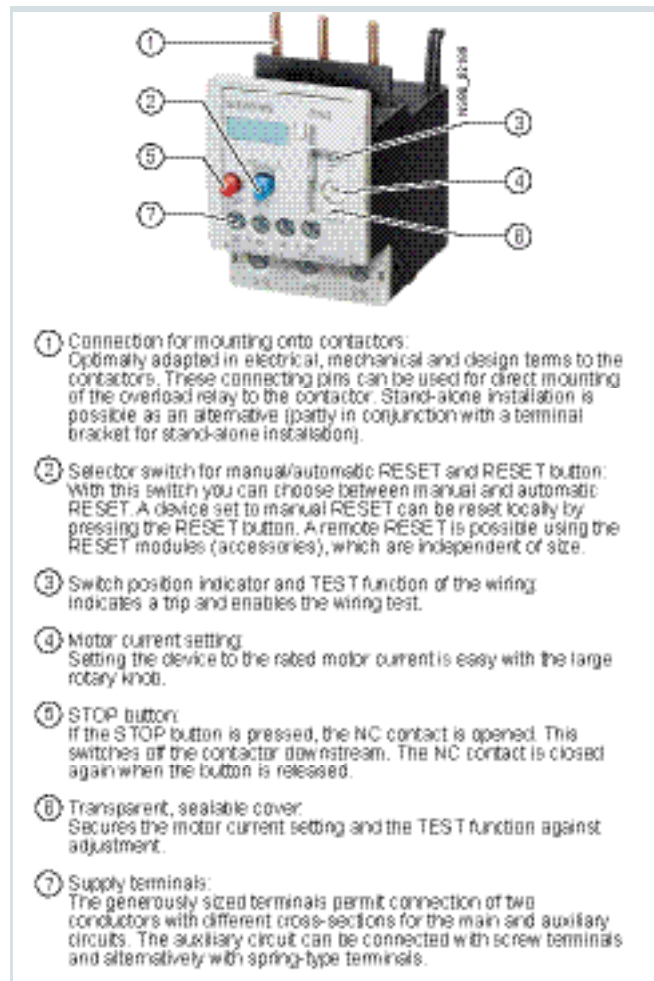
Version		Size	Order No.
Modules for remote RESET, electrical			
	Operating range $0.85 \dots 1.1 \times U_N$, power consumption AC 80 VA, DC 70 W, ON period 0.2 ... 4 s, switching frequency 60/h		
	• 24 ... 30 V AC/DC	S00, S0	3RU19 00-2AB71
	• 110 ... 127 V AC/DC	S00, S0	3RU19 00-2AF71
	• 220 ... 250 V AC/DC	S00, S0	3RU19 00-2AM71
Sealable covers			
	For covering the setting knobs	S00, S0	3RV29 08-0P
3RU19 00-2A.71			
3RV29 08-0P			

Overload Relays

SIRIUS 3RU1 Thermal Overload Relays

3RU11 up to 100 A
for standard applications

Overview



SIRIUS 3RU11 36-1HB0 thermal overload relay

Optimally adapted in electrical, mechanical and design terms to the contactors. The overload relay can be mounted onto a contactor using these pins. Stand-alone installation is possible as an alternative (in some cases in conjunction with a stand-alone installation module).

The 3RU11 thermal overload relays up to 100 A have been designed for inverse-time delayed protection of loads with normal starting against excessive temperature rises due to overload or phase failure.

An overload or phase failure results in an increase of the motor current beyond the set rated motor current. Via heating elements, this current rise heats up the bimetal strips inside the device which then bend and as a result trigger the auxiliary contacts by means of a tripping mechanism. The auxiliary contacts then switch off the load by means of a contactor. The break time depends on the ratio between the tripping current and current setting I_e and is stored in the form of a long-term stable tripping characteristic.

The "tripped" status is signaled by means of a switch position indicator. Resetting takes place either manually or automatically after a recovery time has elapsed.

The devices are manufactured in accordance with environmental guidelines and contain environmentally friendly and reusable materials.

They comply with all important worldwide standards and approvals.

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RU11 thermal overload relays are suitable for the overload protection of explosion-proof motors with "increased safety" type of protection EEx e. The relays meet the requirements of EN 60079-7 (Electrical apparatus for areas subject to explosion hazards – Increased safety "e");

EC prototype test certificate for Category (2) G/D exists. It has the number DMT 98 ATEX G 001.

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th		8th	9th	10th	11th
	☐ ☐ ☐	☐	☐	☐	☐	-	☐	☐	☐	☐
Thermal overload relays	3 R U									
SIRIUS 1st generation		1								
Device series			☐							
Size, rated operational current and power				☐	☐					
Setting range of the overload release							☐	☐		
Connection methods									☐	
Installation type										☐
Example	3 R U	1	1	3	6	-	1	H	B	0

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Application

Industries

The 3RU11 thermal overload relays are suitable for customers from all industries who want to guarantee optimum inverse-time delayed protection of their electrical loads (e.g. motors) under normal starting conditions (CLASS 10).

Application

The 3RU11 thermal overload relays have been designed for the protection of three-phase and single-phase AC and DC motors.

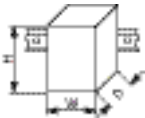
If single-phase AC or DC loads are to be protected by the 3RU11 thermal overload relays, all three bimetal strips must be heated. For this purpose, all main current paths of the relay must be connected in series.

Ambient conditions

The 3RU11 thermal overload relays have temperature compensation in accordance with IEC 60947-4-1 for the temperature range of -20 to +60 °C. For temperatures from +60 to +80 °C the upper set value of the setting range must be reduced by the factor listed in the table below.

Ambient temperature in °C	Derating factor for the upper set value
+60	1.0
+65	0.94
+70	0.87
+75	0.81
+80	0.73

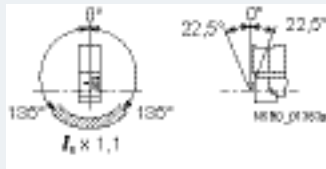
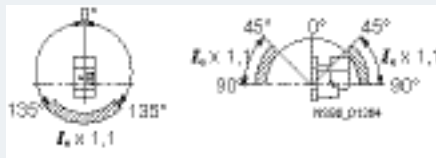
Technical specifications

Type		3RU11 36	3RU11 46
Size		S2	S3
Dimensions (W x H x D) (overload relay with stand-alone installation support)	 mm	55 x 105 x 118	70 x 120 x 140
General data			
Trips in the event of		Overload and phase failure	
Trip class acc. to IEC 60947-4-1	CLASS	10	
Phase failure sensitivity		Yes	
Overload warning		No	
Reset and recovery			
• Reset options after tripping		Manual, Automatic and Remote RESET (Remote RESET in combination with the corresponding accessories)	
• Recovery time			
- For automatic RESET	min	Depends on the strength of the tripping current and characteristic	
- For manual RESET	min	Depends on the strength of the tripping current and characteristic	
- For remote RESET	min	Depends on the strength of the tripping current and characteristic	
Features			
• Display of operating state on device		Yes, by means of TEST function/switch position indicator slide	
• TEST function		Yes	
• RESET button		Yes	
• STOP button		Yes	
Safe operation of motors with "increased safety" type of protection EC type test certificate number acc. to directive 94/9/EC (ATEX)		DMT 98 ATEX G 001  II (2) GD, DMT 98 ATEX G 001 N1	
Ambient temperature			
• Storage/transport	°C	-55 ... +80	
• Operation	°C	-20 ... +70	
• Temperature compensation	°C	Up to 60	
• Permissible rated current at			
- Temperature inside control cabinet 60 °C	%	100 (over +60 °C current reduction is not required)	
- Temperature inside control cabinet 70 °C	%	87	
Repeat terminals			
• Coil repeat terminals		Not required	
• Auxiliary contact repeat terminal		Not required	
Degree of protection acc. to IEC 60529		IP20 (terminal compartment: IP00 degree of protection)	
Touch protection acc. to IEC 61140		Finger-safe	
Shock resistance with sine acc. to IEC 60068-2-27	g/ms	8/10	

Overload Relays

SIRIUS 3RU1 Thermal Overload Relays

3RU11 up to 100 A
for standard applications

Type			3RU11 36	3RU11 46
Size			S2	S3
Dimensions (W x H x D) (overload relay with stand-alone installation support)		mm	55 x 105 x 118	70 x 120 x 140
General data (continued)				
Electromagnetic compatibility (EMC) – Interference immunity				
• Conductor-related interference				
- Burst acc. to IEC 61000-4-4 (corresponds to degree of severity 3)	kV	EMC interference immunity is not relevant for thermal overload relays		
- Surge acc. to IEC 61000-4-5 (corresponds to degree of severity 3)	kV	EMC interference immunity is not relevant for thermal overload relays		
• Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)	kV	EMC interference immunity is not relevant for thermal overload relays		
• Field-related interference acc. to IEC 61000-4-3 (corresponds to degree of severity 3)	V/m	EMC interference immunity is not relevant for thermal overload relays		
Electromagnetic compatibility (EMC) – Emitted interference			EMC interference immunity is not relevant for thermal overload relays	
Resistance to extreme climates – air humidity	%	100		
Dimensions	See "Dimensional drawings"			
Installation altitude above sea level	m	Up to 2000; above this, please enquire		
Mounting position			The diagrams show the permissible mounting positions for mounting onto contactors and stand-alone installation. For installation in the hatched area, a setting correction of 10 % must be implemented. Stand-alone installation:	
				
			Contactor + overload relay:	
				
Type of mounting			Direct mounting/stand-alone installation with terminal bracket (For screw and snap-on mounting on TH 35 standard mounting rail; size S3 also for TH 75 standard mounting rail).	

Type		3RU11 36	3RU11 46
Size		S2	S3
Main circuit			
Rated insulation voltage U_i (pollution degree 3)	V	690	1000
Rated impulse withstand voltage U_{imp}	kV	6	8
Rated operational voltage U_e	V	690	1000
Type of current			
• Direct current		Yes	
• Alternating current		Yes, frequency range up to 400 Hz	
Current setting	A	5.5 ... 8 to 40 ... 50	18 ... 25 to 80 ... 100
Power loss per unit (max.)	W	6 ... 9	10 ... 16.5
Short-circuit protection			
• With fuse without contactor		See "Selection and ordering data"	
• With fuse and contactor		See "Technical specifications" --> "Short-circuit protection with fuses/ motor starter protectors for motor feeders"	
Protective separation between main and auxiliary conducting path acc. to IEC 60947-1	V	690	
Conductor cross-section of the main circuit			
Connection type		 Screw terminals with box terminal	
Terminal screw		M6, Pozidriv size 2	M8, 4 mm Allen screw
Operating devices	mm	ø 5 ... 6	4 mm Allen screw
Prescribed tightening torque	Nm	3 ... 4.5	4 ... 6
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm ²	2 x (0.75 ... 16)	2 x (2.5 ... 16)
• Finely stranded with end sleeve	mm ²	2 x (0.75 ... 16), 1 x (0.75 ... 25)	2 x (2.5 ... 35), 1 x (2.5 ... 50)
• Stranded	mm ²	2 x (0.75 ... 25), 1 x (0.75 ... 35)	2 x (10 ... 50), 1 x (10 ... 70)
• AWG cables, solid or stranded	AWG	2 x (18 ... 3), 1 x (18 ... 1)	2 x (10 ... 1/0), 1 x (10 ... 2/0)
• Ribbon cable conductors (number x width x thickness)	mm	2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)
Connection type		Busbar connection ¹⁾	
Terminal screw		--	M6 x 20
Prescribed tightening torque	Nm	--	4 ... 6
Conductor cross-sections (min./max.)			
• Finely stranded with cable lug	mm ²	--	2 x 70
• Stranded with cable lug	mm ²	--	3 x 70
• AWG cables, solid or stranded, with cable lug	AWG	--	2/0
• With connecting bar (max. width)	mm	--	12

1) The box terminal is removable. Rail and cable lug connections are possible if the box terminal is removed.

Overload Relays

SIRIUS 3RU1 Thermal Overload Relays

3RU11 up to 100 A
for standard applications

Type		3RU11 36	3RU11 46
Size		S2	S3
Auxiliary circuit			
Number of NO contacts		1	
Number of NC contacts		1	
Auxiliary contacts – assignment		1 NO for the signal "tripped"; 1 NC for disconnecting the contactor	
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}	kV	6	
Contact rating of the auxiliary contacts			
• NC contact with alternating current AC-14/AC-15, rated operational current I_e at U_e :			
- 24 V	A	4	
- 120 V	A	4	
- 125 V	A	4	
- 230 V	A	3	
- 400 V	A	2	
- 600 V	A	0.6	
- 690 V	A	0.5	
• NO contact with alternating current AC-14/AC-15, rated operational current I_e at U_e :			
- 24 V	A	3	
- 120 V	A	3	
- 125 V	A	3	
- 230 V	A	2	
- 400 V	A	1	
- 600 V	A	0.6	
- 690 V	A	0.5	
• NC contact, NO contact with direct current DC-13, rated operational current I_e at U_e :			
- 24 V	A	1	
- 60 V	A	On request	
- 110 V	A	0.22	
- 125 V	A	0.22	
- 220 V	A	0.11	
• Conventional thermal current I_{th}	A	6 (up to $I_k \leq 0.5$ kA; ≤ 260 V)	
• Contact reliability (suitability for PLC control; 17 V, 5 mA)		Yes	
Short-circuit protection			
• With fuse			
- Operational class gG	A	6	
- Quick	A	10	
• With miniature circuit breaker (C characteristic)	A	6	
Protective separation between auxiliary conducting paths acc. to IEC 60947-1	V	415	
CSA, UL, UR rated data			
Auxiliary circuit – switching capacity		B600, R300	
Conductor cross-sections of the auxiliary circuit			
Connection type		 Screw terminals	
Terminal screw		M3, Pozidriv size 2	
Operating devices	mm	ø 5 ... 6	
Prescribed tightening torque	Nm	0.8 ... 1.2	
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm ²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	
• Finely stranded without end sleeve	mm ²	--	
• Finely stranded with end sleeve	mm ²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	
• Stranded	mm ²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	
• AWG cables, solid or stranded	AWG	2 x (18 ... 14)	

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Selection and ordering data

3RU11 thermal overload relays with screw terminals on the auxiliary current side for mounting onto contactor¹⁾, CLASS 10

Features and technical specifications:

- Overload and phase failure protection
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function
- STOP button
- Integrated, sealable cover

	Size of contactor ²⁾	Rating for induction motor rated value ³⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁴⁾	Screw terminals (on auxiliary current side)	
		kW	A	A		Order No.
 3RU11 36-..B0	Size S2	S2	3	5.5 ... 8	25	3RU11 36-1HB0
			4	7 ... 10	35	3RU11 36-1JB0
			5.5	9 ... 12.5	35	3RU11 36-1KB0
			7.5	11 ... 16	40	3RU11 36-4AB0
			7.5	14 ... 20	50	3RU11 36-4BB0
			11	18 ... 25	63	3RU11 36-4DB0
			15	22 ... 32	80	3RU11 36-4EB0
			18.5	28 ... 40	80	3RU11 36-4FB0
			22	36 ... 45	100	3RU11 36-4GB0
			22	40 ... 50	100	3RU11 36-4HB0
 3RU11 46-..B0	Size S3	S3	11	18 ... 25	63	3RU11 46-4DB0
			15	22 ... 32	80	3RU11 46-4EB0
			18.5	28 ... 40	80	3RU11 46-4FB0
			22	36 ... 50	125	3RU11 46-4HB0
			30	45 ... 63	125	3RU11 46-4JB0
			37	57 ... 75	160	3RU11 46-4KB0
			45	70 ... 90	160	3RU11 46-4LB0
			45	80 ... 100 ⁵⁾	200	3RU11 46-4MB0

1) With the suitable terminal brackets (see "Accessories"), the 3RU11 overload relays for mounting onto contactor can also be installed as stand-alone units.

2) Observe maximum rated operational current of the devices.

3) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

4) Maximum protection by fuse for overload relay, type of coordination "2".

5) For overload relays > 100 A see 3RB2 solid-state overload relays starting on page 4/___.

Overload Relays

SIRIUS 3RU1 Thermal Overload Relays

**3RU11 up to 100 A
for standard applications**

3RU11 thermal overload relays with screw terminals on the auxiliary current side for stand-alone installation¹⁾, CLASS 10

Features and technical specifications:

- Overload and phase failure protection
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function
- STOP button
- Integrated, sealable cover

	Size of contactor ²⁾	Rating for induction motor rated value ³⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁴⁾	Screw terminals (on auxiliary current side) 
		kW	A	A	Order No.
Size S2					
	S2	15 18.5 22 22	22 ... 32 28 ... 40 36 ... 45 40 ... 50	80 80 100 100	3RU11 36-4EB1 3RU11 36-4FB1 3RU11 36-4GB1 3RU11 36-4HB1
3RU11 36-4EB1					
Size S3					
	S3	30 37 45 45	45 ... 63 57 ... 75 70 ... 90 80 ... 100 ⁵⁾	125 160 160 200	3RU11 46-4JB1 3RU11 46-4KB1 3RU11 46-4LB1 3RU11 46-4MB1
3RU11 46-4JB1					

- 1) Sizes S2 and S3 for screw and snap-on mounting onto TH 35 standard mounting rails, size S3 also for TH 75 standard mounting rails.
- 2) Observe maximum rated operational current of the devices.
- 3) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

4) Maximum protection by fuse for overload relay, type of coordination "2".

5) For overload relays > 100 A see 3RB2 solid-state overload relays starting on page 4/___.

Overview

Overload relays for standard applications

The following optional accessories are available for the 3RU11 thermal overload relays:

- Terminal bracket for stand-alone installation of overload relay sizes S2 and S3
- Mechanical RESET (for all sizes)

- Cable release for resetting devices which are difficult to access (for all sizes)
- Electrical remote RESET module in three voltage variants (for all sizes)
- Terminal covers

Technical specifications

Terminal brackets for stand-alone installation

Type	3RU19 36-3AA01	3RU19 46-3AA01
For overload relays	3RU11 36	3RU11 46
Mounting type	For screw and snap-on mounting onto TH 35 standard mounting rails, size S2 also for TH 75 standard mounting rails	
Connection for main circuit		
Connection type	 Screw terminals with box terminal	
Terminal screw	M6, Pozidriv size 2	4 mm Allen screw
Operating devices	mm ø 5 ... 6	4 mm Allen screw
Prescribed tightening torque	Nm 3 ... 4.5	4 ... 6
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected		
• Solid	mm ² 2 x (0.75 ... 16)	2 x (2.5 ... 16)
• Finely stranded without end sleeve	mm ² --	--
• Finely stranded with end sleeve	mm ² 2 x (0.75 ... 16), 1 x (0.75 ... 25)	2 x (2.5 ... 35), 1 x (2.5 ... 50)
• Stranded	mm ² 2 x (0.75 ... 25), 1 x (0.75 ... 35)	2 x (10 ... 50), 1 x (10 ... 70)
• AWG cables, solid or stranded	AWG 2 x (18 ... 3), 1 x (18 ... 1)	2 x (10 ... 1/0), 1 x (10 ... 2/0)
• Ribbon cable conductors (number x width x thickness)	mm 2 x (6 x 9 x 0.8)	2 x (6 x 9 x 0.8)

Selection and ordering data

	Version	Size	Order No.
Terminal brackets for stand-alone installation			
	For separate mounting of overload relays; screw and snap-on mounting onto TH 35 standard mounting rail; size S3 also for TH 75 standard mounting rail	S2	3RU19 36-3AA01
		S3	3RU19 46-3AA01
Mechanical RESET			
	Resetting plungers, holders and formers	S2, S3	3RU19 00-1A
	Pushbuttons with extended stroke (12 mm), IP65, ø 22 mm	S2, S3	3SB30 00-0EA11
	Extension plungers For compensation of the distance between the pushbutton and the unlatching button of the relay	S2, S3	3SX1 335

3RU19 .6-3AA01

3RU19 00-1A
with pushbutton and
extension plunger

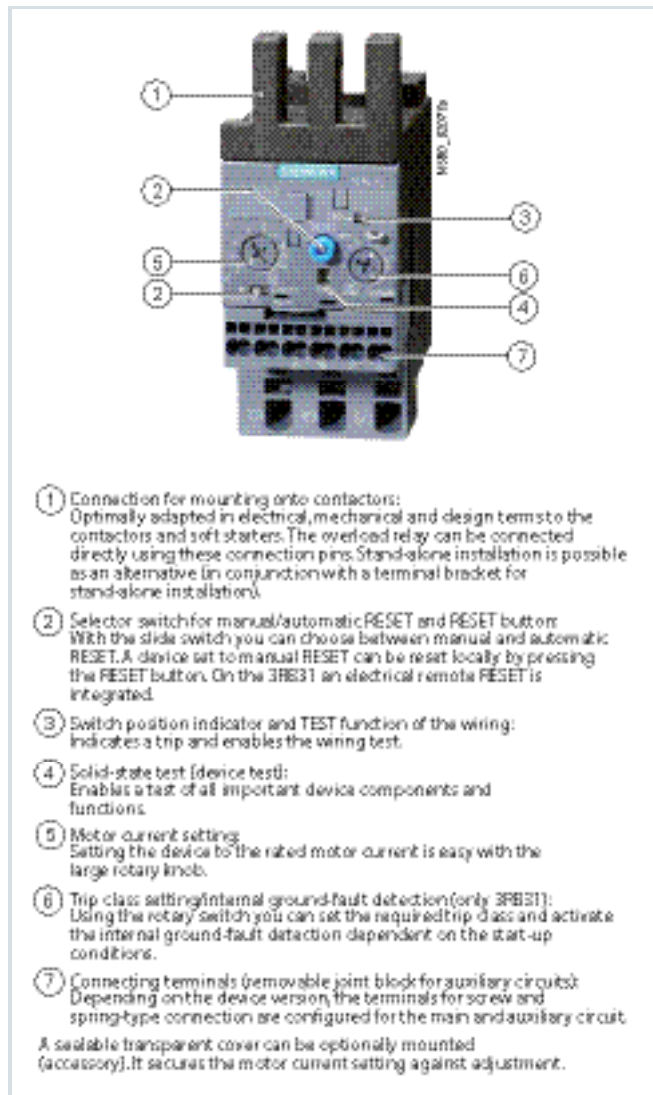
Overload Relays

SIRIUS 3RU1 Thermal Overload Relays

Accessories

Version		Size	Order No.
Cable releases with holder for RESET			
	For ø 6.5 mm holes in the control panel; max. control panel thickness 8 mm	S2, S3	3RU19 00-1B 3RU19 00-1C
	• Length 400 mm • Length 600 mm		
3RU19 00-1.			
Modules for remote RESET, electrical			
	Operating range 0.85 ... 1.1 × U_s , power consumption AC 80 VA, DC 70 W, ON period 0.2 ... 4 s, switching frequency 60/h		
	• 24 ... 30 V AC/DC	S2, S3	3RU19 00-2AB71
	• 110 ... 127 V AC/DC	S2, S3	3RU19 00-2AF71
	• 220 ... 250 V AC/DC	S2, S3	3RU19 00-2AM71
3RU19 00-2A.71			
Terminal covers			
Covers for cable lugs and busbar connections			
	• Length 55 mm	S3	3RT19 46-4EA1
Covers for box terminals			
	• Length 20.6 mm	S2	3RT19 36-4EA2
	• Length 20.8 mm	S3	3RT19 46-4EA2

Overview



SIRIUS 3RB31 23-4VE00 solid-state overload relay

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	8th	9th	10th	11th
	□□□	□	□	□	-	□	□	□	□
Solid-state overload relays	3 R B								
SIRIUS Innovation		3							
Device series			□						
Size, rated operational current and power				□					
Version of the automatic RESET, electrical remote RESET					□				
Trip class (CLASS)						□			
Setting range of the overload release							□		
Connection methods								□	
Installation type									□
Example	3 R B	3	0	1	6	-	1	R	B 0

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

The 3RB30 and 3RB31 solid-state overload relays up to 40 A with internal power supply have been designed for inverse-time delayed protection of loads with normal and heavy starting against excessive temperature rises due to overload, phase unbalance or phase failure. An overload, phase unbalance or phase failure result in an increase of the motor current beyond the set rated motor current. This current rise is detected by the current transformers integrated into the devices and evaluated by corresponding solid-state circuits which then output a pulse to the auxiliary contacts. The auxiliary contacts then switch off the load by means of a contactor. The break time depends on the ratio between the tripping current and current setting I_e and is stored in the form of a long-term stable tripping characteristic.

In addition to inverse-time delayed protection of loads against excessive temperature rises due to overload, phase unbalance and phase failure, the 3RB31 solid-state overload relays also allow internal ground-fault detection (not possible in conjunction with contactor assemblies for wye-delta starting). This provides protection of loads against high-resistance short-circuits due to damage to the insulation material, moisture, condensed water etc.

The "tripped" status is signaled by means of a switch position indicator. Resetting takes place either manually or automatically after the recovery time has elapsed.

The devices are manufactured in accordance with environmental guidelines and contain environmentally friendly and reusable materials. They comply with all important worldwide standards and approvals.

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RB30/3RB31 solid-state overload relays are suitable for the overload protection of explosion-proof motors with "increased safety" type of protection EEx e. The relays meet the requirements of EN 60079-7 (Electrical apparatus for areas subject to explosion hazards – Increased safety "e").

EC type test certificate for Group II, Category (2) G/D exists. It has the number PTB 09 ATEX 3001.

Overload Relays

SIRIUS 3RB3 Solid-State Overload Relays

3RB30, 3RB31 up to 40 A
for standard applications

Application

Industries

The 3RB30/3RB31 solid-state overload relays are suitable for customers from all industries who want to guarantee optimum inverse-time delayed protection of their electrical loads (e.g. motors) under normal and heavy starting conditions (CLASS 5 to 30), minimize project completion times, inventories and power consumption, and optimize plant availability and maintenance management.

Application

The 3RB30/3RB31 solid-state overload relays have been designed for the protection of induction motors in sinusoidal 50/60 Hz voltage networks. The relays are not suitable for the protection of single-phase AC or DC loads.

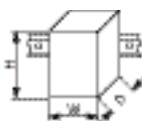
The 3RU21 thermal overload relay or the 3RB22/3RB23 solid-state overload relay can be used for single-phase AC loads. For DC loads we recommend the 3RU21 thermal overload relay.

Ambient conditions

The devices are insensitive to external influences such as shocks, corrosive ambient conditions, ageing and temperature fluctuations.

For the temperature range from -25 °C to $+60\text{ °C}$, the 3RB30/3RB31 solid-state overload relays compensate the temperature in accordance with IEC 60947-4-1.

Technical specifications

Type			3RB30 1., 3RB31 1.	3RB30 2., 3RB31 2.
Size			S00	S0
Dimensions (W x H x D) (overload relay with stand-alone installation support)				
• Screw terminals				
• Spring-type terminals				
		mm mm	45 x 89 x 80 45 x 102 x 80	45 x 97 x 94 45 x 116 x 95
General data				
Trips in the event of			Overload, phase failure, and phase unbalance + ground fault (for 3RB31 only)	
Trip class acc. to IEC 60947-4-1		CLASS	3RB30: 10, 20; 3RB31: 5, 10, 20 and 30 adjustable	
Phase failure sensitivity			Yes	
Overload warning			No	
Reset and recovery			Manual, automatic and remote RESET (depending on the version)	
• Reset options after tripping				
• Recovery time				
- For automatic RESET			Approx. 3 min	
- For manual RESET			Immediately	
- For remote RESET			Immediately	
Features			Yes, by means of switch position indicator slide	
• Display of operating state on device			Yes, test of electronics by pressing the TEST button /test of auxiliary contacts and wiring of control circuit by actuating the switch position indicator slide/self-monitoring	
• TEST function			Yes	
• RESET button			No	
• STOP button				
Explosion protection – safe operation of motors with“increased safety” type of protection			PTB 09 ATEX 3001  II (2) GD	
EC type test certificate number acc. to directive 94/9/EC (ATEX)				
Ambient temperatures				
• Storage/transport			°C	-40 ... +80
• Operation			°C	-25 ... +60
• Temperature compensation			°C	+60
• Permissible rated current at				
- Temperature inside control cabinet 60 °C			%	100
- Temperature inside control cabinet 70 °C			%	100 ¹⁾
On request				
Repeat terminals				
• Coil repeat terminals			Yes	Not required
• Auxiliary contact repeat terminal			Yes	Not required
Degree of protection acc. to IEC 60529			IP20	
Touch protection acc. to IEC 61140			Finger-safe	
Shock resistance with sine acc. to IEC 60068-2-27			g/ms	15/12 (signaling contact 97/98 in position “tripped”: 4/11 g/ms)
Electromagnetic compatibility (EMC) – Interference immunity				
• Conductor-related interference				
- Burst acc. to IEC 61000-4-4 (corresponds to degree of severity 3)			kV	2 (power ports), 1 (signal ports)
- Surge acc. to IEC 61000-4-5 (corresponds to degree of severity 3)			kV	2 (line to earth), 1 (line to line)
• Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)			kV	8 (air discharge), 6 (contact discharge)
• Field-related interference acc. to IEC 61000-4-3 (corresponds to degree of severity 3)			V/m	10
Electromagnetic compatibility (EMC) – Emitted interference			Degree of severity B according to EN 55011 (CISPR 11) and EN 55022 (CISPR 22)	
Resistance to extreme climates – air humidity			%	95
Dimensions			See “Dimensional drawings”	
Installation altitude above sea level			m	Up to 2 000
Mounting position			Any	
Type of mounting			Direct mounting/stand-alone installation with terminal bracket	

1) Permissible rated current in case of heavy starting
Size S0 at 10 A up to 40 A:
- CLASS 20, $I_{e \max} = 32$ A,
- CLASS 30, $I_{e \max} = 25$ A.

Overload Relays

SIRIUS 3RB3 Solid-State Overload Relays

3RB30, 3RB31 up to 40 A
for standard applications

Type		3RB30 1., 3RB31 1.	3RB30 2., 3RB31 2.
Size		S00	S0
Main circuit			
Rated insulation voltage U_i (pollution degree 3)	V	690	
Rated impulse withstand voltage U_{imp}	kV	6	
Rated operational voltage U_e	V	690	
Type of current		No	
• Direct current		Yes, 50/60 Hz ±5 %	
• Alternating current			
Current setting	A	0.1 ... 0.4 to	0.1 ... 0.4 to
	A	4 ... 16	10 ... 40
Power loss per unit (max.)	W	0.05 ... 0.2	
Short-circuit protection			
• With fuse without contactor		See “Selection and ordering data”	
• With fuse and contactor		See “Technical specifications” —> “Short-circuit protection with fuses/ Motor Protection Circuit Breakers for motor feeders”	
Protective separation between main and auxiliary conducting path acc. to IEC 60947-1 (pollution degree 2)	V	690 for grounded networks, otherwise 600 V	
Conductor cross-sections of main circuit			
Connection type		 Screw terminals	
Terminal screw		M3, Pozidriv size 2	M4, Pozidriv size 2
Operating device	mm	Ø 5 ... 6	Ø 5 ... 6
Prescribed tightening torque	Nm	0.8 ... 1.2	2 ... 2.5
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾ , 2 x (0.5 ... 4) ¹⁾	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 10) ¹⁾
• Finely stranded with end sleeves	mm²	2 x (0.5 ... 1.5) ¹⁾ , 2 x (0.75 ... 2.5) ¹⁾	2 x (1 ... 2.5) ¹⁾ , 2 x (2.5 ... 6) ¹⁾ ; max. 1 x 10
• AWG cables, solid or stranded	AWG	2 x (20 ... 16) ¹⁾ , 2 x (18 ... 14) ¹⁾ , 2 x 12	2 x (16 ... 12) ¹⁾ , 2 x (14 ... 8) ¹⁾
Connection type		 Spring-type terminals	
Operating device	mm	3.0 x 0.5 and 3.5 x 0.5	
Conductor cross-sections (min./max.)			
• Solid	mm²	1 x (0.5 ... 4)	1 x (1 ... 10)
• Finely stranded without end sleeve	mm²	1 x (0.5 ... 2.5)	1 x (1 ... 6)
• Finely stranded with end sleeves	mm²	1 x (0.5 ... 2.5)	1 x (1 ... 6)
• AWG cables, solid or stranded	AWG	1 x (20 ... 12)	1 x (18 ... 8)

1) If two different conductor cross-sections are connected to one clamping point, both cross-sections must lie in the range specified. If identical cross-sections are used, this restriction does not apply.

Type		3RB30 1., 3RB31 1.	3RB30 2., 3RB31 2.
Size		S00	S0
Auxiliary circuit			
Number of NO contacts		1	
Number of NC contacts		1	
Auxiliary contacts – assignment		1 NO for the signal “tripped”; 1 NC for disconnecting the contactor	
Rated insulation voltage U_i (pollution degree 3)	V	300	
Rated impulse withstand voltage U_{imp}	kV	4	
Auxiliary contacts – contact rating			
• NC contact with alternating current AC-14/AC-15, rated operational current I_e at U_e :			
- 24 V	A	4	
- 120 V	A	4	
- 125 V	A	4	
- 250 V	A	3	
• NO contact with alternating current AC-14/AC-15, rated operational current I_e at U_e :			
- 24 V	A	4	
- 120 V	A	4	
- 125 V	A	4	
- 250 V	A	3	
• NC contact, NO contact with direct current DC-13, rated operational current I_e at U_e :			
- 24 V	A	2	
- 60 V	A	0.55	
- 110 V	A	0.3	
- 125 V	A	0.3	
- 250 V	A	0.11	
• Conventional thermal current I_{th}	A	5	
• Contact reliability (suitability for PLC control; 17 V, 5 mA)		Yes	
Short-circuit protection			
• With fuse, operational class gG	A	6	
Ground-fault protection (only 3RB31)			
• Tripping value I_o		The information refers to sinusoidal residual currents at 50/60 Hz.	
• Operating range I		$> 0.75 \times I_{motor}$	
• Response time t_{trip} (in steady-state condition)	s	Lower current setting value $< I_{motor} < 3.5 \times$ upper set current value < 1	
Integrated electrical remote RESET (only 3RB31)			
Connecting terminals A3, A4		24 V DC, max. 200 mA for approx. 20 ms, then < 10 mA	
Protective separation between auxiliary conducting paths acc. to IEC 60947-1	V	300	
CSA, UL, UR rated data			
Auxiliary circuit – switching capacity		3RB30: B600, R300; 3RB31: B300, R300	
Conductor cross-sections for auxiliary circuit			
Connection type		 Screw terminals	
Terminal screw		M3, Pozidriv size 2	
Operating device	mm	ø 5 ... 6	
Prescribed tightening torque	Nm	0.8 ... 1.2	
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm²	1 × (0.5 ... 4), 2 × (0.5 ... 2.5)	
• Finely stranded with end sleeve	mm²	1 × (0.5 ... 2.5), 2 × (0.5 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 × (20 ... 14)	
Connection type		 Spring-type terminals	
Operating device	mm	3.0 x 0.5	
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm²	2 × (0.25 ... 1.5)	
• Finely stranded without end sleeve	mm²	2 × (0.25 ... 1.5)	
• Finely stranded with end sleeve	mm²	2 × (0.25 ... 1.5)	
• AWG cables, solid or stranded	AWG	2 × (24 ... 16)	

Overload Relays

SIRIUS 3RB3 Solid-State Overload Relays

3RB30, 3RB31 up to 40 A
for standard applications

Selection and ordering data

3RB30 solid-state overload relays for mounting onto contactor¹⁾, CLASS 10

Features and technical specifications:

- Screw and spring-type terminals
- Overload protection, phase failure protection and unbalance protection
- Internal power supply
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function and self-monitoring
- Sealable covers (optional accessory)



3RB30 16-1TB0



3RB30 16-1TE0



3RB30 26-1VB0



3RB30 26-1VE0

Size contactor ²⁾	Rating for induction motor Rated value ³⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁴⁾	Screw terminals 	Spring-type terminals 
	kW	A	A	Order No.	Order No.
Size S00¹⁾					
S00	0.04 ... 0.09	0.1 ... 0.4	4	3RB30 16-1RB0	3RB30 16-1RE0
	0.12 ... 0.37	0.32 ... 1.25	6	3RB30 16-1NB0	3RB30 16-1NE0
	0.55 ... 1.5	1 ... 4	20	3RB30 16-1PB0	3RB30 16-1PE0
	1.1 ... 5.5	3 ... 12	25	3RB30 16-1SB0	3RB30 16-1SE0
	2.2 ... 7.5	4 ... 16	25	3RB30 16-1TB0	3RB30 16-1TE0
Size S0¹⁾					
S0	0.04 ... 0.09	0.1 ... 0.4	4	3RB30 26-1RB0	3RB30 26-1RE0
	0.12 ... 0.37	0.32 ... 1.25	6	3RB30 26-1NB0	3RB30 26-1NE0
	0.55 ... 1.5	1 ... 4	20	3RB30 26-1PB0	3RB30 26-1PE0
	1.1 ... 5.5	3 ... 12	25	3RB30 26-1SB0	3RB30 26-1SE0
	3 ... 11	6 ... 25	50	3RB30 26-1QB0	3RB30 26-1QE0
	5.5 ... 18.5	10 ... 40	50	3RB30 26-1VB0	3RB30 26-1VE0

- 1) With the suitable terminal brackets, these overload relays can also be installed as stand-alone units.
- 2) Observe maximum rated operational current of the devices.
- 3) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.
- 4) Maximum protection by fuse for overload relay, type of coordination "2".

3RB30 solid-state overload relays for mounting onto contactor¹⁾, CLASS 20

Features and technical specifications:

- Screw and spring-type terminals
- Overload protection, phase failure protection and unbalance protection
- Internal power supply
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function and self-monitoring
- Sealable covers (optional accessory)



3RB30 16-2TB0



3RB30 16-2TE0



3RB30 26-2VB0



3RB30 26-2VE0

Size contactor ²⁾	Rating for induction motor Rated value ³⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁴⁾	Screw terminals	Spring-type terminals
	kW	A	A	Order No.	Order No.
Size S00¹⁾					
S00	0.04 ... 0.09	0.1 ... 0.4	4	3RB30 16-2RB0	3RB30 16-2RE0
	0.12 ... 0.37	0.32 ... 1.25	6	3RB30 16-2NB0	3RB30 16-2NE0
	0.55 ... 1.5	1 ... 4	20	3RB30 16-2PB0	3RB30 16-2PE0
	1.1 ... 5.5	3 ... 12	25	3RB30 16-2SB0	3RB30 16-2SE0
	2.2 ... 7.5	4 ... 16	25	3RB30 16-2TB0	3RB30 16-2TE0
Size S0¹⁾					
S0	0.04 ... 0.09	0.1 ... 0.4	4	3RB30 26-2RB0	3RB30 26-2RE0
	0.12 ... 0.37	0.32 ... 1.25	6	3RB30 26-2NB0	3RB30 26-2NE0
	0.55 ... 1.5	1 ... 4	20	3RB30 26-2PB0	3RB30 26-2PE0
	1.1 ... 5.5	3 ... 12	25	3RB30 26-2SB0	3RB30 26-2SE0
	3 ... 11	6 ... 25	50	3RB30 26-2QB0	3RB30 26-2QE0
	5.5 ... 18.5	10 ... 40	50	3RB30 26-2VB0	3RB30 26-2VE0

1) With the suitable terminal brackets, these overload relays can also be installed as stand-alone units.

2) Observe maximum rated operational current of the devices.

3) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.

4) Maximum protection by fuse for overload relay, type of coordination "2".

Overload Relays

SIRIUS 3RB3 Solid-State Overload Relays

**3RB30, 3RB31 up to 40 A
for standard applications**

3RB31 solid-state overload relays for mounting onto contactor¹⁾, CLASS 5, 10, 20 and 30 adjustable

Features and technical specifications:

- Screw and spring-type terminals
- Overload protection, phase failure protection and unbalance protection
- Internal ground-fault detection (activatable)
- Internal power supply
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Electrical remote RESET integrated
- Switch position indicator
- TEST function and self-monitoring
- Sealable covers (optional accessory)



3RB31 13-4TB0



3RB31 13-4TE0



3RB31 23-4VB0



3RB31 23-4VE0

Size contactor ²⁾	Rating for induction motor Rated value ³⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁴⁾	Screw terminals 	Spring-type terminals 
	kW	A	A	Order No.	Order No.
Size S00¹⁾					
S00	0.04 ... 0.09	0.1 ... 0.4	4	3RB31 13-4RB0	3RB31 13-4RE0
	0.12 ... 0.37	0.32 ... 1.25	6	3RB31 13-4NB0	3RB31 13-4NE0
	0.55 ... 1.5	1 ... 4	20	3RB31 13-4PB0	3RB31 13-4PE0
	1.1 ... 5.5	3 ... 12	25	3RB31 13-4SB0	3RB31 13-4SE0
	2.2 ... 7.5	4 ... 16	25	3RB31 13-4TB0	3RB31 13-4TE0
Size S0¹⁾					
S0	0.04 ... 0.09	0.1 ... 0.4	4	3RB31 23-4RB0	3RB31 23-4RE0
	0.12 ... 0.37	0.32 ... 1.25	6	3RB31 23-4NB0	3RB31 23-4NE0
	0.55 ... 1.5	1 ... 4	20	3RB31 23-4PB0	3RB31 23-4PE0
	1.1 ... 5.5	3 ... 12	25	3RB31 23-4SB0	3RB31 23-4SE0
	3 ... 11	6 ... 25	50	3RB31 23-4QB0	3RB31 23-4QE0
	5.5 ... 18.5	10 ... 40	50	3RB31 23-4VB0	3RB31 23-4VE0

- 1) With the suitable terminal brackets, these overload relays can also be installed as stand-alone units.
- 2) Observe maximum rated operational current of the devices.
- 3) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.
- 4) Maximum protection by fuse for overload relay, type of coordination "2".

Overview

Overload relays for standard applications

The following optional accessories are available for the 3RB30/3RB31 solid-state overload relays:

- Terminal bracket for stand-alone installation with screw or spring-type terminals for every size
- Mechanical RESET (for all sizes)
- Cable release for resetting devices which are difficult to access (for all sizes)
- Sealable cover (for all sizes)

Selection and ordering data

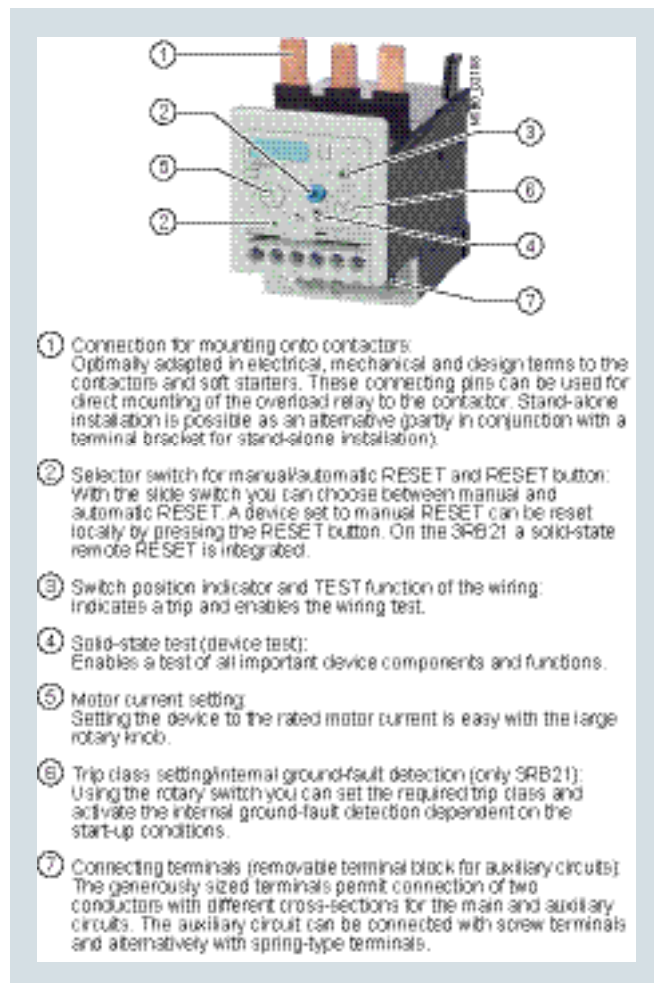
	Version	Size	Order No.
Terminal brackets for stand-alone installation			
 3RU29 16-3AA01  3RU29 26-3AA01	Terminal brackets for overload relays with screw terminals For separate mounting of the overload relays; screw and snap-on mounting onto TH 35 standard mounting rail	S00 S0	 Screw terminals 3RU29 16-3AA01 3RU29 26-3AA01
	Terminal brackets for overload relays with spring-type terminals For separate mounting of the overload relays; screw and snap-on mounting onto TH 35 standard mounting rail	S00 S0	 Spring-type terminals 3RU29 16-3AC01 3RU29 26-3AC01
Mechanical RESET			
 3RB39 80-0A with pushbutton and extension plunger	Resetting plungers, holders and formers	S00, S0	3RB39 80-0A
	Pushbuttons with extended stroke (12 mm), IP65, Ø 22 mm	S00, S0	3SB30 00-0EA11
	Extension plungers For compensation of the distance between a pushbutton and the unlatching button of the relay	S00, S0	3SX1 335
Cable releases with holder for RESET			
 3RB39 80-0.	For Ø 6.5 mm holes in the control panel; max. control panel thickness 8 mm		
	• Length 400 mm • Length 600 mm	S00, S0 S00, S0	3RB39 80-0B 3RB39 80-0C
Sealable covers			
 3RB39 84-0	For covering the setting knobs	S00, S0	3RB39 84-0

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB20, 3RB21 up to 630 A
for standard applications

Overview



SIRIUS 3RB21 33-4UB0 solid-state overload relay

The 3RB20 and 3RB21 solid-state overload relays up to 630 A with internal power supply have been designed for inverse-time delayed protection of loads with normal and heavy starting against excessive temperature rises due to overload, phase unbalance or phase failure.

An overload, phase unbalance or phase failure result in an increase of the motor current beyond the set rated motor current. This current rise is detected by the current transformers integrated into the devices and evaluated by corresponding solidstate circuits which then output a pulse to the auxiliary contacts. The auxiliary contacts then switch off the load by means of a contactor. The break time depends on the ratio between the tripping current and current setting I_e and is stored in the form of a long-term stable tripping characteristic.

In addition to inverse-time delayed protection of loads against excessive temperature rises due to overload, phase unbalance and phase failure, the 3RB21 solid-state overload relays also allow internal ground-fault detection (not possible in conjunction with contactor assemblies for wye-delta starting). This provides protection of loads against high-resistance short-circuits due to damage to the insulation material, moisture, condensed water etc.

The "tripped" status is signaled by means of a switch position indicator. Resetting takes place either manually or automatically after the recovery time has elapsed.

The devices are manufactured in accordance with environmental guidelines and contain environmentally friendly and reusable materials. They comply with all important worldwide standards and approvals.

"Increased safety" type of protection EEx e according to ATEX directive 94/9/EC

The 3RB20/3RB21 solid-state overload relays are suitable for the overload protection of explosion-proof motors with "increased safety" type of protection EExe. The relays meet the requirements of EN 60079-7 (Electrical apparatus for areas subject to explosion hazards – Increased safety "e");

EC type test certificate for Group II, Category (2) G/D exists. It has the number PTB 06 ATEX 3001.

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th	-	8th	9th	10th	11th
Solid-state overload relays	3 R B									
SIRIUS 2nd generation		2								
Device series										
Size, rated operational current and power										
Version of the automatic RESET, electrical remote RESET										
Trip class (CLASS)										
Setting range of the overload release										
Connection methods										
Installation type										
Example	3 R B	2	0	3	6	-	1	Q	B	0

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Application

Industries

The 3RB20 and 3RB21 solid-state overload relays are suitable for customers from all industries who want to guarantee optimum inverse-time delayed protection of their electrical loads (e.g. motors) under normal and heavy starting conditions (CLASS 5 to 30), minimize project completion times, inventories and power consumption, and optimize plant availability and maintenance management.

Application

The 3RB20 and 3RB21 solid-state overload relays have been designed for the protection of induction motors in sinusoidal 50/60 Hz voltage networks. The relays are not suitable for the protection of single-phase AC or DC loads.

The 3RU11 thermal overload relays or the 3RB22 to 3RB24 solidstate overload relays can be used for single-phase AC loads. For DC loads we recommend the 3RU11 thermal overload relay.

Ambient conditions

The devices are insensitive to external influences such as shocks, corrosive ambient conditions, ageing and temperature fluctuations.

For the temperature range from -25°C to $+60^{\circ}\text{C}$, the 3RB20 and 3RB21 solid-state overload relays compensate the temperature in accordance with IEC 60947-4-1.

For the 3RB20 and 3RB21 solid-state overload relays with the sizes S6, S10 and S12, the upper set value of the setting range must be reduced for ambient temperatures $> 50^{\circ}\text{C}$ by a certain factor.

Type	Setting range	Derating factor for the upper set value for stand-alone installation at ambient temperature	
		$+50^{\circ}\text{C}$	$+60^{\circ}\text{C}$
3RB20 56, 3RB21 56	50 ... 200 A	100 %	100 %
3RB20 66, 3RB21 66	55 ... 250 A	100 %	100 %
3RB20 66, 3RB21 66	160 ... 630 A	100 %	90 %

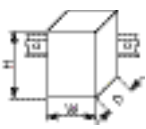
Type	Setting range	Derating factor for the upper set value for mounting onto contactor at ambient temperature	
		$+50^{\circ}\text{C}$	$+60^{\circ}\text{C}$
3RB20 56, 3RB21 56	50 ... 200 A	100 %	70 %
3RB20 66, 3RB21 66	55 ... 250 A	100 %	70 %
3RB20 66, 3RB21 66	160 ... 630 A	100 %	70 %

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB20, 3RB21 up to 630 A
for standard applications

Technical specifications

Type			3RB20 36, 3RB21 33	3RB20 46, 3RB21 43	3RB20 56, 3RB21 53	3RB20 66, 3RB21 63
Size			S2	S3	S6	S10/S12
Dimensions (W x H x D) (overload relay with stand-alone installation support)			mm	55 x 74 x 109	70 x 86 x 124	120 x 119 x 155
General data						
Trips in the event of			Overload, phase failure, and phase unbalance + ground fault (for 3RB21 only)			
Trip class acc. to IEC 60947-4-1		CLASS	3RB20: 10 or 20; 3RB21: 5, 10, 20 and 30 adjustable			
Phase failure sensitivity			Yes			
Overload warning			No			
Reset and recovery			3RB20: Manual and automatic RESET; 3RB21: Manual, automatic and remote RESET			
• Reset options after tripping						
• Recovery time			Approx. 3 min			
- For automatic RESET			Immediately			
- For manual RESET			Immediately			
- For remote RESET						
Features						
• Display of operating state on device			Yes, by means of switch position indicator slide			
• TEST function			Yes, test of electronics by pressing the TEST button / test of auxiliary contacts and wiring of control circuit by actuating the switch position indicator slide/self-monitoring			
• RESET button			Yes			
• STOP button			No			
Explosion protection – Safe operation of motors with “increased safety” type of protection						
EC type test certificate number according to directive 94/9/EC (ATEX)			PTB 06 ATEX 3001  II (2) GD			
Ambient temperatures						
• Storage/transport		°C	-40 ... +80			
• Operation		°C	-25 ... +60			
• Temperature compensation		°C	+60			
• Permissible rated current at						
- Temperature inside control cabinet 60 °C, stand-alone installation		%	100	100	100	100 or 90 ¹⁾
- Temperature inside control cabinet 60 °C, mounted on contactor		%	100	100	70	70
- Temperature inside control cabinet 70 °C		%	On request			
Repeat terminals						
• Coil repeat terminals			Yes	Not required		
• Auxiliary contact repeat terminal			Yes	Not required		
Degree of protection acc. to IEC 60529			IP20		IP20 (terminal compartment: IP00 degree of protection)	
Touch protection acc. to IEC 61140			Finger-safe		Finger-safe; for busbar connection with cover	Finger-safe with cover
Shock resistance with sine acc. to IEC 60068-2-27			g/ms	15/11 (signaling contact 97/98 in position “tripped”: 4/11 g/ms)		
Electromagnetic compatibility (EMC) – Interference immunity						
• Conductor-related interference						
- Burst acc. to IEC 61000-4-4 (corresponds to degree of severity 3)		kV	2 (power ports), 1 (signal ports)			
- Surge acc. to IEC 61000-4-5 (corresponds to degree of severity 3)		kV	2 (line to earth), 1 (line to line)			
• Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)		kV	8 (air discharge), 6 (contact discharge)			
• Field-related interference acc. to IEC 61000-4-3 (corresponds to degree of severity 3)		V/m	10			
Electromagnetic compatibility (EMC) – Emitted interference			Degree of severity B according to EN 55011 (CISPR 11) and EN 55022 (CISPR 22)			
Resistance to extreme climates – air humidity		%	100			
Dimensions			See “Dimensional drawings”			
Installation altitude above sea level		m	Up to 2000			
Mounting position			Any			
Type of mounting			Direct mounting/stand-alone installation with terminal bracket		Direct mounting/stand-alone installation	

1) 90 % for relay with current setting range 160 A to 630 A.

Type		3RB20 36, 3RB21 33	3RB20 46, 3RB21 43
Size		S2	S3
Main circuit			
Rated insulation voltage U_i (pollution degree 3)	V	690/1000 ¹⁾	1000
Rated impulse withstand voltage U_{imp}	kV	6/8 ²⁾	8
Rated operational voltage U_e	V	690/1000 ¹⁾	1000
Type of current		No Yes, 50/60 Hz ±5 %	
• Direct current			
• Alternating current			
Current setting	A	6 ... 25, 12.5 ... 50	12.5 ... 50, 25 ... 100
Power loss per unit (max.)	W	0.05	
Short-circuit protection		See “Selection and ordering data” See “Technical specifications” --> “Short-circuit protection with fuses for motor feeders”	
• With fuse without contactor			
• With fuse and contactor			
Protective separation between main and auxiliary conducting path Acc. to IEC 60947-1 (pollution degree 2)	V	690 for grounded networks, otherwise 600 V	
Conductor cross-sections of the main circuit			
Connection type		 Screw terminals with box terminal	
Terminal screw		M6, Pozidriv size 2	M8, 4 mm Allen screw
Operating devices	mm	ø 5 ... 6	4 mm Allen screw
Prescribed tightening torque	Nm	3 ... 4.5	4 ... 6
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm ²	2 × (1 ... 16)	2 × (2.5 ... 16)
• Finely stranded without end sleeve	mm ²	--	--
• Finely stranded with end sleeve	mm ²	2 × (1 ... 16), 1 × (1 ... 25)	2 × (2.5 ... 35), 1 × (2.5 ... 50)
• Stranded	mm ²	2 × (max. 25), 1 × (1 ... 35)	2 × (10 ... 50), 1 × (10 ... 70)
• AWG cables, solid or stranded	AWG	2 × (max. 4), 1 × (18 ... 2)	2 × (10 ... 1/0), 1 × (10 ... 2/0)
• Ribbon cables (number x width x thickness)	mm	2 × (6 × 9 × 0.8)	2 × (6 × 9 × 0.8)
Connection type		Busbar connections	
Terminal screw		--	M6 × 20
Prescribed tightening torque	Nm	--	4 ... 6
Conductor cross-sections (min./max.)			
• Finely stranded with cable lug	mm ²	--	2 × 70
• Stranded with cable lug	mm ²	--	3 × 70
• AWG cable, solid or stranded, with cable lug	AWG	--	2/0
• With connecting bar (max. width)	mm	--	12
Connection type		Straight-through transformers	
Diameter of opening	mm	15	18

1) For version with straight-through transformer up to 1 000 V AC.

2) For version with straight-through transformer up to 8 kV.

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB20, 3RB21 up to 630 A
for standard applications

Type		3RB20 56, 3RB21 53	3RB20 66, 3RB21 63
Size		S6	S10/S12
Main circuit			
Rated insulation voltage U_i (pollution degree 3)	V	1000	
Rated impulse withstand voltage U_{imp}	kV	8	
Rated operational voltage U_e	V	1000	
Type of current			
• Direct current		No	
• Alternating current		Yes, 50/60 Hz $\pm 5\%$	
Current setting	A	50 ... 200	55 ... 250, 160 ... 630
Power loss per unit (max.)	W	0.05	
Short-circuit protection			
• With fuse without contactor		See "Selection and ordering data"	
• With fuse and contactor		See "Technical specifications" --> "Short-circuit protection with fuses for motor feeders"	
Protective separation between main and auxiliary conducting path Acc. to IEC 60947-1 (pollution degree 2)	V	690 for grounded networks, otherwise 600 V	
Conductor cross-sections of the main circuit			
Connection type		 Screw terminals with box terminal	
Terminal screw	mm	4 mm Allen screw	5 mm Allen screw
Operating devices	mm	4 mm Allen screw	5 mm Allen screw
Prescribed tightening torque	Nm	1 ... 12	20 ... 22
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected			
• Solid	mm ²	--	--
• Finely stranded without end sleeve	mm ²	With 3RT19 55-4G box terminal: 2 x (1 x max. 50, 1 x max. 70), 1 x (10 ... 70) With 3RT19 56-4G box terminal: 2 x (1 x max. 95, 1 x max. 120), 1 x (10 ... 120)	2 x (50 ... 185), rear clamping point only: 1 x (70 ... 240) Rear clamping point only: 1 x (120 ... 185)
• Finely stranded with end sleeve	mm ²	With 3RT19 55-4G box terminal: 2 x (1 x max. 50, 1 x max. 70), 1 x (10 ... 70) With 3RT19 56-4G box terminal: 2 x (1 x max. 95, 1 x max. 120), 1 x (10 ... 120)	2 x (50 ... 185), rear clamping point only: 1 x (70 ... 240) Rear clamping point only: 1 x (120 ... 185)
• Stranded	mm ²	With 3RT19 55-4G box terminal: 2 x (max. 70), 1 x (16 ... 70) With 3RT19 56-4G box terminal: 2 x (max. 120), 1 x (16 ... 120)	2 x (70 ... 240), rear clamping point only: 1 x (95 ... 300) Rear clamping point only: 1 x (120 ... 240)
• AWG cables, solid or stranded	AWG	With 3RT19 55-4G box terminal: 2 x (max. 1/0), 1 x (6 ... 2/0) With 3RT19 56-4G box terminal: 2 x (max. 3/0), 1 x (6 ... 250 kcmil)	2 x (2/0 ... 500 kcmil), rear clamping point only: 1 x (3/0 ... 600 kcmil) Rear clamping point only: 1 x (250 kcmil ... 500 kcmil)
• Ribbon cables (number x width x thickness)	mm	With 3RT19 55-4G box terminal: 2 x (6 x 15.5 x 0.8), 1 x (3 x 9 x 0.8 ... 6 x 15.5 x 0.8) With 3RT19 56-4G box terminal: 2 x (10 x 15.5 x 0.8), 1 x (3 x 9 x 0.8 ... 10 x 15.5 x 0.8)	2 x (20 x 24 x 0.5), 1 x (6 x 9 x 0.8 ... 20 x 24 x 0.5)
Connection type		Busbar connections	
Terminal screw		M8 x 25	M10 x 30
Prescribed tightening torque	Nm	10 ... 14	14 ... 24
Conductor cross-section (min./max.)			
• Finely stranded with cable lug	mm ²	16 ... 95 ¹⁾	50 ... 240 ²⁾
• Stranded with cable lug	mm ²	25 ... 120 ¹⁾	70 ... 240 ²⁾
• AWG cable, solid or stranded, with cable lug	AWG	4 ... 250 kcmil	2/0 ... 500 kcmil
• With connecting bar (max. width)	mm	15	25
Connection type		Straight-through transformers	
Diameter of opening	mm	24.5	--
1) When connecting cable lugs according to DIN 46235 with conductor cross-sections of 95 mm ² and more, the 3RT19 56-4EA1 terminal cover must be used to ensure phase spacing.			
2) When connecting cable lugs according to DIN 46234 with conductor cross-sections of 240 mm ² and more as well as to DIN 46235 with conductor cross-sections of 185 mm ² and more, the 3RT19 56-4EA1 terminal cover must be used for to keep the phase clearance.			

Type		3RB20 36, 3RB21 33	3RB20 46, 3RB21 43	3RB20 56, 3RB21 53	3RB20 66, 3RB21 63
Size		S2	S3	S6	S10/S12
Auxiliary circuit					
Number of NO contacts		1			
Number of NC contacts		1			
Auxiliary contacts – assignment		1 NO for the signal “tripped”; 1 NC for disconnecting the contactor			
Rated insulation voltage U_i (pollution degree 3)		V	300		
Rated impulse withstand voltage U_{imp}		kV	4		
Auxiliary contacts – contact rating					
• NC contact with alternating current AC-14/AC-15, rated operational current I_e at U_e :					
- 24 V		A	4		
- 120 V		A	4		
- 125 V		A	4		
- 250 V		A	3		
• NO contact with alternating current AC-14/AC-15, rated operational current I_e at U_e :					
- 24 V		A	4		
- 120 V		A	4		
- 125 V		A	4		
- 250 V		A	3		
• NC contact, NO contact with direct current DC-13, rated operational current I_e at U_e :					
- 24 V		A	2		
- 60 V		A	0.55		
- 110 V		A	0.3		
- 125 V		A	0.3		
- 250 V		A	0.11		
• Conventional thermal current I_{th}		A	5		
• Contact reliability (suitability for PLC control; 17 V, 5 mA)			Yes		
Short-circuit protection					
• With fuse, operational class gG		A	6		
Ground-fault protection (only 3RB21)					
• Tripping value I_{Δ}			The information refers to sinusoidal residual currents at 50/60 Hz. > $0.75 \times I_{motor}$		
• Operating range I			Lower current setting value < I_{motor} < $3.5 \times$ upper current setting value		
• Response time t_{trip} (in steady-state condition)		s	< 1		
Integrated electrical remote RESET (only 3RB21)					
Connecting terminals A3, A4			24 V DC, 100 mA, 2.4 W short-term		
Protective separation between auxiliary conducting paths acc. to IEC 60947-1		V	300		
CSA, UL, UR rated data					
Auxiliary circuit – switching capacity		B300, R300			
Conductor cross-sections of the auxiliary circuit					
Connection type		 Screw terminals			
Terminal screw		M3, Pozidriv size 2			
Operating devices		mm	ø 5 ... 6		
Prescribed tightening torque		Nm	0.8 ... 1.2		
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected					
• Solid		mm ²	1 × (0.5 ... 4), 2 × (0.5 ... 2.5)		
• Finely stranded without end sleeve		mm ²	--		
• Finely stranded with end sleeve		mm ²	1 × (0.5 ... 2.5), 2 × (0.5 ... 1.5)		
• Stranded		mm ²	--		
• AWG cables, solid or stranded		AWG	2 × (20 ... 14)		
Connection type		 Spring-type terminals			
Operating devices		mm	3.0 x 0.5		
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected					
• Solid		mm ²	2 × (0.25 ... 1.5)		
• Finely stranded without end sleeve		mm ²	--		
• Finely stranded with end sleeve		mm ²	2 × (0.25 ... 1.5)		
• Stranded		mm ²	2 × (0.25 ... 1.5)		
• AWG cables, solid or stranded		AWG	2 × (24 ... 16)		

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB20, 3RB21 up to 630 A
for standard applications

Selection and ordering data

3RB20 solid-state overload relays for mounting onto contactor¹⁾²⁾ and stand-alone installation²⁾³⁾, CLASS 10

Features and technical specifications:

- Overload protection, phase failure protection and unbalance protection
- Internal power supply
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function and self-monitoring



3RB20 36-1UB0



3RB20 56-1FW2

Size contactor ⁴⁾	Rating for induction motor Rated value ⁵⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁶⁾	Screw terminals (on auxiliary current side) Order No.
	kW	A	A	
Size S2¹⁾³⁾⁷⁾				
S2	3 ... 11	6 ... 25	63	3RB20 36-1QB0 3RB20 36-1QW1 3RB20 36-1UB0 3RB20 36-1UW1
	7.5 ... 22	12.5 ... 50	80	
Size S3¹⁾³⁾⁷⁾				
S3	7.5 ... 22	12.5 ... 50	160	3RB20 46-1UB0 3RB20 46-1EB0 3RB20 46-1EW1
	11 ... 45	25 ... 100	315	
Size S6²⁾⁷⁾				
S6 with busbar connections	22 ... 90	50 ... 200	315	3RB20 56-1FC2 3RB20 56-1FW2
S6 with box terminals				
Size S10/S12²⁾				
S10/S12 and size 14 (3TF68/3TF69)	22 ... 110 90 ... 450	55 ... 250 160 ... 630	400 800	3RB20 66-1GC2 3RB20 66-1MC2

- 1) The relays with an Order No. ending with "0" are designed for mounting onto contactor.
- 2) The relays with an Order No. ending with "2" are designed for mounting onto contactor and stand-alone installation. For 3TF68/3TF69 contactors, direct mounting is not possible.
- 3) The relays with an Order No. ending with "1" are designed for stand-alone installation.
- 4) Observe maximum rated operational current of the devices.

- 5) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.
- 6) Maximum protection by fuse for overload relay, type of coordination "2". For fuse values in connection with contactors see "Technical specifications" -> "Short-circuit protection with fuses for motor feeders".
- 7) The relays with an Order No. with "W" or "X" in penultimate position are equipped with a straight-through transformer.

3RB20 solid-state overload relays for mounting onto contactor¹⁾²⁾ and stand-alone installation²⁾³⁾, CLASS 20

Features and technical specifications:

- Overload protection, phase failure protection and unbalance protection
- Internal power supply
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Switch position indicator
- TEST function and self-monitoring



3RB20 36-2UB0



3RB20 56-2FW2

Size of contactor ⁴⁾	Rating for induction motor Rated value ⁵⁾ kW	Current setting of the inverse-time delayed overload release A	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁶⁾ A	Screw terminals (on auxiliary current side) Order No.
Size S2¹⁾³⁾⁷⁾				
S2	3 ... 11	6 ... 25	63	3RB20 36-2QB0 3RB20 36-2QW1 3RB20 36-2UB0 3RB20 36-2UW1
	7.5 ... 22	12.5 ... 50	80	
Size S3¹⁾³⁾⁷⁾				
S3	7.5 ... 22	12.5 ... 50	160	3RB20 46-2UB0 3RB20 46-2EB0 3RB20 46-2EW1
	11 ... 45	25 ... 100	315	
Size S6²⁾⁷⁾				
S6 with busbar connections	22 ... 90	50 ... 200	315	3RB20 56-2FC2 3RB20 56-2FW2
S6 with box terminals				
Size S10/S12²⁾				
S10/S12 and size 14 (3TF68/3TF69)	22 ... 110	55 ... 250	400	3RB20 66-2GC2 3RB20 66-2MC2
	90 ... 450	160 ... 630	800	

- 1) The relays with an Order No. ending with "0" are designed for mounting onto contactor.
- 2) The relays with an Order No. ending with "2" are designed for mounting onto contactor and stand-alone installation. For 3TF68/3TF69 contactors, direct mounting is not possible.
- 3) The relays with an Order No. ending with "1" are designed for stand-alone installation.
- 4) Observe maximum rated operational current of the devices.

- 5) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.
- 6) Maximum protection by fuse for overload relay, type of coordination "2".
For fuse values in connection with contactors see "Technical specifications" --> "Short-circuit protection with fuses for motor feeders".
- 7) The relays with an Order No. with "W" or "X" in penultimate position are equipped with a straight-through transformer.

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

**3RB20, 3RB21 up to 630 A
for standard applications**

*3RB21 solid-state overload relays for mounting onto contactor¹⁾²⁾ and stand-alone installation²⁾³⁾,
CLASS 5, 10, 20 and 30 adjustable*

Features and technical specifications:

- Overload protection, phase failure protection and unbalance protection
- Internal ground-fault detection (activatable)
- Internal power supply
- Auxiliary contacts 1 NO + 1 NC
- Manual and automatic RESET
- Electrical remote RESET integrated
- Switch position indicator
- TEST function and self-monitoring



3RB21 33-4UB0



3RB21 53-4FX2

Size of contactor ⁴⁾	Rating for induction motor Rated value ⁵⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁶⁾	Screw terminals (on auxiliary current side) Order No.
	kW	A	A	
Size S2¹⁾³⁾⁷⁾				
S2	3 ... 11	6 ... 25	63	3RB21 33-4QB0
	7.5 ... 22	12.5 ... 50	80	3RB21 33-4QW1 3RB21 33-4UB0 3RB21 33-4UW1
Size S3¹⁾³⁾⁷⁾				
S3	7.5 ... 22	12.5 ... 50	160	3RB21 43-4UB0
	11 ... 45	25 ... 100	315	3RB21 43-4EB0 3RB21 43-4EW1
Size S6²⁾⁷⁾				
S6 with busbar connection	22 ... 90	50 ... 200	315	3RB21 53-4FC2
S6 with box terminals				3RB21 53-4FW2
Size S10/S12²⁾				
S10/S12 and size 14 (3TF68/3TF69)	22 ... 110	55 ... 250	400	3RB21 63-4GC2
	90 ... 450	160 ... 630	800	3RB21 63-4MC2

- 1) The relays with an Order No. ending with "0" are designed for mounting onto contactor.
- 2) The relays with an Order No. ending with "2" are designed for mounting onto contactor and stand-alone installation. For 3TF68/3TF69 contactors, direct mounting is not possible.
- 3) The relays with an Order No. ending with "1" are designed for stand-alone installation.
- 4) Observe maximum rated operational current of the devices.

- 5) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.
- 6) Maximum protection by fuse for overload relay, type of coordination "2".
For fuse values in connection with contactors see "Technical specifications" --> "Short-circuit protection with fuses for motor feeders".
- 7) The relays with an Order No. with "W" or "X" in penultimate position are equipped with a straight-through transformer.

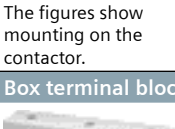
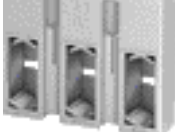
Overview

Overload relays for standard applications

The following optional accessories are available for the 3RB20 and 3RB21 solid-state overload relays:

- Mechanical RESET (for all sizes)
- Cable release for resetting devices which are difficult to access (for all sizes)
- Sealable cover (for all sizes)
- Terminal covers for sizes S2 to S10/S12
- Box terminal blocks for sizes S6 and S10/S12

Selection and ordering data

	Version	Size	Order No.
Mechanical RESET			
	Resetting plungers, holders and formers	S2 ... S10/S12	3RU19 00-1A
	Pushbuttons with extended stroke (12 mm), IP65, ø 22 mm	S2 ... S10/S12	3SB30 00-0EA11
	Extension plungers For compensation of the distance between a pushbutton and the unlatching button of the relay	S2 ... S10/S12	3SX1 335
3RU19 00-1A with pushbutton and extension plunger			
Cable releases with holder for RESET			
	For ø 6.5 mm holes in the control panel; max. control panel thickness 8 mm	S2 ... S10/S12	3RU19 00-1B 3RU19 00-1C
	• Length 400 mm • Length 600 mm		
3RU19 00-1.			
Sealable covers			
	For covering the setting knobs	S2 ... S10/S12	3RB29 84-0
3RB29 86-0			
Terminal covers			
	Covers for cable lugs and busbar connections		
	• Length 55 mm ¹⁾	S3	3RT19 46-4EA1
	• Length 100 mm	S6	3RT19 56-4EA1
	• Length 120 mm	S10/S12	3RT19 66-4EA1
	Covers for box terminals		
	• Length 20.6 mm ¹⁾	S2	3RT19 36-4EA2
	• Length 20.8 mm ¹⁾	S3	3RT19 46-4EA2
	• Length 25 mm	S6	3RT19 56-4EA2
	• Length 30 mm	S10/S12	3RT19 66-4EA2
	Covers for screw terminals between contactor and overload relay, without box terminals (1 unit required per combination)	S6	3RT19 56-4EA3
		S10/S12	3RT19 66-4EA3
3RT19 36-4EA2 The figures show mounting on the contactor.			
Box terminal blocks			
	For round and ribbon cables		
	• Up to 70 mm ²	S6 ²⁾	3RT19 55-4G
	• Up to 120 mm ²	S6	3RT19 56-4G
	• Up to 240 mm ²	S10/S12	3RT19 66-4G
	For technical specifications for conductor cross-sections see note on Technical Information on page 4/1.		
3RT19 5.-4G			

3RT19 5.-4G

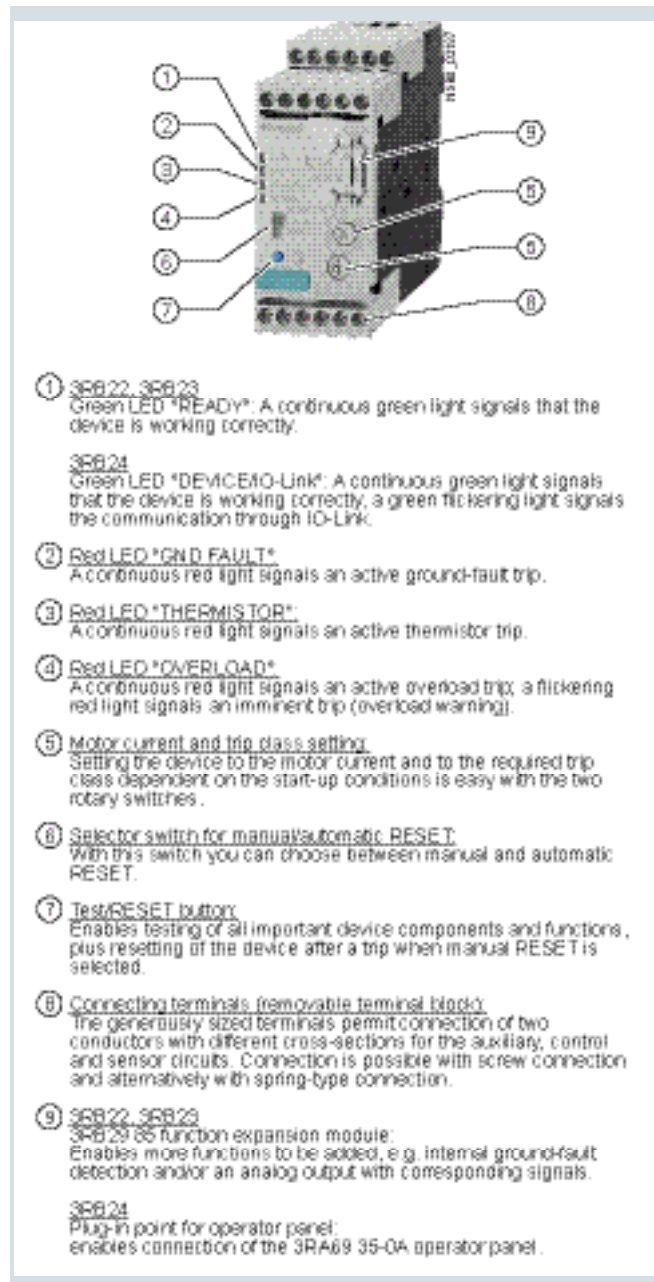
1) In the scope of supply for 3RT10 54-1 contactors (55 kW).

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB22, 3RB23, 3RB24 up to 630 A
for High-Feature applications

Overview



SIRIUS 3RB22 to 3RB24 evaluation modules



SIRIUS 3RB29 06 current measuring module

The 3RB22 to 3RB24 solid-state overload relays up to 630 A (up to 820 A possible in combination with a series transformer) are from a modular system. The 3RB22 overload relays (with monostable auxiliary contacts) and the 3RB23 overload relays (with bistable auxiliary contacts) are supplied from an external voltage, the 3RB24 overload relays (with monostable auxiliary contacts) are supplied through IO-Link.

These devices have been designed for inverse-time delayed protection of loads with normal starting and heavy starting against excessive temperature rises due to overload or phase failure. An overload, phase unbalance or phase failure result in an increase of the motor current beyond the set rated motor current. Depending on the configuration in IO-Link, the 3RB24 overload relays can also be used as direct-on-line or reversing starters (wye-delta starting also possible).

This current rise is detected by means of a current measuring module and electronically evaluated by a special evaluation module which is connected to it. The evaluation electronics sends a signal to the auxiliary contacts. The auxiliary contacts then switch off the load by means of a contactor. The break time depends on the ratio between the tripping current and current setting I_e and is stored in the form of a long-term stable tripping characteristic. The "tripped" status is signaled by means of a continuous red "OVERLOAD" LED.

The LED indicates imminent tripping of the relay due to overload, phase unbalance or phase failure by flickering when the limit current has been violated. In the case of the 3RB22 and 3RB23 overload relays this warning can also be issued through auxiliary contacts, in the case of the 3RB24 overload relays it can also be issued through IO-Link.

In addition to the described inverse-time delayed protection of loads against excessive temperature rises, the 3RB22 to 3RB24 solid-state overload relays also allow direct temperature monitoring of the motor windings (full motor protection) by connection with broken-wire interlock of a PTC sensor circuit. With this temperature-dependent protection, the loads can be protected against overheating caused indirectly by reduced coolant flow, for example, which cannot be detected by means of the current alone. In the event of overheating, the devices switch off the contactor, and thus the load, by means of the auxiliary contacts. The "tripped" status is signaled by means of a continuously illuminated "THERMISTOR" LED.

To also protect the loads against high-resistance short-circuits due to damage to the insulation, humidity, condensed water, etc., the 3RB22 and 3RB23 solid-state overload relays in conjunction with a function expansion module and the 3RB24 solidstate overload relays offer the possibility of internal ground-fault detection (not possible in conjunction with contactor assembly for wye-delta starting). In the event of a ground fault the 3RB22 to 3RB24 relays trip instantaneously.

In the case of the 3RB22 and 3RB23 overload relays the "tripped" status can also be signaled through auxiliary contacts, in the case of the 3RB24 overload relays it can also be signaled through IO-Link.

After tripping due to overload, phase unbalance, phase failure, thermistor or ground-fault tripping, the relay is reset manually or automatically after the recovery time has elapsed. In the case of the 3RB22 and 3RB23 evaluation modules in conjunction with a corresponding function expansion module, the motor current measured by the microprocessor can be output in the form of an analog signal DC 4 mA to 20 mA for operating rotary coil instruments or for feeding into analog inputs of programmable logic controllers.

With an additional AS-Interface analog module the current values of the 3RB22 and 3RB23 overload relays can also be transferred over the AS-i bus system. In the case of the 3RB24 overload relays the current values are transmitted to the higher-level control system directly through IO-Link.

The devices are manufactured in accordance with environmental guidelines and contain environmentally friendly and reusable materials.

They comply with all important worldwide standards and approvals.

“Increased safety” type of protection EEx e according to ATEX directive 94/9/EC

The 3RB22 and 3RB24 (monostable) solid-state overload relays are suitable for the overload protection of explosion-proof motors with “increased safety” type of protection EExe.

The relays meet the requirements of EN 60079-7 (Electrical apparatus for areas subject to explosion hazards – Increased safety “e”).

3RB22

EC prototype test certificate for Group II, Category (2) G/D exists. It has the number PTB 05 ATEX 3022.

3RB24

EC prototype test certificate for Group II, Category (2) G/D has been submitted. On request.

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th		8th	9th	10th	11th
	□□□	□	□	□	□	–	□	□	□	□
Solid-state overload relays	3 R B									
Innovations		2								
Device series			□							
Size, rated operational current and power				□						
Version of the automatic RESET, electrical remote RESET					□					
Trip class (CLASS)							□			
Setting range of the overload release								□		
Connection methods									□	
Installation type										□
Example	3 R B	2	2	8	3	–	4	A	A	1

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Application

Industries

The 3RB22 to 3RB24 solid-state overload relays are suitable for customers from all industries who want to guarantee optimum inverse-time delayed and temperature-dependent protection of their electrical loads (e.g. motors) under normal and heavy starting conditions (CLASS 5 to 30), minimize project completion times, inventories and power consumption, and optimize plant availability and maintenance management.

Application

The 3RB22 to 3RB24 solid-state overload relays have been designed for the protection of three-phase asynchronous and single-phase AC motors.

In addition the 3RB24 overload relays can be used as direct-online or reversing starters (wye-delta starting also possible) which are controlled through IO-Link. It is thus possible to control operating mechanisms directly through IO-Link from a higher-level control system and also to signal e.g. current values directly through IO-Link.

If single-phase AC motors are to be protected by the 3RB22 to 3RB24 solid-state overload relays, the main current paths of the current measuring modules must be series-connected.

Ambient conditions

The devices are insensitive to external influences such as shocks, corrosive ambient conditions, ageing and temperature fluctuations.

For the temperature range from –25 °C to +60 °C, the 3RB22 to 3RB24 solid-state overload relays compensate the temperature in accordance with IEC 60947-4-1.

Configuration notes for use of the devices below –25 °C or above +60 °C on request.

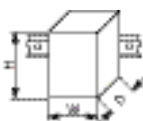
Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB22, 3RB23, 3RB24 up to 630 A
for High-Feature applications

Technical specifications

Type – Overload relay: complete system		3RB22, 3RB23, 3RB24	
Size of contactor		S00 ... S10/S12	
General data			
Trips in the event of		Overload, phase failure and phase unbalance (> 40 % according to NEMA), + ground fault (with corresponding function expansion module) and activation of the thermistor motor protection (with closed PTC sensor circuit)	
Trip class acc. to IEC 60947-4-1	CLASS	5, 10, 20 and 30 adjustable	
Phase failure sensitivity		Yes	
Overload warning		Yes, from 1.125 x I _e for symmetrical loads and from 0.85 x I _e for unsymmetrical loads	
Reset and recovery		Manual, automatic and remote RESET	
• Reset options after tripping			
• Recovery time			
- For automatic RESET	min	- For tripping due to overcurrent: 3 (stored permanently)	
		- For tripping by thermistor: time until the motor temperature has fallen 5 K below the response temperature	
		- For tripping due to a ground fault: no automatic RESET	
- For manual RESET	min	- For tripping due to overcurrent: 3 (stored permanently)	
		- For tripping by thermistor: time until the motor temperature has fallen 5 K below the response temperature	
		- For tripping due to a ground fault: Immediately	
- For remote RESET	min	- For tripping due to overcurrent: 3 (stored permanently)	
		- For tripping by thermistor: time until the motor temperature has fallen 5 K below the response temperature	
		- For tripping due to a ground fault: Immediately	
Features			
• Display of operating state on device		Yes, with 4 LEDs	
		- Green LED: "Ready" (3RB22, 3RB23), "DEVICE/IO-Link" (3RB24)	
		- Red "Ground Fault" LED	
		- Red "Thermistor" LED	
		- Red "Overload" LED	
• TEST function		Yes, test of LEDs, electronics, auxiliary contacts and wiring of control circuit by pressing the button TEST/RESET / self-monitoring	
• RESET button		Yes, with the TEST/RESET button	
• STOP button		No	
Explosion protection – Safe operation of motors with "increased safety" type of protection			
EC type test certificate number according to directive 94/9/EC (ATEX)		3RB22: PTB 05 ATEX 3022  II (2) GD	
		3RB23: --	
		3RB24: On request	
Ambient temperatures			
• Storage/transport	°C	-40 ... +80	
• Operation	°C	-25 ... +60	
• Temperature compensation	°C	+60	
• Permissible rated current			
- Temperature inside control cabinet 60 °C	%	100	
- Temperature inside control cabinet 70 °C	%	On request	
Repeat terminals			
• Coil repeat terminals		Not required	
• Auxiliary contact repeat terminal		Not required	
Degree of protection acc. to IEC 60529		IP20 for the current measuring module sizes S6 and S10/S12 with busbar connection in conjunction with cover	
Touch protection acc. to IEC 61140		The current measuring module sizes S6 and S10/S12 with busbar connection in conjunction with cover are finger-safe.	
Shock resistance with sine acc. to IEC 60068-2-27	g/ms	15/11	
Electromagnetic compatibility (EMC) – Interference immunity			
• Conductor-related interference			
- Burst acc. to IEC 61000-4-4 (corresponds to degree of severity 3)	kV	2 (power ports), 1 (signal ports)	
- Surge acc. to IEC 61000-4-5 (corresponds to degree of severity 3)	kV	2 (line to earth), 1 (line to line)	
• Electrostatic discharge acc. to IEC 61000-4-2 (corresponds to degree of severity 3)	kV	8 (air discharge), 6 (contact discharge)	
• Field-related interference acc. to IEC 61000-4-3 (corresponds to degree of severity 3)	V/m	10	
Electromagnetic compatibility (EMC) – Emitted interference		Degree of severity A acc. to EN 55011 (CISPR 11) and EN 55022 (CISPR 22)	
Resistance to extreme climates – air humidity	%	100	
Dimensions		See "Dimensional drawings"	
Installation altitude above sea level	m	Up to 2000	
Mounting position		Any	
Type of mounting			
• Evaluation modules		Stand-alone installation	
• Current measuring module	Size	S00 to S3: Stand-alone installation, S6 and S10/S12: stand-alone installation or mounting onto contactors	

Type – Overload relay: current measuring modules				3RB29 06	3RB29 06	3RB29 56	3RB29 66
Size of contactor				S00/S0	S2/S3	S6	S10/S12
Dimensions of current measuring modules (W x H x D)		mm		45 x 84 x 45	55 x 94 x 72	120 x 119 x 145	145 x 147 x 148
Main circuit							
Rated insulation voltage U_i (pollution degree 3)		V	1000				
Rated impulse withstand voltage U_{imp}		kV	6				
Rated operational voltage U_e		V	1000				
Type of current			No				
• Direct current			Yes, 50/60 Hz $\pm 5\%$				
• Alternating current							
Current setting		A	0.3 ... 3; 2.4 ... 25	10 ... 100	20 ... 200		63 ... 630
Power loss per unit (max.)		W	0.5				
Short-circuit protection							
• With fuse without contactor			See "Selection and ordering data"				
• With fuse and contactor			See "Technical specifications" --> "Short-circuit protection with fuses for motor feeders"				
Protective separation between main and auxiliary conducting path acc. to IEC 60947-1 (pollution degree 2)		V	690 for grounded networks, otherwise 600 V				
Conductor cross-sections of the main circuit							
Connection type			 Screw terminals with box terminal				
Terminal screw		--			4 mm Allen screw		5 mm Allen screw
Operating devices		mm			4 mm Allen screw		5 mm Allen screw
Prescribed tightening torque		Nm			10 ... 12		20 ... 22
Cond. cross-sections (min./max.), 1 or 2 cond. can be connected							
• Solid		mm ²	--			--	
• Finely stranded without end sleeve		mm ²	--			With 3RT19 55-4G box terminal: 2 x (1 x max. 50, 1 x max. 70), 1 x (10 ... 70) With 3RT19 56-4G box terminal: 2 x (1 x max. 95, 1 x max. 120), 1 x (10 ... 120)	
						2 x (50 ... 185), rear clamping point only: 1 x (70 ... 240)	
						Rear clamping point only: 1 x (120 ... 185)	
• Finely stranded with end sleeve		mm ²	--			With 3RT19 55-4G box terminal: 2 x (1 x max. 50, 1 x max. 70), 1 x (10 ... 70) With 3RT19 56-4G box terminal: 2 x (1 x max. 95, 1 x max. 120), 1 x (10 ... 120)	
						2 x (50 ... 185), rear clamping point only: 1 x (70 ... 240)	
						Rear clamping point only: 1 x (120 ... 185)	
• Stranded		mm ²	--			With 3RT19 55-4G box terminal: 2 x (max. 70), 1 x (16 ... 70) With 3RT19 56-4G box terminal: 2 x (max. 120), 1 x (16 ... 120)	
						2 x (70 ... 240), rear clamping point only: 1 x (95 ... 300)	
						Rear clamping point only: 1 x (120 ... 240)	
• AWG cables, solid or stranded		AWG	--			With 3RT19 55-4G box terminal: 2 x (max. 1/0), 1 x (6 ... 2/0) With 3RT19 56-4G box terminal: 2 x (max. 3/0), 1 x (6 ... 250 kcmil)	
						2 x (2/0 ... 500 kcmil), rear clamping point only: 1 x (3/0 ... 600 kcmil)	
						Rear clamping point only: 1 x (250 kcmil ... 500 kcmil)	
• Ribbon cables (number x width x thickness)		mm	--			With 3RT19 55-4G box terminal: 2 x (6 x 15.5 x 0.8), 1 x (3 x 9 x 0.8 ... 6 x 15.5 x 0.8) With 3RT19 56-4G box terminal: 2 x (10 x 15.5 x 0.8), 1 x (3 x 9 x 0.8 ... 10 x 15.5 x 0.8)	
						2 x (20 x 24 x 0.5), 1 x (6 x 9 x 0.8 ... 20 x 24 x 0.5)	
Connection type			Busbar connections				
Terminal screw		--			M8 x 25		M10 x 30
Prescribed tightening torque		Nm			10 ... 14		14 ... 24
Cond. cross-sections (min./max.), 1 or 2 cond. can be connected							
• Solid with cable lug		mm ²	--			16 ... 95 ¹⁾	
• Stranded with cable lug		mm ²	--			25 ... 120 ¹⁾	
• AWG cable, solid or stranded, with cable lug		AWG	--			4 ... 250 kcmil	
• With connecting bar (max. width)		mm	--			17	
Connection type			Straight-through transformers				
Diameter of opening		mm	7.5	14	25		--

1) When connecting cable lugs according to DIN 46235 with conductor cross-sections of 95 mm² and more, the 3RT19 56-4EA1 terminal cover must be used to ensure phase spacing.

2) When connecting cable lugs according to DIN 46234 with conductor cross-sections of 240 mm² and more as well as to DIN 46235 with conductor cross-sections of 185 mm² and more, the 3RT19 56-4EA1 terminal cover must be used for to keep the phase clearance.

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB22, 3RB23, 3RB24 up to 630 A
for High-Feature applications

Type – Overload relay: evaluation modules			3RB22 83, 3RB23 83		3RB24 83
Size of contactor			S00 ... S10/S12		
Dimensions of evaluation modules (W x H x D)			mm	45 x 111 x 95	
Auxiliary circuit					
Number of NO contacts			2	--	
Number of NC contacts			2	--	
Number of CO contacts			--	1	
Auxiliary contacts – assignment			• Alternative 1 - 1 NO for the signal “tripped by overload and/or thermistor” - 1 NC for disconnecting the contactor - 1 NO for the signal “tripped by ground fault” - 1 NC for disconnecting the contactor - or¹⁾ • Alternative 2 - 1 NO for the signal “tripped by overload and/or thermistor and/or ground fault” - 1 NC for disconnecting the contactor - 1 NO for overload warning - 1 NC for disconnecting the contactor		Changeover contact: direction of rotation left, direction of rotation right
Rated insulation voltage U_i (pollution degree 3)			V	300	
Rated impulse withstand voltage U_{imp}			kV	4	
Auxiliary contacts – contact rating					
• NC contact with alternating current AC-14/AC-15, rated operational current I_e at U_e - 24 V - 120 V - 125 V - 250 V			A	6	
			A	6	
			A	6	
			A	3	
• NO contact with alternating current AC-14/AC-15, rated operational current I_e at U_e - 24 V - 120 V - 125 V - 250 V			A	6	
			A	6	
			A	6	
			A	3	
• NC contact, NO contact with direct current DC-13, rated operational current I_e at U_e - 24 V - 60 V - 110 V - 125 V - 250 V			A	2	
			A	0.55	
			A	0.3	
			A	0.3	
			A	0.2	
• Conventional thermal current I_{th}			A	5	
• Contact reliability (suitability for PLC control; 17 V, 5 mA)				Yes	
Short-circuit protection					
• With fuse, operational class gG			A	6	
• With miniature circuit breaker, C characteristic			A	1.6	
Protective separation between auxil. conducting paths acc. to IEC 60947-1			V	300	
CSA, UL, UR rated data					
Auxiliary circuit – switching capacity			B300, R300		
Conductor cross-sections of the auxiliary circuit					
Connection type			 Screw terminals		
Terminal screw			M3, Pozidriv size 2		
Operating devices			mm	3.0 x 0.5	
Prescribed tightening torque			Nm	0.8 ... 1.2	
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected					
• Solid			mm ²	1 x (0.5 ... 4), 2 x (0.5 ... 2.5)	
• Finely stranded without end sleeve			mm ²	--	
• Finely stranded with end sleeve			mm ²	1 x (0.5 ... 2.5), 2 x (0.5 ... 1.5)	
• Stranded			mm ²	--	
• AWG cables, solid or stranded			AWG	2 x (20 ... 14)	
Connection type			 Spring-type terminals		
Operating devices			mm	3.0 x 0.5	
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected					
• Solid			mm ²	2 x (0.25 ... 1.5)	
• Finely stranded without end sleeve			mm ²	–	
• Finely stranded with end sleeve			mm ²	2 x (0.25 ... 1.5)	
• Stranded			mm ²	2 x (0.25 ... 1.5)	
• AWG cables, solid or stranded			AWG	2 x (24 ... 16)	

1) The assignment of auxiliary contacts may be influenced by function expansion modules.

Type – Overload relay of evaluation modules		3RB22 83, 3RB23 83		3RB24 83	
Size of contactor		S00 ... S10/S12			
Control and sensor circuit as well as the analog output					
Rated insulation voltage U_i (pollution degree 3) ¹⁾	V	300			
Rated impulse withstand voltage U_{imp} ¹⁾	kV	4			
Rated control supply voltage U_s ¹⁾ • AC 50/60 Hz • DC	V V	24 ... 240 24 ... 240		-- 24 through IO-Link	
Operating range ¹⁾ • AC 50/60 Hz • DC		0.85 × U_s min ≤ U_s ≤ 1.1 × U_s max 0.85 × U_s min ≤ U_s ≤ 1.1 × U_s max			
Rated power ¹⁾ • AC 50/60 Hz • DC	W W	0.5 0.5		-- 0.5	
Mains buffering time ¹⁾	ms	200			
Thermistor motor protection (PTC thermistor detector) ²⁾ • Summation cold resistance • Response value • Return value	kΩ kΩ kΩ	≤ 1.5 3.4 ... 3.8 1.5 ... 1.65			
Ground-fault detection • Tripping value I_{Δ} ³⁾ - For 0.3 × I_e < I_{motor} < 2.0 × I_e - For 2.0 × I_e < I_{motor} < 8.0 × I_e • Response time t_{trip}	 ms	The information refers to sinusoidal residual currents at 50/60 Hz. > 0.3 × I_e > 0.15 × I_{motor} 500 ... 1000			
Analog output ³⁾⁴⁾ • Output signal • Measuring range • Load, max.	 mA Ω	4 ... 20 0 ... 1.25 × I_e 4 mA corresponds to 0 × I_e 16.8 mA corresponds to 1.0 × I_e 20 mA corresponds to 1.25 × I_e 100			
Conductor cross-sections for the control and sensor circuit as well as the analog output					
Connection type		 Screw terminals			
Terminal screw		M3, Pozidriv size 2			
Operating devices		mm	3.0 × 0.5		
Prescribed tightening torque		Nm	0.8 ... 1.2		
Conductor cross-sections (min./max.), 1 or 2 conductors can be connected					
• Solid	mm ²	1 × (0.5 ... 4), 2 × (0.5 ... 2.5)			
• Finely stranded without end sleeve	mm ²	--			
• Finely stranded with end sleeve	mm ²	1 × (0.5 ... 2.5), 2 × (0.5 ... 1.5)			
• Stranded	mm ²	--			
• AWG cables, solid or stranded	AWG	2 × (20 ... 14)			

1) Control circuit.

2) Sensor circuit.

3) For the 3RB22 and 3RB23 overload relays in combination with a corresponding function expansion module.

4) Analog input modules, e.g. SM 331, must be configured for 4-wire measuring transducers. In this case the analog input module must not supply current to the analog output of the 3RB22 to 3RB24 relay.

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB22, 3RB23, 3RB24 up to 630 A
for High-Feature applications

Functions of the 3RB22 and 3RB23 evaluation modules in combination with the 3RB29 85 function expansion modules

Evaluation modules	With function expansion module	Basic functions	Inputs		
			A1/A2	T1/T2	Y1/Y2
3RB22 83-4AA1 3RB22 83-4AC1 3RB23 83-4AA1 3RB23 83-4AC1	--	Inverse-time delayed protection, temperature-dependent protection, electrical remote RESET, overload warning	Power supply 24 ... 240 V AC/DC	Connection for PTC sensor	Electrical remote RESET
	3RB29 85-2CA1	Inverse-time delayed protection, temperature-dependent protection, internal ground-fault detection, electrical remote RESET, overload warning	Power supply 24 ... 240 V AC/DC	Connection for PTC sensor	Electrical remote RESET
	3RB29 85-2CB1	Inverse-time delayed protection, temperature-dependent protection, internal ground-fault detection, electrical remote RESET, ground-fault signal	Power supply 24 ... 240 V AC/DC	Connection for PTC sensor	Electrical remote RESET
	3RB29 85-2AA0	Inverse-time delayed protection, temperature-dependent protection, electrical remote RESET, overload warning, analog output	Power supply 24 ... 240 V AC/DC	Connection for PTC sensor	Electrical remote RESET
	3RB29 85-2AA1	Inverse-time delayed protection, temperature-dependent protection, internal ground-fault detection, electrical remote RESET, overload warning, analog output	Power supply 24 ... 240 V AC/DC	Connection for PTC sensor	Electrical remote RESET
	3RB29 85-2AB1	Inverse-time delayed protection, temperature-dependent protection, internal ground-fault detection, electrical remote RESET, ground-fault signal, analog output	Power supply 24 ... 240 V AC/DC	Connection for PTC sensor	Electrical remote RESET

Evaluation modules	With function expansion module	Outputs				
		I (-) / I (+)	95/96 NC	97/98 NO	05/06 NC	07/08 NO
3RB22 83-4AA1 3RB22 83-4AC1 3RB23 83-4AA1 3RB23 83-4AC1	--	No	Disconnection of the contactor (inverse-time delayed/temperature-dependent protection)	Signal "tripped"	Overload warning	Overload warning
	3RB29 85-2CA1	No	Disconnection of the contactor (inverse-time delayed/temperature-dependent protection + ground fault)	Signal "tripped"	Overload warning	Overload warning
	3RB29 85-2CB1	No	Disconnection of the contactor (inverse-time delayed/temperature-dependent protection)	Signal "tripped"	Switching off the contactor (ground fault)	Signal "ground-fault tripping"
	3RB29 85-2AA0	Analog signal	Disconnection of the contactor (inverse-time delayed/temperature-dependent protection)	Signal "tripped"	Overload warning	Overload warning
	3RB29 85-2AA1	Analog signal	Disconnection of the contactor (inverse-time delayed/temperature-dependent protection + ground fault)	Signal "tripped"	Overload warning	Overload warning
	3RB29 85-2AB1	Analog signal	Disconnection of the contactor (inverse-time delayed/temperature-dependent protection)	Signal "tripped"	Switching off the contactor (ground fault)	Signal "ground-fault tripping"

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB22, 3RB23, 3RB24 up to 630 A
for High-Feature applications

Selection and ordering data

3RB22, 3RB23, 3RB24 overload relays (evaluation modules) for full motor protection for stand-alone installation, CLASS 5, 10, 20 and 30 adjustable

Type	3RB22, 3RB23	3RB24
Features and technical specifications		
Overload protection, phase failure protection and unbalance protection	✓	✓
Supplied from an external voltage	✓ 24 ... 240 V AC/DC	✓ 24 V DC through IO-Link
Direct-on-line or reversing starters (wye-delta starting also possible) controllable through IO-Link	--	✓
Auxiliary contacts	✓ 2 NO + 2 NC	✓ 1 CO
Electrical remote RESET integrated	✓	✓
4 LEDs for operating and status displays	✓	✓
TEST function and self-monitoring	✓	✓
Internal ground-fault detection	✓ (with function expansion module)	✓
Screw terminals or spring-type terminals for auxiliary, control and sensor circuits	✓	✓
Input for PTC sensor circuit	✓	✓
Analog output	✓ (with function expansion module)	✓

✓ Available

-- Not available



3RB22 83-4AA1,
3RB23 83-4AA1



3RB24 83-4AA1



3RB22 83-4AC1,
3RB23 83-4AC1



3RB24 83-4AC1

Size of contactor	Version	Screw terminals 
		Order No.
Evaluation modules		
S00 ... S12	Monostable	3RB22 83-4AA1
	Bistable	3RB23 83-4AA1
	Monostable	3RB24 83-4AA1

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB22, 3RB23, 3RB24 up to 630 A
for High-Feature applications

Function expansion modules for 3RB22 and 3RB23 overload relays (evaluation modules)

	Size of contactor	Version	For overload relays	Order No.
Sizes S00 to S12				
 3RB29 85-2..1	S00 ... S12	For plugging into evaluation module (1 unit)		
		Analog Basic 1¹⁾ modules Analog output DC 4 ... 20 mA, with overload warning	3RB22, 3RB23	3RB29 85-2AA0
		Analog Basic 1 GF modules¹⁾²⁾ Analog output DC 4 ... 20 mA, with internal ground-fault detection and overload warning	3RB22, 3RB23	3RB29 85-2AA1
		Analog Basic 2 GF modules¹⁾²⁾ Analog output DC 4 ... 20 mA, with internal ground-fault detection and overload ground-fault signal	3RB22, 3RB23	3RB29 85-2AB1
		Basic 1 GF modules²⁾ with internal ground-fault detection and overload warning	3RB22, 3RB23	3RB29 85-2CA1
		Basic 2 GF modules²⁾ with internal ground-fault detection and ground-fault signaling	3RB22, 3RB23	3RB29 85-2CB1

Note:

Analog input modules, e.g. SM 331, must be configured for 4-wire measuring transducers. In this case the analog input module must not supply current to the analog output of the 3RB22/3RB23 relay.

- 1) The analog signal DC 4 mA up to 20 mA can be used for operating rotary coil instruments or for feeding into analog inputs of programmable logic controllers.
- 2) The following information on ground-fault protection refers to sinusoidal residual currents at 50/60 Hz:
 - With a motor current of between 0.3 and 2 times the current setting I_e the unit will trip at a ground-fault current equal to 30 % of the current setting.
 - With a motor current of between 2 and 8 times the current setting I_e the unit will trip at a ground-fault current equal to 15 % of the current setting.
 - The response delay amounts to between 0.5 s and 1 s.

Operator panel for 3RB24 overload relays (evaluation modules)

	Version	For overload relays	Order No.
Operator panels for communication through IO-Link			
 3RA69 35-0A	Operator panels (set) 1 set comprises: • 1 x operator panel • 1 x 3RA69 36-0A enabling module • 1 x 3RA69 33-0B interface cover • 1 x fixing terminal		3RA69 35-0A
	Connecting cables Length 2 m (round), for connecting the evaluation module to the operator panel		3UF79 33-0BA00-0
	Enabling modules (replacement)		3RA69 36-0A
	Interface covers		3RA69 33-0B

Note:

The connecting cable between the evaluation module and the operator panel is not included in the scope of supply; please order separately.

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

3RB22, 3RB23, 3RB24 up to 630 A
for High-Feature applications

Current measuring modules for mounting onto contactor¹⁾ and stand-alone installation¹⁾²⁾ (essential accessories)

	Size of contactor ³⁾	Rating for induction motor, rated value ⁴⁾	Current setting of the inverse-time delayed overload release	Short-circuit protection with fuse, type of coordination "2", operational class gG ⁵⁾	For overload relays	Order No.
		kW	A			
Sizes S00/S0 ²⁾⁶⁾						
	S00/S0	0.09 ... 1.1	0.3 ... 3	20	3RB22 to 3RB24	3RB29 06-2BG1
		1.1 ... 11	2.4 ... 25	63		3RB29 06-2DG1
3RB29 06-2.G1						
Sizes S2/S3 ²⁾⁶⁾						
	S2/S3	5.5 ... 45	10 ... 100	315	3RB22 to 3RB24	3RB29 06-2JG1
3RB29 06-2JG1						
Size S6 ¹⁾⁶⁾						
	S6 with busbar connection	11 ... 90	20 ... 200	315	3RB22 to 3RB24	3RB29 56-2TH2
	S6 with box terminals				3RB22 to 3RB24	3RB29 56-2TG2
3RB29 56-2TG2						
Sizes S10/S12 ¹⁾						
	S10/S12 and size 14 (3TF68/3TF69)	37 ... 450	63 ... 630	800	3RB22 to 3RB24	3RB29 66-2WH2
3RB29 66-2WH2						

Note:

The connecting cable between the current measuring module and the evaluation module is not included in the scope of supply; please order separately.

- 1) The current measuring modules with an Order No. ending with "2" are designed for mounting onto contactor and stand-alone installation. For 3TF68/3TF69 contactors, direct mounting is not possible.
- 2) The current measuring modules with an Order No. ending with "1" are designed for stand-alone installation.

- 3) Observe maximum rated operational current of the devices.
- 4) Guide value for 4-pole standard motors at 50 Hz 400 V AC. The actual starting and rated data of the motor to be protected must be considered when selecting the units.
- 5) Maximum protection by fuse for overload relay, type of coordination "2". For fuse values in connection with contactors see "Technical specifications" --> "Short-circuit protection with fuses for motor feeders".
- 6) The modules with an Order No. with "G" in penultimate position are equipped with a straight-through transformer.

Accessories

	Size of contactor	Version	For overload relays	Order No.
Connecting cables (essential accessory)				
	S00 ...S3	For connection between evaluation module and current measuring module • Length 0.1 m (only for mounting of the evaluation module directly onto the current measuring module)	3RB22 to 3RB24, 3RB29	3RB29 87-2B
	S00 ... S12	• Length 0.5 m	3RB22 to 3RB24, 3RB29	3RB29 87-2D
3RB29 87-2.				

Overload Relays

SIRIUS 3RB2 Solid-State Overload Relays

Accessories for 3RB22, 3RB23, 3RB24

Overview

Overload relays for High-Feature applications

The following optional accessories are available for the 3RB22 to 3RB24 solid-state overload relays:

- Sealable cover for the evaluation modules
- Terminal covers for the current measuring modules size S6 and S10/S12
- Box terminal blocks for the current measuring modules size S6 and S10/S12
- Push-in lugs for screw fixing for 3RB22 to 3RB24 overload relay and 3RB29 06 current measuring modules

Selection and ordering data

	Version	Size	For overload relays	Order No.
Sealable covers				
	For covering the setting knobs	--	3RB22 to 3RB24	3RB29 84-2
3RB29 84-2				
Terminal covers for current measuring modules				
Covers for cable lugs and busbar connections				
	• Length 100 mm	S6	3RB29 56	3RT19 56-4EA1
	• Length 120 mm	S10/S12	3RB29 66	3RT19 66-4EA1
Covers for box terminals				
	• Length 25 mm	S6	3RB29 56	3RT19 56-4EA2
	• Length 30 mm	S10/S12	3RB29 66	3RT19 66-4EA2
	Covers for screw terminals between contactor and overload relay, without box terminals (1 unit required per combination)	S6 S10/S12	3RB29 56 3RB29 66	3RT19 56-4EA3 3RT19 66-4EA3
Box terminal blocks				
	For current measuring modules, for round and ribbon cables			
	• Up to 70 mm ²	S6 ¹⁾	3RB29 56	3RT19 55-4G
	• Up to 120 mm ²	S6	3RB29 56	3RT19 56-4G
	• Up to 240 mm ²	S10/S12	3RB29 66	3RT19 66-4G
	For technical specifications for conductor cross-sections see note on Technical Information on page 4/1.			
3RT19 5.-4G				
Push-in lugs				
	For screw fixing the overload relays	--	3RB22 to 3RB24	3RP19 03
3RP19 03				
	For screw fixing the current measuring modules (2 units are required per module)	S00 ... S3	3RB29 06	3RB19 00-0B
3RB19 00-0B				



5/2	Introduction
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	General data
	<u>3RA61, 3RA62 Compact Starters</u>
5/11	3RA61 direct-on-line starters
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	<u>3RA64, 3RA65 Compact Starters for IO-Link</u>
5/13	3RA64 direct-on-line starters
5/14	3RA65 reversing starters
5/15	Accessories
5/20	Add-on modules for AS-Interface
5/22	Infeed systems for 3RA6

Load Feeders and Motor Starters

For Use in the Control Cabinet

Introduction

Overview



3RA61



3RA62



3RA64



3RA65



3RA68

		Order No.	Page
SIRIUS 3RA6 compact starters			
	• Integrated functionality of a circuit breaker, contactor and solid-state overload relay and various functions of optional mountable accessories • Usable for direct starting of standard induction motors up to 32 A		
3RA61 direct-on-line starters	• Up to 15 kW/400 V, weld-free, wide setting range, removable terminals	3RA61	5/11
3RA62 reversing starters	• Up to 15 kW/400 V, weld-free, wide setting range, removable terminals	3RA62	5/12
3RA64 direct-on-line starters for IO-Link	• Up to 15 kW/400 V, weld-free, wide setting range, removable terminals	3RA64	5/13
3RA65 reversing starters for IO-Link	• Up to 15 kW/400 V, weld-free, wide setting range, removable terminals	3RA65	5/14
Accessories for 3RA6 direct-on-line and reversing starters		3RA69	5/15
Add-on modules for AS-Interface		3RA69	5/20
Infeed systems for 3RA6	• Modular expandability, up to 100 A, terminals up to 70 mm²	3RA68	5/22

Central and compact starter solutions

Our range offers you many different possibilities for simple and practical starter solutions in the control cabinet. Features common to all our load feeders, compact starters and motor starters: Like all SIRIUS devices they are optimally coordinated with each other, have a very compact design and are particularly easy and quick to install and wire up.

In addition there is a seamless range of SIRIUS 3RW soft starters available for soft starting in the control cabinet.

Overview

3RA6 fuseless compact starters and infeed system for 3RA6



3RA62 reversing starters

Integrated functionality

The SIRIUS 3RA6 compact starters are a generation of innovative load feeders with the integrated functionality of a motor protection circuit breaker, contactor and solid-state overload relay. In addition, various functions of optional mountable accessories (e.g. auxiliary switches, surge suppressors) are already integrated in the SIRIUS compact starter.

Application

The SIRIUS compact starters can be used wherever standard induction motors up to 32 A (approx. 15 kW/400 V) are directly started.

The compact starters are not suitable for the protection of single-phase AC or DC loads.

Approvals according to IEC, UL and CSA standards have been issued for the compact starters.

Low equipment variance

Thanks to wide setting ranges for the rated current and wide voltage ranges, the equipment variance is greatly reduced compared to conventional load feeders.

Very high operational reliability

Through the high short-circuit breaking capacity and defined shut-down when the end of service life is reached means that the SIRIUS compact starter achieves a very high level of operational reliability that would otherwise have only been possible with considerable additional outlay. This sets it apart from devices with similar functionality.

Safe disconnection

The auxiliary switches (NC contacts) of the 3RA6 compact starters are designed as mirror contacts. It is thus possible to use the devices for safe disconnection, e.g. emergency-stops, up to Category 2 (EN 954-1) and together with other redundancy switching devices up to Category 3 or 4.

Communications integration through AS-Interface

To enable communications integration through AS-Interface there is an AS-Interface add-on module available in several -versions for mounting instead of the control circuit terminals on the SIRIUS compact starter.

The design of the AS-Interface add-on module permits a group of up to 62 starters with a total of four cables to be connected

to the control system. This reduces wiring work considerably compared to the parallel wiring method.

Communications integration using IO-Link

Up to 4 compact starters in IO-Link version (reversing and direct-on-line starters) can be connected together and conveniently linked to the IO-Link master through a standardized

IO-Link connection. The 4SI SIRIUS electronic modules are used e.g. as IO-Link masters for connection to the SIMATIC ET 200S distributed I/O system.

The IO-Link connection enables a high density of information in the local range.

The diagnostics data of the process collected by the 3RA6 compact starter, e.g. short-circuit, end of service life, limit position etc., are not only indicated on the compact starter itself but also transmitted to the higher-level control system through IO-Link.

Thanks to the optionally available operator panel, which can be installed in the control cabinet door, it is easy to control the 3RA6 compact starter with IO-Link from the control cabinet door.

Permanent wiring/easy replacement

Using the SIRIUS infeed system for 3RA6 (see page 5/22) it is possible to carry out the wiring in advance without a compact starter needing to be connected.

A compact starter is very easily replaced simply by pulling it out of the device without disconnecting the wiring.

Even with screw connections or mounting on a standard mounting rail there is no need to disconnect any wiring (on account of the removable main and control circuit terminals) in order to replace a compact starter.

Consistent solution from the infeed to the motor feeder

The SIRIUS infeed system for 3RA6 with integrated PE bar is offered as a user-friendly possibility of feeding in summation currents up to 100 A with a maximum conductor cross-section of 70 mm² and connecting the motor cable directly without additional intermediate terminals.

Screw and spring-type connections

The SIRIUS compact starters and the infeed system for 3RA6 are available with screw and spring-type terminals.



Screw terminals



Spring-type terminals

The terminals are indicated in the corresponding tables by the symbols shown on orange backgrounds.

System configurator for engineering

A free system configurator is available to reduce further the amount of engineering work for selecting the required compact starters and matching infeed.

Types of infeed for the 3RA6 fuseless compact starters

On the whole four different infeed possibilities are available:

- Parallel wiring
- Use of three-phase busbars (combination with SIRIUS motor protection circuit breakers and SIRIUS contactors possible)
- 8US busbar adapters
- SIRIUS infeed system for 3RA6 (see page 5/22)

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

General data

SIRIUS 3RA6 compact starters

The SIRIUS 3RA6 compact starters are universal motor feeders according to IEC/EN 60947-6-2. As control and protective switching devices (CPS) they can connect, convey and disconnect the thermal, dynamic and electrical loads from short-circuit currents up to $I_q = 53$ kA, i.e. they are practically weld-free. They combine the functions of a motor protection circuit breaker, a contactor and a solid-state overload relay in one enclosure. Direct-on-line starters with 45 mm width and reversing starters with 90 mm width are available as variants.

The reversing starter version comes with not only an internal electrical interlock but also with a mechanical interlock to prevent simultaneous actuation of both directions of rotation.

The compact starters have isolating features in accordance with IEC / EN 60947-2 and can be used as disconnecter units (main control switch according to EN 60204-1). Isolation is effected by moving the handle into the "OFF" position; disconnection by means of the control contacts is not enough.

3RA6 fuseless load feeders are supplied for 5 different current setting ranges. The 3RA61 and 3RA62 have 3 control voltage ranges (AC/DC), the 3RA64 and 3RA65 have one control voltage range (DC):

Current setting range	At 400 V AC for induction motors Standard output P	Rated control supply voltage for	
		3RA61, 3RA62 compact starters	3RA64, 3RA65 compact starters for IO-Link
A	kW	V AC/DC	V DC
0.1 ... 0.4	0.09	24	24
0.32 ... 1.25	0.37	42 ... 70	
1 ... 4	1.5	110 ... 240	
3 ... 12	5.5		
8 ... 32	15		

Operating conditions

The SIRIUS 3RA6 compact starters are suitable for use in any climate. They are intended for use in enclosed rooms in which no severe operating conditions (such as dust, caustic vapors, hazardous gases) prevail. Suitable covers must be provided for installation in dusty and damp locations.

The SIRIUS compact starters are generally designed to degree of protection IP20. The permissible ambient temperature during operation is -20 to +60 °C.

The rated short-circuit current I_{cs} according to IEC/EN 60947-6-2 is 53 kA at 400 V.

Overload tripping times

The overload tripping time can be set on the device to normal starting conditions (CLASS 10) and to heavy starting conditions (CLASS 20). As the breaker mechanism still remains closed after an overload, resetting is possible by either local manual reset or auto reset after 3 minutes cooling time.

With autoreset there is no need to open the control cabinet.

Diagnostics options

The compact starter provides the following diagnostics options:

- With LEDs
 - Connection to the control voltage
 - Position of the main contacts
- With mechanical indication
 - Tripping due to overload
 - Tripping due to short-circuit
 - Tripping due to malfunction (end of service life reached because of worn switching contacts or a worn switching mechanism or faults in the control electronics)

These states can also be evaluated in the higher-level control system:

- With parallel wiring using the integrated auxiliary and signaling switches of the compact starter
- With AS-Interface or IO-Link in even greater detail using the respective communication interface

Four complement variants for 3RA6 compact starters

- For standard mounting rail or screw mounting: basic version including 1 pair of main circuit terminals and 1 pair of control circuit terminals
- For standard mounting rail or screw fixing when using the AS-i add-on module: without control circuit terminals because the AS-i add-on module is plugged on instead
- For use with the infeed system for 3RA6: without main circuit terminals because they are supplied with the infeed system and the expansion modules
- For use with the infeed system for 3RA6 and AS-i add-on module: without terminal complement (also for reordering when replacing the compact starter)
- The control circuit terminals are always required by the compact starters for IO-Link; the main circuit terminals depend on the use of the infeed system.

More components of the 3RA6

Already integrated in the 3RA61/3RA62 – and connectable using the two 6-pole removable control circuit terminals – in addition to the control supply voltage are the signaling contacts "overload" (1 CO) and "short-circuit / malfunction" (1 NO). The 3RA61 has two auxiliary contacts (1 NO + 1 NC) for indicating the position of the main contacts. Unlike the 3RA61 direct-on-line starter, the 3RA62 reversing starter has one auxiliary contact (1 NO) per direction of rotation per main contact.

Available for the 3RA61 and 3RA64 direct-on-line starters is a slot for an optional auxiliary switch block (optionally 2 NO, 2 NC or 1 NO + 1 NC) and for the 3RA62 and 3RA65 reversing starters there are two slots (for auxiliary switch blocks see Accessories, page 5/15).

Unlike the direct-on-line starter, the 3RA62 reversing starter has one auxiliary contact (1 NO) per direction of rotation per main contact.

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

General data

Positively-driven operation of the auxiliary contacts

Positively-driven operation between individual auxiliary circuits exists for the compact starter in the version as a direct-on-line starter for parallel wiring (3RA61) between the auxiliary circuits of the NC contacts (NC 21-22) and the NO contacts (NO 13-14) in the basic unit.

In addition the optional auxiliary switch block offers positively driven contacts in the version 3RA69 13-1A, each with one NO contact and one NO contact.

Order No. scheme

Digit of the Order No.	1st - 4th	5th	6th	7th	-	8th	9th	10th	11th	12th	-	13th	14th	15th	16th
	☐ ☐ ☐ ☐	☐	☐	☐	-	☐	☐	☐	☐	☐	-	☐	☐	☐	☐
SIRIUS 3RA6 compact starters	3 R A 6														
Version (direct-on-line starter = 1, reversing starter = 2, direct-on-line starter for IO-Link = 4, reversing starter for IO-Link = 5, infeed system = 8, accessories = 9)		☐													
Details of accessories			☐	☐											
Connection method (0 = without terminals, 1 = screw terminals, 2 = spring-type terminals)						☐									
Setting range							☐								
Rated control supply voltage								☐	☐						
Terminals complement variant										☐					
Special versions												☐	☐	☐	☐
Example	3 R A 6	1	2	0	-	0	A	B	3	0					

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Benefits

The SIRIUS 3RA6 compact starters offer a number of benefits:

- Compact design saves space in the control cabinet
- Little planning and assembly work and far less wiring thanks to a single complete unit with one order number
- Little variance through 3 wide voltage ranges and 5 wide setting ranges for the rated current mean low stock levels
- High plant availability through integrated functionalities such as prevention of main contact welding and shut-down at end of service life
- Greater productivity through automatic device reset in case of overload and differentiated detection of overload and short-circuit
- Easy checking of the wiring and testing of the motor direction prior to start-up thanks to optional "control kits"

- Speedy replacement of devices thanks to removable terminals with spring-type and screw connections in the main and control circuit
- Efficient power distribution through the related SIRIUS infeed system for 3RA6
- Direct connection of the motor feeder cable to the SIRIUS infeed system for 3RA6 thanks to integrated PE bar
- Connecting and looping through incoming feeders up to a cross-section of 70 mm²
- When using the infeed system for 3RA6, possibility of directly connecting the motor cable without intermediate terminals
- Integration in Totally Integrated Automation thanks to the optional connection to AS-Interface or IO-Link

The SIRIUS 3RA6 compact starters create the basis for high-availability and future-proof machine concepts.

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

General data

Technical specifications

Type		3RA61	3RA62	3RA64	3RA65	
Size		S0				
Number of poles		3				
Mechanics and environment						
Mounting dimensions (WxHxD)						
• Screw terminals	mm		45 x 170 x 165	90 x 170 x 165	45 x 170 x 165	90 x 170 x 165
• Spring-type terminals	mm		45 x 191 x 165	90 x 191 x 165	45 x 191 x 165	90 x 191 x 165
Depth from standard mounting rail	mm	160				
Permissible ambient temperature						
• For operation(for permissible operational current see the following section “Electrical Specifications”)	°C	-20 ... +60, with restriction up to +70				
• During storage	°C	-55 ... +80				
• During transport	°C	-55 ... +80				
Weight	kg	1.4	2.3 -2.4	1.3	2.3	
Permissible mounting positions		No restrictions, preferably vertical or horizontal installation				
Shock resistance (sine-wave pulse)		$a = 60 \text{ m/s}^2 = 6 \text{ g}$ with 10 ms; for every 3 shocks in all axes				
Vibratory load		$f = 4 \dots 5.8 \text{ Hz}$; $d = 15 \text{ mm}$; $f = 5.8 \dots 500 \text{ Hz}$; $a = 20 \text{ m/s}^2$; 10 cycles				
Degree of protection	Acc. to IEC 60947-1	IP20				
Installation altitude	m	Up to 2 000 above sea level without restriction				
Relative air humidity	%	10 ... 90				
Pollution degree		3				
Electrical specifications						
Device standard		IEC/EN 60947-6-2				
Maximum rated operational voltage U_e	V	690				
	V	400 at 3RA62 50-.E... and 3RA65 00-.E... (reversing starter 32 A versions)				
Rated current I_e and setting range for overload release	0.1 ... 0.4 A	A	0.4			
	0.32 ... 1.25 A	A	1.25			
	1 ... 4 A	A	4			
	3 ... 12 A	A	12			
	8 ... 32 A	A	32			
Permissible operational current of the compact starter						
when several compact starters are mounted side-by-side on a vertical standard mounting rail or in the infeed system for 3RA6						
• For a control cabinet inside temperature of	+40 °C	%	100			
• For a control cabinet inside temperature of	+60 °C	%	80			
Rated frequency		Hz	50/60			
Rated insulation voltage U_i		V	690			
(pollution degree 3)						
Rated impulse withstand voltage U_{imp}		kV	6			
Trip class (CLASS)	Acc. to IEC 60947-4-1, EN 60947-4-1		10/20			
Overload function						
Ratio of lower to upper current mark		1:4				
Rated service short-circuit breaking capacity I_{cs} at 50/60 Hz 400 V AC		kA	53			
Rated service short-circuit breaking capacity I_{csIT} at 50/60 Hz 400/690 V AC in IT systems		kA	1.5			
Power loss $P_{v \max}$ of all main current paths dependent on the rated current I_n (upper setting range)	0.4 A	mW	10			
	1.25 A	mW	100			
	4 A	W	1			
	12 A	W	1.8			
	32 A	W	5.4			
Max. switching frequency	AC-41	1/h	750			
	AC-43	1/h	250			
	AC-44	1/h	15			
No-load switching frequency		1/h	3 600		3 600, depending on the IO-Link communication time	
Touch protection	Acc. to EN 50274	Finger-safe				
Isolating features of the compact starter	Acc. to IEC/EN 60947-3	Yes: Isolation is assured only by moving the handle into the “OFF” position.				
Main and EMERGENCY-STOP switch characteristics of the compact starter and accessories	Acc. to IEC/EN 60204	Yes				

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

General data

Type			3RA61	3RA62	3RA64	3RA65
Size			S0			
Number of poles			3			
Electrical specifications (continued)						
Protective separation	Acc. to IEC 60947-2					
Control circuit to auxiliary circuit						
• Horizontal standard mounting rail		V	Up to 400			
• Other mounting position		V	Up to 250			
Auxiliary circuit to auxiliary circuit						
• Horizontal standard mounting rail		V	Up to 400			
• Other mounting position		V	Up to 250			
Main circuit to auxiliary circuit						
• Any mounting position		V	Up to 400			
EMC interference immunity	Acc. to IEC/EN 60947-1		Corresponds to degree of severity 3			
Conductor-related interference	BURST acc. to IEC/EN 61000-4-4					
• In the main circuit		kV	4		4	
• In the auxiliary circuit		kV	3		2	
Conductor-related interference	SURGE acc. to IEC/EN 61000-4-5					
• In the main circuit						
- Conductor - Ground		kV	4		2	
- Conductor - Conductor		kV	2		1	
• In the auxiliary circuit						
- Conductor - Ground		kV	2		0.5 ¹⁾	
- Conductor - Conductor		kV	1		0.5 ¹⁾	
Auxiliary switches						
• Integrated						
- Position of the main contacts			1 NO + 1 NC	2 NO	1 NO + 1 NC	2 NO
- Overload/short-circuit and malfunction signal			1 CO/1 NO			
• Expandable						
- Position of the main contacts			2 NO, 2 NC, 1 NO, 1 NC			
Surge suppressors			Integrated (Varistor)			
Electromagnetic operating mechanisms						
Control voltage		V	24 AC/DC		24 DC	
		V	42 ... 70 AC/DC		—	
		V	110 ... 240 AC/DC		—	
Frequency	At AC	Hz	50/60 (±5 %)			
Operating range			0.7 ... 1.25 U_s		0.85 ... 1.2 U_s	
No-load switching frequency		1/h	3 600			
Line protection	At 10 kA At 50 kA	mm ² mm ²	2.5 4			
Shock resistance						
• Breaker mechanism OFF		g	25			
• Breaker mechanism ON		g	15			
Normal switching duty						
Making capacity			12 x I_n			
Breaking capacity			10 x I_n			
Switching capacity dependent on rated current	Up to 12 A Up to 32 A	kW kW	5.5 15			
Endurance in operating cycles						
• Electrical endurance	At $I_e = 0.9 \times I_n$ and 400 V		3 ... 10 000 000	2 x 3 ... 10 000 000	3 000 000	2 x 1 500 000

1) To maintain maximum interference immunity in a harsh electromagnetic environment, additional overvoltage protection should be provided in the control circuit.

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

General data

Type		3RA61 20-□B3., 3RA62 50-□B3. □ = A, B, C or D Rated operational current ≤ 12 A				3RA61 20-EB3., 3RA62 50-EB3. Rated operational current 32 A			
Rated control supply voltage	V	24 AC		24 DC		24 AC		24 DC	
Inrush peak current	A	0.59		0.47		0.59		0.47	
Hold current	A	0.13		0.12		0.17		0.14	
Closed	W	2.8		2.9		3.5		3.1	
Operating times, typical									
• On	ms	<160		<140		<160		<140	
• Off	ms	<35		<35		<30		<30	
Type		3RA61 20-□E3., 3RA62 50-□E3. □ = A, B, C or D Rated operational current ≤ 12 A				3RA61 20-EE3., 3RA62 50-EE3. Rated operational current 32 A			
Rated control supply voltage	V	42 AC	70 AC	42 DC	70 DC	42 AC	70 AC	42 DC	70 DC
Inrush peak current	A	0.44	0.50	0.32	0.53	0.47	0.63	0.34	0.56
Hold current	A	0.08	0.08	0.06	0.04	0.09	0.08	0.09	0.07
Closed	W	2.6	3.1	2.2	2.2	2.7	3.2	3.6	4.2
Operating times, typical									
• On	ms	<160	<140	<160	<140	<150	<140	<150	<140
• Off	ms	<35	<50	<35	<40	<30	<40	<30	<40
Type		3RA61 20-□P3., 3RA62 50-□P3. □ = A, B, C or D Rated operational current ≤ 12 A				3RA61 20-EP3., 3RA62 50-EP3. Rated operational current 32 A			
Rated control supply voltage	V	110 AC	240 AC	110 DC	240 DC	110 AC	240 AC	110 DC	240 DC
Inrush peak current	A	0.24	0.40	0.17	0.29	0.24	0.40	0.17	0.29
Hold current	A	0.06	0.08	0.03	0.02	0.06	0.07	0.04	0.03
Closed	W	3.8	6	3.1	5.1	3.7	5.2	3.4	5.8
Operating times, typical									
• On	ms	<160	<140	<150	<140	<160	<140	<150	<140
• Off	ms	<50	<80	<50	<70	<40	<60	<40	<60
Type		3RA64 00-@B4., 3RA65 00-@B4. @ = A, B, C or D Rated operational current ≤ 12A				3RA64 00-EB4., 3RA65 00-EB4. Rated operational current 32 A			
Rated control supply voltage	V	24 DC				24 DC			
Inrush peak current	A	0.39				0.53			
Hold current	A	0.13				0.15			
Closed	W	2.9				3.4			
Operating times, typical ¹⁾									
• On	ms	<140				<140			
• Off	ms	<35				<30			

1) Plus IO-Link communication.

Type			3RA61	3RA62	3RA64	3RA65
Size			S0			
Number of poles			3			
Control circuit						
Rated operational voltage						
• External auxiliary switch block	V		400/690			
• Internal auxiliary switch	V		400/690			
• Short-circuit signaling switch	V		400			
• Overload signaling switch	V		400			
Switching capacity						
• External auxiliary switch block	AC-15					
	• Up to $U_e = 230$ V	A	6			
	• Up to $U_e = 400$ V	A	3			
	• Up to $U_e = 289/500$ V	A	2			
	• Up to $U_e = 400/690$ V	A	1			
	DC-13					
	• Up to $U_e = 24$ V	A	6			
	• Up to $U_e = 60$ V	A	0.9			
	• Up to $U_e = 125$ V	A	0.55			
	• Up to $U_e = 250$ V	A	0.27			
• Internal auxiliary switch	AC-15					
	• Up to $U_e = 230$ V	A	6			
	• Up to $U_e = 400$ V	A	3			
	• Up to $U_e = 289/500$ V	A	2			
	• Up to $U_e = 400/690$ V	A	1			
	DC-13					
	• Up to $U_e = 24$ V	A	10			
	• Up to $U_e = 60$ V	A	2			
	• Up to $U_e = 125$ V	A	1			
	• Up to $U_e = 250$ V	A	0.27			
	• Up to $U_e = 480$ V	A	0.1			
• Signaling switches	AC-15					
	• Up to $U_e = 230$ V	A	3			
	• Up to $U_e = 400$ V	A	1			
	DC-13					
	• Up to $U_e = 24$ V	A	2			
	• Up to $U_e = 250$ V	A	0.11			
External auxiliary switch blocks, internal auxiliary switches						
Endurance in operating cycles						
• Mechanical endurance			10 000 000		3 000 000	
• Electrical endurance	AC-15, 230 V					
	• Up to 6 A		200 000			
	• Up to 3 A		500 000			
	• Up to 1 A		2 000 000			
	• Up to 0.3 A		10 000 000			
	DC-13, 24 V					
	• Up to 6 A		30 000			
	• Up to 3 A		100 000			
	• Up to 0.5 A		2 000 000			
	• Up to 0.2 A		10 000 000			
	DC-13, 110 V					
	• Up to 1 A		40 000			
	• Up to 0.55 A		100 000			
	• Up to 0.3 A		300 000			
	• Up to 0.1 A		2 000 000			
	• Up to 0.04 A		10 000 000			
	DC-13, 220 V					
	• Up to 0.3 A		110 000			
	• Up to 0.1 A		650 000			
	• Up to 0.05 A		2 000 000			
	• Up to 0.018 A		10 000 000			
Contact stability	At 17 V and 5 mA	Operating cycles	1 incorrect switching operation per 100 000 000			
Short-circuit protection						
• Short-circuit current $I_k \leq 1.1$ kA	Fuse links operational class gG	A	10			
	- NEOZED Type 5SE					
	- DIAZED Type 5SB					
	- LV HRC Type 3NA					
• Short-circuit current $I_k < 400$ A	Miniature circuit breaker up to 230 V with C characteristic	A	10			

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

General data

Type			3RA61	3RA62	3RA64	3RA65
Size			S0			
Number of poles			3			
Signaling switches						
Endurance in operating cycles						
• Mechanical endurance			20 000			
• Electrical endurance AC-15	At 230 V and 3 A		6 050			
Contact stability	At 17 V and 5 mA	Operating cycles	1 incorrect switching operation per 100 000 000			
Short-circuit protection						
• Short-circuit current $I_k \leq 1.1$ kA	Fuse links operational class gG - NEOZED Type 5SE - DIAZED Type 5SB - LV HRC Type 3NA	A	6			
• Short-circuit current $I_k < 400$ A	Miniature circuit breaker up to 230 V with C characteristic	A	6			
Overload (short-circuit current $I_k \leq 1.1$ kA)	Fuse links operational class gG - NEOZED Type 5SE - DIAZED Type 5SB - LV HRC Type 3NA	A	4			

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

3RA61, 3RA62 compact starters
3RA61 direct-on-line starters

Selection and ordering data



3RA61 20-1CB32



3RA61 20-2EB32

Direct-on-line start



Width 45 mm

A set of 3RA69 40-0A adapters is required for screw fixing.

Standard induction motor 4-pole at 415 V AC ¹⁾ Standard output P	Setting range for electronic overload release	Order No.	Order No.
kW	A		
For use with the infeed system for 3RA6 and with the AS-i add-on module or as a replacement device, without main and control circuit terminals			
0.09	0.1 ... 0.4	3RA61 20-0A□30	—
0.37	0.32 ... 1.25	3RA61 20-0B□30	—
1.5	1 ... 4	3RA61 20-0C□30	—
5.5	3 ... 12	3RA61 20-0D□30	—
15	8 ... 32	3RA61 20-0E□30	—
Screw terminals Spring-type terminals			
For standard mounting rail or screw mounting, including 1 pair of main circuit terminals and 1 pair of control circuit terminals			
0.09	0.1 ... 0.4	3RA61 20-1A□32	3RA61 20-2A□32
0.37	0.32 ... 1.25	3RA61 20-1B□32	3RA61 20-2B□32
1.5	1 ... 4	3RA61 20-1C□32	3RA61 20-2C□32
5.5	3 ... 12	3RA61 20-1D□32	3RA61 20-2D□32
15	8 ... 32	3RA61 20-1E□32	3RA61 20-2E□32
For use in the infeed system for 3RA6, without main circuit terminals with 1 pair of control circuit terminals			
0.09	0.1 ... 0.4	3RA61 20-1A□33	3RA61 20-2A□33
0.37	0.32 ... 1.25	3RA61 20-1B□33	3RA61 20-2B□33
1.5	1 ... 4	3RA61 20-1C□33	3RA61 20-2C□33
5.5	3 ... 12	3RA61 20-1D□33	3RA61 20-2D□33
15	8 ... 32	3RA61 20-1E□33	3RA61 20-2E□33
For standard mounting rail or screw mounting when using the AS-i add-on module with 1 pair of main circuit terminals without control circuit terminals			
0.09	0.1 ... 0.4	3RA61 20-1A□34	3RA61 20-2A□34
0.37	0.32 ... 1.25	3RA61 20-1B□34	3RA61 20-2B□34
1.5	1 ... 4	3RA61 20-1C□34	3RA61 20-2C□34
5.5	3 ... 12	3RA61 20-1D□34	3RA61 20-2D□34
15	8 ... 32	3RA61 20-1E□34	3RA61 20-2E□34
Order No. supplements for rated control supply voltage		B E P	B E P
• 24 V AC/DC (for combining with AS-i add-on module) • 42 ... 70 V AC/DC • 110 ... 240 V AC/DC			

1) Selection depends on the concrete startup and rated data of the protected motor.

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

3RA61, 3RA62 compact starters
3RA62 reversing starters

Selection and ordering data

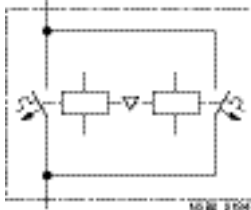


3RA62 50-1CP32



3RA62 50-2DP32

Reversing duty



Width 90 mm

Two sets of 3RA69 40-0A adapters are required for screw fixing.

Standard induction motor 4-pole at 415 V AC ¹⁾ Standard output <i>P</i>	Setting range for electronic overload release	Order No.	Order No.
kW	A		
For use with the infeed system for 3RA6 and with the AS-i add-on module or as a replacement device, without main and control circuit terminals			
0.09	0.1 ... 0.4	3RA62 50-0A□30	—
0.37	0.32 ... 1.25	3RA62 50-0B□30	—
1.5	1 ... 4	3RA62 50-0C□30	—
5.5	3 ... 12	3RA62 50-0D□30	—
15	8 ... 32	3RA62 50-0E□30	—
For standard mounting rail or screw mounting, including 1 pair of main circuit terminals and 1 pair of control circuit terminals			
0.09	0.1 ... 0.4	3RA62 50-1A□32	3RA62 50-2A□32
0.37	0.32 ... 1.25	3RA62 50-1B□32	3RA62 50-2B□32
1.5	1 ... 4	3RA62 50-1C□32	3RA62 50-2C□32
5.5	3 ... 12	3RA62 50-1D□32	3RA62 50-2D□32
15	8 ... 32	3RA62 50-1E□32	3RA62 50-2E□32
For use in the infeed system for 3RA6, without main circuit terminals with 1 pair of control circuit terminals			
0.09	0.1 ... 0.4	3RA62 50-1A□33	3RA62 50-2A□33
0.37	0.32 ... 1.25	3RA62 50-1B□33	3RA62 50-2B□33
1.5	1 ... 4	3RA62 50-1C□33	3RA62 50-2C□33
5.5	3 ... 12	3RA62 50-1D□33	3RA62 50-2D□33
15	8 ... 32	3RA62 50-1E□33	3RA62 50-2E□33
For standard mounting rail or screw mounting when using the AS-i add-on module with 1 pair of main circuit terminals without control circuit terminals			
0.09	0.1 ... 0.4	3RA62 50-1A□34	3RA62 50-2A□34
0.37	0.32 ... 1.25	3RA62 50-1B□34	3RA62 50-2B□34
1.5	1 ... 4	3RA62 50-1C□34	3RA62 50-2C□34
5.5	3 ... 12	3RA62 50-1D□34	3RA62 50-2D□34
15	8 ... 32	3RA62 50-1E□34	3RA62 50-2E□34
Order No. supplements for rated control supply voltage		B E P	B E P
• 24 V AC/DC (for combining with AS-i add-on module)			
• 42 ... 70 V AC/DC			
• 110 ... 240 V AC/DC			

1) Selection depends on the concrete startup and rated data of the protected motor.

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

3RA64, 3RA65 compact starters for IO-Link
3RA64 direct-on-line starters

Selection and ordering data



3RA64 with 3RA69 11-1A
auxiliary switch block

Direct-on-line start



Rated control supply voltage 24 V DC

Width 45 mm

A set of 3RA69 40-0 adapters is required for screw fixing.

Standard induction motor 4-pole at 415 V AC ¹⁾ Standard output <i>P</i>	Setting range for electronic overload release	Screw terminals	Spring-type terminals
kW	 A	Order No.	Order No.
For standard mounting rail or screw mounting, including 1 pair of main circuit terminals and 1 pair of control circuit terminals			
0.09	0.1 ... 0.4	3RA64 00-1AB42	3RA64 00-2AB42
0.37	0.32 ... 1.25	3RA64 00-1BB42	3RA64 00-2BB42
1.5	1 ... 4	3RA64 00-1CB42	3RA64 00-2CB42
5.5	3 ... 12	3RA64 00-1DB42	3RA64 00-2DB42
15	8 ... 32	3RA64 00-1EB42	3RA64 00-2EB42
For use in the infeed system for 3RA6, without main circuit terminals with 1 pair of control circuit terminals			
0.09	0.1 ... 0.4	3RA64 00-1AB43	3RA64 00-2AB43
0.37	0.32 ... 1.25	3RA64 00-1BB43	3RA64 00-2BB43
1.5	1 ... 4	3RA64 00-1CB43	3RA64 00-2CB43
5.5	3 ... 12	3RA64 00-1DB43	3RA64 00-2DB43
15	8 ... 32	3RA64 00-1EB43	3RA64 00-2EB43

1) Selection depends on the concrete startup and rated data of the protected motor.

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

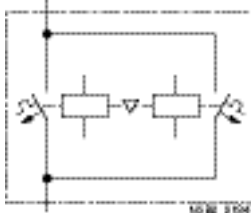
3RA64, 3RA65 compact starters for IO-Link
3RA65 reversing starters

Selection and ordering data



3RA65 with 3RA69 11-1A
auxiliary switch block

Reversing duty



Rated control supply voltage 24 V DC

Width 90 mm

Two sets of 3RA69 40-0A adapters are required for screw fixing.

Standard induction motor 4-pole at 415 V AC ¹⁾ Standard output P		Setting range for electronic overload release	Screw terminals 	Spring-type terminals 
kW		 A	Order No.	Order No.
For standard mounting rail or screw mounting, including 1 pair of main circuit terminals and 1 pair of control circuit terminals				
0.09	0.1 ... 0.4		3RA65 00-1AB42	3RA65 00-2AB42
0.37	0.32 ... 1.25		3RA65 00-1BB42	3RA65 00-2BB42
1.5	1 ... 4		3RA65 00-1CB42	3RA65 00-2CB42
5.5	3 ... 12		3RA65 00-1DB42	3RA65 00-2DB42
15	8 ... 32		3RA65 00-1EB42	3RA65 00-2EB42
For use in the infeed system for 3RA6, without main circuit terminals with 1 pair of control circuit terminals				
0.09	0.1 ... 0.4		3RA65 00-1AB43	3RA65 00-2AB43
0.37	0.32 ... 1.25		3RA65 00-1BB43	3RA65 00-2BB43
1.5	1 ... 4		3RA65 00-1CB43	3RA65 00-2CB43
5.5	3 ... 12		3RA65 00-1DB43	3RA65 00-2DB43
15	8 ... 32		3RA65 00-1EB43	3RA65 00-2EB43

1) Selection depends on the concrete startup and rated data of the protected motor.

Overview

Accessories for SIRIUS 3RA6 compact starters

The following accessories are available specially for the 3RA6 compact starters:

- AS-i add-on module: see [AS-Interface Add-On Modules for 3RA6, page 5/20](#)
- External auxiliary switch blocks: Snap-on auxiliary switch as versions 2 NO, 2 NC and 1 NO + 1 NC with screw or spring-type connections; the contacts of the auxiliary switch block open and close jointly with the main contacts of the compact starter. The NC contacts are designed as mirror contacts.
- Control kit: aid for manually closing the main contacts in order to check the wiring and motor direction under conditions of short-circuit protection
- Adapter for screw fixing the compact starter, including push-in lugs
- Main circuit terminals: Available with screw and spring-type terminals
- Main circuit terminals mixed connection method: With the main circuit terminals mixed connection method it is also possible in the main circuit to switch from screw terminals on the line side to spring-type terminals on the outgoing side. This enables for example the side-by-side mounting of several compact starters and their cost-efficient connection using 3-phase busbars on the infeed side. The motors are then connected directly by the quick and reliably contacting spring-type connection method.

Accessories for infeed using three-phase busbar systems

The three-phase busbars can be used as an easy, time-saving and clearly arranged means of feeding SIRIUS 3RA6 compact starters with screw connection. Motor protection circuit breaker sizes S00 and S0 can also be integrated.

The busbars are suitable for between 2 and 5 devices. However, any kind of extension up to a maximum summation current of 63 A is possible by clamping the tags of an additional busbar (rotated by 180°) underneath the terminals of the respective last motor protection circuit breaker.

A connecting piece is required for the combination with 3RV1 motor protection circuit breaker size S00. Motor protection circuit breakers S00 and S0 of the 3RV2 series can be combined in any way (without a special connecting piece). The motor protection circuit breakers are supplied by appropriate feeder terminals.

The three-phase busbar systems are finger-safe but empty connection tags must be fitted with covers. They are designed for any short-circuit stress which can occur at the output side of connected SIRIUS 3RA6 compact starters or motor protection circuit breakers.

Busbar adapters for 60 mm systems

The compact starters are mounted directly with the aid of busbar adapters on busbar systems with 60 mm center-to-center clearance in order to save space and to reduce infeed times and costs. These starters are suitable for copper busbars with a width from 12 to 30 mm. The busbars can be 4 to 5 mm or 10 mm thick.

The 8US busbar system can be loaded with a maximum summation current of 630 A.

The "reversing starter" version requires a device holder along side the busbar adapter for lateral mounting.

The compact starters are snapped onto the adapter and connected on the line side. This prepared unit is then plugged directly onto the busbar system, and is thus connected both mechanically and electrically at the same time.

Accessories for operation with closed control cabinet doors

Door-coupling rotary operating mechanisms for standard and emergency-stop applications are available for operating the compact starter with closed control cabinet doors.

Accessories for SIRIUS 3RA6 compact starters in IO-Link version

The following accessories are available specially for the 3RA64, 3RA65 compact starters:

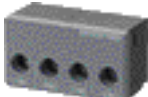
- The 4SI SIRIUS electronic module as IO-Link master allows for the simple and economical connection of SIRIUS controls with IO-Link (e.g. up to four groups of 4 compact starters) to the multifunctional SIMATIC ET 200S distributed I/O system.
- Additional connection cables for side-by-side mounting of up to 4 compact starters
- Operator panel for on-site control and diagnostics of up to 4 compact starters coupled to each other

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Accessories

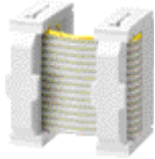
Selection and ordering data

	Version	Order No.
Accessories specially for 3RA6 compact starters		
	Control kits For mechanical actuation of the compact starter	3RA69 50-0A
	Adapters for screw fixing the compact starter (set including push-in lugs) Direct-on-line starters require 1 set, reversing starters 2 sets.	3RA69 40-0A
	Auxiliary switch blocks for compact starters • 2 NO • 2 NC • 1 NO +1 NC (these auxiliary contacts are positively driven.)	Screw terminals  3RA69 11-1A 3RA69 12-1A 3RA69 13-1A
	Main circuit terminals (incoming and outgoing side)	3RA69 20-1A
	Control circuit terminals • For 3RA61 • For 3RA62	3RA69 20-1B 3RA69 20-1C
	Auxiliary switch blocks for compact starters • 2 NO • 2 NC • 1 NO +1 NC (These auxiliary contacts are positively driven.)	Spring-type terminals  3RA69 11-2A 3RA69 12-2A 3RA69 13-2A
	Main circuit terminals (incoming and outgoing side)	3RA69 20-2A
	Control circuit terminals • For 3RA61 • For 3RA62	3RA69 20-2B 3RA69 20-2C

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Accessories

Version		Order No.
Accessories specially for 3RA6 compact starters (continued)		
 3RA69 20-3A	Main circuit terminals mixed connection method 1 set comprises: • 1 joint block on the line side with screw terminals • 1 joint block on the outgoing side with spring-type terminals	3RA69 20-3A
Version		Order No.
Accessories especially for 3RA64, 3RA65 compact starters with IO-Link		
 3RA69 31-0A	Additional connection cables (flat) for side-by-side mounting of up to 4 compact starters • 10-pole - 8 mm¹⁾ - 200 mm¹⁾ • 14-pole - 8 mm²⁾ - 200 mm	3RA69 32-0A 3RA69 33-0B
		3RA69 31-0A 3RA69 33-0C
 3RA69 35-0A	Operator panels (incl. enabling module, blanking cover and mounting bracket)	3RA69 35-0A
Enabling modules		3RA69 36-0A
Blanking covers		3RA69 36-0B
Connection cables (round) for connecting the operator panel 10-pole, 2 000 mm		3RA69 33-0A

1) 10-pole connection cables are required for EMERGENCY-STOP group concepts.

2) Is included in the scope of supply of the SIRIUS 3RA6 compact starter in IO-Link version.

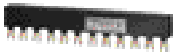
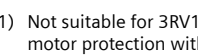
For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Accessories

Number of compact starters and motor protection circuit breakers that can be connected Without lateral accessories	Modular spacing	Rated current I_n at 690 V	For motor protection circuit breakers	Order No.
	mm	A	Size	

Three-phase busbars for infeed with 3RA6

	For feeding several compact starters and/or motor protection circuit breakers with screw terminals, mounted side by side on standard mounting rails, insulated, with touch protection.				
3RV19 15-1AB	2	45	63	S00, S0 ¹⁾	3RV19 15-1AB
	3	45	63	S00, S0 ¹⁾	3RV19 15-1BB
	4	45	63	S00, S0 ¹⁾	3RV19 15-1CB
3RV19 15-1BB	5	45	63	S00, S0 ¹⁾	3RV19 15-1DB
					
3RV19 15-1CB					
					
3RV19 15-1DB					

- 1) Not suitable for 3RV11/3RV21 motor protection circuit breakers for motor protection with overload relay function and for 3RV17/3RV27 and 3RV18/3RV28 circuit breakers according to UL 489 / CSA C22.2 No.5-02. Joint clamping of 3RV1 motor protection circuit breaker sizes S00 and S0 is not possible on account of the different modular spacings and the different height of the terminals. The 3RV19 15-5DB connecting piece is available for connecting the compact starters to the 3RV1 motor protection circuit breaker size S00. Motor protection circuit breakers S00/S0 of the 3RV2 series can be jointly clamped; no connecting piece has to be used.

Version	Modular spacing	For motor protection circuit breakers	Order No.
	mm	Size	

Connecting pieces for three-phase busbars

	For connecting compact starters (left) and 3RV1 motor protection circuit breakers size S00 (right)	45	S00	3RV19 15-5DB
3RV19 15-5DB				

Covers for connection tags of the three-phase busbars

	Touch protection for empty positions	—	S00, S0	3RV19 15-6AB
3RV19 15-6AB				

Conductor cross-section			Tightening torque	For compact starters and motor protection circuit breakers	Order No.
Solid or stranded	Finely stranded with end sleeve	AWG cables, solid or stranded			
mm ²	mm ²	AWG	Nm	Size	

Three-phase feeder terminals for three-phase busbars

	Connection from top				
3RV19 25-5AB	2.5 ... 25	4 ... 16	10-4	4	S0
	Connection from below²⁾				
3RV19 15-5B	2.5 ... 25	4 ... 16	10-4	Input: 4; Output: 2 ... 2.5	S00, S0

- 2) This terminal is connected in place of a switch, please take the space requirement into account.

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Accessories

Version		Order No.		
Busbar adapters for 60 mm system				
	For flat copper profiles according to DIN 46433 Width: 12 ... 30 mm Thickness: 4 ... 5 mm or 10 mm	8US12 11-1NS10		
	8US12 11-1NS10			
Device holders for lateral mounting along side the busbar adapter for 60 mm system				
	Required in addition to the busbar adapter for mounting a reversing starter	8US12 50-1AA10		
	8US12 50-1AA10			
Version		Color of handle	Version of extension shaft	Order No.
Door-coupling rotary operating mechanisms for operating the compact starter with closed control cabinet doors				
	The door-coupling rotary operating mechanisms consist of a knob, a coupling driver and a 130/330 mm long extension shaft (6 mm x 6 mm). The door-coupling rotary operating mechanisms are designed to degree of protection IP65. The door interlocking prevents accidental opening of the control cabinet door in the ON position of the motor protection circuit breaker. The OFF position can be locked with up to 3 padlocks.			
	Door-coupling rotary operating mechanisms	Black	130	3RV29 26-0B
	EMERGENCY-STOP door-coupling rotary operating mechanisms	Red/yellow	130	3RV29 26-0C
3RV29 26-0B				
Version		Order No.		
Tools for opening spring-type terminals by hand				
	Screwdrivers			
	for all SIRIUS devices with spring-type terminals			
	Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated			
3RA29 08-1A		Spring-type terminals 		
		3RA29 08-1A		
Documentation				
System manuals				
SIRIUS Compact Starters and Accessories				
English		3RA69 92-0A		

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Add-on modules for AS-Interface

Overview

Various AS-i add-on modules are available for communication of the 3RA6 compact starter with the control system using AS-Interface:

- Standard version
- With two local inputs
- With two free external inputs
- With one free external input and one free external output
- With two free external outputs
- For local control

The AS-i add-on modules can be combined only in connection with compact starters with a rated control supply voltage of 24 V AC/DC.

AS-i add-on module for on-site controller

With this new module it is also possible for the connected compact starter to be operated directly using simple switches, i.e. without recourse to AS-i Communication, if required.

"Automatic" mode

NC contacts can be connected to the inputs Y2 and Y4 through the local terminals on the AS-i add-on module. If the "+" connections are connected simultaneously to both local inputs, the AS-i add-on module will be in "Automatic" mode, i.e. it will communicate with the control system through AS-Interface.

On-site control

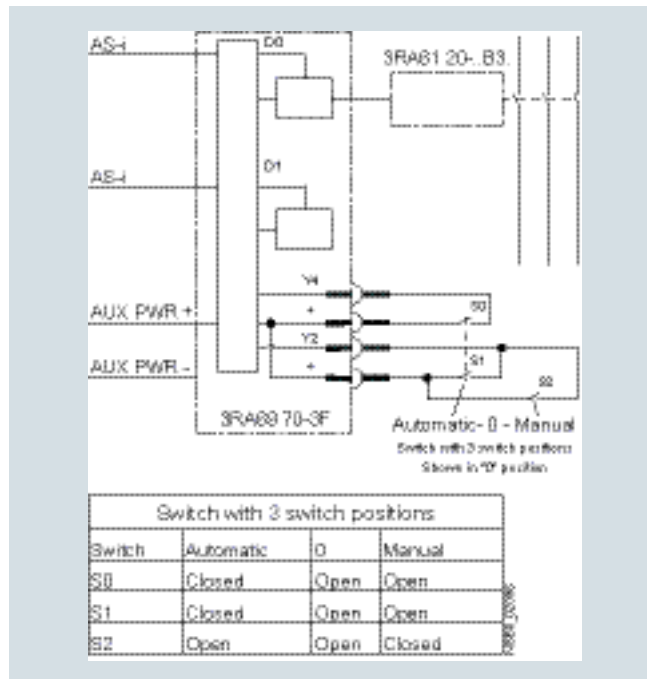
Opening the two inputs Y2 and Y4 will result in the direct disconnection of the compact starter. Operation through AS-i Communication is ended and the compact starter can now be switched on and off directly using NO contacts (one NO contact per direction of rotation on the reversing starter).

"LED AUX Power" must light up green, the 24 V DC supply must be assured and the AS-i control supply voltage must no longer be applied.

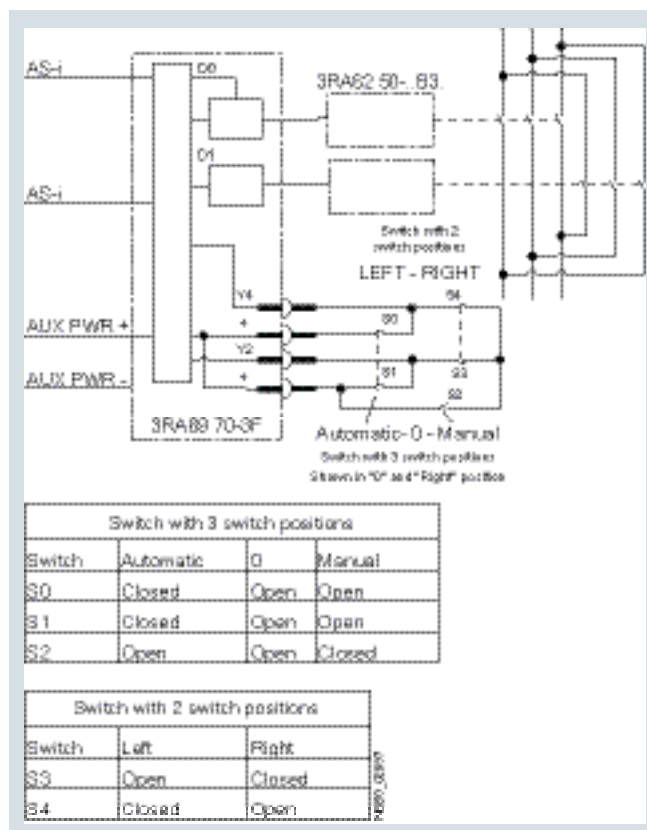
Resetting to "Automatic" mode

Simultaneous application of a "1" signal at the local inputs. The availability bit DI 0 is switched to a "1" signal.

If AS-i Communication is reset, the motor is first switched off and then on again when requested by the control system.



Circuit example for controlling a 3RA61 20 direct-on-line starter using an AS-i add-on module for on-site control



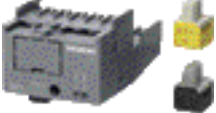
Circuit example for controlling a 3RA62 50 reversing line starter using an AS-i add-on module for on-site control

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Add-on modules for AS-Interface

Selection and ordering data

	Version	Order No.
AS-i add-on modules		
 3RA69 70-3A  3RA69 70-3B to -3F	Standard version For communication of the compact starter with the control system using AS-Interface	3RA69 70-3A
	With two local inputs For safe disconnection through local safety relays, e.g. cable-operated switches	3RA69 70-3B
	With two free external inputs Replaces the digital standard inputs "Motor On" and "Group warning"	3RA69 70-3C
	With one free external input and one free external output Replaces the digital standard input "Group warning"	3RA69 70-3D
	With two free external outputs Only for direct-on-line starters, replaces the digital standard output "Motor left"	3RA69 70-3E
	For local control Control of the compact starter optionally using AS-Interface or local switches	3RA69 70-3F
Accessories for AS-i add-on modules		
 3RK19 04-2AB01	Addressing units • For active AS-Interface modules, intelligent sensors and actuators • Acc. to AS-Interface Version 2.1 • Including expanded addressing mode • Scope of supply -1 addressing unit -1 operating manual (German, English, French, Spanish, Italian) -1 addressing cable (1.5 m long, with jack plug)	3RK19 04-2AB01

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Infeed systems for 3RA6

Overview

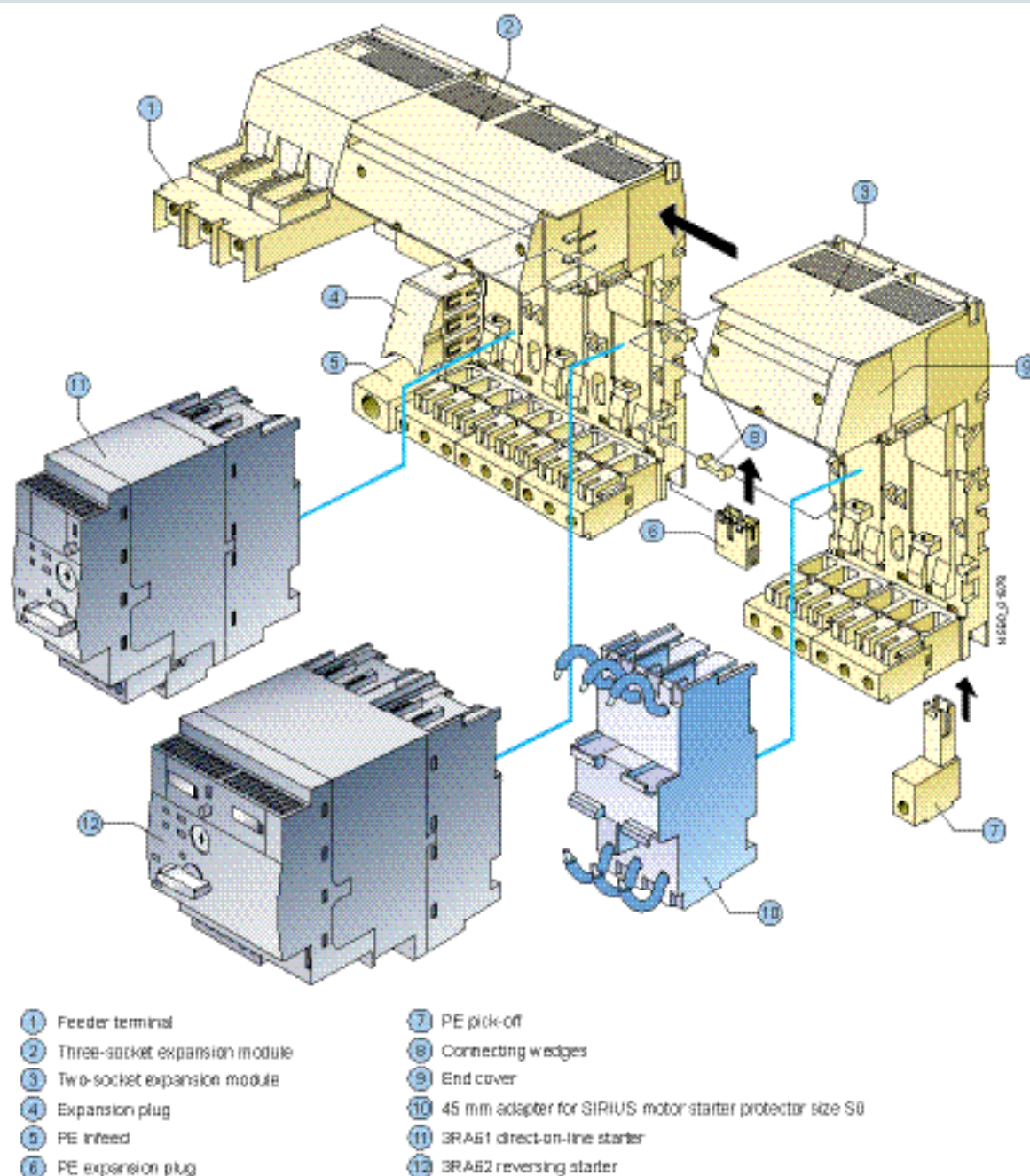
The infeed system for 3RA6 compact starters enables far less wiring in the main circuit and, thanks to the easy exchangeability of the compact starters, reduces the usual downtimes for maintenance work during the plant's operating phase.

The infeed system provides the possibility of completely prewiring the main circuit without a compact starter needing to be connected at the same time. As the result of the removable terminals in the main circuit, compact starters can be integrated in an infeed system in easy manner (without the use of tools).

In addition, the integrated PE bar means it is optionally possible to connect the motor cable directly to the infeed system without additional intermediate terminals. The infeed system for 3RA6 compact starters is designed for summation currents up to

100 A with a maximum conductor cross-section of up to 70 mm² on the feeder terminal block.

The infeed system can be mounted on a standard mounting rail or flat surfaces.



Infeed system for 3RA6 compact starters

① Infeed

The 3-phase infeed is available with screw connection (25/35 mm² up to 63 A or 50/70 mm² up to 100 A) and spring-type connection (25/35 mm² up to 63 A).

The infeed with spring-type terminal can be fitted on the left as well on as the right to an expansion module.

The infeed with screw terminal is supplied only with a 3-socket expansion module and permanently fitted on the left side.

The infeeds with screw connection enable connection of the main conductors (L1, L2, L3) either from above or from below.

The infeed with screw connection is supplied complete with 1 end cover, the infeed with spring-type connection complete with 2 end covers.

② Three-socket expansion modules

The expansion module with 3 sockets for compact starters is available with screw connection and with spring-type connection.

Expansion modules enable the infeed system to be expanded and can be fitted to each other in any number.

Two expansion modules are held together with the help of 2 connecting wedges and 1 expansion plug. These assembly parts are included in the scope of supply of the respective expansion module.

When the infeed system for 3RA6 is used, the compact starters (plug-in modules) are easily mounted and removed even when live.

Optional possibilities:

- PE connection on motor outgoing side
- Outfeed for external auxiliary devices
- Connection to 3RV19 infeed system
- Integration of SIRIUS 3RV1 motor protection circuit breakers size S0 (using 3RA68 90-0BA adapter)

③ Two-socket expansion modules

If only 2 instead of 3 additional sockets are required, then the 2-socket expansion module is the right choice. It has the same functionality as the 3-socket expansion module.

④ Expansion plug

Two expansion modules can be connected together using the expansion plug. Flexible expansion of the infeed system is thus possible.

⑤ PE infeeds

This module enables a PE cable to be connected.

The PE infeed can be ordered with screw connection and spring-type connection (35 mm²) and can be fitted on the right or left to the expansion block.

⑥ PE expansion plug

The PE expansion plug is inserted from below and enables two PE bars to be connected.

⑦ PE pick-off

The PE pick-off is available with screw connection and spring-type connection (6/10 mm²). It is snapped into the infeed system from below.

⑧ Connecting wedges

Two connecting wedges are used to hold together 2 expansion modules.

⑨ End covers

On the last expansion module of a row, the socket provided for the expansion plug can be covered by inserting the end cover.

⑩ 45 mm adapters for SIRIUS 3RV1 motor protection circuit breakers

SIRIUS 3RV1 motor protection circuit breakers size S0 with screw connection can be fitted to the adapter, enabling them to be plugged into the infeed system.

Terminal blocks

Using the terminal block the 3 phases can be fed out of the system; this means that single-phase, two-phase and three-phase components can also be integrated in the system.

After the end cover is pulled out, the terminal block can be plugged onto an expansion module.

Expansion plug for SIRIUS 3RV19 infeed systems

After the end cover is pulled out, the expansion plug for the SIRIUS 3RV19 infeed system can be plugged onto an expansion module. It connects the infeed system for 3RA6 compact starters with the SIRIUS 3RV19 infeed system.

Maximum rated operational current

The following maximum rated operational currents apply for the components of the infeed system for 3RA6:

Component	Maximum rated operational current A
Infeed with screw connection 50/70 mm ²	100
Infeed with screw connection 25/35 mm ²	63
Infeed with spring-type connection 25/35 mm ²	63
Expansion plug	63

With side-by-side mounting of several expansion modules, the maximum rated operational current from the second expansion module to the end of the row is 63 A.

Proposal for upstream short-circuit protection devices

The following short-circuit data apply for the components of the infeed system for 3RA6 compact starters:

Conductor cross-section mm ²	Inscriptions	Proposal for upstream short-circuit protection device
Short-circuit protection for infeed block (25 mm ² /35 mm ²) with screw connection		
2.5 ... 35	$I_{d, max} = 19 \text{ kA}$, $I^2t = 440 \text{ kA}^2\text{s}$	3RV10 41-4JA10
Short-circuit protection for infeed block (50/70 mm ²) with screw connection		
2.5 ... 70	$I_{d, max} = \text{approx. } 22 \text{ kA}$	3RV10 41-4MA10
Short-circuit protection for infeed block with spring-type connection		
4	$I_{d, max} = 9.5 \text{ kA}$, $I^2t = 85 \text{ kA}^2\text{s}$	3RV10 21-4DA10
6	$I_{d, max} = 12.5 \text{ kA}$, $I^2t = 140 \text{ kA}^2\text{s}$	3RV10 31-4EA10
10	$I_{d, max} = 15 \text{ kA}$, $I^2t = 180 \text{ kA}^2\text{s}$	3RV10 31-4HA10
16/25	$I_{d, max} = 19 \text{ kA}$, $I^2t = 440 \text{ kA}^2\text{s}$	3RV10 41-4JA10
Short-circuit protection for terminal block		
1.5	$I_{d, max} = 7.5 \text{ kA}$	5SY...
2.5	$I_{d, max} = 9.5 \text{ kA}$	1)
4	$I_{d, max} = 9.5 \text{ kA}$	
6	$I_{d, max} = 12.5 \text{ kA}$	

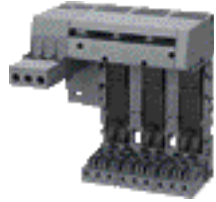
1) To prevent the possibility of short-circuits, the cables on the terminal block must be installed so that they are short-circuit proof according to EN 60439-1 Section 7.5.5.1.2.

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Infeed systems for 3RA6

Selection and ordering data

Version		Order No.
Three-phase infeeds and expansion modules		
 3RA68 12-8AB	Infeeds with screw connection 25/35 mm² left Infeed with screw connection at line side with a permanently fitted 3-socket expansion module with screw or spring-type connection on the outgoing side and integrated PE bar Expansion module with 3 sockets for 3 direct-on-line starters or 1 direct-on-line starter and 1 reversing starter	Screw terminals 
	• Screw terminals on the outgoing side 	3RA68 12-8AB
	• Spring-type terminals on the outgoing side 	3RA68 12-8AC
 3RA68 12-8AC		
 3RA68 13-8AB	Infeeds with screw connection 50/70 mm² left Infeed with screw connection at line side with a permanently fitted 3-socket expansion module with screw or spring-type connection on the outgoing side and integrated PE bar Expansion module with 3 sockets for 3 direct-on-line starters or 1 direct-on-line starter and 1 reversing starter	Screw terminals 
	• Screw terminals on the outgoing side 	3RA68 13-8AB
	• Spring-type terminals on the outgoing side 	3RA68 13-8AC
 3RA68 13-8AC		
 3RA68 30-5AC	Infeeds with screw connection 25/35 mm² left or right Up to 63 A	Spring-type terminals  3RA68 30-5AC

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Infeed systems for 3RA6

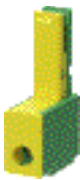
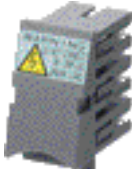
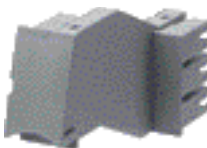
Expansion modules		Version	Order No.
 3RA68 22-0AB	Two-socket expansion modules With screw or spring-type connection and integrated PE bar with 2 sockets for 2 direct-on-line starters or 1 reversing starter Expansion plug and 2 connecting wedges are included in the scope of supply.	• Screw terminals	Screw terminals  3RA68 22-0AB
			Spring-type terminals  3RA68 22-0AC
	Three-socket expansion modules With screw or spring-type connection and integrated PE bar with 3 sockets for 3 direct-on-line starters or 1 direct-on-line starter and 1 reversing starter Expansion plug and 2 connecting wedges are included in the scope of supply.	• Screw terminals	Screw terminals  3RA68 23-0AB
			Spring-type terminals  3RA68 23-0AC
 3RA68 22-0AC		• Spring-type terminals	
 3RA68 23-0AB			
 3RA68 23-0AC			

For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Infeed systems for 3RA6

Accessories

Version		Order No.
Accessories for infeed systems for 3RA6		
<i>PE infeeds 25/35 mm²</i>		
 3RA68 60-6AB	• Screw terminals	Screw terminals  3RA68 60-6AB
	• Spring-type terminals	Spring-type terminals  3RA68 60-5AC
<i>PE pick-offs 6/10 mm²</i>		
 3RA68 70-4AB	• Screw terminals	Screw terminals  3RA68 70-4AB
	• Spring-type terminals	Spring-type terminals  3RA68 70-3AC
<i>Expansion plugs</i>		
 3RA68 90-0EA	PE expansion plugs	3RA68 90-0EA
	Expansion plugs between 2 expansion modules Is included in the scope of supply of the expansion modules.	3RA68 90-1AB
	Expansion plugs for SIRIUS 3RV19 infeed system Connects infeed system for 3RA6 to 3RV19 infeed system	3RA68 90-1AA
 3RA68 90-1AB		
 3RA68 90-1AA		

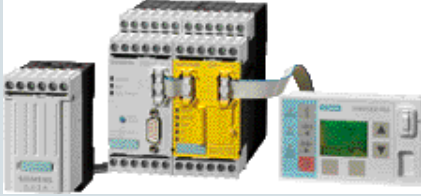
For Use in the Control Cabinet

SIRIUS 3RA6 Compact Starters

Infeed systems for 3RA6

Version		Order No.
Accessories for infeed systems for 3RA6 (Continued)		
 3RA68 90-0BA	45 mm adapters For SIRIUS 3RV1 motor protection circuit breakers size S0 Screw terminals	Screw terminals  3RA68 90-0BA
	Terminal blocks For integration of single-phase, 2-phase and 3-phase external components Spring-type terminals	Spring-type terminals  3RV19 17-5D
Tools for opening spring-type terminals by hand		
 3RA29 08-1A	Screwdrivers For all SIRIUS devices with spring-type terminals Length approx. 200 mm, 3.0 mm x 0.5 mm, titanium gray/black, partially insulated	Spring-type terminals  3RA29 08-1A

Notes



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SIMOCODE 3UF Motor Management and Control Devices

SIMOCODE pro 3UF7

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SIRIUS 3TK28 Safety Relays

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Timing Relays

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SIRIUS 3RR2 Monitoring Relays for Mounting onto 3RT2 Contactors

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Level monitoring

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6/65 Accessories

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

6/66 General data

6/69 Relays, analogically adjustable for 1 sensor

6/72 Relays, digitally adjustable for 1 sensor

6/74 Relays, digitally adjustable for up to 3 sensors

6/76 Accessories

SIRIUS 3RN1 Thermistor Motor Protection

6/77 For PTC sensors

Introduction

Overview



Type	SIMOCODE pro C	SIMOCODE pro V	Page
SIMOCODE 3UF motor management and control devices			
Basic units	✓	✓	6/11
Current measuring modules	✓	✓	6/11
Current/voltage measuring modules	—	✓	6/11
Decoupling modules	—	✓	6/11
Operator panels	✓	✓	6/11
Operator panels with display	—	✓	6/11
Expansion modules	—	✓	6/12
Failsafe expansion modules	—	✓	6/13
Current transformers	✓	✓	6/56
SIMOCODE ES 2007	✓	✓	6/16
SIMOCODE pro function block library for SIMATIC PCS 7	✓	✓	6/17



Type	3RP15
Timing relays	
Enclosure:	
• 17.5 mm industry and household equipment installation	—
• 22.5 mm industry	✓
• 45 mm industry	—
• For contactor sizes S0 to S12	—
Monofunction	✓
Multifunction	✓
Monovoltage	—
Combination voltage	✓
Wide voltage range	✓
Application:	
• Control systems and mechanical engineering	✓
• Infrastructure	—
• Mounting onto contactors	—



Type	3UG45 1., 3UG46 1.	3UG46 3.	3RR2, 3UG46 21, 3UG46 22	3UG46 41	3UG46 24	3UG30 81, 3UG30 82	3UG45 01	3UG46 51	3RS10, 3RS20	3RN1	Page
Monitoring relays											
Line monitoring	✓	—	—	—	—	—	—	—	—	—	6/40
Voltage monitoring	—	✓	—	—	—	—	—	—	—	—	6/45
Current monitoring	—	—	✓	—	—	—	—	—	—	—	6/48
Power factor and active current monitoring	—	—	—	✓	—	—	—	—	—	—	6/51
Residual current monitoring	—	—	—	—	✓	—	—	—	—	—	6/54
Insulation monitoring	—	—	—	—	—	✓	—	—	—	—	6/57
Level monitoring	—	—	—	—	—	—	✓	—	—	—	6/61
Temperature monitoring relays											
Temperature monitoring	—	—	—	—	—	—	—	—	✓	—	6/66
Thermistor motor protection											
Thermistor motor protection	—	—	—	—	—	—	—	—	—	✓	6/77

SIMOCODE 3UF Motor Management and Control Devices

SIMOCODE pro 3UF7

General data

Overview



SIMOCODE pro V with current/voltage measuring module, failsafe expansion module and operator panel with display

SIMOCODE pro is a flexible, modular motor management system for motors with constant speeds in the low-voltage performance range. It optimizes the connection between I&C and motor feeder, increases plant availability and allows significant savings to be made for startup, operation and maintenance of a system.

When SIMOCODE pro is installed in the low-voltage switchboard, it is the intelligent interface between the higher-level automation system and the motor feeder and includes the following:

- Multifunctional, solid-state full motor protection which is independent of the automation system
- Integrated control functions instead of hardware for the motor control
- Detailed operating, service and diagnostics data
- Open communication through PROFIBUS DP, the standard for fieldbus systems
- Safety relay function for the failsafe disconnection of motors up to SIL 3 (IEC 61508/62061) or PL e with Category 4 (ISO 13849-1)

SIMOCODE ES is the software package for SIMOCODE pro parameterization, start-up and diagnostics.

Two series

SIMOCODE pro is structured into two functionally tiered series:

- SIMOCODE pro C, as a compact system for direct-on-line starters and reversing starters or the actuation of a circuit breaker
- SIMOCODE pro V, as a variable system with all control functions and with the possibility of expanding the inputs, outputs and functions of the system at will using expansion modules

Expansion possibilities	SIMOCODE pro C, Basic Unit 1	SIMOCODE pro V, Basic Unit 2 ¹⁾
Operator panels	✓	✓
Operator panels with display	—	✓
Current measuring modules	✓	✓
Current/voltage measuring modules	—	✓
Decoupling modules	—	✓
Expansion modules:		
• Digital modules (max. 2)	—	✓
• Failsafe digital module (max. 1) ²⁾	—	✓
• Analog module (max. 1)	—	✓
• Ground-fault module (max. 1)	—	✓
• Temperature module (max. 1)	—	✓

✓ Available — Not available

1) When an operator panel with display and/or a decoupling module is used, more restrictions on the number of expansion modules connectable per basic unit must be observed, see page 6/10.

2) The failsafe digital module can be used instead of one of the two digital modules.

Per feeder each system always comprises one basic unit and one separate current measuring module. The two modules are connected together electrically through the system interface with a connection cable and can be mounted mechanically connected as a unit (one behind the other) or separately (side by side). The motor current to be monitored is decisive only for the choice of the current measuring module.

An operator panel for mounting in the control cabinet door is optionally connectable through a second system interface on the basic unit. Both the current measuring module and the operator panel are electrically supplied by the basic unit through the connection cable. More inputs, outputs and functions can be added to basic unit 2 (SIMOCODE pro V) by means of optional expansion modules, thus supplementing the inputs and outputs already existing on the basic unit. With the DM-F Local and DM-F PROFIsafe failsafe digital modules it is also possible to integrate the failsafe disconnection of motors in the SIMOCODE pro V motor management system.

All modules are connected by connection cables. The connection cables are available in various lengths. The maximum distance between the modules (e.g. between the basic unit and the current measuring module) must not exceed 2.5m. The total length of all the connection cables in a single system must not be more than 3 m.

Order No. scheme

Digit of the Order No.	1st - 4th □□□□	5th □	6th □	7th □	–	8th 1	9th □	10th □	11th 0	12th 0	–	13th 0
SIMOCODE pro motor management system	3 U F 7											
Type of unit/module		□										
Functional version of the unit/module			□	□								
Connection type of the current transformer							□					
Voltage version								□				
Example	3 U F 7	0	1	0	–	1	A	A	0	0	–	0

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Benefits

General customer benefits

- Integrating the whole motor feeder into the process control by means of a bus significantly reduces the wiring outlay between the motor feeder and PLC
- Decentralization of the automated processes by means of configurable control and monitoring functions in the feeder saves resources in the automation system and ensures full functionality and protection of the feeder even if the I&C or bus system fails
- The acquisition and monitoring of operational, service and diagnostics data in the feeder and process control system increases plant availability as well as maintenance and service-friendliness
- The high degree of modularity allows users to perfectly implement their plant-specific requirements for each motor feeder
- The SIMOCODE pro system offers functionally graded and space-saving solutions for each customer application
- The replacement of the control circuit hardware with integrated control functions decreases the number of hardware components and wiring required and in this way limits stock keeping costs and potential wiring errors
- The use of solid-state full motor protection permits better utilization of the motors and ensures long-term stability of the tripping characteristic and reliable tripping even after years of service

Multifunctional, solid-state full motor protection for rated motor currents up to 820 A

SIMOCODE pro offers comprehensive protection of the motor feeder by means of a combination of different, multi-step and delayable protection and monitoring functions:

- Inverse-time delayed solid-state overload protection (CLASS 5 to 40)
- Thermistor motor protection
- Phase failure/unbalance protection
- Stall protection
- Monitoring of adjustable limit values for the motor current
- Voltage and power monitoring
- Monitoring of the power factor (motor idling/load shedding)
- Ground-fault monitoring
- Temperature monitoring, e.g. over PT100/PT1000
- Monitoring of operating hours, downtime and number of starts etc.

Recording of measuring curves

SIMOCODE pro can record measuring curves and therefore is able, for example, to present the progression of motor current during motor start-up.

Flexible motor control implemented with integrated control functions (instead of comprehensive hardware interlocks)

Many predefined motor control functions have already been integrated into SIMOCODE pro, including all necessary logic operations and interlocks:

- Overload relays
- Direct-on-line and reversing starters
- Wye/delta starters (also with direction reversal)
- Two speeds, motors with separate windings (pole-changing switch); also with direction reversal
- Two speeds, motors with separate Dahlander windings (also with direction reversal)
- Positioner actuation
- Solenoid valve actuation
- Actuation of a circuit breaker
- Soft starter actuation (also with direction reversal)

These control functions are predefined in SIMOCODE pro and can be freely assigned to the inputs and outputs of the device (including PROFIBUS DP).

These predefined control functions can also be flexibly adapted to each customized configuration of a motor feeder by means of freely configurable logic modules (truth tables, counters, timers, edge evaluation, etc.) and with the help of standard functions (power failure monitoring, emergency start, external faults, etc.), without additional auxiliary relays being necessary in the control circuit.

SIMOCODE pro makes a lot of additional hardware and wiring in the control circuit unnecessary which results in a high level of standardization of the motor feeder in terms of its design and circuit diagrams.

Detailed operational, service and diagnostics data

SIMOCODE pro makes different operational, service and diagnostics data available and helps to detect potential faults in time and to prevent them by means of preventative measures. In the event of a malfunction, a fault can be diagnosed, localized and rectified very quickly – there are no or very short downtimes.

Operating data

- Motor switching state derived from the current flow in the main circuit
- All phase currents
- All phase voltages and phase-to-phase voltages
- Active power, apparent power and power factor
- Phase unbalance and phase sequence
- Time to trip
- Motor temperature
- Remaining cooling time etc.

Service data

- Motor operating hours
- Motor stop times
- Number of motor starts
- Number of overload trips
- Interval for compulsory testing of the enabling circuits
- Consumed power
- Internal comments stored in the device etc.

Diagnostics data

- Numerous detailed early warning and fault messages
- Internal device fault logging with time stamp
- Time stamping of freely selectable status, alarm or fault messages etc.

Easy operation and diagnostics

Operator panels

The operator panel is used to control the motor feeder and can replace all conventional pushbuttons and indicator lights to save space. It makes SIMOCODE pro or the feeder directly operable in the control cabinet. It features all the status LEDs available on the basic unit and externalizes the system interface for simple parameterization or diagnosis on a PC/PG.

Operator panels with display

As an alternative to the 3UF7 20 standard operator panel for SIMOCODE pro V there is also an operator panel with display: the 3UF7 21 is thus able in addition to indicate current measured values, operational and diagnostics data or status information of the motor feeder at the control cabinet. The pushbuttons of the operator panel can be used to control the motor while at the same time the display indicates current measured values, status information, fault messages or the device-internal fault protocol. Using the display settings each user can select for himself how the measured values are presented as standard and how the displayed unit is converted (e.g. °C -> °F).

SIMOCODE 3UF Motor Management and Control Devices

SIMOCODE pro 3UF7

General data

Communication

SIMOCODE pro is equipped with an integral PROFIBUS DP interface (SUB-D or terminal connection) and can therefore replace all individual wiring (including marshalling racks), which would usually be required for exchanging data with the higher-level automation system, with a single 2-wire cable.

In conjunction with a failsafe controller (F-CPU), the DM-F PROFIsafe failsafe digital module also enables failsafe disconnection through the same PROFIBUS with the PROFIsafe profile.

SIMOCODE pro supports among other things:

- Baud rates up to 12 Mbit/s
- Automatic baud rate detection
- Communication with up to 3 masters
- Time synchronization over PROFIBUS (SIMATIC S7)
- Time stamp with high timing precision (SIMATIC S7)
- Cyclic services (DPV0) and acyclic services (DPV1)
- DPV1 communication after the Y-Link
- Failsafe communication through PROFIBUS/PROFIsafe in conjunction with the DM-F PROFIsafe (F-DO) failsafe digital module etc.

For SIMOCODE pro motor management and control devices with communication function see page 6/11 onwards.

For accessories see page 6/14 onwards.

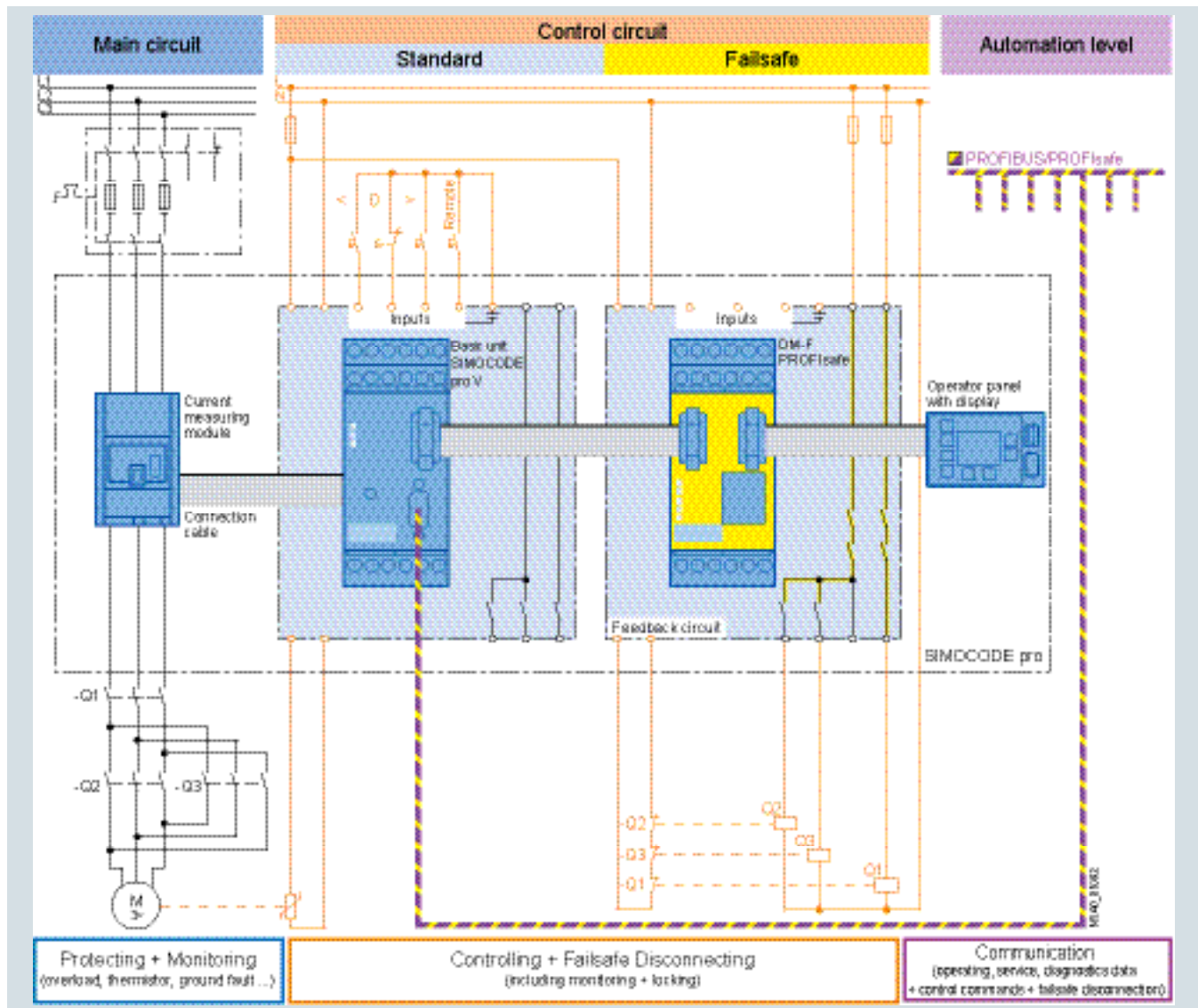
For accessories for PROFIBUS DP see Catalog IK PI "Industrial Communication".

Autonomous operation

An essential feature of SIMOCODE pro is independent execution of all protection and control functions even if communication with the I&C system breaks down. If the bus or automation system fails, the full functionality of the feeder is ensured or a pre-defined response can be initiated, e.g. the feeder can be shut down in a controlled manner or certain configured control mechanisms can be performed (e.g. the direction of rotation can be reversed).

SIMOCODE pro designed for mixed operation

Depending on functional requirements, the two systems can be used simultaneously without any problems and without any additional outlay in a low-voltage system. SIMOCODE pro C is fully upward-compatible to SIMOCODE pro V. The same components are used. The parameterization of SIMOCODE pro C can be transferred without any problems. Both systems have the same removable terminals and the same terminal designations.



SIMOCODE pro combines all essential functions, including safety functions, through PROFIBUS/PROFIsafe for the motor feeder

Application

SIMOCODE pro is often used for automated processes where plant downtimes are very expensive (e.g. steel or cement industry) and where it is important to prevent plant downtimes through detailed operational, service and diagnostics data or to localize the fault very quickly in the event of a fault.

SIMOCODE pro is modular and space-saving and suited especially for operation in motor control centers in the process industry and for power plant technology.

Applications

Protection and control of motors

- In hazardous areas for types of protection EEx e/d according to ATEX directive 94/9/EC see www.siemens.com/industrial-controls/atex
- With heavy starting (paper, cement, metal and water industries)
- In high-availability plants (chemical, oil, raw material processing industry, power plants)

Safety technology for SIMOCODE pro

The safe disconnection of motors in the process industry is becoming increasingly important as the result of new and revised standards and requirements in the safety technology field.

With the DM-F Local and DM-F PROFIsafe failsafe expansion modules it is easy to integrate functions for failsafe disconnection in the SIMOCODE pro V motor management system while retaining service-proven concepts. The strict separation of safety functions and operational functions proves particularly advantageous for planning, configuring and construction. Seamless integration in the motor management system leads to greater transparency for diagnostics and during operation of the system.

Suitable components for this purpose are the DM-F Local and DM-F PROFIsafe failsafe expansion modules, depending on the requirements:

- The DM-F Local failsafe digital module for when direct assignment between a failsafe hardware disconnect signal and a motor feeder is required, or
- The DM-F PROFIsafe failsafe digital module for when a failsafe controller (F-CPU) creates the signal for the disconnection and transmits it failsafe through PROFIBUS/PROFIsafe to the motor management system

Technical specifications

General data		
Permissible ambient temperature		
• During operation	°C	-25 ... +60 ; 3UF7 21: 0 ... +60
• Storage and transport	°C	-40 ... +80 ; 3UF7 21: -20 ... +70
Degree of protection (acc. to IEC 60529)		
• Measuring modules with busbar connection		IP00
• Operator panel (front) and door adapter (front) with cover		IP54
• Other components		IP20
Shock resistance (sine pulse)	g/ms	15/11
Mounting position		Any
Frequency	Hz	50/60 ±5 %
Immunity to electromagnetic interference (acc. to IEC 60947-1)		
• Line-induced interference, burst acc. to IEC 61000-4-4	kV	Corresponds to degree of severity 3
	kV	2 (power ports)
		1 (signal ports)
• Line-induced interference, high frequency acc. to IEC 61000-4-6	V	10
• Line-induced interference, surge acc. to IEC 61000-4-5	kV	2 (line to earth)
	kV	1 (line to line)
• Electrostatic discharge, ESD acc. to IEC 61000-4-2	kV	8 (air discharge)
	kV	6 (contact discharge); 3UF7 21: 4 (contact discharge)
• Field-related interference acc. to IEC 61000-4-3	V/m	10
Immunity to electromagnetic interference (acc. to IEC 60947-1)		
• Line-conducted and radiated interference emission		EN 55011/ EN 55022 (CISPR 11/ CISPR 22) (corresponds to degree of severity A)
Protective separation (acc. to IEC 60947-1)		
All circuits in SIMOCODE pro are safely separated from each other according to IEC 60947-1, i.e. they are designed with doubled creepage paths and clearances. In this context, compliance with the instructions in the test report "Safe Isolation" No. 2668 is required.		

SIMOCODE 3UF Motor Management and Control Devices

SIMOCODE pro 3UF7

General data

Basic units				
Control circuit				
Rated control supply voltage U_s (acc. to EN 61131-2)		110 ... 240 AC/DC; 50/60 Hz		24 V DC
Operating range		0.85 ... 1.1 x U_s		0.80 ... 1.2 x U_s
Power consumption		7 VA/5 W		5 W
• Basic Unit 1 (3UF7 000)		10 VA/7 W		7 W
• Basic Unit 2 (3UF7 010) incl. two expansion modules connected to Basic Unit 2				
Rated insulation voltage U_i		V	300 (at pollution degree 3)	
Rated impulse withstand voltage U_{imp}		kV	4	
Relay outputs		3 monostable relay outputs		
• Number		• Fuse links, operational class gA 6 A, quick-acting 10 A (IEC 60947-5-1)		
• Specified short-circuit protection for auxiliary contacts (relay outputs)		• Miniature circuit breaker 1.6 A, C characteristic (IEC 60947-5-1)		
		• Miniature circuit breaker 6 A, C characteristic ($I_k < 500$ A)		
• Rated uninterrupted current		A	6	
• Rated switching capacity		AC-15	6 A/24 V AC	6 A/120 V AC
		DC-13	2 A/24 V DC	0.55 A/60 V DC
				3 A/230 V AC
				0.25 A/125 V DC
Inputs (binary)		4 inputs supplied internally by the device electronics (with 24 V DC) and connected to a common potential		
Thermistor motor protection (binary PTC)				
• Summation cold resistance		kΩ	≤ 1.5	
• Response value		kΩ	3.4 ... 3.8	
• Return value		kΩ	1.5 ... 1.65	
Current measuring modules or current/voltage measuring modules				
Main circuit				
		3UF7 1.0	3UF7 1.1	3UF7 1.2
Current setting I_e	A	0.3 ... 3	2.4 ... 25	10 ... 100
Rated insulation voltage U_i	V	690; 3UF7 103 and 3UF7 104: 1000 (at pollution degree 3)		
Rated operational voltage U_e	V	690		
Rated impulse withstand voltage U_{imp}	kV	6; 3UF7 103 and 3UF7 104: 8		
Rated frequency	Hz	50/60		
Type of current		Three-phase current		
Short-circuit		Additional short-circuit protection is required in main circuit		
Accuracy of current measurement (in the range of 1 x minimum current setting I_o to 8 x max. current setting I_o)	%	±3		
Typical voltage measuring ranges				
• Phase-to-phase voltage/line-to-line-voltage (e.g. U_{L1L2})	V	110 ... 690 (only the phase voltages are available in SIMOCODE pro as measured values)		
• Phase voltage (e.g. U_{L1})	V	65 ... 400		
Accuracy				
• Voltage measurement (phase voltage U_L in the range 230 ... 400 V)	%	±3 (typical)		
• Power factor measurement (in the rated load range p. f. = 0.4 ... 0.8)	%	±5 (typical)		
• Apparent power measurement (in the rated load range)	%	±5 (typical)		
Notes on voltage measurement				
• In insulated, high-resistance or asymmetrically grounded formsof power supply system and for single-phase systems		In these networks the current/voltage measuring module can be used only with an upstream decoupling module on the system interface.		
• Feeder lines for voltage measurement		In the feeder lines from the main circuit for voltage measurement of SIMOCODE pro it may be necessary to provide additional line protection!		
Digital modules				
Control circuit				
Rated insulation voltage U_i		V	300 (at pollution degree 3)	
Rated impulse withstand voltage U_{imp}		kV	4	
Relay outputs		2 monostable or bistable relay outputs (depending on the version)		
• Number		• Fuse links, operational class gG 6 A, quick-acting 10 A (IEC 60947-5-1)		
• Specified short-circuit protection for auxiliary contacts (relay outputs)		• Miniature circuit breaker 1.6 A, C characteristic (IEC 60947-5-1)		
		• Miniature circuit breaker 6 A, C characteristic ($I_k < 500$ A)		
• Rated uninterrupted current		A	6	
• Rated switching capacity		AC-15	6 A/24 V AC	6 A/120 V AC
		DC-13	2 A/24 V DC	0.55 A/60 V DC
				3 A/230 V AC
				0.25 A/125 V DC
Inputs (binary)		4 inputs, electrically isolated, supplied externally with 24 V DC or 110 ... 240 V AC/DC depending on the version, connected to a common potential		

Ground-fault modules

Control circuit

Connectable 3UL22 summation current transformer with rated fault currents I_N

A

0.3/0.5/1

- $I_{\text{Ground fault}} \leq 50 \% I_N$
- $I_{\text{Ground fault}} \geq 100 \% I_N$

No tripping
Tripping

Response delay (conversion time)

ms

300 ... 500, additionally delayable

Temperature modules

Sensor circuit

Typical sensor circuits

- PT100
- PT1000/KTY83/KTY84/NTC

mA

1 (typical)

mA

0.2 (typical)

Open-circuit/short-circuit detection

- For sensor type
- Open circuit
- Short-circuit
- Measuring range

°C

PT100/PT1000

✓

✓

-50 ... +500

KTY83-110

✓

✓

-50 ... +175

KTY84

✓

✓

-40 ... +300

Measuring accuracy at 20 °C ambient temperature (T20)

K

< ±2

Deviation due to ambient temperature (in % of measuring range)

%

0.05 per K deviation from T20

Conversion time

ms

500

Connection type

Two- or three-wire connection

Analog modules

Control circuit

Inputs

- Channels
- Parameterizable measuring ranges
- Shielding
- Max. input current (destruction limit)
- Accuracy
- Input resistance
- Conversion time
- Resolution
- Open-circuit detection

mA

2 (passive)

0/4 ... 20

Up to 30 m shield recommended, from 30 m shield required

mA

40

%

±1

Ω

50

ms

150

bit

12

With measuring range 4 ... 20 mA

Output

- Channels
- Parameterizable output range
- Shielding
- Max. voltage at output
- Accuracy
- Max. output load
- Conversion time
- Resolution
- Short-circuit proof

mA

1

0/4 ... 20

Up to 30 m shield recommended, from 30 m shield required

30 V DC

%

±1

Ω

500

ms

25

bit

12

Yes

Connection type

Two-wire connection

Electrical separation of inputs/output to the device electronics

No

✓ Detection possible

SIMOCODE 3UF Motor Management and Control Devices

SIMOCODE pro 3UF7

General data

More information

Configuration instructions when using an operator panel with display and/or a decoupling module

If you want to use an operator panel with display and/or a decoupling module in the SIMOCODE pro V system, then the following configuration instructions concerning the type and number of connectable expansion modules must be observed.

The following tables show the maximum possible configuration of the expansion modules for the various combinations.

The DM-F Local and DM-F PROFIsafe failsafe expansion modules behave in this connection like digital modules for standard applications.

Use of an operator panel with display

Digital modules	Digital modules	Analog modules	Temperature modules	Ground-fault modules
Only operator panel with display for basic unit 2 (24 V DC or 110 ... 240 V AC/DC)				
Max. 4 expansion modules can be used				
Operator panel with display and current/voltage measurement with basic unit 2 (110 ... 240 V AC/DC)				
Max. 3 expansion modules can be used or:				
—	—	✓	✓	—

✓ Available

— Not available

Use of a decoupling module (voltage measurement in insulated networks)

Digital modules	Digital modules	Analog modules	Temperature modules	Ground-fault modules
Basic units 2 (24 V DC)				
✓ ¹⁾	✓ ¹⁾	✓	✓	✓
Basic unit 2 (110 ... 240 V AC/DC)				
✓	✓	—	✓	✓
✓ ¹⁾	✓ ¹⁾	✓	✓	—
✓	—	✓	✓	—
✓	—	✓	—	✓

✓ Available

— Not available

1) No bistable relay outputs and no more than 5 of 7 relay outputs active simultaneously (> 3 s).

Use of a decoupling module (voltage measurement in insulated networks) in combination with an operator panel with display

Digital modules	Digital modules	Analog modules	Temperature modules	Ground-fault modules
Basic units 2 (24 V DC)				
✓	—	✓	✓	✓
✓	✓	—	✓	✓
Basic unit 2 (110 ... 240 V AC/DC)				
✓ ²⁾	—	✓	✓	✓
✓	✓	—	—	—
✓ ¹⁾	✓ ¹⁾	✓ ³⁾	—	—
✓	—	—	✓	✓

✓ Available

— Not available

1) No bistable relay outputs and no more than 5 of 7 relay outputs active simultaneously (> 3 s).

2) No bistable relay outputs and no more than 3 of 5 relay outputs active simultaneously (> 3 s).

3) Analog module output is not used.

Protective separation

All circuits in SIMOCODE pro are safely separated from each other according to IEC 60947-1, Annex N. That is, they are designed with double creepages and clearances. In the event of a fault, therefore, no parasitic voltages can be formed in neighboring circuits. The instructions of Test Report No. 2668 must be complied with.

Types of protection EEx e and EEx d

The overload protection and the thermistor motor protection of the SIMOCODE pro system comply with the requirements for overload protection of explosion-protected motors to the type of protection:

- EEx d "flameproof enclosure" e. g. according to EN 50018 or EN 60079-1
- EEx e "increased safety" e.g. according to EN 50019 or EN 60079-7.

When using SIMOCODE pro devices with a 24 V DC control voltage, electrical separation must be ensured using a battery or a safety transformer according to EN 61558-2-6. EC prototype test certificate: BVS 06 ATEX F 001
Test report: BVS PP 05.2029 EG.

Selection data for type-tested assemblies/load feeders

Configuration tables according to type of coordination "1" or "2" can be found in the manual "SIRIUS Configuration", Order No.: E86060-T1815-A101-A3 or in the SIMOCODE pro System Manual.

System manual

The SIMOCODE pro system manual describes the motor management system and its functions in detail. It provides information on configuration, start-up, servicing and maintenance. A typical example of a reversing starter application is used to teach the user quickly and practically how to use the system. In addition to help on how to identify and rectify faults in the event of a malfunction, the manual also contains special information for servicing and maintenance. For selection of equipment and for configuration, it is recommended that the 3UF7 970-0AA0.-0 system manual is consulted.

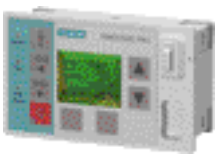
A detailed description of the DM-F Local and DM-F PROFIsafe failsafe expansion modules is provided in the system manual

"SIMOCODE pro Safety Failsafe Digital Modules", which can be downloaded from the Internet.

Internet

More information is available on the Internet at:
www.siemens.com/simocode

Selection and ordering data

Version		Current setting	Width	Screw terminals	
		A	mm	Order No.	
SIMOCODE pro					
	SIMOCODE pro C, Basic Unit 1 PROFIBUS DP interface, 12 Mbit/s, RS 485 I/3 O freely assignable, input for thermistor connection, monostable relay outputs, rated control supply voltage U_s : • 24 V DC • 110 ... 240 V AC/DC				3UF7 000-1AB00-0 3UF7 000-1AU00-0
3UF7 000-1A.00-0					
	SIMOCODE pro V, Basic Unit 2 PROFIBUS DP interface, 12 Mbit/s, RS 485 I/3 O freely assignable, input for thermistor connection, monostable relay outputs, can be expanded by expansion modules, rated control supply voltage U_s : • 24 V DC • 110 ... 240 V AC/DC				3UF7 010-1AB00-0 3UF7 010-1AU00-0
3UF7 010-1A.00-0					
	Current measuring modules • Straight-through transformers 0.3 ... 345 2.4 ... 2545 10 ... 10055 20 ... 200120 • Busbar connections 20 ... 200120 63 ... 630145				3UF7 100-1AA00-0 3UF7 101-1AA00-0 3UF7 102-1AA00-0 3UF7 103-1AA00-0 3UF7 103-1BA00-0 3UF7 104-1BA00-0
3UF7 100-1AA00-0					
	Current/voltage measuring modules for SIMOCODE pro V Voltage measuring up to 690 V if required in connection with a decoupling module • Straight-through transformers 0.3 ... 345 2.4 ... 2545 10 ... 10055 20 ... 200120 • Busbar connections 20 ... 200120 63 ... 630145				3UF7 110-1AA00-0 3UF7 111-1AA00-0 3UF7 112-1AA00-0 3UF7 113-1AA00-0 3UF7 113-1BA00-0 3UF7 114-1BA00-0
3UF7 110-1AA00-0					
	Decoupling modules For connecting upstream from a current/voltage measuring module on the system interface when using voltage detection in insulated, high-resistance or asymmetrically grounded systems and in single-phase systems				3UF7 150-1AA00-0
3UF7 150-1AA00-0					
	Operator panels Installation in control cabinet door or front plate, for plugging into basic unit, 10 LEDs for status indication and user-assignable buttons for controlling the motor				3UF7 200-1AA00-0
3UF7 200-1AA00-0					
	Operator panels with display for SIMOCODE pro V¹⁾ Installation in control cabinet door or front plate, for plugging into basic unit 2, 7 LEDs for status indication and user-assignable buttons for controlling the motor, multilingual display, e.g. for indication of measured values, status information or fault messages				3UF7 210-1AA00-0
3UF7 210-1AA00-0					

1) Only possible with basic unit 2, product version E03 and higher (from 12/2006).

SIMOCODE 3UF Motor Management and Control Devices

SIMOCODE pro 3UF7

Expansion modules

Selection and ordering data

Version		Screw terminals							
		Order No.							
Expansion modules for SIMOCODE pro V									
With SIMOCODE pro V, it is possible to expand the type and number of inputs and outputs in steps. Each expansion module has two system interfaces on the front. Through the one system interface the expansion module is connected to the system interface of the SIMOCODE pro V using a connection cable; through the second system interface, further expansion modules or the operator panel can be connected. The power supply for the expansion modules is provided by the connection cable through Basic Unit 2. <u>Note:</u> Please order connection cable separately, see page 6/14.									
 3UF7 300-1AU00-0	Digital modules Up to two digital modules can be used to add additional binary inputs and relay outputs to basic unit. The input circuits of the digital modules are supplied from an external power supply. 4 binary inputs and 2 relay outputs, up to 2 digital modules can be connected per basic unit 2								
	<table><tr><th>Relay outputs</th><th>Input voltage</th></tr><tr><td>Monostable</td><td>24 V DC 110 ... 240 V AC/DC</td></tr><tr><td>Bistable</td><td>24 V DC 110 ... 240 V AC/DC</td></tr></table>	Relay outputs	Input voltage	Monostable	24 V DC 110 ... 240 V AC/DC	Bistable	24 V DC 110 ... 240 V AC/DC	3UF7 300-1AB00-0 3UF7 300-1AU00-0 3UF7 310-1AB00-0 3UF7 310-1AU00-0	
	Relay outputs	Input voltage							
	Monostable	24 V DC 110 ... 240 V AC/DC							
	Bistable	24 V DC 110 ... 240 V AC/DC							
Analog modules Basic unit can be optionally expanded with analog inputs and outputs (0/4 ... 20 mA) by means of the analog module. 2 inputs (passive) for input and 1 output for output of 0/4 ... 20 mA signals, max. 1 analog module can be connected per Basic Unit 2.	3UF7 400-1AA00-0								
Ground-fault modules Instead of ground-fault monitoring using the current measuring modules or current/ voltage measuring modules, it may be necessary, especially in high-impedance grounded networks, to implement ground-fault monitoring for smaller ground fault currents using a summation current transformer. 1 input for connecting a summation current transformer 3UL22, up to 1 ground-fault module can be connected per Basic Unit 2 <u>Note:</u> For corresponding summation current transformers for rated fault currents of 0.3 A, 0.5 A or 1 A see page 6/56.	3UF7 500-1AA00-0								
Temperature modules Independently of the thermistor motor protection of the basic units, up to 3 analog temperature sensors can be evaluated using a temperature module. Sensor types: PT100/PT1000, KTY83/KTY84 or NTC 3 inputs for connecting up to 3 analog temperature sensors, up to 1 temperature module can be connected per Basic Unit 2	3UF7 700-1AA00-0								
 3UF7 400-1AA00-0									
 3UF7 500-1AA00-0									
 3UF7 700-1AA00-0									

Selection and ordering data

Version		Screw terminals 
		Order No.
Failsafe expansion modules for SIMOCODE pro V		
Thanks to the failsafe expansion modules, SIMOCODE pro V can be expanded with the function of a safety relay for the failsafe disconnection of motors. A maximum of 1 failsafe digital module can be connected; it can be used instead of a digital module. The failsafe expansion modules are equipped likewise with two system interfaces at the front for making the connection to other system components. Unlike other expansion modules, power is supplied to the modules through a separate terminal connection. <u>Note:</u> Please order connection cable separately, see page 6/14.		
 3UF7 320-1AB00-0	DM-F Local failsafe digital modules For failsafe disconnection using a hardware signal2 relay enabling circuits, joint switching; 2 relay outputs, common potential disconnected failsafe; inputs for sensor circuit, start signal, cascading and feedback circuit, safety function adjustable using DIP switches, rated control supply voltage U_s: • 24 V DC • 110 ... 240 V AC/DC	3UF7 320-1AB00-0 3UF7 320-1AU00-0
	DM-F PROFIsafe failsafe digital modules For failsafe disconnection using PROFIBUS/PROFIsafe 2 relay enabling circuits, joint switching; 2 relay outputs, common potential disconnected failsafe; 1 input for feedback circuit; 3 binary standard inputs, rated control supply voltage U_s: • 24 V DC • 110 ... 240 V AC/DC	3UF7 330-1AB00-0 3UF7 330-1AU00-0
 3UF7 330-1AB00-0		

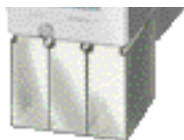
SIMOCODE 3UF Motor Management and Control Devices

SIMOCODE pro 3UF7

Accessories

Selection and ordering data

Version		Order No.
Connection cables (essential accessory)		
 3UF7 932-0AA00-0	Connection cables In different lengths for connecting basic unit, current measuring module, current/ voltage measuring module, operator panel or expansion modules or decoupling module: Length 0.025 m (flat) Important: Only suitable for connecting basic unit 2 to its expansion modules or for connecting expansion modules to each other; only when the front plates finish at the same height!	3UF7 930-0AA00-0
	- Length 0.1 m (flat) - Length 0.3 m (flat) - Length 0.5 m (flat)	3UF7 931-0AA00-0 3UF7 935-0AA00-0 3UF7 932-0AA00-0
	- Length 0.5 m (round) - Length 1.0 m (round) - Length 2.5 m (round)	3UF7 932-0BA00-0 3UF7 937-0BA00-0 3UF7 933-0BA00-0
	PC cables and adapters	
	For PC/PG communication with SIMOCODE pro Through the system interface, for connecting to the serial interface of the PC/PG	3UF7 940-0AA00-0
 3UF7 940-0AA00-0	USB/serial adapters To connect an RS 232 PC cable to the USB port of a PC, we recommend using modular safety system 3RK3, soft starter 3RW44, ET 200S/ECOFASST/ET 200pro motor starter, AS-i safety monitor, AS-i analyzer in conjunction with SIMOCODE pro 3UF7	3UF7 946-0AA00-0
Memory modules		
 3UF7 900-0AA00-0	The memory module enables the complete parameter assignment of a system to be saved and transferred to a new system, e.g. when a device is replaced, without the need for additional aids or detailed knowledge of the the system interface	3UF7 900-0AA00-0
Interface covers		
 3UF7 950-0AA00-0	For system interface	3UF7 950-0AA00-0
Addressing plugs		
 3UF7 910-0AA00-0	For assigning the PROFIBUS addresses without using a PC or programming device On SIMOCODE pro through the system interface	3UF7 910-0AA00-0
Door adapters		
 3UF7 920-0AA00-0	For external connection of the system interface Outside, for example, a control cabinet	3UF7 920-0AA00-0
Adapters for operator panel		
 3UF7 922-0AA00-0	The adapter enables the smaller 3UF7 20 operator panel from SIMOCODE pro to be used in a front panel cutout in which previously, e.g. after a change of system, a larger 3UF5 2 operator panel from SIMOCODE-DP had been used; degree of protection IP54	3UF7 922-0AA00-0

Version		Order No.
Labeling strips		
	- For pushbuttons of the 3UF7 20 operator panel - For pushbuttons of the 3UF7 21 operator panel with display - For LEDs of the 3UF7 20 operator panel	3UF7 925-0AA00-0 3UF7 925-0AA01-0 3UF7 925-0AA02-0
	<i>Note: Pre-punched labeling strips for user-specific printing using the free inscription software "SIRIUS Label Designer" on a laser printer.</i> <i>Note the software version!</i> Download from www.siemens.com/simocode	
	3UF7 925-0AA02-0	
Push-in lugs		
	For screw fixing E.g. on mounting plate, 2 units required per device - Can be used with 3UF7 1.0, 3UF7 1.1 and 3UF7 1.2 - Can be used with 3UF7 0, 3UF7 3, 3UF7 4, 3UF7 5 and 3UF7 7	3RB19 00-0B 3RP19 03
	3RB19 00-0B	
Terminal covers		
	Covers for cable lugs and busbar connections - Length 100 mm, can be used for 3UF7 1.3-1BA00-0 - Length 120 mm, can be used for 3UF7 1.4-1BA00-0	3RT19 56-4EA1 3RT19 66-4EA1
	3RT19 56-4EA1	
	Covers for box terminals - Length 25 mm, can be used for 3UF7 1.3-1BA00-0 - Length 30 mm, can be used for 3UF7 1.4-1BA00-0	3RT19 56-4EA2 3RT19 66-4EA2
	 Covers for screw terminals Between contactor and current measuring module or current/voltage measuring module for direct mounting - Can be used for 3UF7 1.3-1BA00-0 - Can be used for 3UF7 1.4-1BA00-0	3RT19 56-4EA3 3RT19 66-4EA3
Box terminal blocks		
	For round and ribbon cables - Up to 70 mm², can be used for 3UF7 1.3-1BA00-0 - Up to 120 mm², can be used for 3UF7 1.3-1BA00-0 - Up to 240 mm², can be used for 3UF7 1.4-1BA00-0	3RT19 55-4G 3RT19 56-4G 3RT19 66-4G
	3RT19 55-4G	
Bus termination modules		
	With separate supply voltage for terminating the bus following the last unit on the bus line. Supply voltage: 115/230 V AC 24 V DC	3UF1 900-1KA00 3UF1 900-1KB00
System manuals		
	SIMOCODE pro With token fee, languages: - German - English - French	3UF7 970-0AA01-0 3UF7 970-0AA00-0 3UF7 970-0AA02-0
	3UF7 970-0AA01-0	

Note:

The system manual "SIMOCODE pro Safety Failsafe Digital Modules" is available on the Internet at www.siemens.com/simocode.

SIMOCODE 3UF Motor Management and Control Devices

SIMOCODE pro 3UF7

Accessories

Version		Order No.
SIMOCODE ES 2007 Basic		
	Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through system interface	
	• License key on USB stick, Class A • License key download, Class A	3ZS1 312-4CC10-0YA5 3ZS1 312-4CE10-0YB5
SIMOCODE ES 2007 Standard		
	Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through system interface, integrated graphics editor	
	• License key on USB stick, Class A • License key download, Class A	3ZS1 312-5CC10-0YA5 3ZS1 312-5CE10-0YB5
	Upgrade for SIMOCODE ES 2004 and later Floating license for one user, E-SW, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface	3ZS1 312-5CC10-0YE5
	Powerpack for SIMOCODE ES 2007 Basic Floating license for one user, E-SW, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface	3ZS1 312-5CC10-0YD5
	Software Update Service For 1 year with automatic extension, assuming the current software version is in use, E-SW, software and documentation on CD, communication through the system interface	3ZS1 312-5CC10-0YL5
SIMOCODE ES 2007 Premium		
	Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through PROFIBUS or system interface, integrated graphics editor, STEP7 Object Manager	
	• License key on USB stick, Class A • License key download, Class A	3ZS1 312-6CC10-0YA5 3ZS1 312-6CE10-0YB5
	Upgrade for SIMOCODE ES 2004 and later Floating license for one user, E-SW, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through PROFIBUS or the system interface	3ZS1 312-6CC10-0YE5
	Powerpack for SIMOCODE ES 2007 Standard Floating license for one user, E-SW, license key on USB stick, Class A, 3 languages (German/English/French), communication through the PROFIBUS or the system interface	3ZS1 312-6CC10-0YD5
	Software Update Service For 1 year with automatic extension, assuming the current software version is in use, E-SW, software and documentation on CD, communication through PROFIBUS or the system interface	3ZS1 312-6CC10-0YL5

Please order PC cable separately, see page 6/14.

Version		Order No.
SIMOCODE pro function block library for SIMATIC PCS 7		
 3UF7 982-0AA00-0	Scope of supply: AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system	
	Engineering software for one engineering station (single license) including runtime software for execution of the AS module in an automation system (single license), German/English/French, Type of delivery: CD incl. electronic documentation	
	• For PCS 7 Version V 6.0	3UF7 982-0AA00-0
	• For PCS 7 Version V 6.1	3UF7 982-0AA02-0
	• For PCS 7 Version V 7.0	3UF7 982-0AA10-0
	Runtime software For execution of the AS module in an automation system (single license), Type of delivery: license without software and documentation	
	• For PCS 7 Version V 6.x	3UF7 982-0AA01-0
	• For PCS 7 Version V 7.x	3UF7 982-0AA11-0
	Upgrade for the PCS 7 function block library SIMOCODE pro, V6.0 or V6.1 on Version SIMOCODE pro V7.0 for integrating SIMOCODE pro into the PCS 7 process control system, for PCS 7 Version V7.0 (single license), German/English/French, Type of delivery: CD incl. electronic documentation	3UF7 982-0AA13-0

SIRIUS 3TK28 Safety Relays

General data

Overview



SIRIUS 3TK28 safety relay

SIRIUS safety relays are the key modules of a consistent and cost-effective safety chain. Be it EMERGENCY-STOP disconnection, protective door monitoring or the protection of presses or punches – with SIRIUS safety relays every safety application can be implemented to optimum effect in terms of engineering and price.

SIRIUS safety relays provide numerous safety-related functions:

- Monitoring the safety functions of sensors
- Monitoring the sensor leads
- Monitoring the correct operation of the safety relay
- Monitoring actuators for stoppage
- Safety-oriented disconnection when dangers arise

Depending on the version of the device, SIRIUS safety relays satisfy the most stringent requirements (PL e) of ISO 13849-1 and achieve the highest Safety Integrity Level (SIL 3) acc. to IEC 61508.

3TK28 safety relays				With electronic enabling circuits			With contactor relay enabling circuits			With special functions	
With relay enabling circuits				Basic units	Basic units t_v	Multifunction units	Basic units	Expansion units	Expansion units t_v	Standstill monitors	Overspeed Monitors
3TK28 20	3TK28 26	3TK28 30	3TK28 34	3TK28 40	3TK28 42	3TK28 45	3TK28 50	3TK28 56	3TK28 57	3TK28 10-0	3TK28 10-1
3TK28 21	3TK28 27			3TK28 41			3TK28 51				
3TK28 22	3TK28 28						3TK28 52				
3TK28 23							3TK28 53				
3TK28 24											
3TK28 25											
3TK28 26											

Benefits

General

- Can be used for all safety applications thanks to compliance with the highest safety requirements (PL e according to ISO 13849-1 or SIL 3 according to IEC 61508)
- Suitable for use all over the world through compliance with all globally established certifications
- Compact, service-proven SIRIUS design creates more space in the control cabinet
- Flexible connectability and expendability make subsequent changes easy
- Removable terminals for greater plant availability
- Yellow front plate clearly identifies the device as an item of safety technology
- Sensor cable up to 2000 m long enables use in large-scale plants

Relay outputs

- Different voltages can be switched through the floating contacts
- Higher currents can be switched with relay contacts

Solid-state outputs

- Wear-free
- Suitable for operation in fast switching applications
- Insensitive to vibrations and dirt
- Good electrical endurance

Microprocessor systems

- Flexible use thanks to many different integrated functions
- Easy parameterization using DIP switches on the front
- High functional reliability based on extensive monitoring functions
- Operated by the machine control
- Also connection of non-contact sensors (light arrays, light barriers etc.)

Application

SIRIUS safety relays are used mainly in autonomous safety applications which are not connected to a safety-oriented bus system. Their function here is to evaluate the sensors and the safety-oriented shutdown of hazards. Also they check and monitor the sensors, actuators and safety-oriented functions of the safety relay.

With relay enabling circuits

Overview



SIRIUS 3TK28 2. safety relay

Safety relays with with relay enabling circuits – safety with floating contacts

SIRIUS safety relays with relay enabling circuits not only save a great deal of space thanks to their compact design but also offer extra safety in the form of positively driven pairs of make and break contacts. If one of the contacts becomes welded, the other will disconnect the circuit. A positively driven break contact (NC) then performs the fault detection of the faulty make contact (NO).

For two-hand operation consoles in press control systems the 3TK28 34 press control device serves as a safe evaluation unit.

3TK28 30 expansion units are available to increase the number of enabling circuits.

3TK28 26 safety relays

The 3TK28 26 is a parameterizable safety relay. It is used as an evaluation unit for typical safety chains (detection, evaluation, disconnection). DIP switches on the front can be used to set many different functions. The 3TK28 26 is therefore universally applicable.

Safety sensors (e.g. EMERGENCY-STOP pushbuttons) are connected at the input side while contactors or valves for disconnecting the “hazardous function” are connected at the output side. The 3TK28 26 performs the monitoring of the sensor and actuator functions as well as the safe disconnection of the outputs (enabling circuits).

3TK28 26 with DIP switch

OFF	Schematic	DIP switch No.	ON
Without crossover monitoring		1	Switching mat operation
NC/NO evaluation:		2	NC/NC contact evaluation
2 x 1-channel		3	1 x 2-channel
Debounce time for sensor inputs ≈ 50 ms		4	Debounce time for sensor inputs » 10 ms
Autostart sensor input		5	Monitored start sensor input
Cascading input autostart		6	Cascading input monitored start
With start test		7	Without start test
Automatic start after mains failure (not permitted in connection with a start test)		8	Without automatic start after mains failure

Benefits

General

- Compact design
- Floating safe outputs
- 3TK28 34 safety relays also suitable for press and punch controls
- Can be used up to an ambient temperature of max. 70 °C

3TK28 26 safety relays

- Connection of all standard sensor types
- Many functions available in a single unit
- Status displays
- Expanded diagnostics options
- Approvals (EN 13849-1, IEC 61508, UL/CSA)
- Signaling of disconnect faults in the actuator circuit
- Floating outputs
- Units with wide voltage range
- Saving of the sensor status in the event of voltage failure

SIRIUS 3TK28 Safety Relays

With relay enabling circuits

Selection and ordering data

Type	Basic units					
	3TK28 20	3TK28 21	3TK28 22	3TK28 23	3TK28 24	3TK28 25
Sensors						
• Input	1	1	1	1	1	1
• Solid-state	—	—	—	—	—	—
• With contacts	✓	✓	✓ ¹⁾	✓	✓	✓
• Magnetically operated switch (Reed contacts)	✓	—	—	—	—	—
Safety mats	—	—	—	—	—	—
Start						
• Auto	✓	✓	✓	—	✓	✓
• Monitored	✓	✓	—	✓	—	✓
Cascading input 24 V DC	—	—	—	—	—	—
Key-operated switch	—	—	—	—	—	—
Enabling circuit, floating						
• Stop category 0	3 NO	3 NO	2 NO	2 NO	2 NO	3 NO
• Stop category 1	—	—	—	—	—	—
Enabling circuit, solid-state						
• Stop category 0	—	—	—	—	—	—
• Stop category 1	—	—	—	—	—	—
Signaling outputs						
• Floating	1 NC	1 NC	—	—	—	2 NC
• Solid-state	—	—	—	—	—	—
Standards	EN 60204-1, EN ISO 12100, ISO 13849-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508
Compliance to standards	TÜV, UL, CSA	BG, SUVA, UL, CSA	BG, SUVA, UL, CSA	BG, SUVA, UL, CSA	BG, SUVA, UL, CSA	BG, SUVA, UL, CSA
Category according to EN 954-1 max	4 (according to ISO 13849-1)	3 ²⁾	4	4	3 ²⁾	4
SIL level max. according to IEC 61508	3	1	3	3	1	3
Performance level PL according to ISO 13849-1	e	c	e	e	c	e
Probability of a dangerous failure per hour (PFH_d)	9.38 x 10 ⁻¹⁰ 1/h	1.1 x 10 ⁻⁹ 1/h	1.3 x 10 ⁻⁹ 1/h	1.3 x 10 ⁻⁹ 1/h	8.7 x 10 ⁻¹⁰ 1/h	1.5 x 10 ⁻⁹ 1/h
Rated control supply voltage						
• 24 V DC	—	—	—	—	✓	✓
• 24 V AC/DC	✓	✓	✓	✓	✓	—
• 24 V AC	—	—	—	—	—	✓
• 115 V AC	✓	—	—	—	✓	✓
• 230 V AC	✓	—	—	—	✓	✓
• 24 ... 240 V AC/DC	—	—	—	—	—	—

✓ Available

— Not available

1) The ON button is not monitored.

2) Depending on the hazard assessment, additional measures may be necessary in the sensor circuit (e.g. protected laying).

SIRIUS 3TK28 Safety Relays

With relay enabling circuits

Type	Basic units						Two-hand control devices 3TK28 34	Expansion units ²⁾ 3TK28 30
	3TK28 26 24 V DC	Wide voltage range	24 V DC t_v	Wide voltage range t_v	3TK28 27 t_v	3TK28 28 t_v		
Sensors								
• Input	1	1	1	1	1	1	1	—
• Solid-state	✓	✓	✓	✓	—	—	—	—
• With contacts	✓	✓	✓	✓	✓	✓	✓	—
• Magnetically operated switch (Reed contacts)	✓	✓	✓	✓	—	—	—	—
Safety mats	✓	✓	✓	✓	—	—	—	—
Start								
• Auto	✓	✓	✓	✓	—	✓	—	—
• Monitored	✓	✓	✓	✓	✓	—	—	—
Cascading input 24 V DC	✓	✓	✓	✓	—	—	—	—
Key-operated switch	—	—	—	—	—	—	—	—
Enabling circuit, floating								
• Stop category 0	4 NO	4 NO	2 NO	2 NO	2 NO	2 NO	2 NO+2 NC	4 NO
• Stop category 1	—	—	2 NO	2 NO	2 NO	2 NO	—	—
Enabling circuit, solid-state								
• Stop category 0	—	—	—	—	—	—	—	—
• Stop category 1	—	—	—	—	—	—	—	—
Signaling outputs								
• Floating	1 NC	1 NO + 1 NC	2 NC	1 NO + 2 NC	1 NC	1 NC	2	—
• Solid-state	2	—	2	—	—	—	—	—
Standards	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508, EN 574	EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508
Compliance to standards	TÜV, UL, CSA	TÜV, UL, CSA	TÜV, UL, CSA	TÜV, UL, CSA	BG, SUVA, UL, CSA	BG, SUVA, UL, CSA	BG, SUVA, UL, CSA, TÜV	BG, SUVA, UL, CSA, TÜV
Category according to EN 954-1 max	4	4	4	4	4 ¹⁾	4 ¹⁾	4	As basic unit
SIL level max. according to IEC 61508	3	3	3	3	3 ³⁾	3 ³⁾	—	As basic unit
Performance level PL according to ISO 13849-1	e	e	e	e	e ³⁾	e ³⁾	—	As basic unit
Probability of a dangerous failure per hour (PFH_d)	7.8 x 10 ⁻⁹ 1/h	7.8 x 10 ⁻⁹ 1/h	7.8 x 10 ⁻⁹ 1/h	7.8 x 10 ⁻⁹ 1/h	2.7 x 10 ⁻⁹ 1/h	2.7 x 10 ⁻⁹ 1/h	1.4 x 10 ⁻⁹ 1/h	1.2 x 10 ⁻⁹ 1/h
Rated control supply voltage								
• 24 V DC	✓	—	✓	—	✓	✓	✓	—
• 24 V AC/DC	—	—	—	—	—	—	—	✓
• 24 V AC	—	—	—	—	✓	✓	✓	—
• 115 V AC	—	—	—	—	✓	✓	✓	✓
• 230 V AC	—	—	—	—	✓	✓	✓	✓
• 24 ... 240 V AC/DC	—	✓	—	✓	—	—	—	—

✓ Available

— Not available

1) Only possible for instantaneous enabling contacts, otherwise Category 3.

2) For expansion of Siemens safety products.

3) Only possible for instantaneous enabling contacts, otherwise SIL 2 or Performance Level PL d.

SIRIUS 3TK28 Safety Relays

With relay enabling circuits



3TK28 21-1CB30



3TK28 25-1BB40



3TK28 26-2BB40



3TK28 27-1BB41

Rated control supply voltage U_s	Start	OFF-delay t_v	Screw terminals
V		s	Order No.
Basic units			
<i>With floating enabling circuits</i>			
3TK28 20			
• 24 AC/DC	Auto/monitored	—	3TK28 20-1CB30
• 115 AC	Auto/monitored	—	3TK28 20-1AJ20
• 230 AC	Auto/monitored	—	3TK28 20-1AL20
3TK28 21			
• 24 AC/DC	Auto	—	3TK28 21-1CB30
3TK28 22			
• 24 AC/DC	Auto	—	3TK28 22-1CB30
3TK28 23			
• 24 AC/DC	Monitored	—	3TK28 23-1CB30
3TK28 24			
• 24 AC/DC	Auto	—	3TK28 24-1CB30
• 24 DC	Auto	—	3TK28 24-1BB40
• 115 AC	Auto	—	3TK28 24-1AJ20
• 230 AC	Auto	—	3TK28 24-1AL20
3TK28 25			
• 24 DC	Auto/monitored	—	3TK28 25-1BB40
• 24 AC	Auto/monitored	—	3TK28 25-1AB20
• 115 AC	Auto/monitored	—	3TK28 25-1AJ20
• 230 AC	Auto/monitored	—	3TK28 25-1AL20
3TK28 26			
• 24 DC	Auto/monitored	—	3TK28 26-1BB40
• 24 ... 240 AC/DC	Auto/monitored	—	3TK28 26-1CW30
<i>With time-delay enabling circuits</i>			
3TK28 26 t_v			
• 24 DC	Auto/monitored	0.05 ... 3	3TK28 26-1BB41
• 24 ... 240 AC/DC	Auto/monitored	0.05 ... 3	3TK28 26-1CW31
• 24 DC	Auto/monitored	0.5 ... 30	3TK28 26-1BB42
• 24 ... 240 AC/DC	Auto/monitored	0.5 ... 30	3TK28 26-1CW32
• 24 DC	Auto/monitored	5 ... 300	3TK28 26-1BB44
• 24 ... 240 AC/DC	Auto/monitored	5 ... 300	3TK28 26-1CW34
3TK28 27 t_v			
• 24 DC	Monitored	0.05 ... 3	3TK28 27-1BB41
• 24 AC	Monitored	0.05 ... 3	3TK28 27-1AB21
• 115 AC	Monitored	0.05 ... 3	3TK28 27-1AJ21
• 230 AC	Monitored	0.05 ... 3	3TK28 27-1AL21
• 24 DC	Monitored	0.5 ... 30	3TK28 27-1BB40
• 24 AC	Monitored	0.5 ... 30	3TK28 27-1AB20
• 115 AC	Monitored	0.5 ... 30	3TK28 27-1AJ20
• 230 AC	Monitored	0.5 ... 30	3TK28 27-1AL20
3TK28 28 t_v			
• 24 DC	Auto	0.05 ... 3	3TK28 28-1BB41
• 24 AC	Auto	0.05 ... 3	3TK28 28-1AB21
• 115 AC	Auto	0.05 ... 3	3TK28 28-1AJ21
• 230 AC	Auto	0.05 ... 3	3TK28 28-1AL21
• 24 DC	Auto	0.5 ... 30	3TK28 28-1BB40
• 24 AC	Auto	0.5 ... 30	3TK28 28-1AB20
• 115 AC	Auto	0.5 ... 30	3TK28 28-1AJ20
• 230 AC	Auto	0.5 ... 30	3TK28 28-1AL20



SIRIUS 3TK28 Safety Relays

With relay enabling circuits



3TK28 21-1CB30

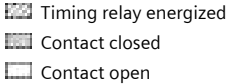
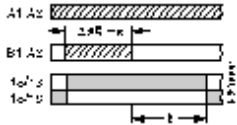
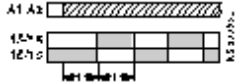
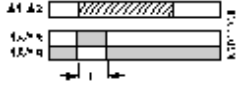
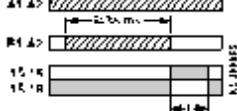
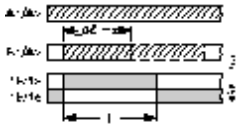
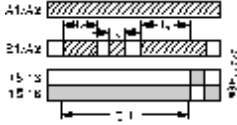
Rated control supply voltage U_s	Start	OFF-delay t_v	Screw terminals 
V		s	Order No.
Two-hand control devices			
With floating enabling circuits			
3TK28 34			
• 24 DC	—	—	3TK28 34-1BB40
• 24 AC	—	—	3TK28 34-1AB20
• 115 AC	—	—	3TK28 34-1AJ20
• 230 AC	—	—	3TK28 34-1AL20
Expansion units			
With floating enabling circuits			
3TK28 30			
• 24 AC/DC	—	—	3TK28 30-1CB30
• 115 AC	—	—	3TK28 30-1AJ20
• 230 AC	—	—	3TK28 30-1AL20

Timing Relays

General data

Overview

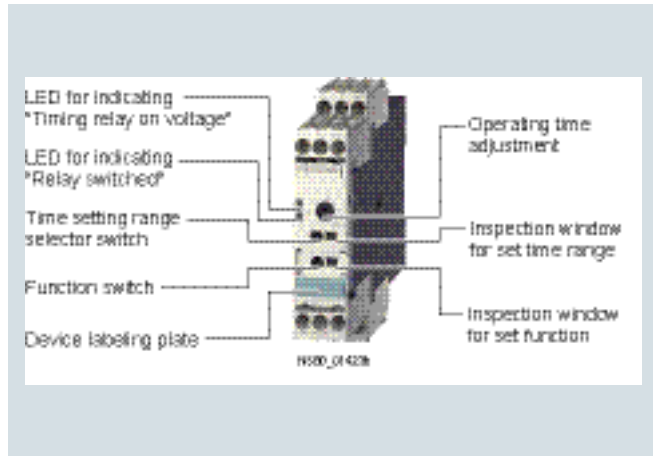
3RP15 timing diagram

Function	Timing diagram	3RP15 timing relay and 3RP19 01 label set						
		3RP15 05-A 3RP19 01-0A	Identification letter	3RP15 1.	3RP15 25	3RP15 3.	3RP15 40	3RP15 7.
1 CO contact								
ON-delay		■	A	■	■			
OFF-delay With auxiliary voltage		■	B ¹⁾			■		
ON-delay and OFF-delay with auxiliary voltage ($t = t_{on} = t_{off}$)		■	C ¹⁾					
Flashing, starting with interval (pulse/interval 1:1)		■	D					
Passing make contact		■	E					
Passing break contact with auxiliary voltage		■	F ¹⁾					
Pulse-forming with auxiliary voltage (pulse generation at the output does not depend on duration of energizing)		■	G ¹⁾					
Additive ON-delay with auxiliary voltage		■	H ¹⁾					
2 NO contacts								
Star-delta function YΔ								■

1) Note on function with start contact: A new control signal at terminal B, after the operating time has started, resets the operating time to zero. This does not apply to G and H, which are not retriggerable.

■ Function is possible

Overview



SIRIUS 3RP15 timing relays

Standards

The timing relays comply with:

- EN 60721-3-3
"Environmental conditions"
- EN 61812-1
"Specified time relays for industrial use"
- EN 61000-6-2 and EN 61000-6-4
"Electromagnetic compatibility"
- EN 60947-5-1
"Low-voltage switchgear and controlgear – Electromechanical control circuit devices"

Accessories



Push-in lugs for screw fixing



Sealable cover



Label set for marking the multifunction relay

Order No. scheme

Digit of the Order No.	1st - 5th □□□□□	6th □	7th □	–	8th □	9th □	10th □	11th □	12th 0	13th 8	14th K
Timing relays in industrial enclosure, 22.5mm	3 R P 1 5										
Functions/time setting ranges		□	□								
Connection type					□						
Contacts						□					
Rated control supply voltage								□	□		
Example	3 R P 1 5	0	5	–	1	A	W	3	0	8	K

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Application

Timing relays are used in control, starting, and protective circuits for all switching operations involving time delays. They guarantee a high level of functionality and a high repeat accuracy of timer settings.

Enclosure version

All timing relays are suitable for snap-on mounting onto TH 35 standard mounting rails according to EN 60715 or for screw mounting.

Timing Relays

SIRIUS 3RP15 timing relays in industrial enclosure, 22.5 mm

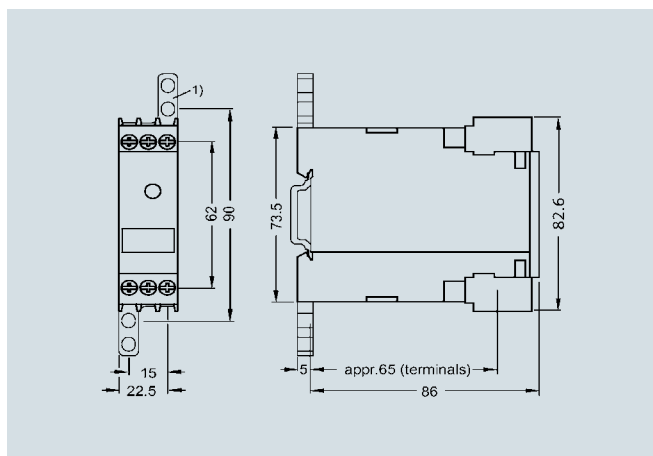
Technical specifications

Type		3RP15 05 3RP15 31 3RP15 33	3RP15 11 3RP15 13 3RP15 25	3RP1574 3RP1576
Rated insulation voltage (Pollution degree 3) Overvoltage category III acc. to DIN VDE 0110		V AC 300/500*		
Permissible ambient temperature	during operation	°C -25 to +60		
	during storage	°C -40 to +80		
Mechanical endurance		operating cycles	30 x 10 ⁶	
Rated operational currents I_e AC-15 at 230 V AC, 50 Hz DC-13 at 24 V DC-13 at 110 V DC-13 at 230 V		A A A A	3 1 0.2 0.1	
Control voltage tolerance		V Hz	0.85 - 1.1 x U _s for AC 50/60Hz; 0.8 - 1.25 x U _s for 24VDC 0.95 to 1.05 x rated frequency	
Operating frequency at rated current I _e , 230 V AC		1/h	2500	
Setting accuracy referred to upper limit of scale			< ±5%	
Repeat accuracy			< ±1%	
Recovery time		ms	150	150
Minimum ON period		ms	35	—
Degree of protection	cover		IP 40	
	terminals		IP 20	
Rated power Power consumption at 230 V AC, 50 Hz		W VA	2 6	
Rated control fuse - Utilization category gL/gG		A	4	
Permissible mounting position			any	
Conductor cross-sections – main / auxiliary conductors	solid	mm ²	1x(0.5-4), 2x(0.5-2.5)	
	finely stranded with end sleeve	mm ²	1x(0.5-2.5), 2x(0.5-1.5)	
	solid or stranded AWG conductors	AWG	2x(20-14)	
	terminal screw		M3	
tightening torque		Nm	0.8 to 1.2	
Electrical endurance		operating cycles @ I _c	1 x 10 ⁵	
Uninterrupted thermal current		A	5	

* Insulation voltage is 300V for executions other than having operating voltage less than 440V

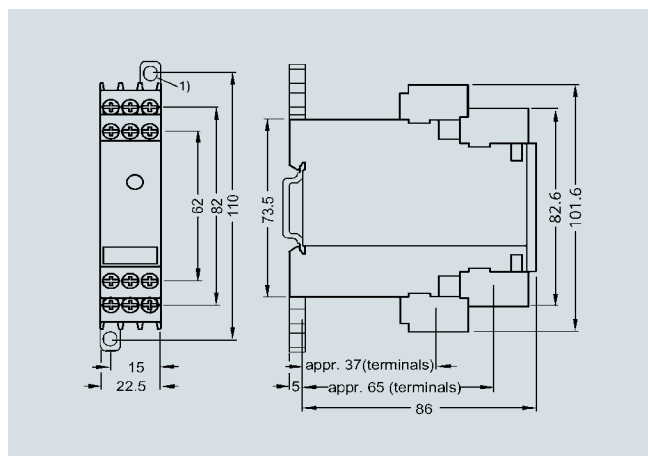
Dimensions

3RP15



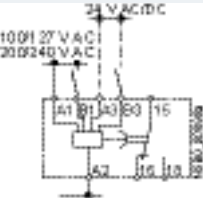
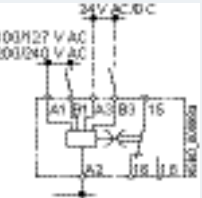
1 C/O contact without auxiliary voltage and star delta timer

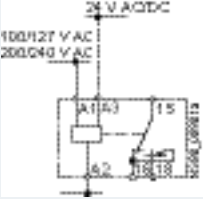
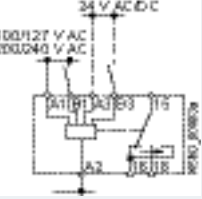
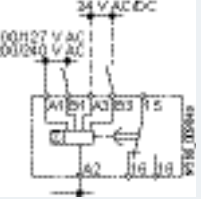
1) Push-in lug (for screw mounting on a base plate) for 3RP15

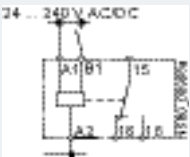
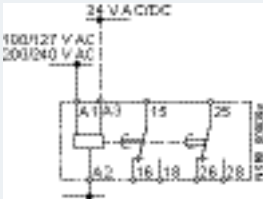
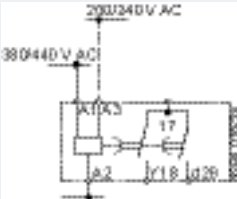


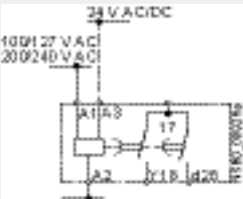
1 and 2 C/O contacts, with auxiliary voltage

3RP15 internal circuit diagrams (terminal designation to DIN 46199, Part 5)

3RP15 05-A, 3RP15 1-, 3RP15 25-A	3RP15 05-A, 3RP15 3--A	3RP15 05-A	3RP15 05-A
			
ON-delay	OFF-delay with auxiliary voltage	ON-delay and OFF-delay with auxiliary voltage	Flashing

3RP15 05-A	3RP15 05-A	3RP15 05-A	3RP15 05-A
			
Passing make contact	Passing break contact with auxiliary voltage	Pulse-forming with auxiliary voltage	Additive ON-delay with auxiliary voltage

3RP15 05-AW30	3RP15 25-1B	3RP15 25-. BW30	3RP15 7--.M20
			
Multifunction relay (same functions as 3RP15 05-1A)	ON-delay, 3RP15 25-1B also for 42 ... 48/60 V AC/DC	ON-delay	Star-delta timing relay

3RP15 74, 3RP15 76

Star-delta timing relay

Timing Relays

SIRIUS 3RP15 timing relays in industrial enclosure, 22.5 mm



3RP15 33-1AP30

Version	Time setting range t adjustable by rotary switch to	Rated control supply voltage U_s		Screw terminals 
		AC 50/60 Hz	DC	
		V	V	Order No.
3RP15 3. timing relays, OFF-delay, with auxiliary voltage, 1 time setting range				
With LED and 1 CO contact The same potential must be applied to terminals A and B	0.5 ... 10 s	24/100 ... 127	24	3RP15 31-1AQ30-8K
		24/200 ... 240	24	3RP15 31-1AP30-8K
	5 ... 100 s	24/100 ... 127	24	3RP15 33-1AQ30-8K
		24/200 ... 240	24	3RP15 33-1AP30-8K
3RP15 7. timing relays, star-delta function, dead interval 50 ms, 1 time setting range				
1 NO contact instantaneous and 1 NO contact delayed (common contact root terminal 17)	1 ... 20 s	200 ... 240/380 ... 440	—	3RP15 74-1NM20-8K
	3 ... 60 s	24/100 ... 127	24	3RP15 76-1NQ30-8K
		24/200 ... 240	24	3RP15 76-1NP30-8K
		200 ... 240/380 ... 440	—	3RP15 76-1NM20-8K
		230 ... 400	—	3RP15 76-1NP20-8K

Selection and ordering data

Solid-state timing relays for general use in control systems and mechanical engineering with:

- 1 or 2 CO contacts
- Single or selectable time setting ranges
- Switch position indication and voltage indication by LED



3RP15 11-1AP30 8K



3RP15 25-1BW30 8K



3RP15 05-1AW30 8K

Version	Time setting range t adjustable by rotary switch to	Rated control supply voltage U_s		Screw terminals 
		AC 50/60 Hz	DC	Order No.
		V	V	

3RP15 05 timing relays, multifunction, 15 time setting ranges

The functions can be adjusted by means of rotary switches. Insert labels can be used to adjust different functions of the 3RP15 05 timing relay clearly and unmistakably. The corresponding labels can be ordered as an accessory. The same potential must be applied to terminals A. and B. For functions see 3RP19 01 label set, page 6/30.

With LED and

1 CO contact, 8 functions	0.05 ... 1 s 0.15 ... 3 s 0.5 ... 10 s 1.5 ... 30 s 0.05 ... 1 min 5 ... 100 s 0.15 ... 3 min 0.5 ... 10 min 1.5 ... 30 min 0.05 ... 1 h 5 ... 100 min 0.15 ... 3 h 0.5 ... 10 h 1.5 ... 30 h 5 ... 100 h ∞ ¹⁾	24 ... 240 ³⁾	24 ... 240 ²⁾	3RP15 05-1AW30-8K

3RP15 1. timing relays, ON-delay, 1 time setting range

With LED and 1 CO contact	0.5 ... 10 s	24/100 ... 127 24/200 ... 240	24 24	3RP15 11-1AQ30-8K 3RP15 11-1AP30-8K
	5 ... 100 s	24/100 ... 127 24/200 ... 240	24 24	3RP15 13-1AQ30-8K 3RP15 13-1AP30-8K

3RP15 25 timing relays, ON-delay, 15 time setting ranges

With LED and

1 CO contact	0.05 ... 1 s 0.15 ... 3 s 0.5 ... 10 s	24/100 ... 127 24/200 ... 240	24 24	3RP15 25-1AQ30-8K 3RP15 25-1AP30-8K
2 CO contacts	1.5 ... 30 s 0.05 ... 1 min 5 ... 100 s 0.15 ... 3 min 0.5 ... 10 min 1.5 ... 30 min 0.05 ... 1 h 5 ... 100 min 0.15 ... 3 h 0.5 ... 10 h 1.5 ... 30 h 5 ... 100 h ∞ ¹⁾	24 ... 240 ³⁾	24 ... 240 ²⁾	3RP15 25-1BW30-8K

1) With switch position ∞ no timing. For test purposes (ON/OFF function) on site. Relay is constantly on when activated, or relay remains constantly off when activated. Depending on which function is set.

2) Operating range 0.7 to 1.1 x U_s .

3) Operating range 0.8 to 1.1 x U_s .

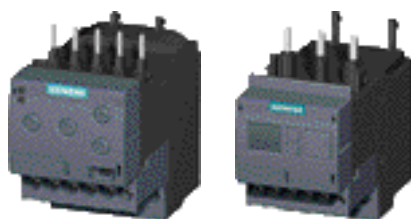
Accessories

Selection and ordering data

Accessories for 3RP15

Version	Function	Identification letter	Use	Order No.	
Label sets for 3RP15 and 3RP20					
 3RP19 01-0A	Accessory for 3RP15 05. The label set offers the possibility of labeling timing relays with the set function in English and German.			3RP19 01-0A-8K	
	1 label set (1 unit) with 8 functions	ON-delay	A		For devices with 1 CO contact and 3RP15 05-. RW30
		OFF-delay with auxiliary voltage	B		
		ON-delay and OFF-delay with auxiliary voltage	C		
		Flashing, starting with interval	D		
		Passing make contact	E		
		Passing break contact with auxiliary voltage	F		
		Pulse-forming with auxiliary voltage	G		
		Additive ON-delay with auxiliary voltage	H		
Push-in lugs for 3RP15					
 3RP19 03	Push-in lugs For screw fixing, 2 units are required for each device		For 3RP15 with 1 or 2 CO contacts	3RP19 03-8K	

Overview



Features	3RR21	3RR22	Benefits
General data			
Sizes	S00, S0	S00, S0	• Are coordinated with the dimensions, connections and technical characteristics of the other devices in the SIRIUS modular system (contactors, soft starters, etc.) • Permit the mounting of slim and compact load feeders in widths of 45 mm (S00 and S0) • Simplify configuration
Current range	S00: 1.6 ... 16 A S0: 4 ... 40 A	S00: 1.6 ... 16 A S0: 4 ... 40 A	• Is adapted to the other devices in the SIRIUS modular system • Just a single version per size with a wide setting range enables easy configuration
Permissible ambient temperature			
• During operation	-25 ... +60 °C	-25 ... +60 °C	• Suitable for applications in the control cabinet, worldwide
Monitoring functions			
Current overshoot	✓ (Two-phase)	✓ (Three-phase)	• Provides optimum inverse-time delayed protection of loads against excessive temperature rises due to overload • Enables detection of filter blockages or pumping against closed gate valves • Enables drawing conclusions about wear, poor lubrication or other maintenance-relevant phenomena
Current undershoot	✓ (Two-phase)	✓ (Three-phase)	• Enables detection of overload due to a slipping or torn belt • Guarantees protection of pumps against dry running • Facilitates monitoring of the functions of resistive loads such as heaters • Permits energy savings through monitoring of no-load operation
Apparent current monitoring	✓	✓ (Selectable)	• Precision current monitoring especially in a motor's rated and upper torque range
Active current monitoring	—	✓ (Selectable)	• Optimum current monitoring over a motor's entire torque range through the patented combination of power factor and apparent current monitoring
Range monitoring	✓ (Two-phase)	✓ (Three-phase)	• Simultaneous monitoring of current overshoot and undershoot with a single device
Phase failure, open-circuit	✓ (Two-phase)	✓ (Three-phase)	• Minimizes heating of induction motors during phase failure through immediate disconnection • Prevents operation of hoisting equipment with reduced load carrying capacity
Phase sequence monitoring	—	✓ (Selectable)	• Prevents starting of motors, pumps or compressors in the wrong direction of rotation
Internal ground-fault detection (residual current monitoring)	—	✓ (Selectable)	• Provides optimum protection of loads against high-resistance short-circuits or ground faults due to moisture, condensed water, damage to the insulation material, etc. • Eliminates the need for additional special equipment • Saves space in the control cabinet • Reduces wiring outlay and costs
Blocking current monitoring	—	✓ (Selectable)	• Minimizes heating of induction motors when blocked during operation through immediate disconnection • Minimizes mechanical loading of the system by acting as an electronic shear pin

✓ Available

— Not available

Monitoring Relays

SIRIUS 3RR2 Monitoring Relays for Mounting onto 3RT2 Contactors

General data



Features	3RR21	3RR22	Benefits
Features			
RESET function	✓	✓	- Allows manual or automatic resetting of the relay - Resetting directly on the device or by switching the control supply voltage off and on (remote RESET)
ON-delay time	0 ... 60 s	0 ... 99 s	- Enables motor starting without evaluation of the starting current - Can be used for monitoring motors with lengthy start-up
Tripping delay time	0 ... 30 s	0 ... 30 s	- Permits brief threshold value violations during operation - Prevents frequent warnings and disconnections with currents near the threshold values
Operating and indicating elements	LEDs and rotary potentiometers	Displays and buttons	- For setting the threshold values and delay times - For selectable functions - For quick and selective diagnostics - Displays for permanent indication of measured values
Integrated contacts	1 CO contact	1 CO, 1 semiconductor output	- Enable disconnection of the system or process when there is an irregularity - Can be used to output signals
Design of load feeders			
Short-circuit strength up to 100 kA at 690 V (in conjunction with the corresponding fuses or the corresponding motor starter protector)	✓	✓	Provides optimum protection of the loads and operating personnel in the event of short-circuits due to insulation faults or faulty switching operations
Electrical and mechanical matching to 3RT2 contactors	✓	✓	- Simplifies configuration - Reduces wiring outlay and costs - Enables stand-alone installation as well as space-saving direct mounting
Spring-type connection for main circuit and auxiliary circuits	✓ (Optional)	✓ (Optional)	- Enables fast connections - Permits vibration-resistant connections - Enables maintenance-free connections
More features			
Suitable for single- and three-phase loads	✓	✓	Enables the monitoring of single-phase systems through parallel infeed at the contactor or looping the current through the three phase connections
Wide setting ranges	✓	✓	- Reduce the number of variants - Minimize the configuration outlay and costs - Minimize storage overheads, storage costs, tied-up capital
Wide voltage supply range	✓ (Optional)	✓ (Optional)	- Reduces the number of variants - Minimizes the configuring outlay and costs - Minimizes storage overhead, storage costs, tied-up capital

✓ Available

Possible combinations of 3RR2 monitoring relays with 3RT2 contactors

Monitoring Relays	Current range	Contactors (type, size, rating)	
		3RT20 1	3RT20 2
Type	A	S00	S0
		3/4/5.5/7.5 kW	5.5/7.5/11/15/18.5 kW
3RR21 41	1.6 ... 16	✓	With stand-alone installation support
3RR22 41	1.6 ... 16	✓	With stand-alone installation support
3RR21 42	4 ... 40	With stand-alone installation support	✓
3RR22 42	4 ... 40	With stand-alone installation support	✓

✓ Available

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th		8th	9th	10th	11th	12th
	□□□	□	□	□	□	–	□	□	□	□	0
Monitoring relays	3 R R										
SIRIUS 2nd generation		2									
Type of setting			□								
Type of monitoring relay				□							
Size					□						
Connection methods							□				
Number and type of outputs								□			
Signal type of the supply voltage									□	□	
Example	3 R R	2	1	4	1	–	1	A	A	3	0

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Monitoring Relays

SIRIUS 3RR2 Monitoring Relays for Mounting onto 3RT2 Contactors

Current monitoring

Overview



SIRIUS 3RR22 42 and 3RR21 42 current monitoring relays

The SIRIUS 3RR2 current monitoring relays are suitable for the load monitoring of motors or other loads. In two or three phases they monitor the rms value of AC currents for overshooting or undershooting of set threshold values.

Whereas apparent current monitoring is used above all in connection with the rated torque or in case of overload, the active current monitoring option can be used to observe and evaluate the load factor over a motor's entire torque range.

The 3RR2 current monitoring relays can be integrated directly in the feeder by mounting onto the 3RT2 contactor; separate wiring of the main circuit is therefore superfluous. No separate transformers are required.

For a line-oriented configuration or simultaneous use of an overload relay, terminal brackets for stand-alone installation are available for separate standard rail mounting.

Versions

- **Basic versions**
The basic versions with two-phase apparent current monitoring, a CO contact output and analog adjustability provide a high level of monitoring reliability especially in the rated and overload range.
- **Standard versions**
The standard versions monitor the current in three phases with selectable active current monitoring. They have additional diagnostics options such as residual current monitoring and phase sequence monitoring, and they are also suitable for monitoring motors below the rated torque. These devices have an additional independent semiconductor output, an actual value indicator, and are digitally adjustable.

Both versions are available optionally with screw terminals or spring-type terminals, in each case for sizes S00 and S0.

Benefits

- Directly mountable onto 3RT2 contactors, i.e. no additional wiring outlay in the main circuit
- Optimally coordinated with the technical characteristics of the 3RT2 contactors
- No separate current transformer required
- Versions with wide voltage supply range
- Variably adjustable to overvoltage, undervoltage or range monitoring
- Freely configurable delay times and RESET response
- Display of ACTUAL value and status messages
- All versions with removable control current terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals
- Simple determination of the threshold values through direct reference to actually measured values for setpoint loading
- Range monitoring and selectable active current measurement mean that only one device for monitoring a motor is required along the entire torque curve
- In addition to current monitoring it is also possible to monitor for broken cables, phase failure, phase sequence, residual current and motor blocking.

Application

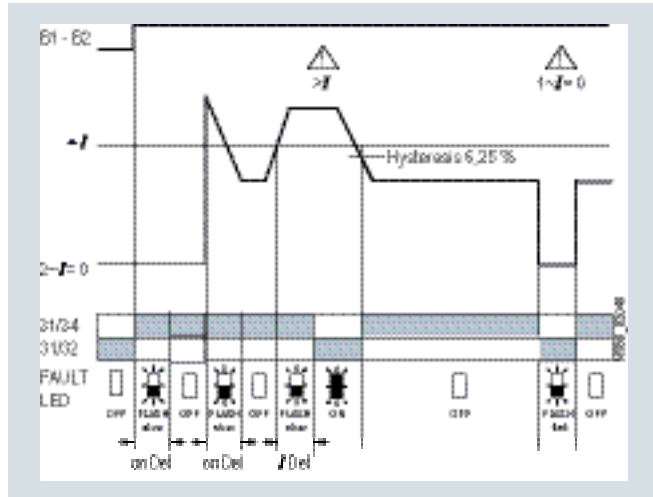
- Monitoring of current overshoot and undershoot
- Monitoring of broken conductors
- Monitoring of no-load operation and load shedding, e.g. in the event of a torn V-belt or no-load operation of a pump
- Monitoring of overload, e.g. on pumps due to a dirty filter system
- Monitoring the functionality of electrical loads such as heaters
- Monitoring of wrong phase sequence on mobile equipment such as compressors or cranes
- Monitoring of high-resistance short-circuits, e.g. due to damaged insulation or dampness

Technical specifications

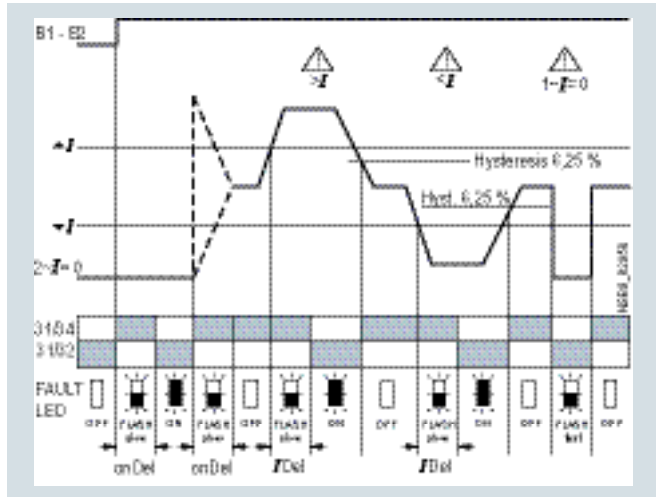
Function diagrams of 3RR21 4.-A.30 basic variant, analogically adjustable

Closed-circuit principle upon application of the control supply voltage

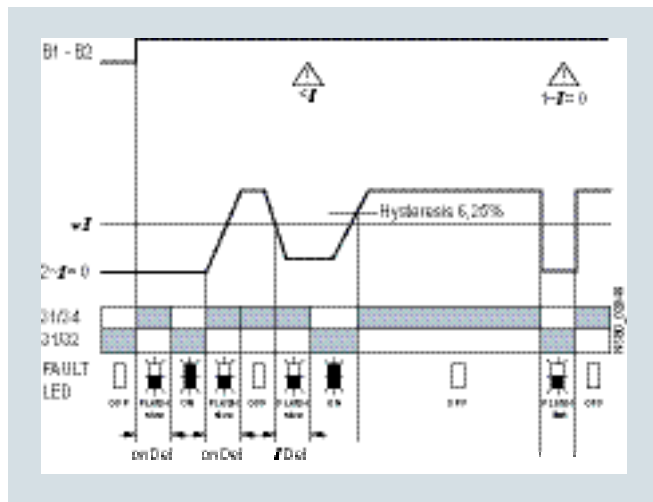
Current overshoot



Range monitoring



Current undershoot



Monitoring Relays

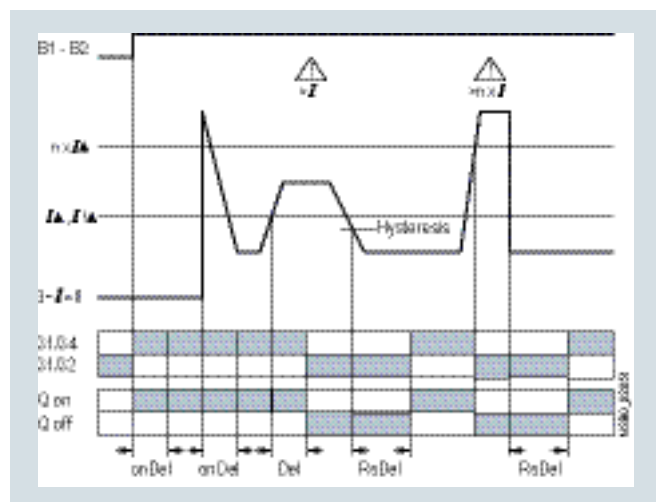
SIRIUS 3RR2 Monitoring Relays for Mounting onto 3RT2 Contactors

Current monitoring

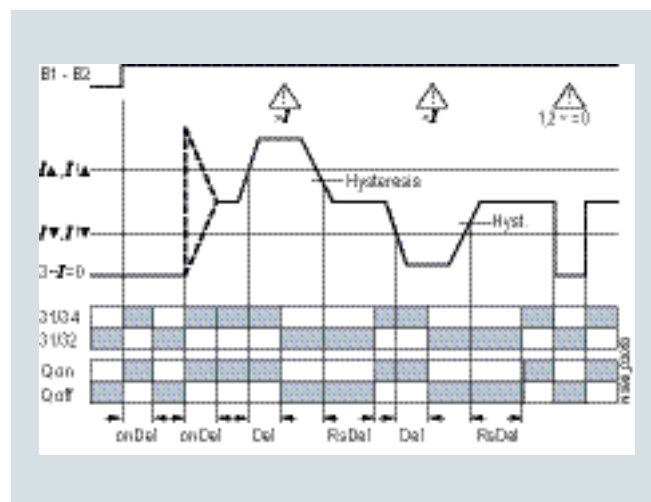
Function diagrams of 3RR22 4...F.30 standard version, digitally adjustable

With the closed-circuit principle selected upon application of the control supply voltage

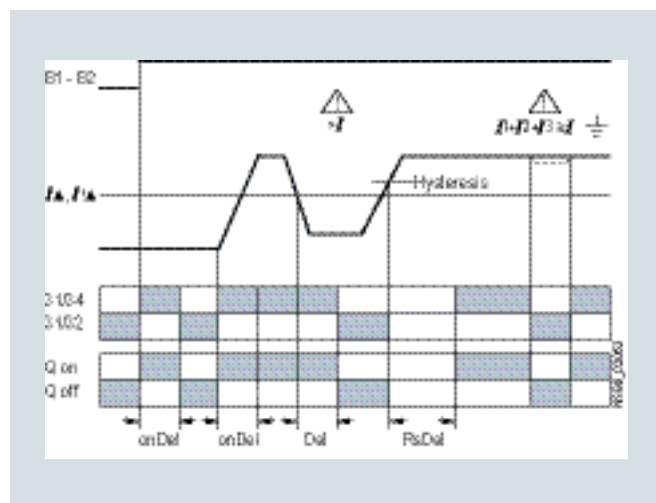
Current overshoot



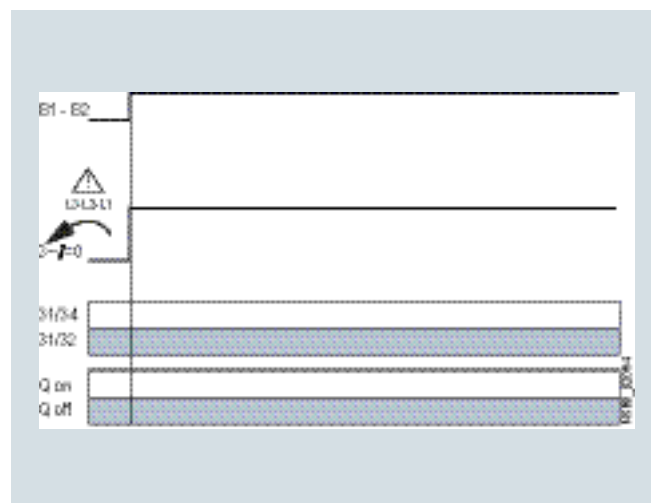
Range monitoring



Current undershoot with residual current monitoring



Phase sequence monitoring



Selection and ordering data

SIRIUS 3RR2 current monitoring relays

- For load monitoring of motors or other loads
- Multi-phase monitoring of undercurrent and overcurrent
- Starting and tripping delay can be adjusted separately
- Tripping delay 0 to 30 s
- Auto or manual RESET



3RR21 41-1AW30



3RR21 42-1AW30



3RR22 41-1FW30



3RR22 42-1FW30



3RR21 41-2AA30



3RR22 41-2FA30

Size	Measuring range	Hysteresis	Power supply U _s	Screw terminals	Spring-type terminals
	A	A	V	Order No.	Order No.

Basic versions

Analogically adjustable, closed-circuit principle, 1 CO, 2-phase current monitoring, apparent current monitoring, start-up delay 0 ... 60 s

S00	1.6 ... 16	6.25 % of threshold value	24 AC/DC 24 ... 240 AC/DC	3RR21 41-1AA30 3RR21 41-1AW30	3RR21 41-2AA30 3RR21 41-2AW30
S0	4 ... 40	6.25 % of threshold value	24 AC/DC 24 ... 240 AC/DC	3RR21 42-1AA30 3RR21 42-1AW30	3RR21 42-2AA30 3RR21 42-2AW30

Standard versions

Digitally adjustable, LCD, open-circuit or closed-circuit principle, 1 CO, 1 semiconductor output, 3-phase current monitoring, active current or apparent current monitoring, phase sequence monitoring, residual current monitoring, blocking current monitoring, reclose delay time 0 ... 300 min, start-up delay 0 ... 99 s, separate settings for warning and alarm thresholds

S00	1.6 ... 16	0.1 ... 3	24 AC/DC 24 ... 240 AC/DC	3RR22 41-1FA30 3RR22 41-1FW30	3RR22 41-2FA30 3RR22 41-2FW30
S0	4 ... 40	0.1 ... 8	24 AC/DC 24 ... 240 AC/DC	3RR22 42-1FA30 3RR22 42-1FW30	3RR22 42-2FA30 3RR22 42-2FW30

Monitoring Relays

SIRIUS 3RR2 Monitoring Relays for Mounting onto 3RT2 Contactors

Line monitoring

Accessories

	Use	Version	Size	Order No.	
Terminal brackets for stand-alone installation ¹⁾					
 3RU29 16-3AA01	For 3RR2	For separate mounting of the overload relays or monitoring relays; screw and snap-on mounting onto TH 35 standard mounting rail	• Screw connection	Screw terminals 	
				3RU29 16-3AA01	
				3RU29 26-3AA01	
 3RU29 26-3AC01			• Spring-type connection	S00 S0	Spring-type terminals 
					3RU29 16-3AC01
					3RU29 26-3AC01

Overview

Order No. scheme

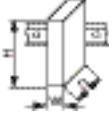
Digit of the Order No.	1st - 3rd	4th	5th	6th	7th		8th	9th	10th	11th	12th	
	☐ ☐ ☐	☐	☐	☐	☐	-	☐	☐	☐	☐	☐	
Monitoring relays	3 U G											
Generation		☐										
Type of setting			☐									
Functions				☐	☐							
Connection methods							☐					
Contacts								☐				
Control supply voltage									☐			
Signal type of the supply voltage										☐		
Special version											☐	
Example	3 U G	4	5	1	1	-	1	A	N	2	0	

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Technical specifications

General data			
Type			3UG
Dimensions (W x H x D)			
• For 2 terminal blocks			
- Screw terminals		mm	22.5 x 83 x 91
- Spring-type terminals		mm	22.5 x 84 x 91
• For 3 terminal blocks			
- Screw terminals		mm	22.5 x 92 x 91
- Spring-type terminals		mm	22.5 x 94 x 91
• For 4 terminal blocks			
- Screw terminals		mm	22.5 x 103 x 91
- Spring-type terminals		mm	22.5 x 103 x 91
Permissible ambient temperature			
• During operation		°C	-25 ... +60
Connection type			 Screw terminals
• Terminal screw			M3 (for standard screwdriver, size 2 and Pozidriv 2)
• Solid		mm²	1 x (0.5 ... 4)/2 x (0.5 ... 2.5)
• Finely stranded with end sleeve		mm²	1 x (0.5 ... 2.5)/2 x (0.5 ... 1.5)
• AWG cables, solid or stranded		AWG	2 x (20 ... 14)
• Tightening torque		Nm	0.8 ... 1.2

Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Line monitoring

Overview



SIRIUS 3UG46 15 monitoring relay

Solid-state line monitoring relays provide maximum protection for mobile machines and plants or for unstable networks. Network and voltage faults can be detected early and rectified before far greater damage ensues.

Depending on the version, the relays monitor phase sequence, phase failure with and without N conductor monitoring, phase asymmetry, undervoltage or overvoltage.

Phase asymmetry is evaluated as the difference between the greatest and the smallest phase voltage relative to the greatest phase voltage. Undervoltage or overvoltage exists when at least one phase voltage deviates by 20 % from the set rated system voltage or the directly set limit values are overshoot or undershot. The rms value of the voltage is measured.

With the 3UG46 17 or 3UG46 18 relay, a wrong direction of rotation can also be corrected automatically.

Benefits

- Can be used without auxiliary voltage in any network from 160 to 600 V AC worldwide thanks to wide voltage range
- Variably adjustable to overvoltage, undervoltage or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Permanent display of ACTUAL value and network fault type on the digital versions
- Automatic correction of the direction of rotation by distinguishing between power system faults and wrong phase sequence
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

The relays are used above all for mobile equipment, e.g. air conditioning compressors, refrigerating containers, building site compressors and cranes.

Function	Application
Phase sequence	• Direction of rotation of the drive
Phase failure	• A fuse has tripped • Failure of the control supply voltage • Broken cable
Phase asymmetry	• Overheating of the motor due to asymmetrical voltage • Detection of asymmetrically loaded networks
Undervoltage	• Increased current on a motor with corresponding overheating • Unintentional resetting of a device • Network collapse, particularly with battery power
Overvoltage	• Protection of a plant against destruction due to overvoltage

Technical specifications

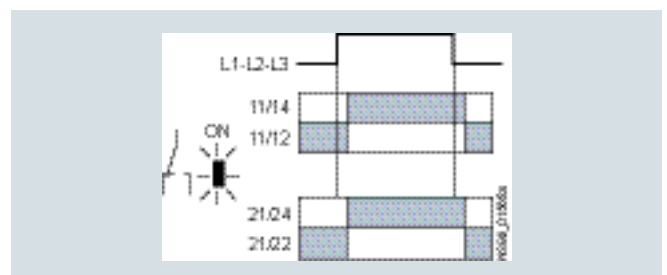
3UG45 11 monitoring relays

The 3UG45 11 phase sequenced relay monitors the phase sequence in a three-phase network. No adjustments are required for operation. The device has an internal power supply and works using the closed-circuit principle. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up after the delay time has elapsed and the LED is lit. If the phase sequence is wrong, the output relay remains in its rest position.

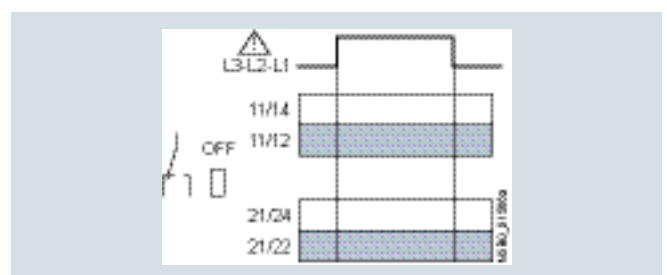
Note:

When one phase fails, connected loads (motor windings, lamps, transformers, coils, etc.) create a feedback voltage at the terminal of the failed phase due to the network coupling. Because the 3UG45 11 relays are not resistant to voltage feedback, such a phase failure is not detected. Should this be required, then the 3UG45 12 monitoring relay must be used.

Correct phase sequence



Wrong phase sequence



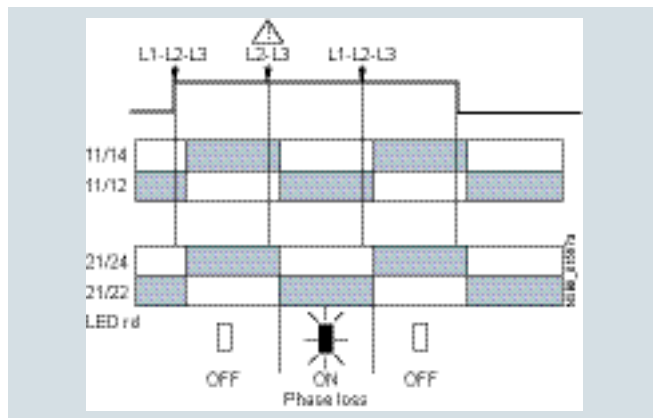
3UG45 12 monitoring relays

The 3UG45 12 line monitoring relay monitors three-phase networks with regard to phase sequence, phase failure and phase unbalance of 10 %. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V and feedback through the load of up to 90 %. The device has an internal power supply and works using the closed-circuit principle. No adjustments are required. When the mains voltage is switched on, the green LED is lit. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up. If the phase sequence is wrong, the red LED flashes and the output relay remains in its rest position. If a phase fails, the red LED is permanently lit and the output relay drops.

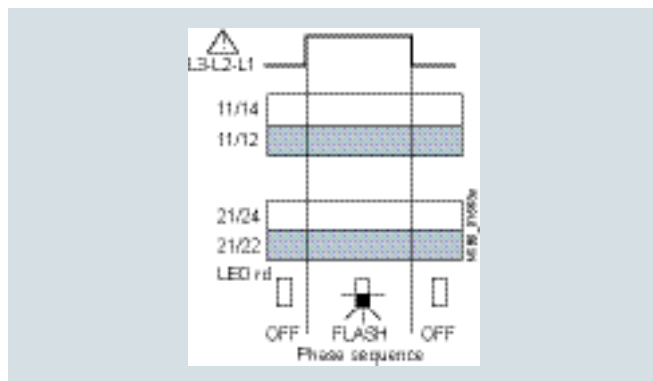
Note:

The red LED is a fault diagnostic indicator and does not show the current relay status. The 3UG45 12 monitoring relay is suitable for line frequencies of 50/60 Hz.

Phase failure



Wrong phase sequence



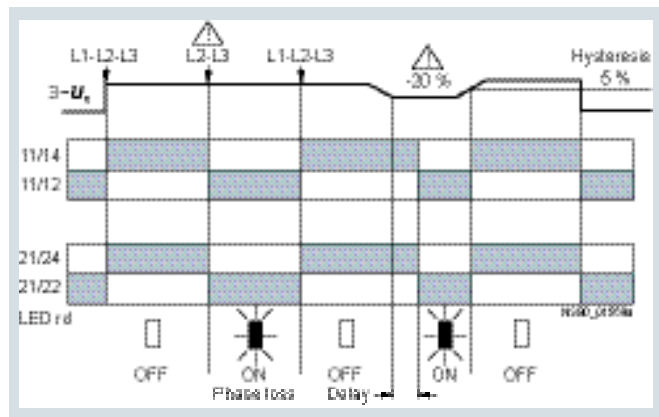
3UG45 13 monitoring relays

The 3UG45 13 line monitoring relay monitors three-phase networks with regard to phase sequence, phase failure, phase asymmetry and undervoltage of 20 %. The device has an internal power supply and works using the closed-circuit principle. The hysteresis is 5 %. The integrated response delay time is adjustable from 0 to 20 s and responds to undervoltage. If the direction is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V and feedback through the load of up to 80 %. When the mains voltage is switched on, the green LED is lit. If the phase sequence at the terminals L1-L2-L3 is correct, the output relay picks up. If the phase sequence is wrong, the red LED flashes and the output relay remains in its rest position. If a phase fails, the red LED is permanently lit and the output relay drops.

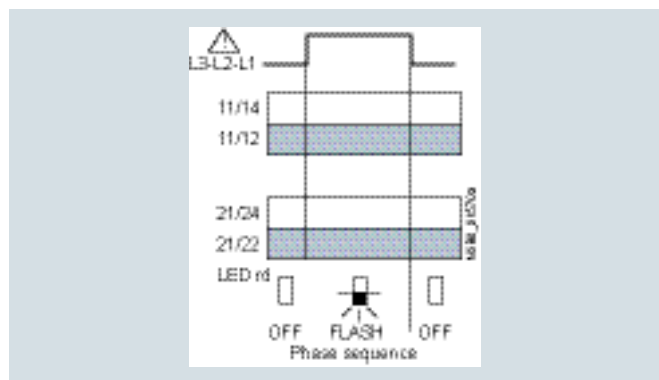
Note:

The red LED is a fault diagnostic indicator and does not show the current relay status. The 3UG45 13 monitoring relay is suitable for line frequencies of 50/60 Hz.

Phase failure and undervoltage



Wrong phase sequence



Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Line monitoring

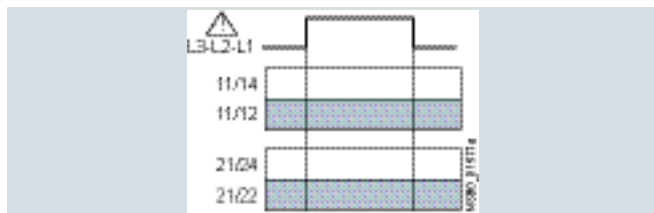
3UG46 14 monitoring relays

The 3UG46 14 line monitoring relay has a wide voltage range and an internal power supply. The device is equipped with a display and is parameterized using three buttons. It monitors three-phase networks with regard to phase asymmetry from 5 to 20 %, phase failure, undervoltage and phase sequence. The hysteresis is adjustable from 1 to 20 V. In addition the device has a response delay and ON-delay from 0 to 20 s in each case. The integrated response delay time responds to phase asymmetry and undervoltage. If the direction is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V and feedback through the load of up to 80%.

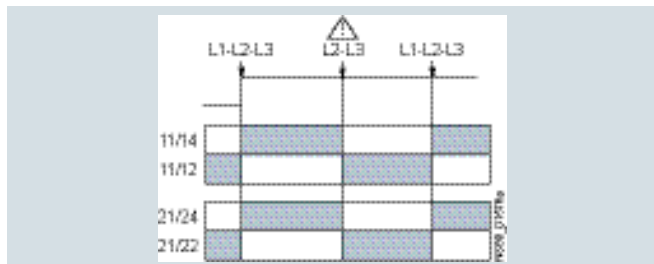
The 3UG46 14 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with manual or auto RESET.

With the closed-circuit principle selected

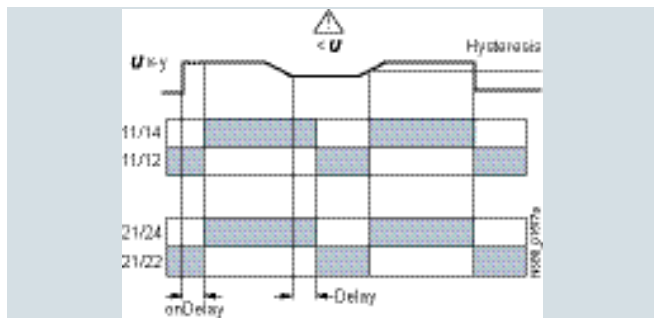
Wrong phase sequence



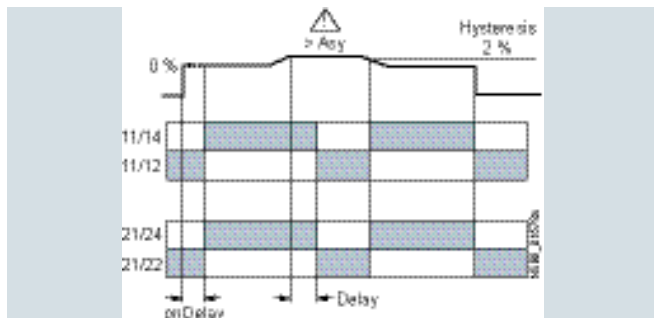
Phase failure



Undervoltage



Unbalance



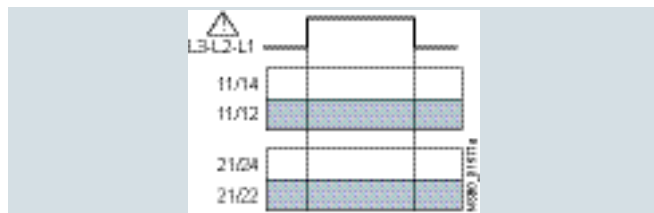
3UG46 15/3UG46 16 monitoring relays

The 3UG46 15/3UG46 16 line monitoring relay has a wide voltage range and an internal power supply. The device is equipped with a display and is parameterized using three buttons. The 3UG46 15 device monitors three-phase networks with regard to phase failure, undervoltage, overvoltage and phase sequence. The 3UG46 16 monitoring relay monitors the neutral conductor as well. The hysteresis is adjustable from 1 to 20 V. In addition the device has two separately adjustable delay times for overvoltage and undervoltage from 0 to 20 s in each case. If the direction is incorrect, the device switches off immediately. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V and feedback through the load of up to 80 %.

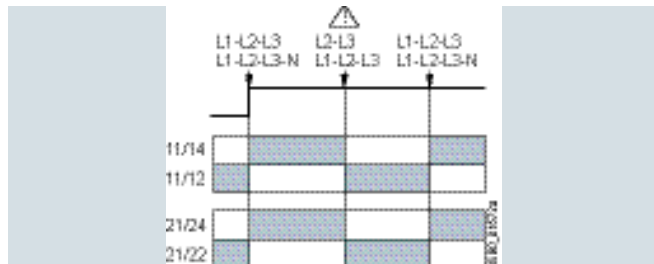
The 3UG46 15/3UG46 16 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with manual or auto RESET.

With the closed-circuit principle selected

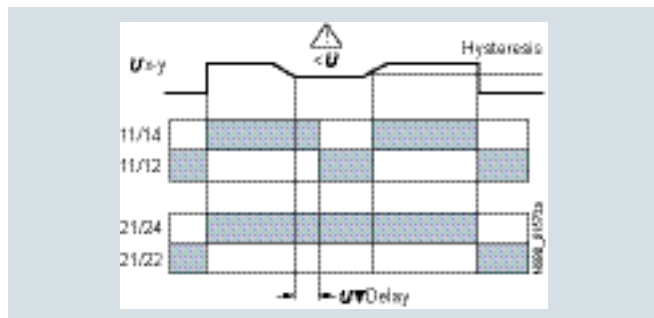
Wrong phase sequence



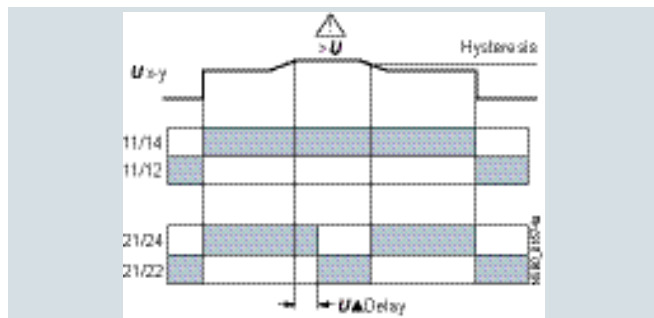
Phase failure



Undervoltage



Overvoltage

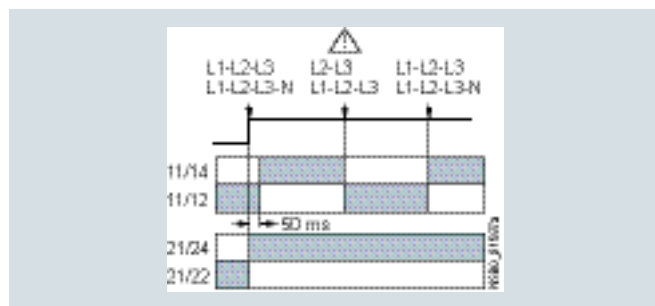


3UG46 17/3UG46 18 monitoring relays

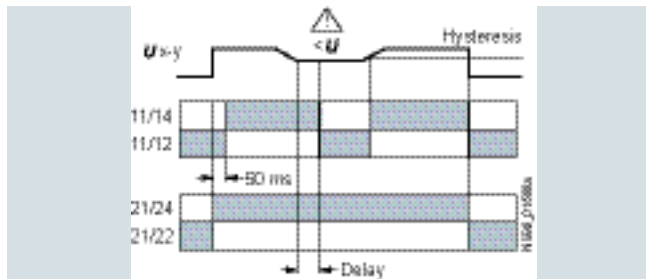
The 3UG46 17/3UG46 18 line monitoring relay has an internal power supply and can automatically correct a wrong direction of rotation. Thanks to a special measuring method, a phase failure is reliably detected in spite of the wide voltage range from 160 to 690 V AC and feedback through the load of up to 80 %. The device is equipped with a display and is parameterized using three buttons. The 3UG46 17 line monitoring relay monitors three-phase networks with regard to phase sequence, phase failure, phase unbalance, undervoltage and overvoltage. The 3UG46 18 monitoring relay monitors the neutral conductor as well. The hysteresis is adjustable from 1 to 20 V. In addition the device has delay times from 0 to 20 s in each case for overvoltage, undervoltage, phase failure and phase unbalance. The 3UG46 17/3UG46 18 monitoring relay can be operated on the basis of either the open-circuit or closed-circuit principle and with manual or auto RESET. The one changeover contact is used for warning or disconnection in the event of power system faults (voltage, unbalance), the other responds only to a wrong phase sequence. In conjunction with a contactor reversing assembly it is thus possible to change the direction automatically.

With the closed-circuit principle selected

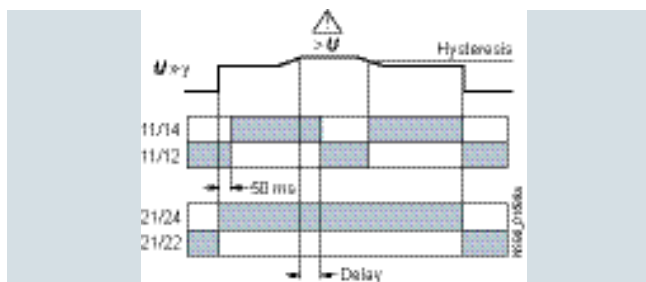
Phase failure



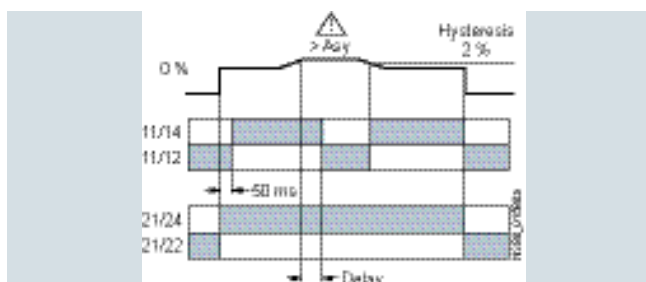
Undervoltage



Overvoltage



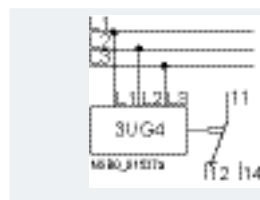
Unbalance



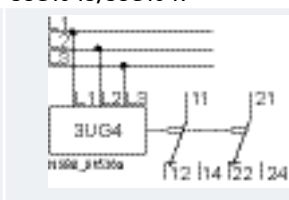
Type	3UG45 11 ... 3UG45 13, 3UG46 14 ... 3UG46 18	
General data		
Rated insulation voltage U_i	V	690
Pollution degree 3		
Overvoltage category III acc. to EN 60664-1		
Rated impulse withstand voltage	kV	6
Control circuit		
Load capacity of the output relay		
• Conventional thermal current I_{th}	A	5
Rated operational current I_e at		
• AC-15/24 ... 400 V	A	3
• DC-13/24 V	A	1
• DC-13/125 V	A	0.2
• DC-13/250 V	A	0.1
Minimum contact load at 17 V DC	mA	5
Electrical endurance AC-15	Million operating cycles	0.1
Mechanical endurance	Million operating cycles	10

Circuit diagrams

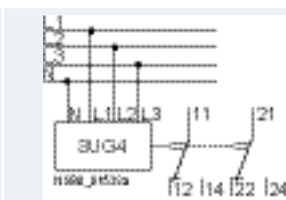
3UG45 11-A,
3UG45 12-A



3UG45 11-B, 3UG45 12-B,
3UG45 13, 3UG46 14,
3UG46 15, 3UG46 17



3UG46 16,
3UG46 18



Note:
It is not necessary to protect the measuring circuit for device protection. The protective device for line protection depends on the cross-section used.

Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Line monitoring

Selection and ordering data

							
3UG45 11-1AP20	3UG46 15-1CR20	3UG46 16-1CR20	3UG46 17-1CR20	3UG46 18-1CR20	3UG45 11-2BP20	3UG45 12-2BR20	
Hysteresis	Undervoltage detection	Overvoltage detection	ON-delay	Tripping delay	Version of auxiliary contacts	Rated control supply voltage $U_s^{1)}$	Screw terminals 
			s	s	CO	V	Order No.
Monitoring of phase sequence							
Auto-RESET							
—	—	—	—	—	1	160 ... 260 AC	3UG45 11-1AN20
					2		3UG45 11-1BN20
					1	320 ... 500 AC	3UG45 11-1AP20
					2		3UG45 11-1BP20
					1	420 ... 690 AC	3UG45 11-1AQ20
					2		3UG45 11-1BQ20
Monitoring of phase sequence, phase failure and phase unbalance							
Auto-RESET, closed-circuit principle, unbalance threshold 10 %							
—	—	—	—	—	1	160 ... 690 AC	3UG45 12-1AR20
					2		3UG45 12-1BR20
Monitoring of phase sequence, phase failure, unbalance and undervoltage							
Analogically adjustable, Auto-RESET, closed-circuit principle, fixed unbalance threshold 20 %							
5 % of set value	✓	—	—	0.1 ... 20	2	160 ... 690 AC	3UG45 13-1BR20
Digitally adjustable, auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %							
Adjustable	✓	—	0.1 ... 20	0.1 ... 20	2	160 ... 690 AC	3UG46 14-1BR20
1 ... 20 V							
Monitoring of phase sequence, phase failure, overvoltage and undervoltage							
Digitally adjustable, Auto-RESET or manual RESET, open-circuit or closed-circuit principle							
Adjustable	✓	✓	—	0.1 ... 20 ²⁾	2 ²⁾	160 ... 690 AC	3UG46 15-1CR20
1 ... 20 V							
Monitoring of phase sequence, phase and N conductor failure, overvoltage and undervoltage							
Digitally adjustable, Auto-RESET or manual RESET, open-circuit or closed-circuit principle							
Adjustable	✓	✓	—	0.1 ... 20 ²⁾	2 ²⁾	90... 400 AC against N	3UG46 16-1CR20
1 ... 20 V							
Automatic correction of the direction of rotation in case of wrong phase sequence, phase failure, phase unbalance, overvoltage and undervoltage							
Digitally adjustable, auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %							
Adjustable	✓	✓	—	0.1 ... 20	2 ³⁾	160 ... 690 AC	3UG46 17-1CR20
1 ... 20 V							
Automatic correction of the direction of rotation in case of wrong phase sequence, phase and N conductor failure, phase unbalance, overvoltage and undervoltage							
Digitally adjustable, auto or manual RESET, open-circuit or closed-circuit principle, unbalance threshold 0 or 5 ... 20 %							
Adjustable	✓	✓	—	0.1 ... 20	2 ³⁾	90... 400 AC against N	3UG46 18-1CR20
1 ... 20 V							

- ✓ Function available
— Function not available

- 1) Absolute limit values.
2) 1 CO contact each and 1 tripping delay time each for U_{min} and U_{max} .
3) 1 CO contact each for power system fault and phase sequence correction.

For accessories, see page 6/65.

Overview



SIRIUS 3UG46 31 monitoring relay

The relays monitor single-phase AC voltages (rms value) and DC voltages against the set threshold value for overshoot and undershoot. The devices differ with regard to their power supply (internal or external).

Benefits

- Versions with wide voltage supply range
- Variably adjustable to overvoltage, undervoltage or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display of ACTUAL value and status messages
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

- Protection of a plant against destruction due to overvoltage
- Switch-on of a plant at a defined voltage and higher
- Protection against overloaded control supply voltages, particularly with battery power
- Threshold switch for analog signals from 0.1 to 10 V

Technical specifications

3UG46 33 monitoring relays

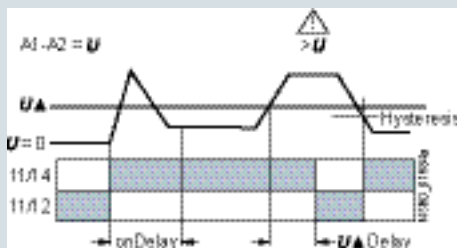
The 3UG46 33 voltage monitoring relay has an internal power supply and performs overshoot, undershoot or range monitoring of the voltage depending on how it is parameterized. The device is equipped with a display and is parameterized using three buttons.

The operating and measuring range extends from 17 to 275 V AC/DC. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the tripping delay time has elapsed. This delay time U_{del} can be set from 0.1 to 20 s like the ON-delay time on_{del} .

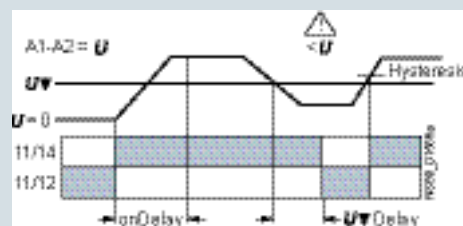
The hysteresis is adjustable from 0.1 to 150 V. The device can be operated on the basis of either the open-circuit or closed-circuit principle and with manual or auto RESET. One output changeover contact is available as signaling contact.

With the closed-circuit principle selected

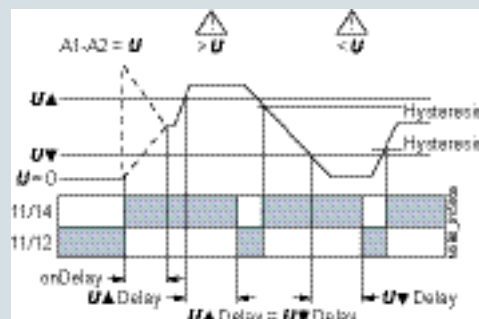
Overvoltage



Undervoltage



Range monitoring



Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Voltage monitoring

3UG46 31/3UG46 32 monitoring relays

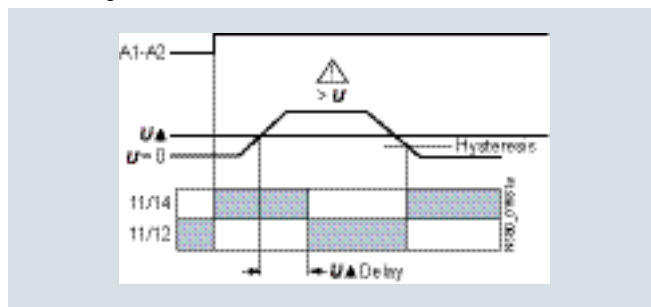
The 3UG46 31/3UG46 32 voltage monitoring relay is supplied with an auxiliary voltage of 24 V AC/DC or 24 to 240 V AC/DC and performs overshoot, undershoot or range monitoring of the voltage depending on how it is parameterized. The device is equipped with a display and is parameterized using three buttons.

The measuring range extends from 0.1 to 60 V or 10 to 600 V AC/DC. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the delay time has elapsed. This delay time U_{del} can be set from 0.1 to 20 s.

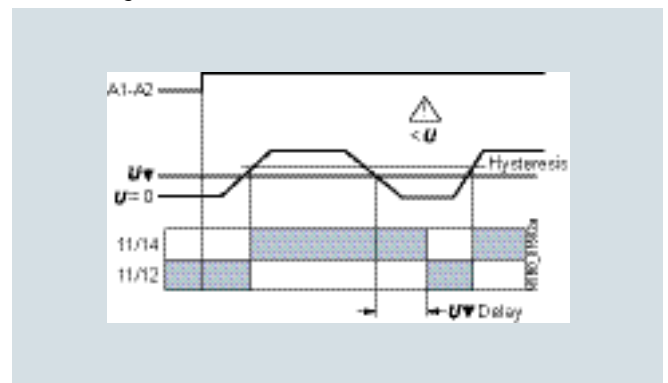
The hysteresis can be set from 0.1 to 30 V or 0.1 to 300 V. The device can be operated on the basis of either the open-circuit or closed-circuit principle and with manual or auto RESET. One output changeover contact is available as signaling contact.

With the closed-circuit principle selected

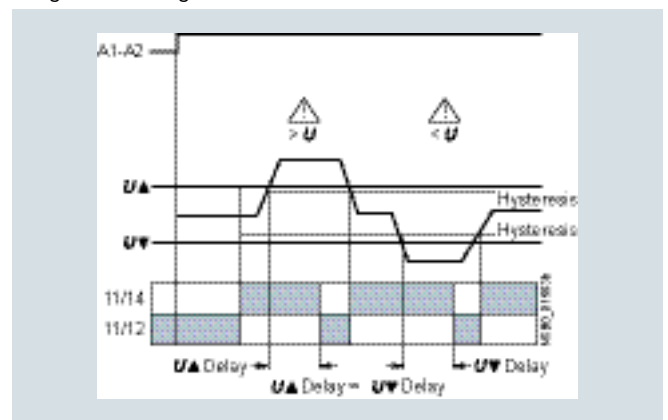
Overvoltage



Undervoltage



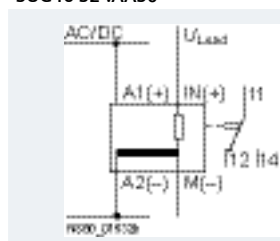
Range monitoring



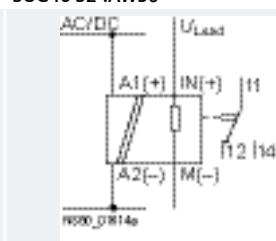
		3UG46 31	3UG46 32	3UG46 33
General data				
Rated insulation voltage U_i	V	690		
Pollution degree 3				
Overvoltage category III acc. to EN 60664-1				
Rated impulse withstand voltage U_{imp}	kV	6		
Measuring circuit				
Permissible measuring range single-phase AC/DC voltage	V	0.1 ... 68	10 ... 650	17 ... 275
Setting range single-phase voltage	V	0.1 ... 60	10 ... 600	17 ... 275
Measuring frequency	Hz	40 ... 500		
Control circuit				
Load capacity of the output relay				
• Conventional thermal current I_{th}	A	5		
Rated operational current I_c at				
• AC-15/24 ... 400 V	A	3		
• DC-13/24 V	A	1		
• DC-13/125 V	A	0.2		
• DC-13/250 V	A	0.1		
Minimum contact load at 17 V DC	mA	5		

Circuit diagrams

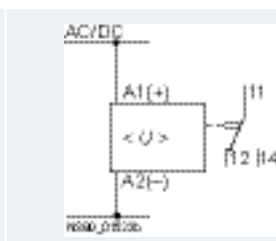
3UG46 31-AA30,
3UG46 32-AA30



3UG46 31-AW30,
3UG46 32-AW30



3UG46 33



Note:

It is not necessary to protect the measuring circuit for device protection. The protective device for line protection depends on the cross-section used.

Selection and ordering data

- Digitally adjustable, with illuminated LC display
- Auto or manual RESET
- Open or closed-circuit principle
- 1 CO contact



3UG46 31-1AA30



3UG46 33-2AL30

Measuring range	Hysteresis	Rated control supply voltage U_s	Screw terminals 
V	V	V	Order No.
Internal power supply without auxiliary voltage, ON-delay and tripping delay can be adjusted separately 0.1 ... 20 s			
17 ... 275 AC/DC	0.1 ... 150	17 ... 275 AC/DC ¹⁾	3UG46 33-1AL30
Supplied from an external auxiliary voltage, tripping delay adjustable 0.1 ... 20 s			
0.1 ... 60 AC/DC 10 ... 600 AC/DC	0.1 ... 30 0.1 ... 300	24 AC/DC	3UG46 31-1AA30 3UG46 32-1AA30
0.1 ... 60 AC/DC 10 ... 600 AC/DC	0.1 ... 30 0.1 ... 300	24 ... 240 AC/DC	3UG46 31-1AW30 3UG46 32-1AW30

1) Absolute limit values.

For accessories, see page 6/65.

Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Current monitoring

Overview



SIRIUS 3UG46 22 monitoring relay

The relays monitor single-phase AC currents (rms value) and DC currents against the set threshold value for overshoot and undershoot. They differ with regard to their measuring ranges and supply voltage types.

Benefits

- Versions with wide voltage supply range
- Variably adjustable to overvoltage, undervoltage or range monitoring
- Freely configurable delay times and RESET response
- Width 22.5 mm
- Display of ACTUAL value and status messages
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

- Overcurrent and undercurrent monitoring
- Monitoring the functionality of electrical loads
- Open-circuit monitoring
- Threshold switch for analog signals from 4 to 20 mA

Technical specifications

3UG46 21/3UG46 22 monitoring relays

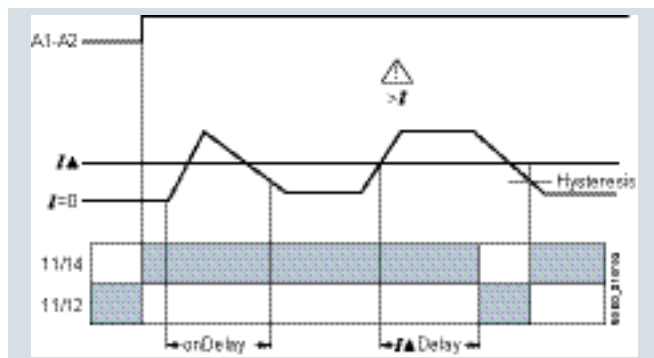
The 3UG46 21 or 3UG46 22 current monitoring relay is supplied with an auxiliary voltage of 24 V AC/DC or 24 to 240 V AC/DC and performs overshoot, undershoot or range monitoring of the current depending on how it is parameterized. The device is equipped with a display and is parameterized using three buttons.

The measuring range extends from 3 to 500 mA or 0.05 to 10 A. The rms value of the current is measured. The threshold values for overshoot or undershoot can be freely configured within this range. If one of these threshold values is reached, the output relay responds according to the set principle of operation as soon as the tripping delay time t_{del} has elapsed. This time and the ON-delay time t_{on} are adjustable from 0.1 to 20 s.

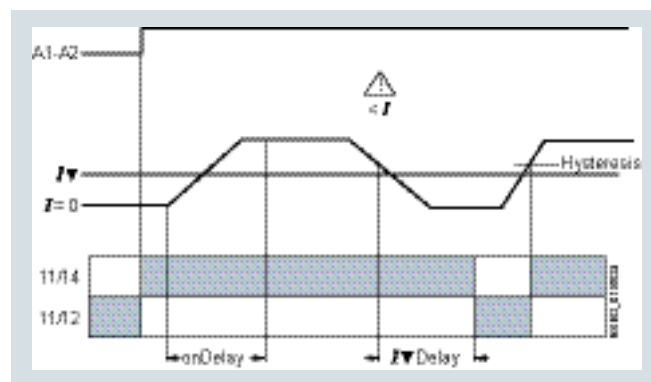
The hysteresis is adjustable from 0.1 to 250 mA or 0.01 to 5 A. The device can be operated with manual or auto RESET and on the basis of either the open-circuit or closed-circuit principle. Following options are available: Response of the output relay when the supply voltage $U_s = ON$ is applied or not until the lower measurement range limit of the measuring current ($I > 3 \text{ mA}/50 \text{ mA}$) is reached. One output changeover contact is available as signaling contact.

With the closed-circuit principle selected upon application of the supply voltage

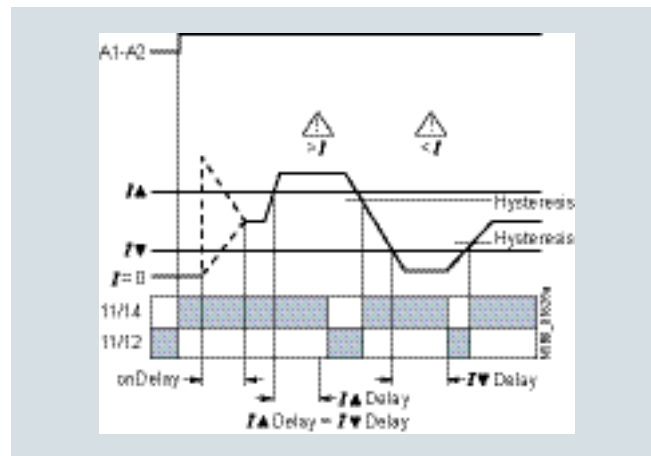
Current overshoot



Current undershoot



Range monitoring



		3UG46 21-AA	3UG46 21-AW	3UG46 22-AA	3UG46 22-AW
General data					
Rated insulation voltage U_i Pollution degree 3; overvoltage category III acc. to EN 60664-1	V	690			
Rated impulse withstand voltage U_{imp}	kV	6			
Measuring circuit					
Measuring range for single-phase AC/DC current	A	0.003 ... 0.6		0.05 ... 15	
Setting range for single-phase current	A	0.003 ... 0.5		0.05 ... 10	
Load supply voltage	V	24	Max. 300 ¹⁾ Max. 500 ²⁾	24	Max. 300 ¹⁾ Max. 500 ²⁾
Control circuit					
Load capacity of the output relay • Conventional thermal current I_{th}	A	5			
Rated operational current I_o at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1			
Minimum contact load at 17 V DC	mA	5			

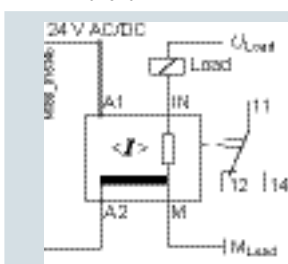
1) With protective separation.

2) With simple separation.

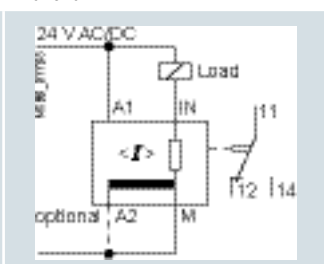
Circuit diagrams

3UG46 21-AA30, 3UG46 22-AA30

Operation with separate control circuit and load circuit

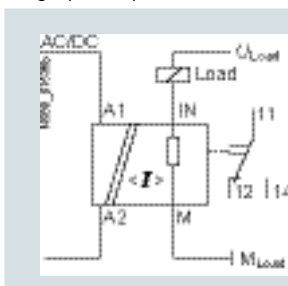


Operation with joint control circuit and load circuit

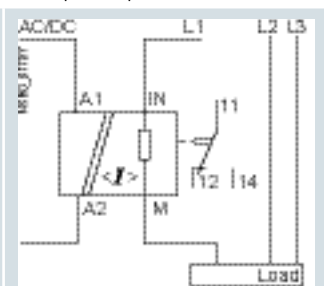


3UG46 21-AW30, 3UG46 22-AW30

Single-phase operation

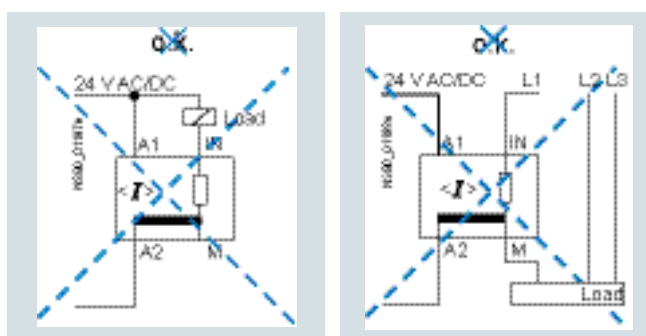
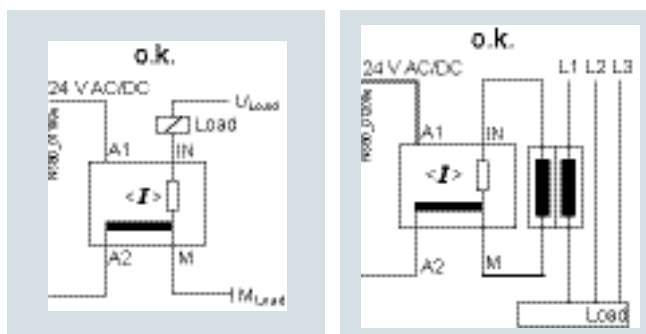


Three-phase operation



Wiring diagram for 24 V AC/DC (only 3UG46 21-AA30)

From the following circuit diagrams it is clear that loads in measuring circuits have to be in the current flow upstream from the monitoring relay. Otherwise, the monitoring relay could be destroyed and the short-circuit current could cause damage to the plant.



Configuring note:

A2 and M are electrically connected internally.

For applications in which the load to be monitored and the monitoring relay are supplied from the same power supply, there is no need for connection A2.

The load current must always flow through M or the monitoring relay may be destroyed.

Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Current monitoring

Selection and ordering data

- Digitally adjustable, with illuminated LC display
- Auto or manual RESET
- Open or closed-circuit principle
- 1 CO contact



3UG46 21-1AA30



3UG46 22-2AW30

Measuring range	Hysteresis	Rated control supply voltage U_s	Screw terminals 
		V	Order No.
Monitoring of undercurrent and overcurrent, ON-delay and tripping delay can be adjusted separately 0.1 ... 20 s			
AC/DC 3 ... 500 mA AC/DC 0.05 ... 10 A	0.1 ... 250 mA 0.01 ... 5 A	24 AC/DC ¹⁾	3UG46 21-1AA30 3UG46 22-1AA30
AC/DC 3 ... 500 mA AC/DC 0.05 ... 10 A	0.1 ... 250 mA 0.01 ... 5 A	24 ... 240 AC/DC ²⁾	3UG46 21-1AW30 3UG46 22-1AW30

1) No electrical separation. Load supply voltage 24 V.

2) Electrical separation between control circuit and measuring circuit. Load supply voltage for protective separation max. 300 V, for simple isolation max. 500 V.

For accessories, see page 6/65.

With AC currents $I > 10$ A it is possible to use 4NC current transformers as an accessory.

Overview



SIRIUS 3UG46 41 monitoring relay

The 3UG46 41 power factor and active current monitoring device enables the load monitoring of motors.

Whereas power factor monitoring is used above all for monitoring no-load operation, the active current monitoring option can be used to observe and evaluate the load factor over the entire torque range.

Technical specifications

3UG46 41 monitoring relays

The 3UG46 41 monitoring relay is self-powered and serves the single-phase monitoring of the p.f or performs overshoot, undershoot or range monitoring of the active current depending on how it is parameterized. The load to be monitored is connected upstream of the IN terminal. The load current flows through the terminals IN and Ly/N. The setting range for the power factor is 0.1 to 0.99 and for the active current I_{res} 0.2 to 10 A. If the supply voltage is switched on and no load current flows, the display will show $I < 0.2$ and a symbol for overrange, underrange or range monitoring. If the motor is now switched on and the current exceeds 0.2 A, the set ON delay time begins. During this time, if the set limit values are fallen below or exceeded, this does not lead to a relay reaction of the changeover contact. If the operational flowing active current and/or the power factor value falls below or exceeds the respective set threshold value, the spike delay begins. When this time has expired, the relay changes its switch position. The relevant measured variables for overshooting and undershooting in the display flashes. If the monitoring of active current overshooting is deactivated ($I_{res} \nabla = \text{OFF}$) and the load current drops below the lower measurement range threshold (0.2 A), then the CO contacts remain unchanged. If a threshold value is set for the monitoring of active current undershooting, then undershooting of the measurement range threshold (0.2 A) will result in a response of the CO contacts.

The relay operates either according to the open-circuit or closed-circuit principle.

If the device is set to Auto-RESET (Memory = No), depending on the set principle of operation, the switching relay returns to its initial state and the flashing ends when the hysteresis threshold is reached.

If manual RESET is selected in the menu (Memory = Yes), the switching relay remains in its current switching state and the current measured value and the symbol for undershooting and overshooting continues to flash, even when the measured variable reaches a permissible value again. This stored fault status can be reset by pressing the UP▲ and DOWN▼ key simultaneously for 2 seconds, or by switching the supply voltage off and back on again.

Benefits

- Can be used worldwide thanks to wide voltage range from 90 to 690 V (absolute limit values)
- Monitoring of even small single-phase motors with a no-load supply current below 0.5 A
- Simple determination of threshold values through the direct collection of measured variables on motor loading
- Range monitoring and active current measurement enable detection of cable breaks between control cabinets and motors, as well as phase failures
- Power factor or active current can be selected as measurement principle
- Width 22.5 mm
- All versions with removable terminals

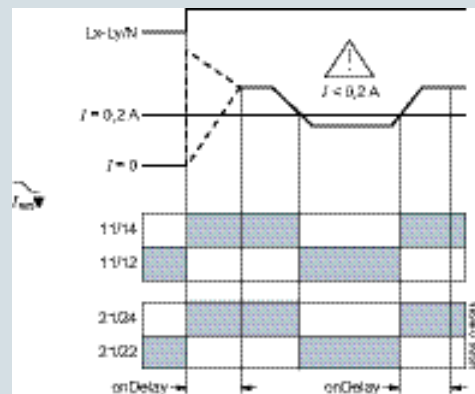
Application

- No-load monitoring and load shedding, such as in the event of a V-belt tear
- Underload monitoring in the low performance range, e.g. in the event of pump no-load operation
- Monitoring of overload, e.g. due to a dirty filter system
- Simple power factor monitoring in networks for control of compensation equipment
- Broken cable between control cabinet and motor

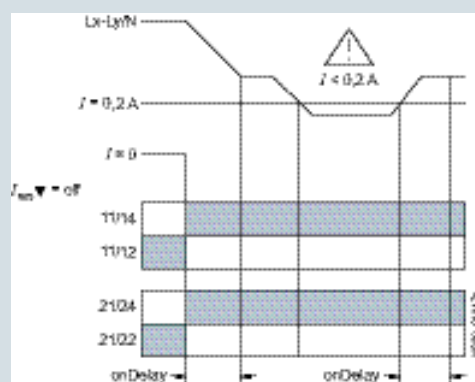
With the closed-circuit principle selected

Response in the event of undershooting the measurement range limit

- With activated monitoring of $I_{res} \nabla$



- With deactivated monitoring of active current overshooting

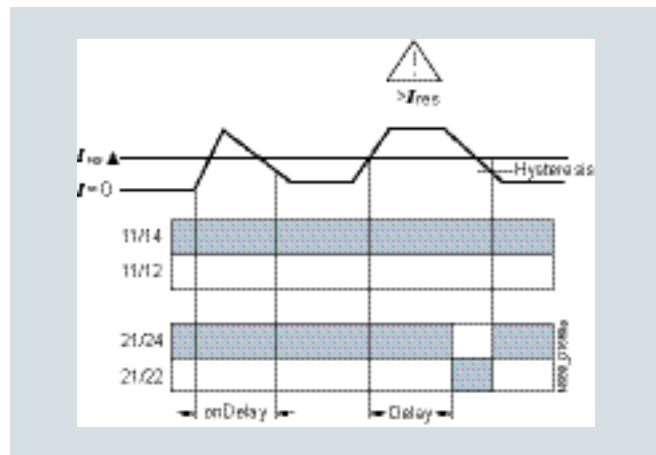


Monitoring Relays

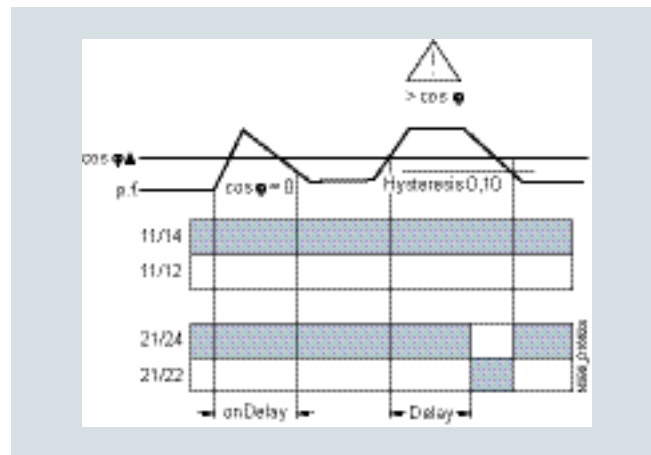
SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Power factor and active current monitoring

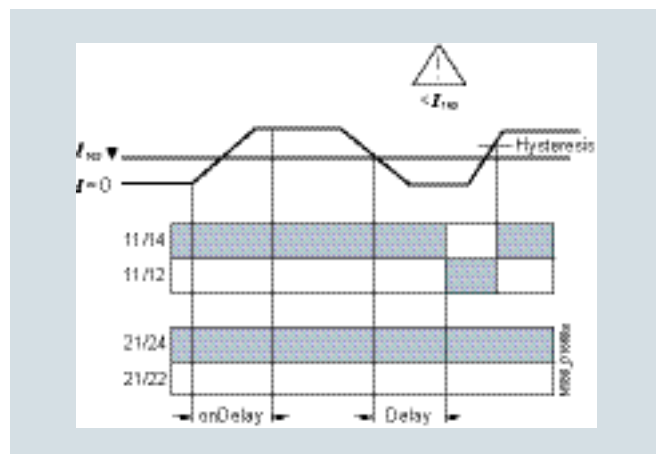
Overshooting of active current



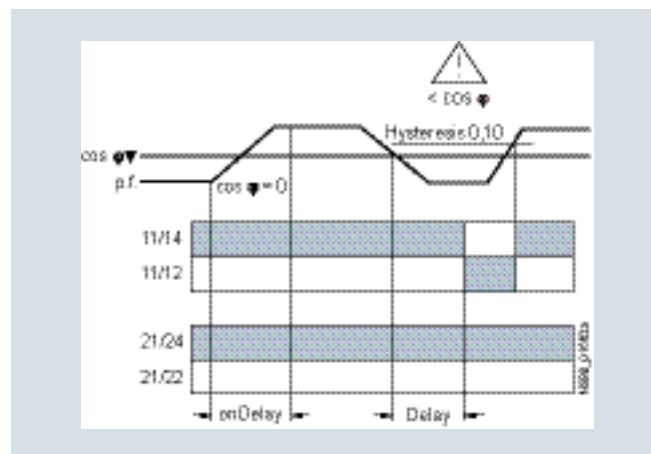
Overshooting of power factor



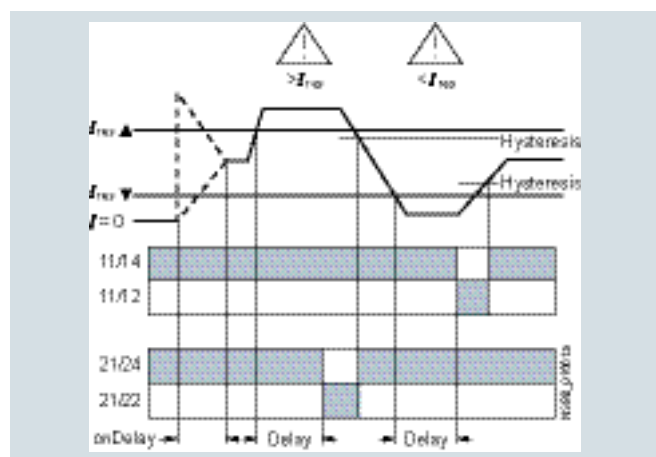
Undershooting of active current



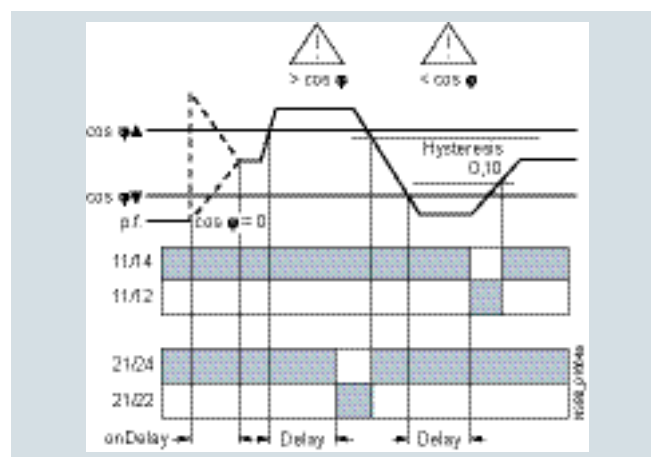
Undershooting of power factor



Range monitoring of active current



Range monitoring of power factor

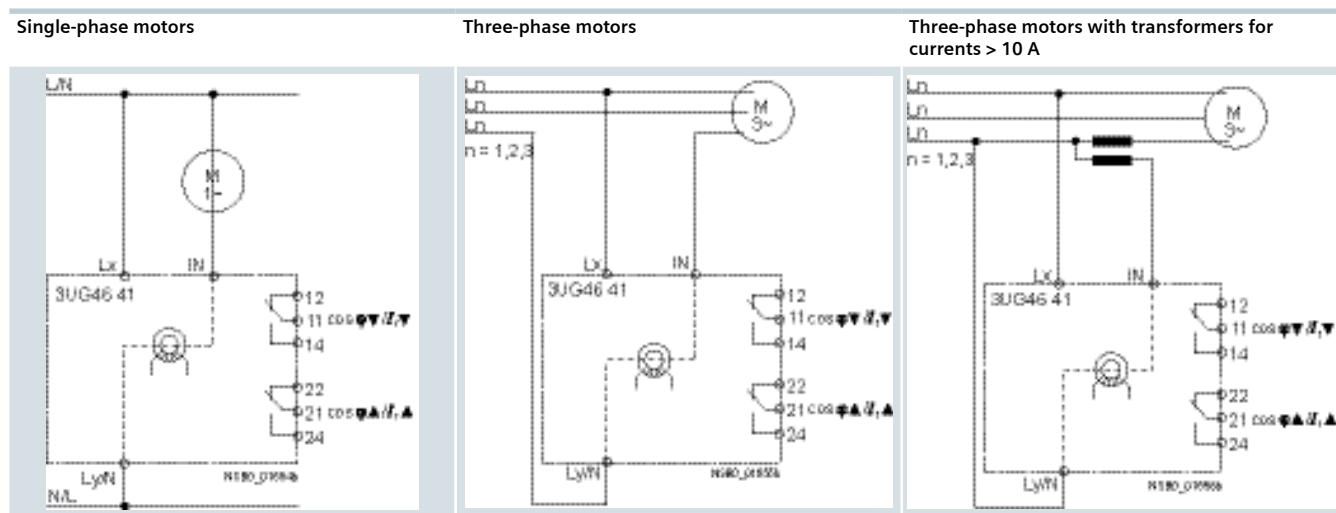


Legend

cos φ: p.f. (power factor)

Type	3UG46 41	
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to EN 60664-1	V	690
Rated impulse withstand voltage	kV	6
Control circuit		
Number of CO contacts for auxiliary contacts		2
Load capacity of the output relay		
• Conventional thermal current I_{th}	A	5
Rated operational current I_e at		
• AC-15/24 ... 400 V	A	3
• DC-13/24 V	A	1
• DC-13/125 V	A	0.2
• DC-13/250 V	A	0.1
Minimum contact load at 17 V DC	mA	5

Circuit diagrams



Selection and ordering data

- For monitoring the power factor and the active current I_{res} (p.f. x I)
- Suitable for single- and three-phase currents
- Digitally adjustable, with illuminated LC display
- Overshoot, undershoot or range monitoring
- Upper and lower threshold value can be adjusted separately
- Permanent display of actual value and tripping state
- 1 changeover contact each for undershoot/overshoot

Measuring range		Hysteresis		ON-delay	OFF-delay	Rated control supply voltage $U_s^{1)}$	Screw terminals 
For power factor	For active current I_{res}	For power factor	For active current I_{res}			AC 50/60 Hz	
P.f.	A	P.f.	A	s	s	V	Order No.
0.10 ... 0.99	0.2 ... 10.0	0.1	0.1 ... 2.0	0 ... 99	0.1 ... 20.0	90 ... 690	3UG46 41-1CS20

1) Absolute limit values.

For accessories, see page 6/65.

With AC currents $I_{res} > 10$ A it is possible to use 4NC current transformers as an accessory.

Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Residual current monitoring: Residual-current monitoring relays

Overview



SIRIUS 3UG46 24 monitoring relay

The 3UG46 24 residual-current monitoring relay is used together with the 3UL22 summation current transformer for plant monitoring.

Benefits

- Can be used worldwide thanks to wide voltage range from 90 to 690 V (absolute limit values)
- Variably adjustable threshold values for warning and disconnection
- Freely configurable delay times and RESET response
- Permanent indication of the actual value and fault diagnosis on the display
- High flexibility and space savings through installation of the transformer outside the control cabinet
- Width 22.5 mm
- All versions with removable terminals

Application

- Monitoring of plants in which residual currents can occur, e.g. due to dust deposits or moisture, porous cables and leads or capacitive residual currents

Technical specifications

3UG46 24 monitoring relays

The main conductor and any neutral conductor to which a load is connected, are routed through the opening of the annular strip-wound core of a summation current transformer. A secondary winding is placed around this annular strip-wound core to which the monitoring relay is connected.

If operation of a plant is fault-free, the sum of the inflowing and outward currents equals zero. In this case, no voltage is induced in the secondary winding of the summation current transformer.

However, if an insulation fault occurs downstream of the residual current operated circuit breaker, the sum of the inflowing currents is greater than that of the outward currents.

The differential current - the residual current - induces a secondary current in the secondary winding of the transformer. This current is evaluated in the monitoring relay and is used on the one hand to display the actual residual current and on the other, to switch the relay if the set warning or tripping threshold is overshot.

If the measured residual current exceeds the set warning value, the associated changeover contact instantly changes the switching state and an indication appears on the display. If the measured residual current exceeds the set tripping value, the set delay time begins and the associated relay symbol flashes. On expiry of this time, the associated changeover contact changes the switching state.

ON-delay time for motor start

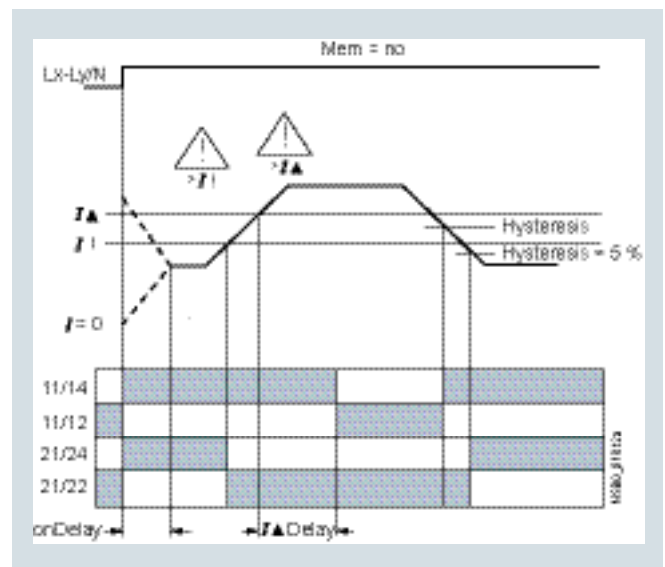
To be able to start a motor, once the auxiliary voltage has been applied for an adjustable ON-delay time, and depending on whether the open-circuit or closed-circuit principle is selected, the output relay switches to the GO state.

The changeover contacts do not react if the set threshold value is overshoot during this period.

With the closed-circuit principle selected

Residual current monitoring with Auto-RESET (Memory = no)

If the device is set to Auto-RESET (Memory = No), the relay switches for the tripping value once the value falls below the set hysteresis threshold and the display stops flashing. The associated relay changes its switching state if the value falls below the fixed hysteresis value of 5 % of the warning value. Any overshoots are therefore not stored.

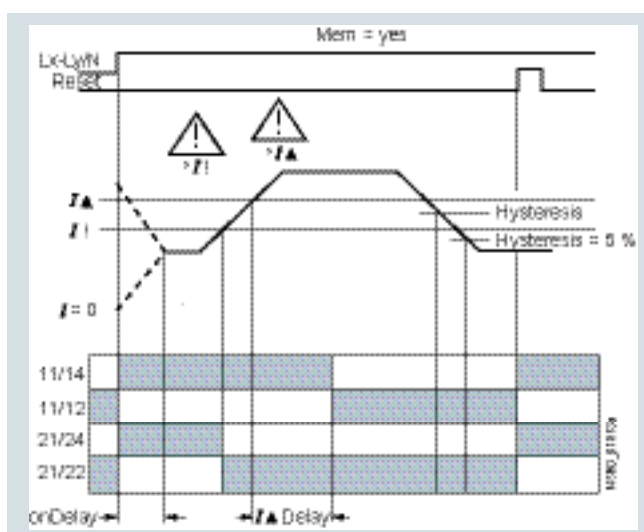


Residual current monitoring with Manual RESET (Memory = yes)

If Manual RESET is selected in the menu, the output relay remains in its current switching state and the current measured value and the symbol for overshooting continues to flash, even when the measured residual current returns to a permissible value. This stored fault status can be reset by pressing the UPs and DOWNt key simultaneously for > 2 seconds, or by switching the supply voltage off and back on again.

Note:

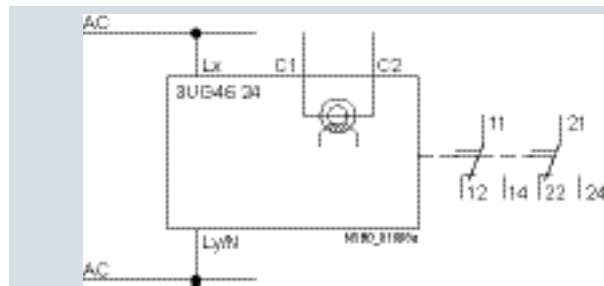
The neutral conductor must not be grounded downstream of the summation current transformer as this may impair the function of the residual current monitoring device.



Type	3UG46 24	
General data		
Rated insulation voltage U_i Pollution degree 3 Overvoltage category III acc. to EN 60664-1	V	690
Rated impulse withstand voltage	kV	6
Control circuit		
Number of CO contacts for auxiliary contacts		2
Load capacity of the output relay Conventional thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

Circuit diagram

3UG46 24



Note:

It is not necessary to protect the measuring circuit for device protection. The protective device for line protection depends on the cross-section used.

Selection and ordering data

- For monitoring residual currents I_{dn} 0.3 to 40 A
- For 3UL22 summation current transformers with feed-through opening 40 to 120 mm
- Digitally adjustable, with illuminated LC display
- Separately adjustable limit value and warning threshold
- Permanent display of actual value and tripping state
- 1 CO contact each for limit violation and warning threshold

Display range	Setting range	Hysteresis	ON / tripping delay time	Rated control supply voltage $U_c^{(2)}$	Screw terminals
A	A	Limit value Warning value	s	V	Order No.
10 ... 120 % of I_{An}	10 ... 100 % of I_{An}	LSB ¹⁾ up to 50 % of I_{An} 5 % of I_{An}	0.1 ... 20	90 ... 690	3UG46 24-1CS20

1) LSB: Smallest adjustable value, transformer-dependent, $\leq 1\%$ of I_{An} .

2) Absolute limit values.

For accessories, see page 6/65.

For 3UL22 summation current transformers see page 6/56.

Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Residual current monitoring: Summation current transformers

Overview

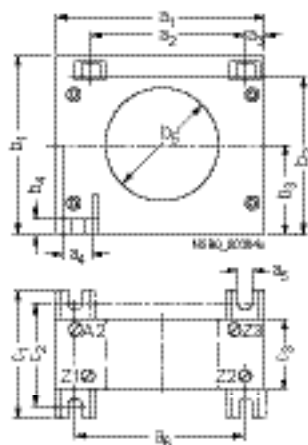


SIRIUS 3UL22 summation current transformers

The 3UL22 summation current transformers detect fault currents in machines and plants. Together with the 3UG46 24 residual-current monitoring relay or the SIMOCODE 3UF motor management and control device they enable residual-current and ground-fault monitoring.

Technical specifications

Dimensional drawings



Order No.	b ₁	b ₂	b ₃	b ₄	b ₅	b ₆	b ₇	b ₈	b ₉	b ₁₀	b ₁₁	b ₁₂	b ₁₃	b ₁₄	b ₁₅
3UL22 01	100	75	10	15	for M4	80	85	72.5	42.5	7.5	40	65	80	40	
3UL22 02	125	95	10	15	for M4	100	110	87.5	55	7.5	65	70	80	45	
3UL22 03	200	165	20	20	for M4	170	200	100	10	10	120	65	70	55	

Selection and ordering data

Feed-through opening diameter	Rated insulation voltage U_i	Rated fault current I_{An}	For Protodur cable, can be fed through	Screw terminals
mm	V	A	max. mm ²	Order No.
Summation current transformers (essential accessory for 3UG46 24 or SIMOCODE 3UF)				
40	690	0.3	4 x 95	3UL22 01-1A
		0.5		3UL22 01-2A
		1		3UL22 01-3A
65	690	0.3	4 x 240	3UL22 02-1A
		0.5		3UL22 02-2A
		1		3UL22 02-3A
		6		3UL22 02-1B
		10		3UL22 02-2B
		16		3UL22 02-3B
		25		3UL22 02-4B
		40		3UL22 02-5B
120	1000	0.3	8 x 300	3UL22 03-1A
		0.5		3UL22 03-2A
		1		3UL22 03-3A
		6		3UL22 03-1B
		10		3UL22 03-2B
		16		3UL22 03-3B
		25		3UL22 03-4B
		40		3UL22 03-5B

Overview



SIRIUS 3UG30 81 insulation monitor

Relay for monitoring the insulation resistance between the ungrounded single or three-phase AC supply and a protective conductor

- Measuring principle with superimposed DC voltage
- Two selectable measuring ranges of 1 to 110 kW
- Stepless setting within the measuring range
- Selectable:
 - Auto RESET function with fixed hysteresis or
 - Storage of the tripping operation
- Test function with test button and terminal connections on the front
- Switching output: 1 CO contact
- Insulation fault indication with a red LED
- Control supply voltage indication with a green LED
- Electromagnetically compatible according to EN 61000-6-2 and EN 61000-6-4

Technical specifications

The monitoring relay measures the insulation resistance between the ungrounded AC supply and an associated protective conductor.

A superposed DC measuring voltage is used to perform the measurement.

The monitoring relay is divided into two ranges for an insulation resistance range from 1 to 100 kW. A range switch on the front can be used to switch over between a 1 to 11 kW range and a 10 to 110 kW range. Within the selected range, the monitoring relay can be steplessly adapted to the respective insulation conditions.

If the insulation resistance undershoots the set response value, the output relay is excited and the red LED (fault indication) is lit.

If the insulation resistance exceeds 1.6 times (corresponding to 60 % hysteresis) the set response value, the output relay will return to the rest position.

Test functions

The "Test" button on the front can be used to simulate a ground fault. If the "Test" button is pressed for at least 300 ms, the output relay is energized and the fault LED lights up. An external test button, which is connected to PE, can also be connected to terminal Y1. The function is activated by closing (> 300 ms).

Note:

The monitoring relay is designed for AC voltage systems. Series-connected rectifiers must be electrically isolated from the measuring relay.

Application

The 3UG30 81 monitoring device is suitable for insulation monitoring of AC systems with one or three phases in ungrounded networks (IT networks).

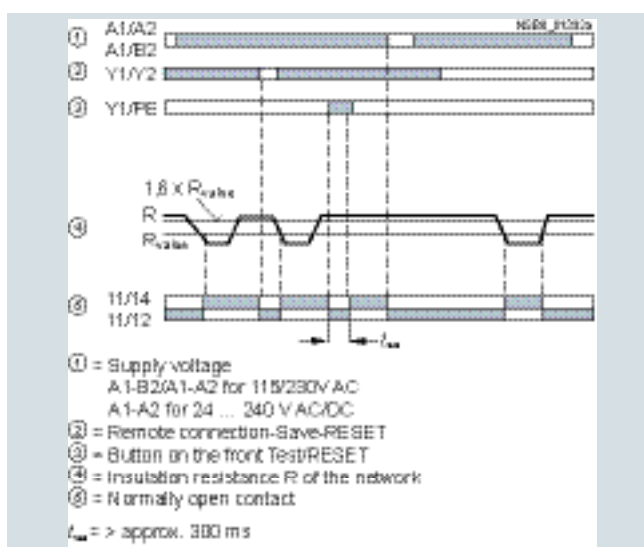
Control supply voltage

The 3UG30 81-1AK20 has alternative voltage terminals. Only one control supply voltage is permitted to be connected to it! Terminals A1 and A2 are used to connect 230 V AC and terminals A1 and B2 are used to connect 115 V AC.

The 3UG30 81-1AW30 has a wide-range input of 24 V to 240 V AC/DC on terminals A1 and A2.

Fault storage and RESET

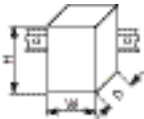
If terminals Y1 and Y2 are jumpered, the monitoring relay is set to fault storage mode. If the set insulation resistance is undershot, the output relay is excited and remains tripped even after the insulation resistance rises above 1.6 times the set value again. Fault storage can be reset by briefly pressing the RESET button, briefly jumpering (< 300 ms) the Y1 and PE/ground terminals or by switching off and on the supply voltage.



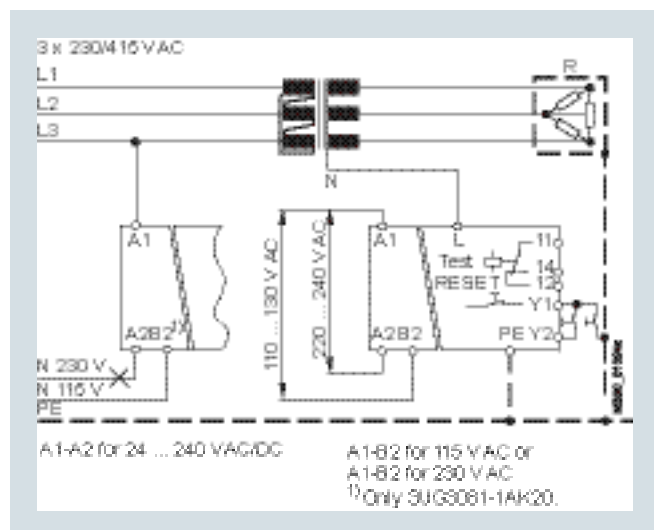
Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded AC networks

Type		3UG30 81
Dimensions (W x H x D)	mm	45 x 100 x 100
		
General data		
Rated insulation voltage U_i between supply, measurement, and output circuit	V	250 acc. to IEC 60947-1
Measuring circuit L/PE		
Response value	k Ω	1...110
Min. internal resistance for AC	k Ω	100
Min. internal resistance for DC	k Ω	100
Measurement DC voltage	V	30
Max. AC insulation voltage (L/PE)	V	415
Reset/test function terminals (max. 10 m)		Y1-Y2
Delay time in case of response	s	1
Output relay		1 CO contact, open-circuit principle

Connection diagram for networks up to 415 V AC



Selection and ordering data

	Measuring range U_e	Rated control supply voltage U_s	Screw terminals 
	kΩ	V	Order No.
Insulation monitors for ungrounded AC networks			
	1 ... 110	115 / 230 AC	3UG30 81-1AK20
		24 ... 240 AC/DC	3UG30 81-1AW30

3UG30 81-1AK20

For accessories, see page 6/65.

Overview



SIRIUS 3UG30 82 insulation monitor

Relay for monitoring the insulation resistance between ungrounded pure DC networks and a protective conductor

- Measuring principle for residual current measurement
- Response value can be adjusted steplessly from 10 to 110 kW
- Selectable
 - Auto RESET function with hysteresis or
 - Storage of the tripping operation
- Front selector switch for open-circuit and closed-circuit principle for the output relay
- Test function with test buttons on the front for L+ and L- and over terminal connections
- Switching output: 1 CO contact
- Insulation fault indicator for L+ and L- through two red LEDs
- Control supply voltage indication with a green LED
- Electromagnetically compatible according to EN 61000-6-2 and EN 61000-6-4

Technical specifications

The monitoring relay measures the insulation resistance between the positive and negative supply voltage in an ungrounded DC voltage network and a corresponding protective conductor.

The measurement is based on the DC residual current measurement principle. The response value can be adjusted steplessly in the range from 10 to 110 kW and thus can be adapted to the corresponding conditions. If the insulation resistance falls below the set response value, the output relay triggers (depending on the setting of the open/closed-circuit principle selector switch) and a fault LED lights up.

A ground fault is evaluated separately for L+ and L- and indicated by means of a corresponding LED.

Note:

Due to the measurement principle, a symmetrical ground fault on terminals L+ and L- cannot be evaluated.

Test function

A ground fault can be simulated using the Test L+ and Test L- buttons on the front. If the test button is pressed for at least 1 s, the status of the output relay changes and the corresponding fault LED lights up.

An external test button can be connected to terminals Y1-Y3 for L+ and terminals Y4-Y3 for L-. The function is triggered by means of a NO contact.

Application

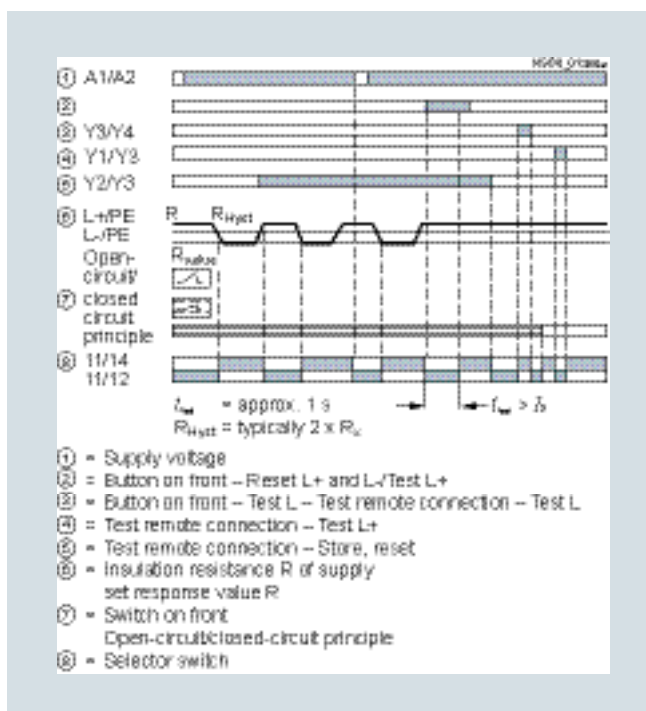
The 3UG30 82 monitoring relay has been designed for insulation monitoring in ungrounded, purely DC networks with or without filtering. It is mainly used to monitor ungrounded DC voltage networks as well as to monitor battery-powered systems.

Control supply voltage

Due to the electrical isolation of the supply voltage and the measuring circuit, the relay can be used for DC networks in which the auxiliary voltage is either supplied externally or where the network to be monitored also serves as the power supply.

Note:

If the monitoring relay is supplied with an external voltage, then the terminals A1 and L+ as well as A2 and L- must not be connected with each other!



Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Insulation monitoring for ungrounded DC networks

Fault storage and RESET

If terminals Y2 and Y3 are linked, the monitoring relay is set to fault storage mode.

If the insulation resistance falls below the set value, the output relay triggers (depending on the setting of the open/closed circuit selector switch), and stays in this state even if the insulation resistance rises again above the hysteresis value (typical: 2 times the set value). This fault storage can be deleted by pressing and releasing the L+ RESET button, opening the Y2-Y3 connection or by switching off the supply voltage.

Open/closed-circuit principle selector switch

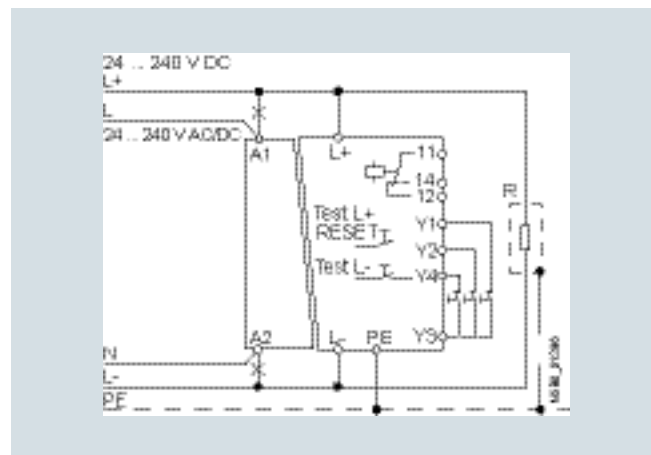
The principle of operation of the output relay can be adjusted by means of a selector switch on the front panel.

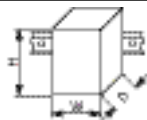
If the relay is to respond in the event of a fault (contact symbol open), the open-circuit principle must be selected. If the relay however is to trigger in the event of a fault (contact symbol closed), the closed-circuit principle must be selected.

Note:

The position of the selector switch has no effect upon the fault LEDs. The LEDs always light up if the insulation resistance on L+ or L- falls below the set value.

Connection diagram for 24 to 240 V DC



Type		3UG30 82
Dimensions (W x H x D)	mm	45 x 100 x 100
		
General data		
Rated insulation voltage U_i between supply, measurement, and output circuit	V	250
Measuring circuit		
Response value	k Ω	10 ... 110
Min. internal resistance for DC	k Ω	57
Measurement DC voltage	V	24 ... 240
Max. DC insulation voltage (L+/PE/ground, L-/PE/ground)	V	300
Reset/test function terminals (max. 10 m)		Y1/Y3, Y4/Y3
Delay time in case of response	s	1
Output relay		1 changeover contact, open-circuit or closed-circuit principle

Selection and ordering data

	Measuring range U_e	Rated control supply voltage U_s	Screw terminals
	k Ω	V	Order No.
Insulation monitors for ungrounded DC networks			
	10 ... 110	24 ... 240 AC/DC	3UG30 82-1AW30
			
3UG30 82-1AW30			

For accessories, see page 6/65.

Overview



SIRIUS 3UG45 01 monitoring relay

The 3UG45 01 level monitoring relay is used together with 2- or 3-pole sensors to monitor the levels of conductive liquids.

Benefits

- Can be used worldwide thanks to wide voltage range from 24 to 240 V (absolute limit values)
- 2- and 3-pole wire electrodes can be individually shortened for simple mounting from above or below
- Bow electrodes for installing from the side, for higher filling heights and minimum space requirements
- Can be flexibly adapted to different conductive liquids through analog setting of the sensitivity from 2 to 200 kW
- Compensation of wave movements through a tripping delay time of 0.1 to 10 seconds
- Selectable inlet or outlet function
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

- Single-point and two-point level monitoring
- Overflow protection
- Dry run protection
- Leak monitoring

Technical specifications

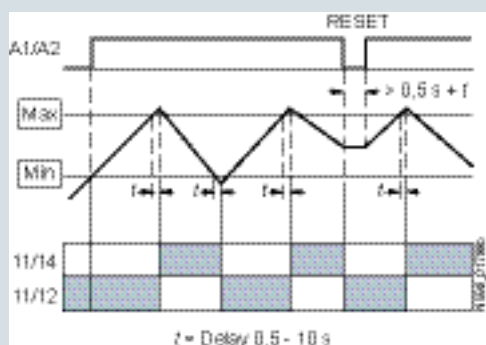
3UG45 01 monitoring relays

The principle of operation of the 3UG45 01 level monitoring relay is based on measuring the electrical resistance of the liquid between two immersion sensors and a reference terminal. If the measured value is lower than the sensitivity set at the front, the output relay changes its switching state. In order to exclude electrolytic phenomena in the liquid, the sensors are supplied with alternating current.

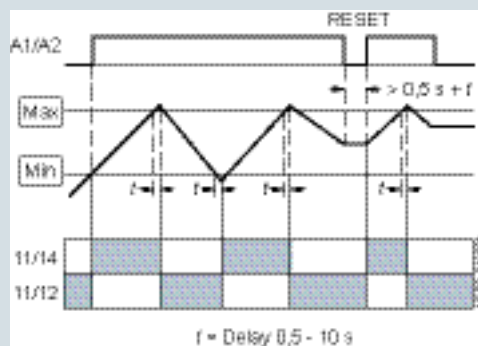
Two-point control

The output relay changes its switching state as soon as the liquid level reaches the maximum sensor, while the minimum sensor is submerged. The relay returns to its original switching state as soon as the minimum sensor no longer has contact with the liquid.

OVER, two-point control



UNDER, two-point control



Note:

It is also possible to connect other resistance sensors to the Min and Max terminals in the range 2 to 200 kW, e.g. photoresistors, temperature sensors, encoders based on resistance, etc. The monitoring relay can therefore also be used for other applications apart from monitoring the levels of liquids.

Monitoring Relays

SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Level monitoring: Level monitoring relays

Single-point control

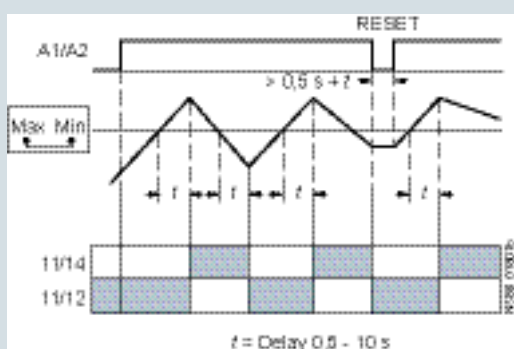
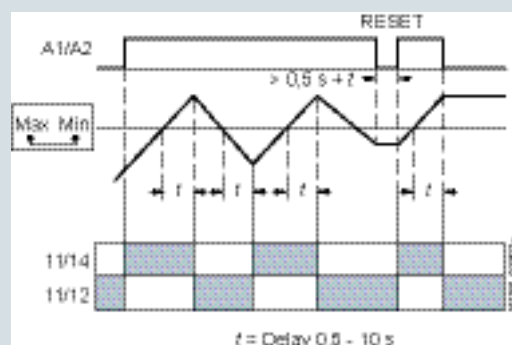
If only one level is being controlled, the terminals for Min and Max on the monitoring relay are bridged. The output relay changes its switching state as soon as the liquid level is reached and returns to its original switching state once the sensor no longer has contact with the liquid.

In order to prevent premature tripping of the switching function caused by wave motion or frothing, even though the set level has not been reached, it is possible to delay this function by 0.5 ... 10 s.

For safe resetting, the supply voltage must be interrupted for at least the set delay time of +0.5 s.

OVER, single-point control

UNDER, single-point control

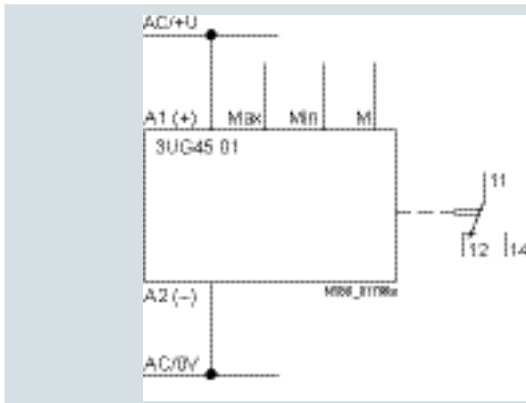


Type	3UG45 01	
General data		
Rated insulation voltage U_i Pollution degree 3, Overvoltage category III acc. to EN 60664-1	V	300
Rated impulse withstand voltage	kV	4
Measuring circuit		
Electrode current, max. (typ. 70 Hz)	mA	1
Electrode voltage, max. (typ. 70 Hz)	V	15
Sensor feeder cable	m	Max. 100
Conductor capacity of sensor cable ¹⁾	nF	Max. 10
Control circuit		
Load capacity of the output relay Conventional thermal current I_{th}	A	5
Rated operational current I_e at • AC-15/24 ... 400 V • DC-13/24 V • DC-13/125 V • DC-13/250 V	A A A A	3 1 0.2 0.1
Minimum contact load at 17 V DC	mA	5

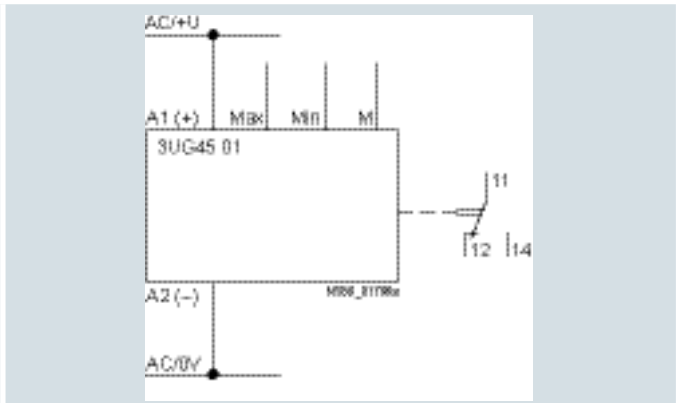
- 1) The sensor cable does not necessarily have to be shielded, but we do not recommend installing this cable parallel to the power supply lines. It is also possible to use a shielded cable, whereby the shield has to be connected to the M terminal.

Circuit diagrams

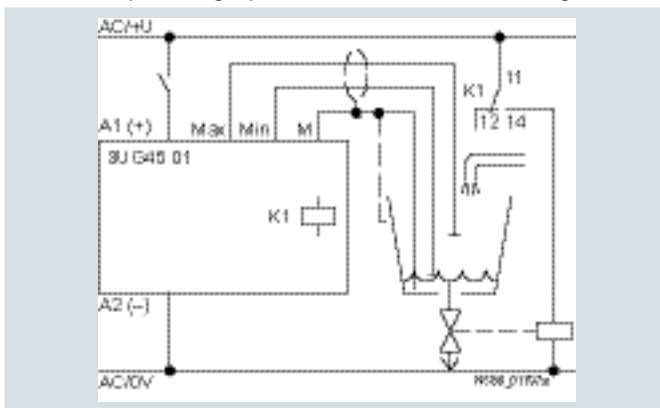
Schematic circuit diagram



Circuit example of two-point control with outlet monitoring



Circuit example of single-point control with inlet monitoring



Selection and ordering data

- For level monitoring of electrically conductive liquids
- Control principle: inlet or outlet control per rotary switch
- Single-point and two-point control possible
- Analogically adjustable sensitivity (specific resistance of the liquid)
- Analogically adjustable tripping delay time
- 1 yellow LED for indicating the relay state
- 1 green LED for indicating the applied control supply voltage
- 1 CO contact

Sensitivity	Tripping delay time	Rated control supply voltage U_s	Screw terminals 
k Ω	s	VAC/DC	Order No.
2 ... 200	0.5 ... 10	24 ¹⁾	3UG45 01-1AA30
		24 ... 240	3UG45 01-1AW30

1) The rated control supply voltage and the measuring circuit are not electrically separated.

For accessories, see page 6/65.

For level monitoring sensors see page 6/64.

Monitoring Relays

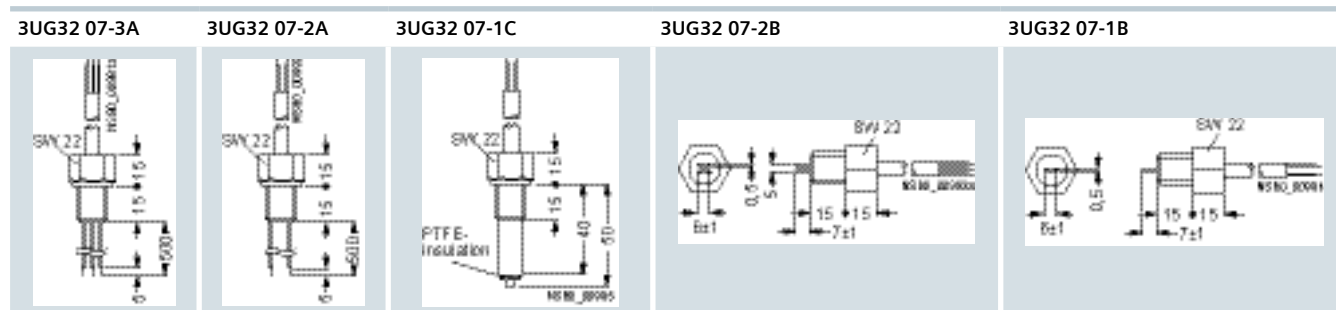
SIRIUS 3UG Monitoring Relays for Stand-Alone Installation

Level monitoring:
Level monitoring sensors

Technical specifications

Type		3UG32 07-3A three-pole	3UG32 07-2A two-pole	3UG32 07-2B two-pole	3UG32 07-1B single-pole	3UG32 07-1C single-pole
Length	mm	500	500	—	—	—
Insulation	Teflon insulation (PTFE)	Yes	Yes	Yes	—	Yes
Installation		Vertical	Vertical	Lateral	Lateral	Lateral
Screw-in gland width A/F		22				
Thread	inch	R 3/8				
Connecting cable	mm ²	3 x 0.5, 2 m long				
Operating temperature	°C	90				
Operating pressure	bar	10				
Cable/electrode assignment						
• Cable brown		Center electrode	Not assignable	Gland	Gland	Gland
• Cable white		Not assignable	Not assignable	Not assignable	Electrode	Electrode
• Cable green		Not assignable	—	Not assignable	—	—

Dimensional drawings



Selection and ordering data

Version	Order No.
Level monitoring sensors (essential accessory)	
 3UG32 07-3A The wire electrodes can be cut or bent to the required length before or after installation. The Teflon insulation must be removed over a length of approx. 5 mm. Three-pole wire electrodes, 500 mm long For 2-point liquid level control in an insulating tank. One electrode each for the min. and max. value and a common reference electrode.	3UG32 07-3A
 3UG32 07-2A Two-pole wire electrodes, 500 mm long For alarm indication in the event of overflow or low level and for 2-point liquid level control, when the conductive tank is used as the reference electrode.	3UG32 07-2A
 3UG32 07-2B Two-pole bow electrodes Thanks to the small space requirements due to lateral fitting, ideal for use in small containers and pipes, as a leak monitor and level monitor or for warning of water entering an enclosure.	3UG32 07-2B
 3UG32 07-1B Single-pole bow electrodes for lateral fitting As a max. value electrode for lateral fitting or for alarm indication in conductive tanks or pipes.	3UG32 07-1B
 3UG32 07-1C Single-pole rod electrodes for lateral fitting For high flow velocities or for intensively sparkling fluids.	3UG32 07-1C

Selection and ordering data

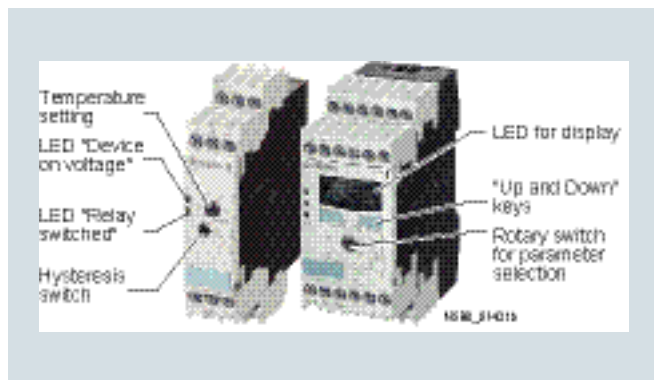
	Use	Version	Order No.
Blank labels			
 3RT19 00-1SB20	For 3UG4	Unit labeling plates For SIRIUS devices 20 mm x 7 mm, pastel turquoise ¹⁾	3RT19 00-1SB20
	For 3UG4	Inscription labels for sticking For SIRIUS devices 19 mm x 6 mm, pastel turquoise	3RT19 00-1SB60
		19 mm x 6 mm, zinc yellow	3RT19 00-1SD60
Push-in lugs and covers			
 3RP19 03	For 3UG4	Push-in lugs For screw fixing, 2 units are required for each device	3RP19 03
 3RP19 02	For 3UG4	Sealable covers For securing against unauthorized adjustment of setting knobs	3RP19 02
	For 3UG45	Sealing foil For securing against unauthorized adjustment of setting knobs	3TK28 20-0AA00
Covers for insulation monitoring relays			
	For 3UG30 81, 3UG30 82	Sealable, transparent covers	3UG32 08-1A

1) PC labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH
www.murrplastik.de

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

General data

Overview



SIRIUS 3RS temperature monitoring relay

Order No. scheme

Digit of the Order No.	1st - 3rd	4th	5th	6th	7th		8th	9th	10th	11th	12th	
	□□□	□	□	□	□	-	□	□	□	□	□	
Temperature monitoring relays	3 R S											
Device type		□	□									
Version and type of sensor				□	□							
Connection methods							□					
Number and type of outputs								□				
Control supply voltage									□			
Measuring range										□		
Special version											□	
Example	3 R S	1	0	0	0	-	1	C	D	0	0	

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

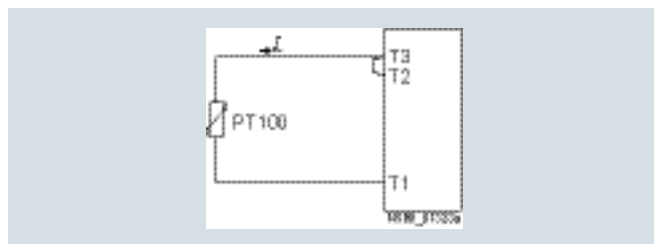
For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Technical specifications

Connection of resistance-type thermometers

Two-wire measurement

When two-wire temperature sensors are used, the resistances of the sensor and wiring are added. The resulting systematic error must be taken into account when the signal evaluation unit is calibrated. A jumper must be clamped between terminals T2 and T3 for this purpose.



Wiring errors

The errors that are generated by the wiring comprise approximately 2.5 Kelvin/Ω. If the resistance of the cable is not known and cannot be measured, the wiring errors can also be estimated using the following table.

The 3RS10, 3RS20 temperature monitoring relays can be used for measuring temperatures in solid, liquid and gas media. The temperature is detected by the sensor in the medium, evaluated by the device and monitored for overshoot or undershoot or for staying within an operating range (window function).

The range comprises adjustable analog units with one or two threshold values, digital units for 1 sensor, which are also a good alternative to temperature controllers for the low-end range, and digital units for up to 3 sensors which have been optimized for monitoring large motors.

Temperature drift dependent on the length and cross-section of the cable with PT100 sensors and an ambient temperature of 20°C, in K

Cable length in m	Cross-section mm²			
	0.5	0.75	1	1.5
	Temperature drift in K:			
0	0	0	0	0
10	1.8	1.2	0.9	0.6
25	4.5	3.0	2.3	1.5
50	9.0	6.0	4.5	3.0
75	13.6	9.0	6.8	4.5
100	18.1	12.1	9.0	6.0
200	36.3	24.2	18.1	12.1
500	91.6	60.8	45.5	30.2

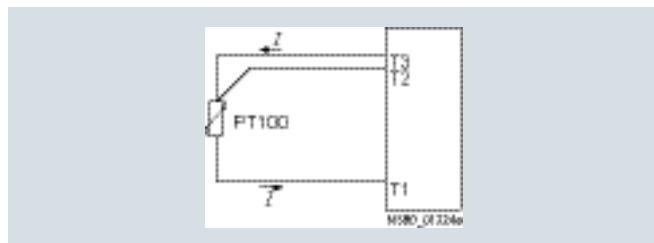
Example: On a PT100 sensor with a cable length of 10 m and a conductor cross-section of 1 mm² the temperature drift equals 0.9 K.

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

General data

Three-wire measurement

To minimize the effects of the line resistances, a three-wire circuit is often used. Using the additional cable, two measuring circuits can be formed of which one is used as a reference. The signal evaluation unit can then automatically calculate the line resistance and take it into account.



More information is available on the Internet at:

www.feldgeraete.de/76/produkte/fuw.html

www.ephy-mess.de

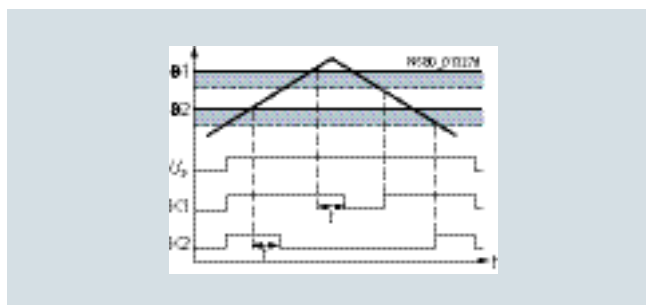
Principle of operation

Once the temperature has reached the set threshold value J1, the output relay K1 changes its switching state as soon as the set time t has elapsed (K2 responds in the same manner to J2). The delay time can only be adjusted with digital units (on analog units $t = 0$).

The relays return to their original state as soon as the temperature reaches the set hysteresis value.

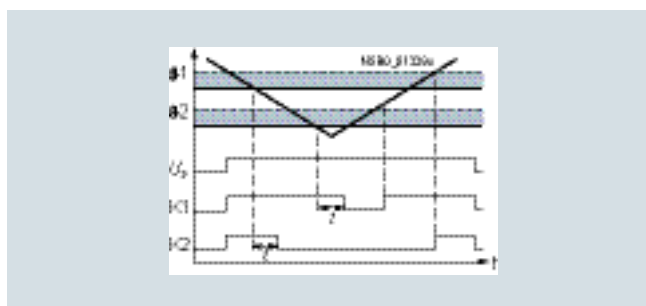
Temperature overshoot

Closed-circuit principle



Temperature undershoot

Closed-circuit principle

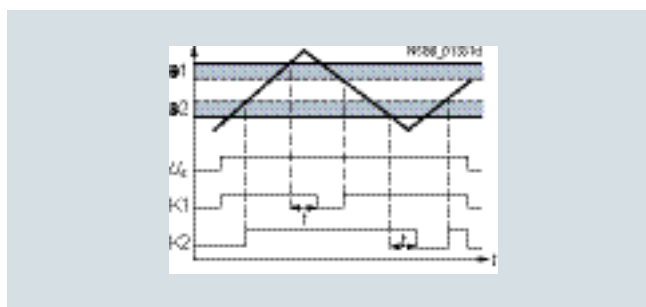


Range monitoring (digital units only)

Once the temperature has reached the upper threshold value J1, the output relay K1 changes its switching state as soon as the set time t has elapsed. The relay returns to its original state as soon as the temperature reaches the set hysteresis value.

K2 responds in the same manner to the lower threshold value of J2.

Closed-circuit principle



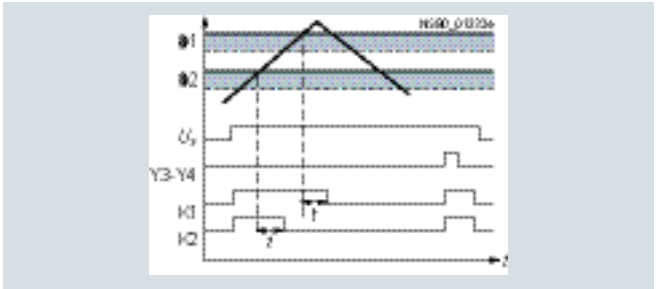
SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

General data

Principle of operation with memory function (3RS10 42) based on the example of temperature overshoot

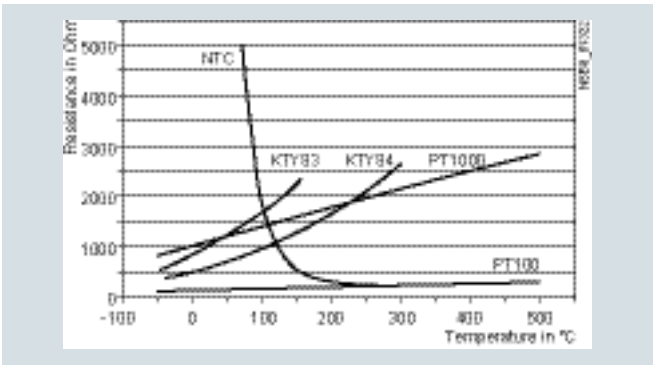
Once the temperature has reached the set threshold value J1, the output relay K1 changes its switching state as soon as the set time t has elapsed (K2 responds in the same manner to J2). The relays only return to the original state when the temperature falls below the set hysteresis value and when terminals Y3 and Y4 have been briefly jumpered.

Closed-circuit principle



Characteristic curves

For resistance sensors



The short-circuit and open-circuit detection as well as the measuring range is limited, depending on the sensor type.

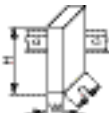
Measuring range in °C for resistance sensors

Sensor type	Short-circuit	Open circuit	3RS10 40/ 3RS10 41 Measuring range in °C	3RS10 42 Measuring range in °C
PT100	✓	✓	-50 ... +500	-50 ... +750
PT1 000	✓	✓	-50 ... +500	-50 ... +500
KTY83-110	✓	✓	-50 ... +175	-50 ... +175
KTY84	✓	✓	-40 ... +300	-40 ... +300
NTC ¹⁾	✓	—	80 ... 160	80 ... 160

✓ Detection possible

— Detection not possible

1) NTC type: B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).

Type		3RS10 analog	3RS10, 3RS20 digital
Dimensions (W x H x D) • Screw terminals • Spring-type terminals		mm mm	22.5 x 102 x 91 22.5 x 103 x 91
Permissible ambient temperature • During operation	°C	-25 ... +60	
Connection type		 Screw terminals	
• Terminal screw • Solid • Finely stranded with end sleeve • AWG cables, solid or stranded • Tightening torque	mm ² mm ² AWG Nm	M3 (for standard screwdriver, size 2 and Pozidriv 2) 1 x (0.5 ... 4)/2 x (0.5 ... 2.5) 1 x (0.5 ... 2.5)/2 x (0.5 ... 1.5) 2 x (20 ... 14) 0.8 ... 1.2	45 x 106 x 91 45 x 108 x 91

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

Relays, analogically adjustable, for 1 sensor

Overview



SIRIUS analog monitoring relay for 1 sensor

The 3RS10 analog temperature monitoring relays can be used for measuring temperatures in solid, liquid and gas media. The temperature is detected by the sensors in the medium, evaluated by the device and monitored for overshoot or undershoot. When the threshold values are reached, the output relay switches on or off depending on the parameterization.

Benefits

- All devices except for 24 V AC/DC feature electrical separation
- Extremely easy operation using a rotary potentiometer
- Variable hysteresis
- Adjustable working principle for devices with 2 threshold values.
- All versions with removable terminals
- All versions with screw terminals, many versions alternatively with spring-type connections

Application

The analogically adjustable SIRIUS 3RS10 temperature monitoring relays can be used in almost any application in which temperature overshoot or undershoot is not permitted, e.g. in the monitoring of set temperature limits and the output of alarm messages for:

- Motor and system protection
- Control cabinet temperature monitoring
- Freeze monitoring
- Temperature limits for process variables e.g. in the packaging industry or electroplating
- Controlling equipment and machines such as heating, climate and ventilation systems, solar collectors, heat pumps or warm water supplies
- Motor, bearing and gear oil monitoring
- Monitoring of coolants

Technical specifications

Type		3RS10 00, 3RS10 10	3RS10 20, 3RS10 30	
Auxiliary circuit				
Rated operational currents I_n				
• AC-15 at 230 V, 50 Hz	A	3		
• DC-13 at				
- 24 V	A	1		
- 240 V	A	0.1		
Releases				
Measuring accuracy at 20 °C ambient temperature (T20)		Typically < ±5 % from upper limit of scale		
Reference point accuracy		—	—	
Deviations due to ambient temperature In % of the measuring range		< 2	< 2	
Hysteresis settings • For temperature 1 • For temperature 2		2 ... 20 % from upper limit of scale 5 % from upper limit of scale		
Sensor circuit				
Typical sensor circuits • PT100 • PT1000		mA mA	Typically 1 Typically 0.2	Typically 1 Typically 0.2
Open-circuit detection		No		
Short-circuit detection		No		
Three-wire conductor connection ¹⁾		Yes	Yes	
Enclosures				
Rated insulation voltage U_i (pollution degree 3)		V	300	

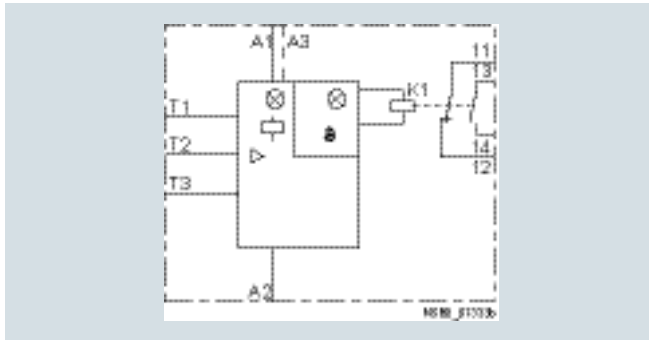
1) Two-wire connection of resistance sensors with wire jumper between T2 and T3.

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

Relays, analogically adjustable, for 1 sensor

Circuit examples

3RS10 00, 3RS10 10



Legend

A1 = 24 V AC/DC, 230 V AC, 24 to 240 V AC/DC

A3 = 110 V AC

A2 = M

K1, K2 = output relays

 = LED: "Device connected to voltage"

J1 = LED: "Relay 1 tripped"

J2 = LED: "Relay 2 tripped"

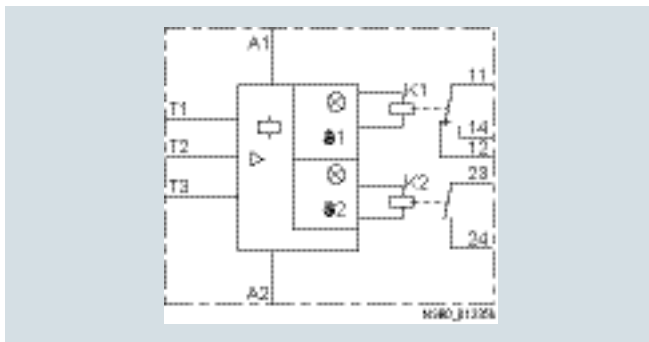
T1 to T3 = Sensor connection for resistance sensor

T+/T- = Sensor connection for thermoelements

⚠ Important!

When resistance sensors with two-wire connection are used, T2 and T3 must be jumpered.

3RS10 20, 3RS10 30



SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

Relays, analogically adjustable, for 1 sensor

Selection and ordering data

- For temperature monitoring with resistance sensors or thermoelements
- Temperature range -55 °C to +1000 °C, depending on the sensor type
- Wide-range voltage versions are electrically separated.
- Analogically adjustable, setting accuracy $\pm 5\%$
- Versions with 2 separately adjustable threshold values and adjustable open/closed-circuit principle
- Hysteresis for threshold value 1 is adjustable (2 to 20 %), hysteresis for threshold 2 is non-adjustable (5 %)
- 1 NC + 1 NO for versions with one threshold value
- 1 CO for threshold value 1 and 1 NO for threshold value 2

Sensor	Function	Measuring range	Rated control supply voltage U_i AC 50/60 Hz	Screw terminals	
		°C	V	Order No.	
Analogically adjustable, 1 threshold value, width 22,5 mm; closed-circuit principle; without memory; 1 NO + 1 NC					
 3RS10 00-1CD10	PT100 (resistance sensor)	Overshoot	- 50 ... + 50	24 AC/DC 110/230 AC	3RS10 00-1CD00 3RS10 00-1CK00
			0 ... + 100	24 AC/DC 110/230 AC	3RS10 00-1CD10 3RS10 00-1CK10
			0 ... + 200	24 AC/DC 110/230 AC	3RS10 00-1CD20 3RS10 00-1CK20
	Undershoot	- 50 ... + 50	24 AC/DC 110/230 AC	3RS10 10-1CD00 3RS10 10-1CK00	
		0 ... + 100	24 AC/DC 110/230 AC	3RS10 10-1CD10 3RS10 10-1CK10	
		0 ... + 200	24 AC/DC 110/230 AC	3RS10 10-1CD20 3RS10 10-1CK20	
Analogically adjustable for warning and disconnection (2 threshold values), 22.5 mm width, open/closed-circuit principle switchable; without memory; 1 NO + 1 CO					
 3RS10 20-1DD00	PT100 (resistance sensor)	Overshoot	- 50 ... + 50	24 AC/DC 24 ... 240 AC/DC	3RS10 20-1DD00 3RS10 20-1DW00
			0 ... + 100	24 AC/DC 24 ... 240 AC/DC	3RS10 20-1DD10 3RS10 20-1DW10
			0 ... + 200	24 AC/DC 24 ... 240 AC/DC	3RS10 20-1DD20 3RS10 20-1DW20
	Undershoot	-50 ... + 50	24 AC/DC 24 ... 240 AC/DC	3RS10 30-1DD00 3RS10 30-1DW00	
		0 ... + 100	24 AC/DC 24 ... 240 AC/DC	3RS10 30-1DD10 3RS10 30-1DW10	
		0 ... + 200	24 AC/DC 24 ... 240 AC/DC	3RS10 30-1DD20 3RS10 30-1DW20	

For accessories, see page 6/76.

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

Relays, digitally adjustable, for 1 sensor

Overview



SIRIUS digital monitoring relay for 1 sensor

The 3RS10, 3RS20 temperature monitoring relays can be used for measuring temperatures in solid, liquid and gas media. The temperature is detected by the sensor in the medium, evaluated by the device and monitored for overshoot or undershoot or for staying within an operating range (window function). The 3RS10 unit indicate the measured temperature in degrees Celsius, the 3RS20 unit in degrees Fahrenheit.

The units are also an excellent alternative to temperature controllers in the low-end performance range (two-or three-point closed-loop control).

Benefits

- Very simple operation without complicated menu selections
- Two- or three-point control can be configured quickly
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

The temperature monitoring relays can be used in almost any application in which temperature overshoot or undershoot is not permitted, e.g. in the monitoring of set temperature limits and the output of alarm messages for:

- Plant and environment protection
- Temperature limits for process variables e.g. in the packaging industry or electroplating
- Temperature limits for district heating plants
- Exhaust temperature monitoring
- Controlling equipment and machines such as heating, climate and ventilation systems, solar collectors, heat pumps or warm water supplies
- Motor, bearing and gear oil monitoring
- Monitoring of coolants

Technical specifications

Type		3RS10 40, 3RS10 42, 3RS20 40
Auxiliary circuit		
Rated operational currents I_e		
• AC-15 at 230 V, 50 Hz	A	3
• DC-13 at:		
- 24 V	A	1
- 240 V	A	0,1
Releases		
Measuring accuracy at 20 °C ambient temperature (T20)		$< \pm 2 \text{ K}, \pm 1 \text{ digit}$
Reference point accuracy		—
Deviations due to ambient temperature In % of measuring range	%	0.05 °C per K deviation from T20
Measuring cycle	ms	500
Hysteresis settings for temperature 1		1 ... 99 K, for both values
Adjustable delay time	s	0 ... 999
Sensor circuit		
Typical sensor circuits		
• PT100	mA	Typically 1
• PT1 000/KTY83/KTY84/NTC	mA	Typically 0.2
Open-circuit detection		Yes ¹⁾
Short-circuit detection		Yes
Three-wire conductor connection		Yes ²⁾
Enclosures		
Rated insulation voltage U_i (pollution degree 3)	V AC	300

1) Not for NTC type B57227-K333-A1 (100 °C: 1.8 kW; 25 °C: 32.762 kΩ).

2) Two-wire connection of resistance sensors with wire jumper between T2 and T3.

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

Relays, digitally adjustable, for 1 sensor

Selection and ordering data

- For temperature monitoring with resistance sensors or thermoelements
- Temperature range independent of sensor type
 - For 3RS10
 - For 3RS20
- Wide-range voltage versions are electrically separated.
- Non-volatile
- Short-circuit and open-circuit detection in sensor circuit
- Digitally adjustable, with illuminated LC display
- Overshoot, undershoot or range monitoring
- Exact sensor type can be set
- 2 separately adjustable threshold values
- 1 hysteresis applies to both thresholds (0 to 99 K)
- 1 delay time applies to both thresholds (0 to 999 s)
- Adjustable open/closed-circuit principle
- Adjustable manual/remote RESET
- Permanent display of actual value in °C or °F and tripping state
- 1 CO contact each per threshold value
- 1 NO for sensor monitoring

Sensor	Measuring range (measuring range limit depends on the sensor)	Rated control supply voltage U_s AC 50/60 Hz	Screw terminals 
V			Order No.

Temperature monitoring relays, digitally adjustable, 2 threshold values, width 45 mm; 1 CO + 1 CO + 1 NO, memory function possible with external jumper, device parameters are non-volatile



3RS10 40-1GD50



3RS10 40-2GW50

PT100/1 000; KTY83/84;
NTC (resistance sensors)¹⁾

- 50 ... + 500 °C

- 58 ... + 932 °F

24 AC/DC
24 ... 240 AC/DC

24 AC/DC
24 ... 240 AC/DC

3RS10 40-1GD50
3RS10 40-1GW50

3RS20 40-1GD50
3RS20 40-1GW50

Temperature monitoring relays, digitally adjustable, 2 threshold values, width 45 mm; 1 CO + 1 CO + 1 NO, tripping state and device parameters are non-volatile

PT100/1 000; KTY83/84;
NTC (resistance sensors)¹⁾

- 50 ... + 750 °C

24 AC/DC
24 ... 240 AC/DC

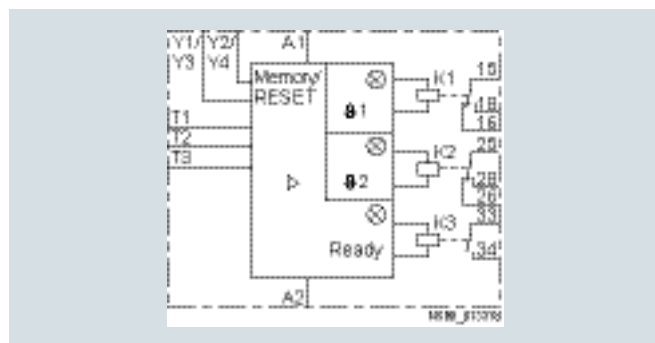
3RS10 42-1GD70
3RS10 42-1GW70

1) NTC type: B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).

For accessories, see page 6/76.

Circuit examples

3RS10 40, 3RS10 42, 3RS20 40



Legend

A1, A2, A3 = terminals for rated control supply voltage

K1, K2, K3 = output relays

J1 = LED: "Relay 1 tripped"

J2 = LED: "Relay 2 tripped"

Ready = LED: "Device is ready for operation"

T1 to T3 = Sensor connection for resistance sensor

T+/T- = Sensor connection for thermoelements

Y1/Y2 = Connection for memory jumper for 3RS10 40, 3RS11 40, 3RS20 40, 3RS21 40

Y3/Y4 = RESET input for 3RS10 42, 3RS11 42

⚠ Important!

When resistance sensors with two-wire connection are used, T2 and T3 must be jumpered.

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

Relays, digitally adjustable for up to 3 sensors

Overview



SIRIUS digital monitoring relay for up to 3 sensors

The 3RS10, 3RS20 temperature monitoring relays can be used for measuring temperatures in solid, liquid and gas media. The temperature is detected by the sensor in the medium, evaluated by the device and monitored for overshoot or undershoot or for staying within an operating range (window function). The 3RS10 units indicate the measured temperature in degrees Celsius, the 3RS20 units in degrees Fahrenheit. The evaluation unit can evaluate up to 3 resistance sensors at the same time and is specially designed for monitoring motor windings and bearings.

Benefits

- Very simple operation without complicated menu selections
- Space-saving with 45 mm width
- All devices are available alternatively with spring-type terminals
- Two- or three-point control can be configured quickly
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

The 3RS10, 3RS20 temperature monitoring relays can be used in almost any application in which several temperatures have to be monitored simultaneously for overshoot or undershoot or within a range.

Monitoring of set temperature limits and output of alarm messages for:

- Plant and environment protection
- Temperature limits for process variables e.g. in the packaging industry or electroplating
- Controlling equipment and machines such as heating, climate and ventilation systems, solar collectors, heat pumps or warm water supplies
- Motor, bearing and gear oil monitoring
- Monitoring of coolants

Technical specifications

Type		3RS10, 3RS20
Auxiliary circuit		
Rated operational currents I_N • AC-15 at 230 V, 50 Hz • DC-13 at - 24 V - 240 V	A	3
	A	1
	A	0.1
DIAZED fuse • Operational class gG	A	4
Releases		
Measuring accuracy at 20 °C ambient temperature (T20)		< ±2 K, ±1 digit
Deviations due to ambient temperature In % of measuring range	%	0.05 per K deviation from T20
Measuring cycle	ms	500
Hysteresis settings for temperature 1		1 ... 99 K, for both values
Adjustable delay time	s	0 ... 999
Sensor circuit		
Typical sensor circuits • PT100 • PT1 000/KTY83/KTY84/NTC	mA	Typically 1
	mA	Typically 0.2
Open-circuit detection		Yes ¹⁾
Short-circuit detection		Yes
Three-wire conductor connection		Yes ²⁾
Enclosures		
Rated insulation voltage U_i (pollution degree 3)	V AC	300

1) Not for NTC type B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).

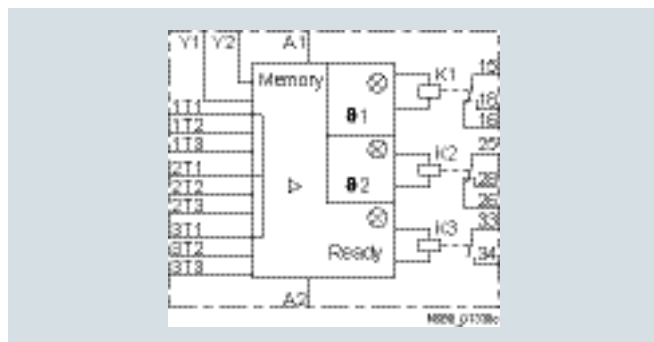
2) Two-wire connection of resistance sensors with wire jumper between T2 and T3.

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

Relays, digitally adjustable for up to 3 sensors

Circuit example

3RS10 41, 3RS20 41



Legend

A1, A2, A3 = terminals for rated control supply voltage

K1, K2, K3 = output relays

J1 = LED: "Relay 1 tripped"

J2 = LED: "Relay 2 tripped"

Ready = LED: "Device is ready for operation"

1T1 to 1T3 = Sensor connection for resistance sensor 1

2T1 to 2T3 = Sensor connection for resistance sensor 2

3T1 to 3T3 = Sensor connection for resistance sensor 3

Y1/Y2 = Connection for memory jumper

⚠ Important!

When resistance sensors with two-wire connection are used, T2 and T3 must be jumpered.

Selection and ordering data

- For monitoring the temperatures of solids, liquids, and gases
- For two- and three-wire resistance sensors or thermoelements
- Temperature range independent of sensor type
 - For 3RS10: -50 to +500 °C
 - For 3RS20: -58 to +932 °F
- Wide-range voltage versions are electrically separated.
- Non-volatile
- Short-circuit and open-circuit detection in sensor circuit
- Digitally adjustable, with illuminated LC display
- Overshoot, undershoot or range monitoring
- Exact sensor type and number of sensors can be set
- 2 separately adjustable threshold values
- 1 hysteresis; applies to both thresholds (0 to 99 K)
- 1 delay time; applies to both thresholds (0 to 999 s)
- Adjustable open/closed-circuit principle
- With connectable and disconnectable error memory
- Permanent display of actual value in °C or °F and tripping state
- 1 CO contact each per threshold value
- 1 NO for sensor monitoring

Sensor	Number of sensors	Measuring range (measuring range limit depends on the sensor)	Rated control supply voltage U_s	Screw terminals
			V	Order No.
Motor monitoring relays, digitally adjustable for 3 sensors, width 45 mm; 1 CO + 1 CO + 1 NO				
	PT100/1 000;	1 ... 3 sensors	-50 ... +500 °C	24 ... 240 AC/DC
	KTY83/84; NTC (resistance sensors) ¹⁾		-58 ... +932 °F	24 ... 240 AC/DC
				3RS10 41-1GW50
				3RS20 41-1GW50

3RS10 41-1GW50

1) NTC type: B57227-K333-A1 (100 °C: 1.8 kΩ; 25 °C: 32.762 kΩ).

For accessories, see page 6/76.

SIRIUS 3RS10, 3RS20 Temperature Monitoring Relays

Accessories

Selection and ordering data

	Use	Version	Order No.
Push-in lugs and covers			
 3RP19 03	For 3RS1	Push-in lugs For screw fixing, 2 units are required for each device	3RP19 03
 3RP19 02	For 3RS1	Sealable covers For securing against unauthorized adjustment of setting knobs	3RP19 02

1) PC labeling system for individual inscription of unit labeling plates available from:
murrplastik Systemtechnik GmbH
www.murrplastik.de .

Matching sensors can be found at
www.siemens.com/temperature

Overview



SIRIUS 3RN1 thermistor motor protection

Thermistor motor protection devices are used for direct monitoring of the motor winding temperature. For this purpose, the motors are equipped with temperature-dependent resistors (PTC) that are directly installed in the motor winding and abruptly change their resistance at their limit temperature.

Order No. scheme

Digit of the Order No.	1st - 5th	6th	7th		8th	9th	10th	11th	12th
	□□□□□	□	□	-	□	□	□	□	□
Thermistor motor protection	3 R N 1 0								
Number and version of the sensor circuits		□							
RESET response			□						
Connection type					□				
Type and number of outputs						□			
Control supply voltage							□		
Protective separation								□	
Behavior in the event of voltage failure									□
Example	3 R N 1 0	0	0	-	1	A	B	0	0

Note:

The Order No. scheme is presented here merely for information purposes and for better understanding of the logic behind the order numbers.

For your orders, please use the order numbers quote in the catalog in the Selection and ordering data.

Benefits

- Thanks to direct motor protection, overdimensioning of the motors is not necessary
- No settings on the device are necessary
- Solid-state compatible output thanks to versions with hard gold-plated contacts
- Rapid error diagnosis thanks to versions that indicate open- and short-circuit in the sensor circuit
- All versions with removable terminals
- All versions with screw terminals or alternatively with innovative spring-type terminals

Application

Direct motor protection through temperature monitoring of the motor winding offers 100 % motor protection even under the most difficult ambient conditions, without the need to make adjustments on the device. Versions with hard gold-plated contacts ensure, in addition, a high switching reliability that is even higher than an electronic control.

Direct motor protection

- At increased ambient temperatures
- For high switching frequency
- For long start-up and braking procedures
- Used together with frequency converters (low speeds)

ATEX approval for operation in areas subject to explosion hazard

The SIRIUS 3RN1 thermistor motor protection relay for PTC sensors is certified according to ATEX Ex II (2) G and GD for gases and dust [see www.siemens.com/industrial-controls/atex](http://www.siemens.com/industrial-controls/atex)

SIRIUS 3RN1 Thermistor Motor Protection

For PTC sensors

Use in areas subject to explosion hazard for gases

All devices are approved for Equipment Group II, Category (2) in Area "G" (areas that contain explosive gases, vapor, spray and air mixtures).

With PTB 01 ATEX 3218 ex II (2) G, compliance with directive 94/9 EC Appendix II is confirmed. The safety devices must be selected with suitable settings for the safe operation of motors of the "Increased safety" (EEx e) and "Flameproof enclosure" (EEx d) degrees of protection and are used outside the area subject to explosion hazard.

PTB 01 ATEX 3218 ex II (2) G

The increased danger in areas subject to explosion hazard demands careful analysis of the operator's guide, the safety and commissioning instructions and the standard (EN 60079-14 / VDE 0165) for electronic equipment in areas subject to gas explosion hazards.

A risk analysis must be performed for the complete plant or machine. If this risk analysis results in a minimal potential for danger (Safety Category 1), all 3RN1 TMS releases can be implemented taking into account the safety notes. In the case of plants or machines with a high potential risk, versions with integrated short-circuit detection in the sensor circuit are necessary.

Device	Class
3RN10 00	EN 954-1: Category 1

The measuring circuit leads must be routed as separate control cables. It is not permitted to use cores from the supply line of the motor or any other main supply cables. If extreme inductive or capacitive interference is expected as a result of power lines routed in parallel, shielded control cables must be used.

Cable routing

Maximum cable length for sensor circuit cables

Conductor cross section	Cable length for releases
	Without short-circuit detection 3RN10 00
mm ²	m
2.5	2 x 2 800
1.5	2 x 1 500
0.5	2 x 500

- 1) A short-circuit in the sensor circuit will be detected up to this maximum cable length.

Note:

Tripping of the thermistor motor protection relay even in combination with a converter must directly result in disconnection. This must be implemented with circuitry.

*Mounting and installation must only be performed by qualified personnel who observe the applicable regulations! For mounting, use the mounting instructions
Order No.: 3ZX1012-0RN10-1AA1.*

The 3RN10 is not intended for installation in hazardous areas. For installation in areas subject to explosion hazards, the 3RN10 must be enclosed in a flameproof casing.

For tripping units with a 24 V AC/DC control voltage, electrical separation must be secured with a battery network or a safety transformer to EN 61558.

When releases with Auto-RESET function are used, a reset is performed automatically after the cooling time has expired. It must be ensured by means of an external interlock (latching with a separate ON and OFF button) that the machine to be monitored does not start up again spontaneously.

Units with the "Auto-RESET" function must not be used in applications in which the unexpected restart can lead to personal injury or property damage.

In the case of releases without short-circuit detection, during commissioning or after modifications or maintenance work (assembly, disassembly) on the equipment, the sensor resistance must be measured using a suitable measuring device. For resistances of < 50 W the sensor circuit must be checked for a short-circuit.

If 3RN10 00 units are used to protect EEx e motors, separate monitoring of the control voltage is recommended because there is no Ready LED to indicate connection to the supply voltage.

Before commissioning, the effectiveness of the protection function must be checked.

SIRIUS 3RN1 Thermistor Motor Protection

For PTC sensors

Motor protection using current- and temperature-dependent protective devices

EN 60204 and IEC 60204 stipulate that motors must be protected from overheating at a rating of 0.5 kW and higher. The protection can take the form of overload protection, overtemperature protection or current limiting.

For motors with frequent starting and braking and in environments where cooling may be impaired (e.g. by dust), it is recommended to use the overtemperature protection option in the form of a protective device coordinated with this mode of operation. A good choice in this case is the use of 3RN1 thermistor motor protection devices.

On rotor-critical motors, overtemperature detection in the stator windings can lead to delayed and hence inadequate protection. In this case the standards stipulate additional protection, e.g. by means of an overload relay.

This combination of thermistor motor protection and an overload relay is recommended for full motor protection in case of frequent starting and braking of motors, irregular intermittent duty or excessive switching frequency. To prevent premature tripping of the overload relay in such operating conditions, a higher setting than that normally required for the operational current is chosen. The overload relay then performs the stall protection, and the 3RN1 thermistor motor protection device monitors the temperature of the motor windings.

Application	Motor protection		
	Only current-dependent, e.g. with overload relay	Only temperature-dependent, e.g. with thermistor motor protection relay	Current- and temperature-dependent
Motor protection in case of			
Overloading in uninterrupted duty	✓	✓	✓
Long start-up and braking operations	○	✓	✓
Irregular intermittent duty	○	✓	✓
Excessively high switching frequency	○	✓	✓
Single-phase operation and current unbalance	✓	✓	✓
Voltage and frequency fluctuations	✓	✓	✓
Stalling of the rotor	✓	✓	✓
Switching on a stalled rotor of a stator-critical motor	✓	✓	✓
Switching on a stalled rotor of a rotor-critical motor	✓	○	✓
Elevated ambient temperature	—	✓	✓
Impeded cooling	—	✓	✓

- ✓ Full protection
- Conditional protection
- No protection

Technical specifications

The 3RN1 tripping units are suitable for use in any climate and finger-safe according to EN 50274.

They comply with:

- EN 61000-6-2 and EN 61000-6-4
"Electromagnetic compatibility of I&C equipment in industrial process engineering"
- EN 60947-8

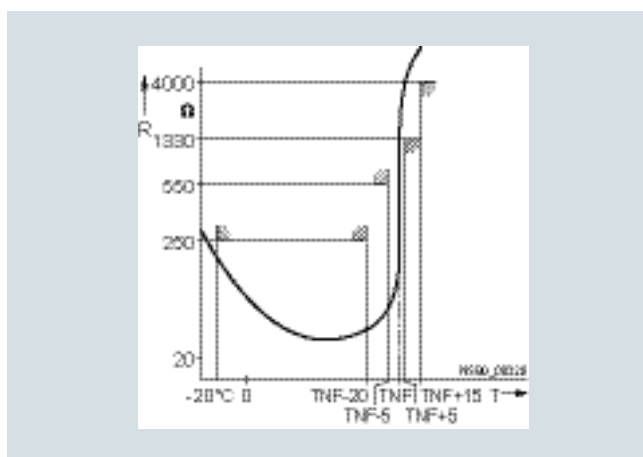
The terminals of the auxiliary contacts are designated in accordance with EN 50005.

The 3RN1 tripping units are suitable for snap-on mounting onto TH 35 standard mounting rails according to EN 60715 or for screw mounting using an adapter (Accessories).

Any mounting position is possible.

For devices with the "Manual RESET" function, the test function can be activated and a trip simulated by pressing the blue Test/RESET button for > 2 seconds.

If a Type A temperature sensor is connected to a Type A tripping unit, compliance with the operating temperatures is assured (on pick-up and reset) according to IEC 60034-11-2 (EN 60947-8).



Characteristic curve of the 3RN1 release

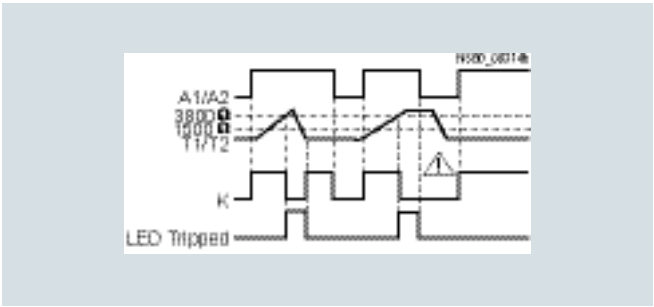
The characteristic curves of the Type A temperature sensors are described in EN 60947-8, DIN 44081 and DIN 44082.

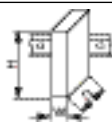
SIRIUS 3RN1 Thermistor Motor Protection

For PTC sensors

Function diagrams

3RN10 00 (Auto-RESET)



Type	Compact units 3RN10 00	
Dimensions (W x H x D)		
• For 2 terminal blocks		
- Screw terminals		mm 22.5 x 83 x 91
- Spring-type terminals		mm 22.5 x 84 x 91
• For 3 terminal blocks		
- Screw terminals		mm 22.5 x 92 x 91
- Spring-type terminals		mm 22.5 x 94 x 91
• For 4 terminal blocks		
- Screw terminals	mm 22.5 x 102 x 91	
- Spring-type terminals	mm 22.5 x 103 x 91	
General data		
Number of connectable sensor circuits	1	
Manual RESET	—	
Auto-RESET	✓	
Remote-RESET	—	
TEST pushbutton	—	
Short-circuit detection for sensor circuit	—	
Short-circuit and open-circuit indication	—	
Warning and disconnection in one unit	—	
Permissible ambient temperature	°C	-25 ... +60
• During operation		

✓ Function is available

— Function is not available

1) Remote-RESET possible by disconnecting control voltage.

2) Open circuits are only indicated by monostable versions (3RN10 13-....0).

SIRIUS 3RN1 Thermistor Motor Protection

For PTC sensors

Principle of operation

The 3RN1 releases operate in accordance with the closed-circuit principle and therefore monitor themselves for open circuit. A momentary voltage failure of less than 50 ms does not change the status of the auxiliary contacts.

All tripping units (except for 24 V AC/DC) feature electrical separation between the control circuit and the sensor circuit.

3RN10 00 compact releases

The compact release is equipped with a red LED (TRIPPED) for the tripped indicator and a changeover contact.

After the unit has tripped, it is automatically reset once the thermistors have cooled down. The root of the changeover contact is connected to the control voltage (95 is connected to terminal A1).

This unit is particularly suitable in circuits in which the control circuit and signaling circuit have the same potential, e.g. in local control cabinets.

Response of the releases in the event of control voltage failure

Behavior	Monostable 3RN10 00, 3RN10 10, 3RN10 11
In case of failure of the control voltage	Device trips
In case of return of the control voltage without a preceding tripping operation	Device resets
In case of return of the control voltage after a preceding tripping operation	Device resets

SIRIUS 3RN1 Thermistor Motor Protection

For PTC sensors

Type		Compact units 3RN10 00
Releases		
Rated insulation voltage U_i (pollution degree 3)	V	300
Connection type		 Screw terminals
- Terminal screw - Solid - Finely stranded with end sleeve - AWG cables, solid or stranded - Tightening torque	mm ² mm ² AWG Nm	M3 (for standard screwdriver, size 2 and Pozidriv 2) 1 x (0.5 ... 4)/2 x (0.5 ... 2.5) 1 x (0.5 ... 2.5)/2 x (0.5 ... 1.5) 2 x (20 ... 14) 0.8 ... 1.2
Sensor circuit		
Measuring circuit load at $R_f \leq 1.5$ mW		≤ 5
Voltage in sensor circuit at $R_f \leq 1.5$ mW	V	≤ 2
Response temperature (depends on sensor)	°C	60 ... 180
Coupling time (depends on sensor)	s	About 5
Summation PTC resistance R_f (per sensor loop)	kΩ	≤ 1.5 ; response value 3.4 ... 3.8; return value 1.5 ... 1.65
Response tolerance	°C	± 6
Control circuit		
Rated control supply voltage U_s		See page 6/84
Operating range 110/230 V AC 24 ... 240 V AC/DC 24 V AC/DC		0.85 ... 1.1 x U_s 0.85 ... 1.1 x U_s 0.85 ... 1.2 x U_s for DC operation, 0.85 ... 1.1 x U_s for AC operation
Rated power AC/DC	W	< 2
Auxiliary circuit		
Conventional thermal current I_{th}	A	5
Rated operational current I_e		
- AC-15/240 V - DC-13/24 V	A A	3 1
DIAZED fuse	A	6 ¹⁾
CSA and UL rated data, control circuit		
Rated control voltage 50/60 Hz		
- AC - DC	V V	300 300
Switching capacity		R 300/B 300
Protective separation up to 300 V according to DIN 60947-1		—

1) $I_n > 1$ kA weld-free according to EN 60947-5-1.

For PTC sensors

Circuit diagrams

Illustrated with control voltage applied	Illustrated with control voltage not applied	Illustrated with control voltage applied	Illustrated with control voltage not applied	General legend
3RN10 00, 1 CO				
				A1, A2 , A3 Terminals of the control voltage N Amplifier T/R TEST/RESET button Y1, Y2 Terminals for Remote-RESET (jumpared = Auto-RESET) ↑↑ The double arrow indicates an operating state of the contact according to DIN 40900, Part 7 which deviates from the norm (here: Position of the contacts when control voltage is applied to terminals A1 and A2)
				Legend for 3RN10 H1 LED "READY" H2 LED "TRIPPED" K Output relay T1, T2 Terminals of the sensor loop

SIRIUS 3RN1 Thermistor Motor Protection

For PTC sensors

Selection and ordering data

- For monitoring the motor winding temperature using temperature-dependent resistors (PTCs, type A) that are directly installed in the motor winding by the manufacturer
- Monostable versions with closed-circuit principle, i.e. relays respond in the event of control supply voltage failure
- All devices with PTB01 ATEX approval for dust or gas see www.siemens.com/industrial-controls/atex
- All devices except for 24 V AC/DC feature electrical separation
- Versions with safe isolation up to 300 V according to EN 61140
- Non-volatile versions
- Versions with short-circuit and open-circuit detection in sensor circuit
- Versions with solid-state compatible contacts with hard gold-plating
- Versions for up to 6 sensor circuits
- Versions with Manual-RESET, Remote-RESET, Auto-RESET and test button
- Terminal labeling according to DIN 50005
- All terminals are removable
- Width 22.5 mm (45 mm on version for several sensor circuits)

RESET	Contacts	Rated control supply voltage U_s 50/60 Hz V	Screw terminals 	Order No.
Compact signal evaluation units, width 22.5 mm, 1 LED				
Terminal A1 is jumpered with the root of the CO contact				
Auto	1 CO	24 AC/DC 110 AC 230 AC	3RN10 00-1AB00 3RN10 00-1AG00 3RN10 00-1AM00	
Standard evaluation units, width 22.5 mm, 2 LEDs				
	Auto	1 NO + 1 NC	24 AC/DC 110 AC 230 AC 24 ... 240 AC/DC	
		2 CO	24 AC/DC 110 AC 230 AC	
		2 CO, hard gold-plated	24 AC/DC	
3RN10 11-1BB00	Manual/Remote ¹⁾	1 NO + 1 NC	24 AC/DC 110/230 AC	
	Short-circuit detection for sensor circuit			
	Manual/Remote ¹⁾	2 CO	24 AC/DC 110 AC 230 AC	
		2 CO, hard gold-plated	24 AC/DC	
3RN10 13-1BB00	Non-volatile ²⁾	1 NO + 1 NC	24 AC/DC 110/230 AC	
	Non-volatile ²⁾ , short-circuit detection in sensor circuit			
	Manual/Auto/Remote	2 CO	24 AC/DC 110 AC 230 AC	
		2 CO, hard gold-plated	24 AC/DC	
	Non-volatile ²⁾ , short-circuit and open-circuit detection and indication in sensor circuit; wide-range voltage with screw terminal with safe isolation			
	Manual/Auto/Remote	2 CO	24 AC/DC 24 ... 240 AC/DC	
3RN10 12-2CK00		2 CO, hard gold-plated	24 ... 240 AC/DC	
Evaluation units for 2 sensor circuits, warning and disconnection, width 22.5 mm, 3 LEDs				
Test/RESET button, non-volatile ²⁾				
Manual/Auto/Remote	1 NO + 1 CO	24 ... 240 AC/DC		
Evaluation units for 6 sensor circuits, multiple motor protection, width 45 mm, 8 LEDs				
Test/RESET button, non-volatile ²⁾				
Manual/Auto/Remote	1 NO + 1 NC	24 ... 240 AC/DC		
Bistable evaluation units, width 22.5 mm				
Test / RESET button, non-volatile ²⁾ , short-circuit and open-circuit detection and indication in sensor circuit				
Manual/Auto/Remote	2 CO	24 ... 240 AC/DC		

1) The unit can be reset with the RESET button or by disconnecting the control supply voltage.

SIRIUS 3RN1 Thermistor Motor Protection

For PTC sensors

Accessories

	Use	Version	Order No.
Push-in lugs			
 3RP19 03	For 3RN1	Push-in lugs For screw fixing, 2 units are required for each device	3RP19 03

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