ECOFAST

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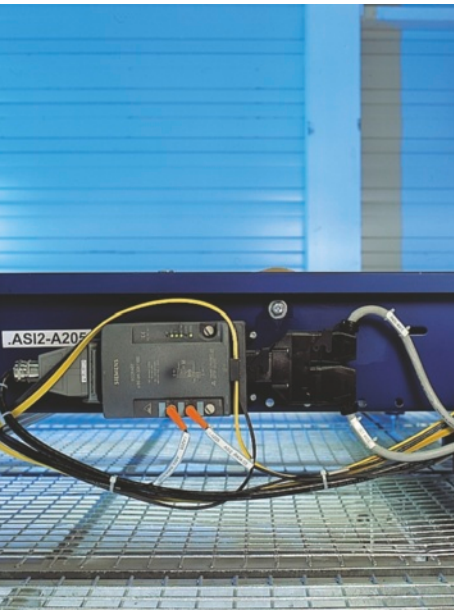


General data

Overview

ECOFAST (Energy and Communication Field Installation System) connects the components of an automation system (such as switching and and control devices, I/O stations, motors and geared motors) using a uniform, standardized connection method for data and power.

ECOFAST is a solution for decentralization outside the control cabinet, with standardized connection methods for all components on a distributed installation basis, consistent for PROFIBUS DP and AS-Interface. ECOFAST sets standards in equipping machines and plants for automation, low-voltage controlgear and drives. ECOFAST is centered on the extensive decentralization and modularization of installations, combined with comprehensive diagnostics down to the component level.

Modern field and power bus technologies open up new possibilities for machinery and plant engineering. Decentrally conceived solutions are flexibly adaptable to the various applications in automated industrial tools.

This gives rise to advantages in terms of overall process costs. The standardized distributed installation technology with a high degree of protection (IP65) produces savings during

- Configuration
- Wiring
- Mounting
- Commissioning
- Operation

Features

- ECOFAST is a solution for a wide range of automation, drive and installation components with a high degree of protection.
- ECOFAST combines the components of an automation system with completely standardized connection methods for data and power according to ISO 23570.
- With ECOFAST, power and information are distributed and transmitted in a line.
- Parameters and control and diagnostics functionality are transmitted through PROFIBUS or AS-Interface for fast operation start-ups and troubleshooting.

Shorter time frames

With ECOFAST it is possible to shorten the time frames for the tendering, planning and configuring of machines and plants:

- Modular planning of machines and plants
- Compiling of tenders from ready-made modules
- Faster construction and mounting
- Cabinet-free construction with a high degree of protection
- Use of prefabricated and tested function units
- Faster installation on site
- Smaller plant footprints

Fast and smooth start-up

ECOFAST enables the fast and smooth start-up of automation and drive systems:

- Minimization of error sources through standardized interfaces and plug-in connectors
- Extensive diagnostics on the device and though the bus
- Improved EMC by direct coupling of switching unit and drive

High plant availability

ECOFAST maintains a high level of plant availability:

- Reduction of downtime thanks to the speedy and safe exchange of devices
- No interruption of the power and field bus while devices are being exchanged
- Automatic parameterizing when devices are exchanged
- Extensive status and diagnostics information
- Transmission of operating parameters (e.g. current values or status messages)

Components connected by ECOFAST

- Switchgear and control devices (direct-on-line starters, reversing starters, soft starters, frequency converters)
  - For near-motor or motor-mounted installation
  - As stand-alone device
  - As isolated solution
- I/O stations
- Motors and geared motors

For effective connection, installation components (cables, plugs, etc.) are used:
- For communication
- For power

ECOFAST in motor starters for operation in the field

The ECOFAST connection technology can be used to provide **power supply and communication** for motor starters for operation in the field:

- For ET 200pro motor starters
- For ECOFAST motor starters

The ECOFAST connection technology can be used for **power supply**:

- For M200D motor starters
- For MCU motor starters

The ECOFAST network topology

All interfaces for communication and power are completely standardized and comply with ISO 23570.

Communication via PROFIBUS DP (see page 10/4)

- Hybrid field bus connections (see page 10/5)
- PROFIBUS DP hybrid field bus cables (see page 10/7)
- Additional components (see page 10/10)
  - Hybrid plugs
  - Data T pieces
  - ECOFAST bus termination plug-in connectors

Communication via AS-Interface (see page 10/13)

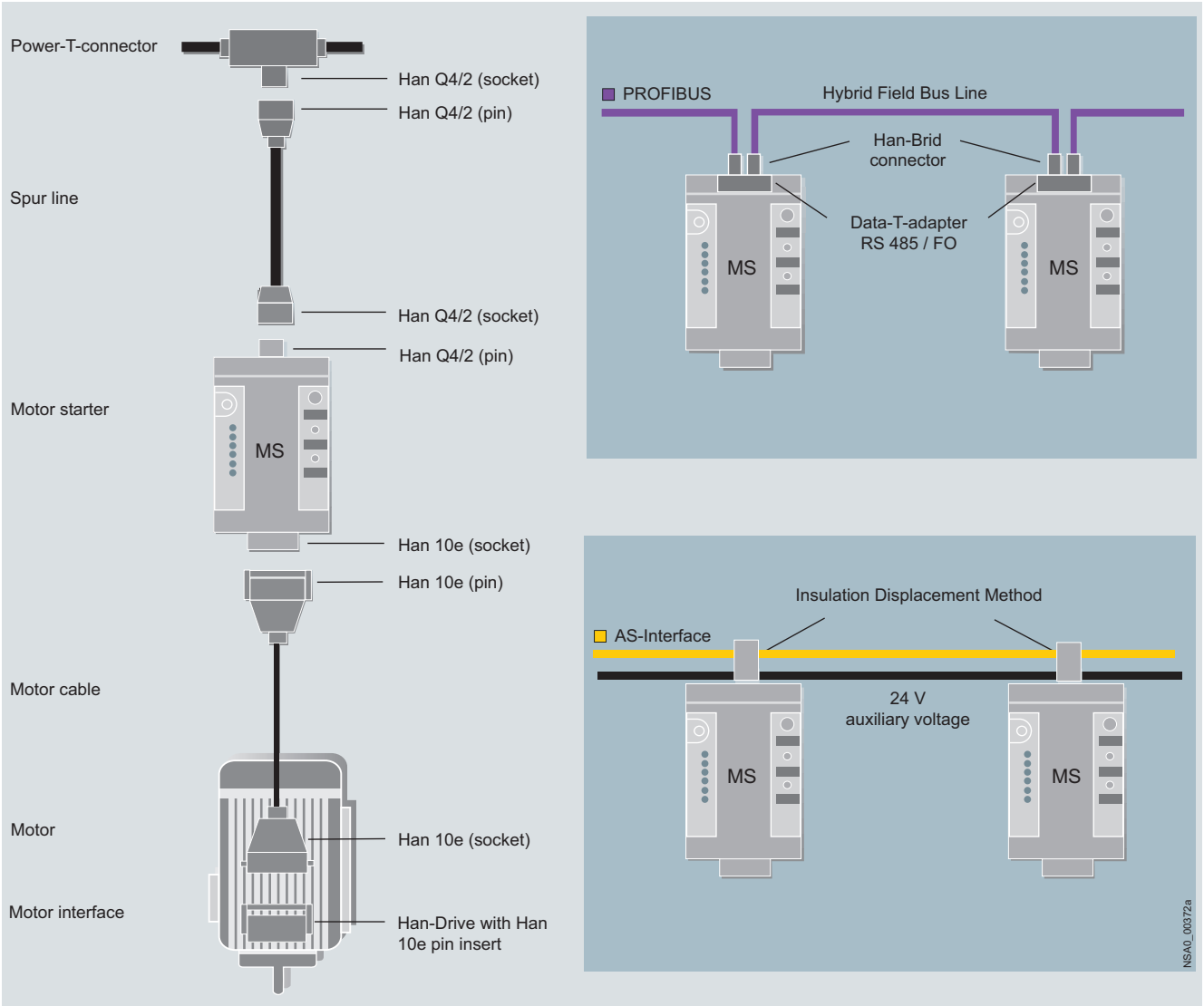
- Yellow and black AS-Interface cable for data transmission (yellow) and auxiliary voltage (black)
- Connection of the AS-Interface cable by insulation piercing method

Power connection technology (see page 10/15)

- Power cables, plugs and power terminal connectors for the power supply (see page 10/16)
- Motor connection cables and plugs for the motor connection (see page 10/18)

(See figure "Schematic interface overview for ECOFAST network topology" page 10/3)

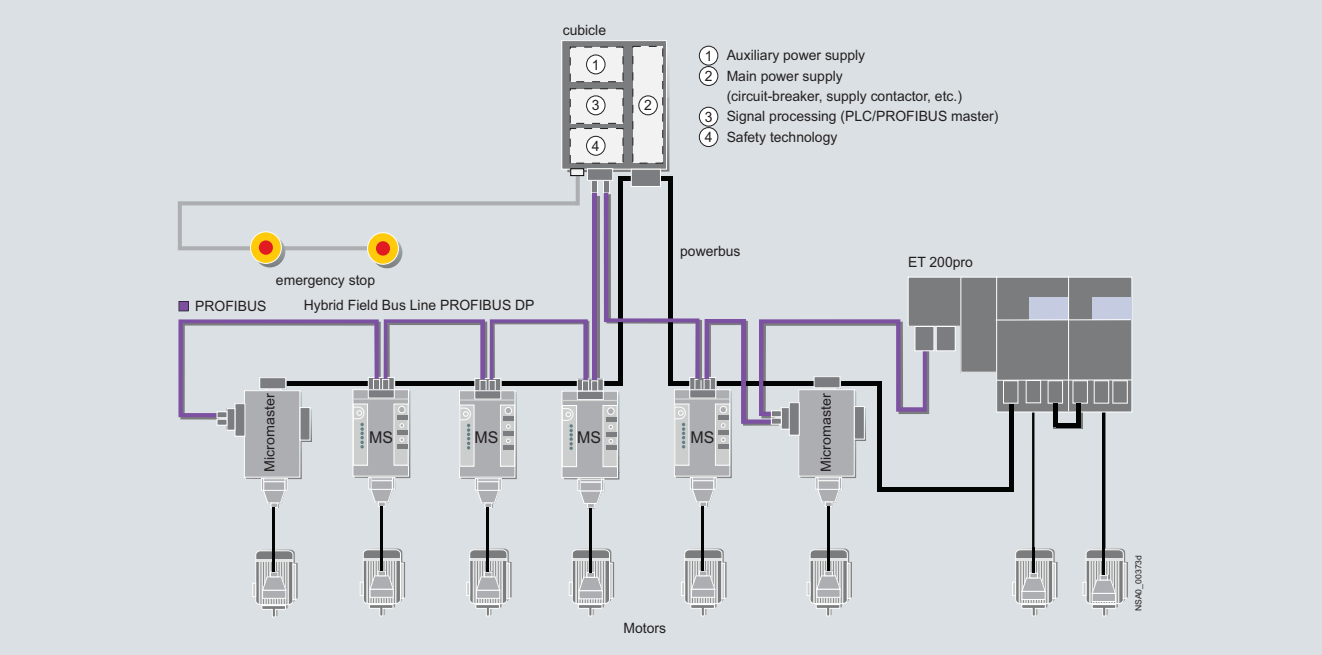
Overview (continued)



Schematic interface overview for ECOFAST network topology based upon the example of the ECOFAST motor starter:
Left: Power feeder from power bus with spur line to the motor starter and motor cable for connection of the motor
- Connection via Han10e plug-in connection on the field device
- Connection via HanDrive/10e plug-in connector on the motor
- Motor connection cable as shielded or non-shielded version: Use of a frequency converter requires EMC shielding
Right: Communication bus with PROFIBUS DP (top) or AS-Interface (bottom)

Communication via PROFIBUS DP

Overview



PROFIBUS DP network topology

Hybrid field bus connections

Hybrid field bus connections configured as control cabinet glands transmit data and power from the control cabinet (IP 20) into the field (IP65). They are the interface for jointly routing PROFIBUS DP and the auxiliary voltages into the hybrid field bus cable. The active hybrid field bus connections with signal refresher function can considerably increase the maximum PROFIBUS cable length when used in the field (see page 10/5).

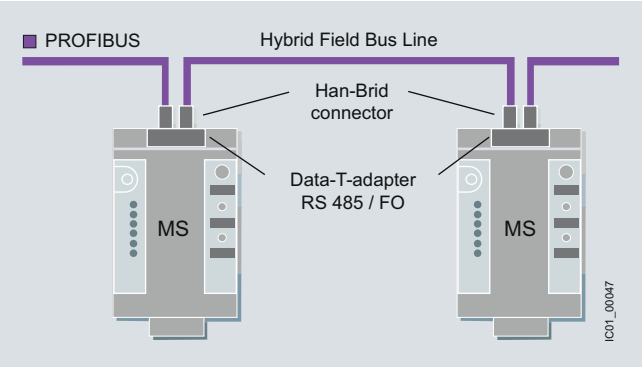
Hybrid field bus cables

Four copper cores are available for the **transmission of voltage** in the hybrid field bus cables.

There are two transmission types for the **data transmission with PROFIBUS DP** in hybrid field bus cables:
- Electrically via two Cu-RS 485 copper cores (see ECOFAST hybrid field bus cables PROFIBUS DP in Cu-RS 485 page 10/7)
- Optically via two plastic fiber-optic cables (see ECOFAST Fiber Optic Hybrid Cable page 10/11

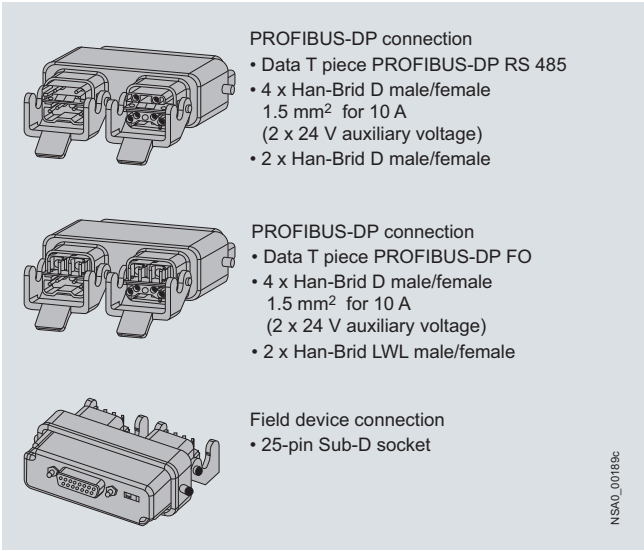
HanBrid plug-in connectors

The hybrid field bus cables are connected to the data T pieces via HanBrid plug-in connections.



Connection of the field devices to PROFIBUS DP

Data T pieces



Data T pieces

The data T pieces connect individual field devices to the ECOFAST hybrid field bus PROFIBUS DP. They ensure the interruption-free operation of the data bus when the field device is unplugged.

There are two T pieces in the ECOFAST system:
- Data T piece for PROFIBUS DP with copper cable (PROFIBUS DP RS 485) and 2 x 24 V auxiliary voltage (switched and non-switched)
- Data T piece for PROFIBUS DP with optical conductor (PROFIBUS DP FO) and 2 x 24 V auxiliary voltage (switched and non-switched)

Overview

Hybrid field bus connection socket/socket (HanBrid)

Hybrid field bus connection socket/socket (M12)

Hybrid field bus connections configured as control cabinet glands transmit data and power from the control cabinet (IP 20) into the field (IP65). They are the interface for jointly routing PROFIBUS DP and the auxiliary voltages into the hybrid field bus cable.

Passive and active hybrid field bus connections

The hybrid field bus connections are available in two versions which differ in their functionality. They are:

- The passive version
- The active version with signal refresher function to considerably increase the maximum PROFIBUS cable length

Connection methods

The field side is connected using HanBrid or M12 plug-in connectors.

In the case of HanBrid, the following versions are available:

- Socket/socket for infeeding into the field
- Pin/socket for looping in the field

The M12 version is generally configured with socket/socket.

Following connections are available at the rear (cabinet side) in the case of the passive glands:

- Direct connection
- FastConnect connection

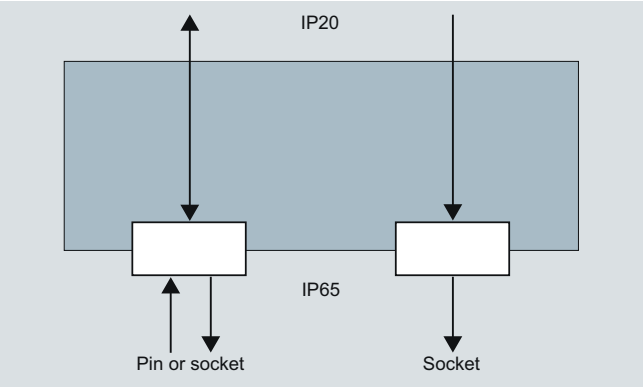
The active gland with refresher function has 9-pole Sub-D sockets for the rear connection.

Auxiliary power infeed

The HanBrid plug-in design offers the possibility of infeeding or looping through not only the Profibus signal but also 2 separate auxiliary voltages of 24 V DC (switched/unswitched) into the field. The terminal block with spring-type terminals at the rear (cabinet side) of the hybrid field bus connection provides a variety of interconnecting operations for these auxiliary voltages.

Passive hybrid field bus connections

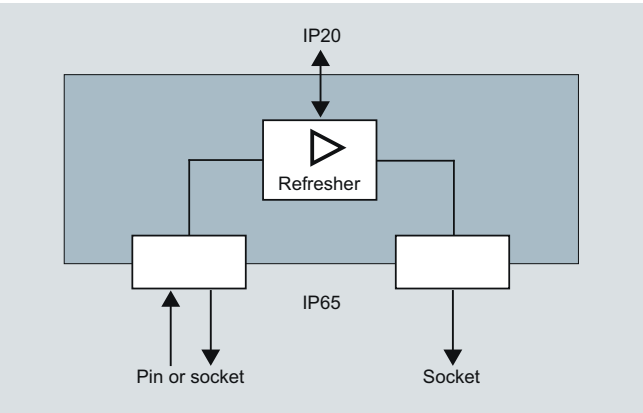
- Gland from the control cabinet (IP20) into the field (IP65)
- HanBrid plug-in design socket/socket or pin/socket
- Direct connection or Fast-Connect connection for PROFIBUS at the rear
- Terminal block with spring-type terminals (0.25 … 2.5 mm^2) for infeeding or looping through the auxiliary voltages



Hybrid field bus connection as passive control cabinet gland

Active hybrid field bus connections with refresher function

- Gland from the control cabinet (IP20) into the field (IP65)
- 3 independent, electrically separated Profibus segments
- Signal refresher function from and to all segments
- Automatic continuous baud rate detection
- Status/diagnostics displays with LEDs
- Cascading depth of a maximum 9 hybrid field bus connections
- HanBrid plug-in design socket/socket and pin/socket
- M12 plug-in design socket/socket
- 9-pole Sub D socket connection for PROFIBUS at the rear
- Terminal block with spring-type terminals (0.25 … 2.5 mm^2) for infeeding or looping through the auxiliary voltages



Hybrid field bus connection as active control cabinet gland with refresher function

Technical specifications

Type		Passive hybrid field bus connections	Active hybrid field bus connections
Mechanics and environment			
Dimensions (W x H x D)	mm	93 x 103 x 65	
Cutout (W x H)	mm	80 x 90	
Temperature range	°C	-25 ... +60	
Degree of protection		IP20 internal / IP65 on field side	
Material/enclosures	mm	Plastic (black PC), flame retardant	
Electrical specifications			
Rated operational voltage			
• 24 V DC not switched (NS)	V DC	24, ±25 %	
• 24 V DC switched (S)	V DC	24, ±25 %	
Max. rated current	A	10	
Power supply		–	From 24 V DC not switched (NS)
Max. power consumption	mA	–	130
Mains buffering	ms	–	> 20
Baud rate detection		–	Automatic
Maximum cascading depth		–	9 hybrid field bus connections
Baud rates	kbit/s	9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500/1 500 / 3 000 / 6 000 /12 000	
Electrical separation	V DC	500	

Selection and ordering data

Hybrid field bus connection on the field side:
With socket/socket (HanBrid)

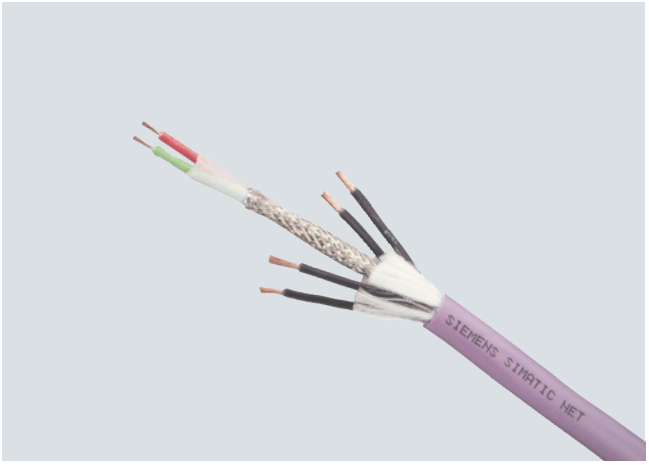
With pin/socket (HanBrid)

With socket/socket (M12)

Link type/ function	Connection IP65	Connection IP20 (PROFIBUS)	**Order No.**
Hybrid field bus connections			
Passive			
• Cu/Cu, for feeding into the field	Socket/socket (2 x HanBrid)	Direct connection	**3RK1 911-1AA22**
• Cu/Cu, for looping through in the field	Pin/socket (2 x HanBrid)	Direct connection	**3RK1 911-1AA32**
• Cu/Cu, for feeding into the field	Socket/socket (2 x HanBrid)	PROFIBUS FastConnect bus connectors	**3RK1 911-1AF22**
• Cu/Cu, for looping through in the field	Pin/socket (2 x HanBrid)	PROFIBUS FastConnect bus connectors	**3RK1 911-1AF32**
Active (refresher)			
• Cu/Cu, for feeding into the field	Socket/socket (2 x HanBrid)	9-pole Sub D socket	**3RK1 911-1AJ22**
• Cu/Cu, for looping through in the field	Pin/socket (2 x HanBrid)	9-pole Sub D socket	**3RK1 911-1AJ32**
• Cu/Cu, for feeding into the field	Socket/socket (2 x M12)	9-pole Sub D socket	**3RK1 911-1AK22**

[1] When ordering, specify the length as well (example: length = 7.50 m).
Orders possible for minimum 10 cm module widths.

Overview



ECOFAST Hybrid Cable PROFIBUS DP in Cu-RS 485

All devices running in the field are connected to the PROFIBUS DP with the ECOFAST bus cables.

The bus cable is configured as a hybrid cable and contains:

- PROFIBUS DP in Cu-RS 485;
- Four additional copper cores for transmission of the 24 V DC voltage:
  - 24 V DC, not switched (for electronics and inputs)
  - 24 V DC, switched (for outputs, can be switched off, e.g. on EMERGENCY-STOP)

The ECOFAST hybrid cables are available by the meter or in pre-assembled lengths with ECOFAST connectors (Han Brid) and sockets.

Technical specifications

Type		6XV1 830-7AH10	6XV1 860-2P
		PROFIBUS ECOFAST hybrid cables – copper	PROFIBUS ECOFAST Hybrid Cable GP
Suitability for use		Connection for ECOFAST stations	Connection for ECOFAST stations
Cable designation		02Y (ST)C 1 x 2 x 0.65/2.56- 150 LI LIH-Z 11Y 4 x 1 x 1.5 VI FRNC	02Y (ST)C 1 x 2 x 0.65/2.56 -150 LI LIY-Z Y 4 x 1 x 1.5 VI
Electrical specifications			
Damping dimension per length			
• At 16 MHz	dB/km	49	49
• At 4 MHz	dB/km	25	25
• At 9.6 MHz	dB/km	3	3
Shaft resistance			
• At 9.6 kHz	Ω	270	270
• At 38.4 kHz	Ω	185	185
• At 3 MHz ... 20 MHz	Ω	150	150
• Rated value	Ω	150	150
Symmetrical tolerance of the shaft resistance			
• At 3 MHz ... 20 MHz	Ω	±15	±15
• At 38.4 kHz	Ω	±18.5	±18.5
• At 9.6 MHz	Ω	±27	±27
Maximum loop resistance per length	Ω/km	138	138
Maximum shield resistance per length	Ω/km	15	15
Capacity per length at 1 kHz	nF/km	30	30
RMS value of operational voltage	V	100	100
Uninterrupted current of power cores	A	12	12

✓ Function is available
– Function is not available

Technical specifications (continued)

Type		6XV1 830-7AH10 PROFIBUS ECOFAST hybrid cables – copper	6XV1 860-2P PROFIBUS ECOFAST Hybrid Cable GP
Suitability for use		Connection for ECOFAST stations	Connection for ECOFAST stations
Cable designation		02Y (ST)C 1 x 2 x 0.65/2.56- 150 LI LIH-Z 11Y 4 x 1 x 1.5 VI FRNC	02Y (ST)C 1 x 2 x 0.65/2.56 -150 LI LIY-Z Y 4 x 1 x 1.5 VI
Mechanical specifications			
Cable sheath			
• Material		PUR	PVC
• External diameter	mm	11	11
• Color		Violet	Violet
Power core			
• Conductor cross-section	mm^2	1.5	1.5
• Color of core insulation		Black	Black
Ambient temperature			
• During mounting	°C	-40 ... +60	-30 … +80
• During operating phase	°C	-40 ... +60	-30 … +80
• During storage	°C	-40 ... +60	-30 … +80
• During transport	°C	-40 ... +60	-30 … +80
Bending radius			
• With single bend	mm	38	77
• With several bends	mm	85	110
Number of bending cycles		5 000 000	1 000 000 [1]
Weight per length	kg/km	150	154
Fire behavior		IEC 60332-1	IEC 60332-3-24 Category C
Chemical resistance			
• To mineral oil		Conditionally resistant	Conditionally resistant
• To grease		Conditionally resistant	Conditionally resistant
Radiological resistance to UV radiation resistance		–	✓
Product feature			
• Halogen-free		✓	–
• Silicone-free		✓	✓
UL listing at 300 V rating		–	✓ / CM, CL3, SunRes, OilRes
UL style at 600 V rating		–	✓

✓ Function is available
– Function is not available
[1] At bending radius 15 x D.

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Selection and ordering data

Version	Order No.
PROFIBUS ECOFAST hybrid cables – copper	
Trailing cables (PUR sheath) with two copper conductors, shielded, for PROFIBUS DP and four copper cores with 1.5 mm^2	
Sold by the meter Delivery unit max. 1 000 m, minimum order quantity 20 m	**6XV1 830-7AH10**
Non-assembled	
• 20 m	**6XV1 830-7AN20**
• 50 m	**6XV1 830-7AN50**
• 100 m	**6XV1 830-7AT10**
Pre-assembled With ECOFAST plug and socket (HanBrid), fixed length	
• 0.5 m	**6XV1 830-7BH05**
• 1.0 m	**6XV1 830-7BH10**
• 1.5 m	**6XV1 830-7BH15**
• 3 m	**6XV1 830-7BH30**
• 5 m	**6XV1 830-7BH50**
• 10 m	**6XV1 830-7BN10**
• 15 m	**6XV1 830-7BN15**
• 20 m	**6XV1 830-7BN20**
• 25 m	**6XV1 830-7BN25**
• 30 m	**6XV1 830-7BN30**
• 35 m	**6XV1 830-7BN35**
• 40 m	**6XV1 830-7BN40**
• 45 m	**6XV1 830-7BN45**
• 50 m	**6XV1 830-7BN50**
With two ECOFAST connectors (HanBrid), variable length (can be ordered from your local Siemens representative)	
PROFIBUS ECOFAST Hybrid Cable GP	
Trailing cable with 4 x Cu and 2 x Cu, shielded with UL approval	
Sold by the meter Delivery unit max. 1 000 m, minimum order quantity 20 m	**6XV1 860-2P**
Non-assembled	
• 20 m	**6XV1 860-4PN20**
• 50 m	**6XV1 860-4PN50**
• 100 m	**6XV1 860-4PT10**
Assembled With ECOFAST plug and socket (HanBrid)	
• 0.5 m	**6XV1 860-3PH05**
• 1 m	**6XV1 860-3PH10**
• 1.5 m	**6XV1 860-3PH15**
• 3 m	**6XV1 860-3PH30**
• 5 m	**6XV1 860-3PH50**
• 10 m	**6XV1 860-3PN10**
• 15 m	**6XV1 860-3PN15**
• 20 m	**6XV1 860-3PN20**
• 25 m	**6XV1 860-3PN25**
• 30 m	**6XV1 860-3PN30**
• 35 m	**6XV1 860-3PN35**
• 40 m	**6XV1 860-3PN40**
• 45 m	**6XV1 860-3PN45**
• 50 m	**6XV1 860-3PN50**

Selection and ordering data (continued)

Version	Order No.
Additional components	
PROFIBUS copper bus connector With 2 x Cu shielded and 4 x Cu 1.5 mm^2; contact type: POF, Han D for 24 V; tool: Crimping tool, polishing set; 5 units; with mounting instructions	
• With pin insert	**6GK1 905-0CA00**
• With female insert	**6GK1 905-0CB00**
PROFIBUS ECOFAST HybridPlug, angled; With 2 x Cu shielded and 4 x Cu 1.5 mm^2; 5 units; with mounting instructions	
• Pin insert	**6GK1 905-0CC00**
• Female inserts	**6GK1 905-0CD00**
ECOFAST Terminating Plug Bus termination plug-in connector for PROFIBUS DP; with 2 x Cu and 4 x Cu 1.5 mm^2; pin insert, integrated terminating resistors	
• Pack of 1	**6GK1 905-0DA10**
• Pack of 5	**6GK1 905-0DA00**
Data T piece for 2 x 24 V auxiliary voltage (switched and non-switched) and PROFIBUS DP	
• for Cu RS 485	**3RK1 911-2AG00**
Addressing plug for setting the PROFIBUS DP address	**6ES7 194-1KB00-0XA0**

Supplementary components for the SIMATIC NET cabling range can be ordered from your local representative.
Technical consulting is available at:

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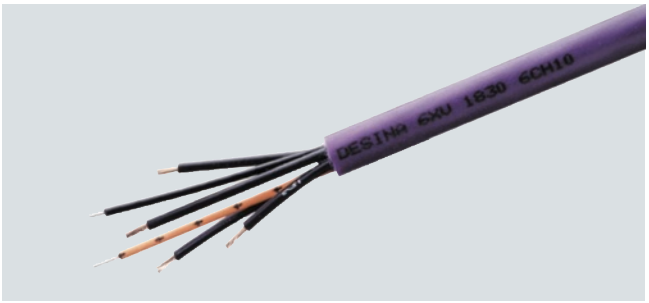
Overview



ECOFAST fiber-optic hybrid cable

The ECOFAST fiber-optic hybrid cable from SIMATIC NET is used for setting up optical PROFIBUS DP networks indoors.

The robust and trailing hybrid cable contains two plastic optical conductors for data transmission and four copper cables (1.5 mm^2) for the power supply of DESINA [1] stations.

It is particularly suitable for the connection of DESINA components installed near the machine and is easy to assemble on site. The maximum cable length between two DP units is 50 m.

- Hybrid cable for joint transmission of data and power supply
- Electrical separation of DP units
- Protection of the transmission path against electromagnetic faults
- Up to 50 m cable length with plastic optical conductor
- Robust fiber-optic cable, designed for industrial applications

[1] DESINA is the trademark for **DE**centralized (distributed) and **S**tandardized **IN**stall**A**tion technology on machine tools.

Technical specifications

Type		6XV1 830-6CH10 ECOFAST fiber-optic hybrid cable (DESINA-compatible)
Suitability for use		DESINA-compatible devices, e.g. for ET 200X
Cable designation of the ECOFAST Hybrid Cable		I-(ZN) J-V4Y 11Y2S 980/1000+4x1.5
Version of the assembled FO cable		Sold by the meter, can be assembled locally with DESINA connectors or pre-assembled with two DESINA connectors
Electrical specifications		
Damping dimension per length at 660 nm maximum	dB/km	280
Operational voltage rated value	V	300
Uninterrupted current of power cores	A	10
Mechanical specifications		
Number of electrical cores		4
Number of conductors of the FO cable		2
Version of the FO conductor fiber		Step index fiber
Material		
• of the FO fiber core		Polymethylmethacrylate (PMMA)
• of the FO fiber sheath		Fluorinated special polymer
• of the sheath of the FO cable		PUR
• of the sheath of the FO core		PA
Color		
• of the sheath of the FO core		Black, orange
• of the core insulation of power cores		Black
• of the sheath of the hybrid cable		Violet
Diameter of the FO fiber core	µm	980
Conductor cross-section of the power cores	mm^2	1.5

Type		6XV1 830-6CH10 ECOFAST fiber-optic hybrid cable (DESINA-compatible)
Mechanical specifications (continued)		
External diameter		
• of the FO fiber sheath	µm	1 000
• of the sheath of the cable	mm	10.6
• of the sheath of the FO core	mm	2.2
- Lower deviation	mm	2.19
- Upper deviation	mm	2.21
Weight per length	kg/km	146
Maximum permitted short-term tensile loading	N	60
Short-term shear force per length	N/m	1 000
Bending radius with several bends with minimum permitted tensile loading	mm	110
Ambient temperature		
• During operating phase	°C	-20 … +60
• During storage	°C	-20 … +60
• During transport	°C	-20 … +60
• During mounting	°C	-5 … +50
• In the short circuit on the conductor	°C	+160 (max. 5 s)
Chemical resistance		
• To ASTM oil 2		Conditionally resistant
• To grease		Conditionally resistant
• To water		Conditionally resistant
Radiological resistance to UV radiation resistance		–
Fire behavior		IEC 60332-1
Verification of suitability UL approval		–
Product feature		
• Halogen-free		–
• Silicone-free		✓

✓ Function is available
– Function is not available

Selection and ordering data

Version	Order No.
ECOFAST fiber-optic hybrid cable (DESINA-compatible)	
Trailing cable with 2 plastic optical conductors and 4 copper cores, 1.5 mm^2 only for operation in DESINA-compatible devices	
Sold by the meter	**6XV1 830-6CH10**
Delivery unit max. 1 000 m, minimum order quantity 20 m	
Non-assembled	
• 20 m	**6XV1 830-6CN20**
• 50 m	**6XV1 830-6CN50**
• 100 m	**6XV1 830-6CT10**
Pre-assembled	
With 2 DESINA connectors	
• 1.5 m	**6XV1 830-6DH15**
• 3 m	**6XV1 830-6DH30**
• 5 m	**6XV1 830-6DH50**
• 10 m	**6XV1 830-6DN10**
• 15 m	**6XV1 830-6DN15**
ECOFAST fiber-optic hybrid plug 180, DESINA-compatible (ECOFAST FOC)	
2 x FO; 4 x 1.5 mm^2 Cu	
• With pin insert (Hanbrid connectors)	**6GK1 905-0BA00**
• With female insert (Hanbrid connectors)	**6GK1 905-0BB00**
Data T piece	
For 2 x 24 V auxiliary voltage (switched and non-switched) and PROFIBUS DP	
• For FOC	**3RK1 911-2AH00**
Manual for PROFIBUS networks	
Paper version	
Network architecture, configuring, network components, mounting	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection	
Electronic manuals for communication systems, protocols, products; on DVD; German/English	**6GK1 975-1AA00-3AA0**

Supplementary components for the SIMATIC NET cabling range can be ordered from your local representative.
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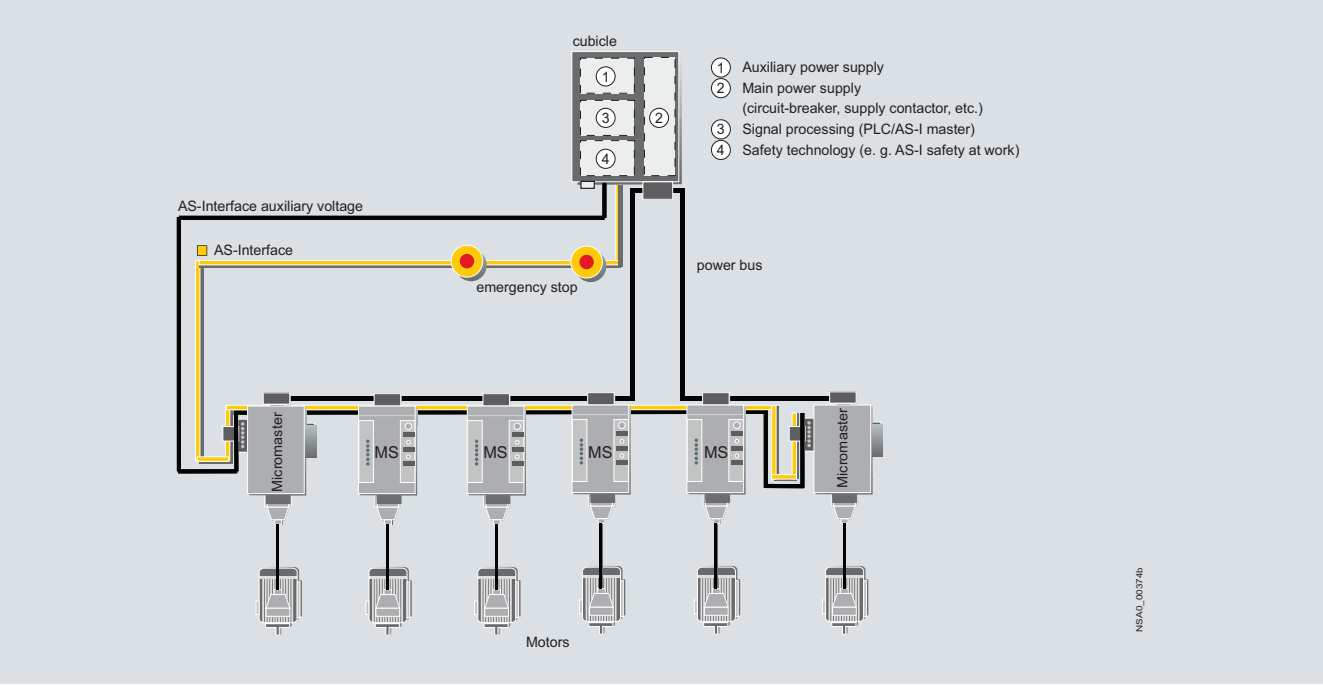
Overview



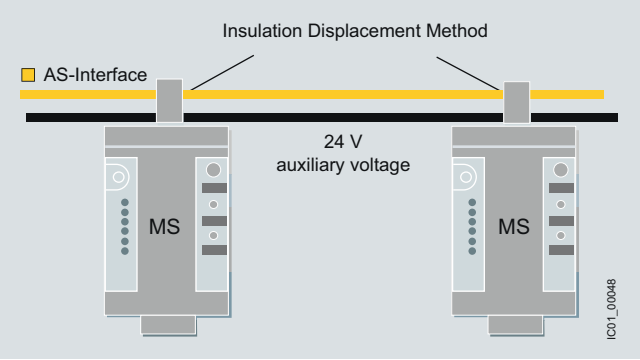
AS-Interface network topology

AS-Interface shaped cable

The two-core AS-Interface shaped cable is used in the communication via AS-Interface (see page 10/14):
- Yellow core for data transmission
- Black core for 24 V auxiliary voltage

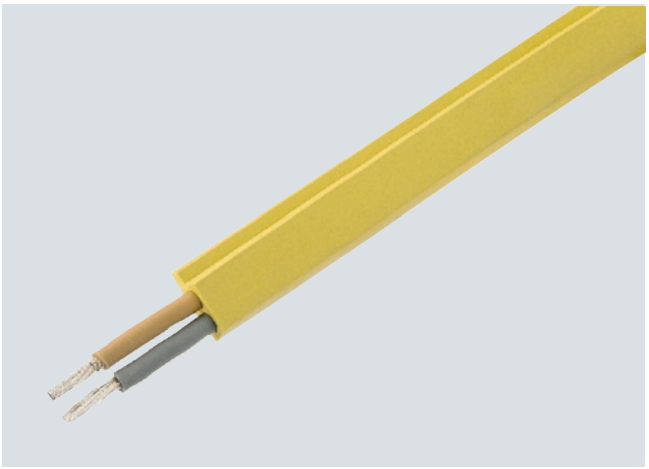
Insulation piercing method

Connection is by means of the insulation piercing method which was developed especially for the AS-Interface (see page 10/14).



Connection at AS-Interface using insulation piercing method

Overview



AS-Interface shaped cable

The **Actuator-Sensor Interface (AS-Interface)** - the networking system used for the lowest field area - is characterized by very easy mounting and installation. A new connection method was developed specially for the AS-Interface.

The stations are connected using the AS-Interface cable. This two-wire AS-Interface shaped cable has a trapezoidal shape, thus ruling out polarity reversal.

Connection is effected by the **insulation piercing method**. In other words, male contacts pierce the shaped AS-Interface cable and make reliable contact with the two wires. Cutting to length and stripping are superfluous. Consequently, AS-Interface stations (e. g. I/O modules, intelligent devices) can be connected in the shortest possible time and exchanging devices is quick.

To enable use in the most varied ambient conditions (e. g. in an oily environment), the AS-Interface cable is available in different materials (rubber, TPE, PUR).

For special applications it is also possible to use an unshielded standard round cable H05VV-F 2x1.5 mm^2 according to AS-i Specification. With AS-Interface, data and energy for the sensors (e.g. proximity switches BERO) and actuators (e. g. indicator lights) are transmitted over the yellow AS-Interface cable.

The black cable must be used for actuators with a 24 V DC supply (e.g. solenoid valves) and a high power requirement.

Suitable for operation in tow chains

The use of the AS-Interface shaped cables with TPE and PUR outer sheath was checked in a tow chain test with the following conditions:

Chain length	m	6
Travel	m	10
Bending radius	mm	75
Travel speed	m/s	4
Acceleration	m/s^2	4
Number of cycles		10 million
Duration of test		approx. 3 years (11 000 cycles per day)

After termination of the 10 million cycles only slight wear was visible due to the lugs of the tow chain. No damage to the cores and core insulation could be detected.

Note:

When using a tow chain, the cables must be installed such that they are not subject to tensile forces. On no account may the cables be twisted, but must be routed flat through the tow chain.

Selection and ordering data

	Material	Color	Quantity	Order No.
	**AS-Interface shaped cables**			
	Rubber	Yellow (AS-Interface)	100-m roll	**3RX9 010-0AA00**
			1-km drum	**3RX9 012-0AA00**
		Black (24 V DC)	100-m roll	**3RX9 020-0AA00**
			1-km drum	**3RX9 022-0AA00**
	TPE	Yellow (AS-Interface)	100-m roll	**3RX9 013-0AA00**
			1-km drum	**3RX9 014-0AA00**
		Black (24 V DC)	100-m roll	**3RX9 023-0AA00**
			1-km drum	**3RX9 024-0AA00**
	TPE special version [1]	Yellow (AS-Interface)	100-m roll	**3RX9 017-0AA00**
		Black (24 V DC)	100-m roll	**3RX9 027-0AA00**
	PUR	Yellow (AS-Interface)	100-m roll	**3RX9 015-0AA00**
			1-km drum	**3RX9 016-0AA00**
		Black (24 V DC)	100-m roll	**3RX9 025-0AA00**
			1-km drum	**3RX9 026-0AA00**

[1] Special version according to UL Class

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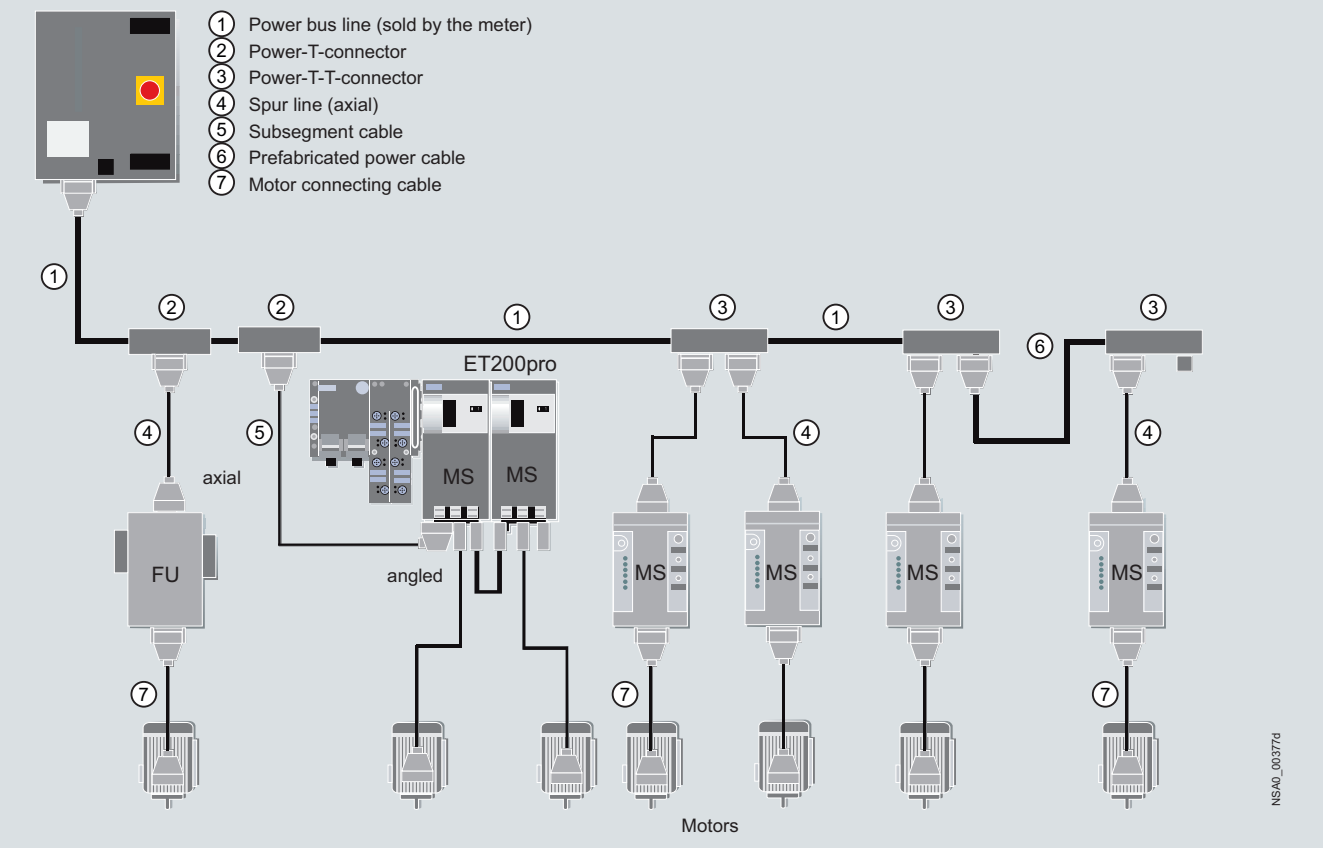
Overview



Power supply to the motors via the power bus with power T and TT terminal connectors, spur lines to the field devices and power loop-through via motor connection cables

Power bus

The power supply to the field devices (ECOFAST motor starter, ET 200pro motor starter, M200D motor starter, MCU motor starter or frequency converter) is provided via the power bus, in which the power T terminal connector ② or power double-T terminal connector ③ are connected by power bus cables ①.

Feeders

From the terminal connectors, spur lines ④ with Han Q4/2 plugs lead to the field devices from which the motors are supplied with power via motor connection cables ⑦.

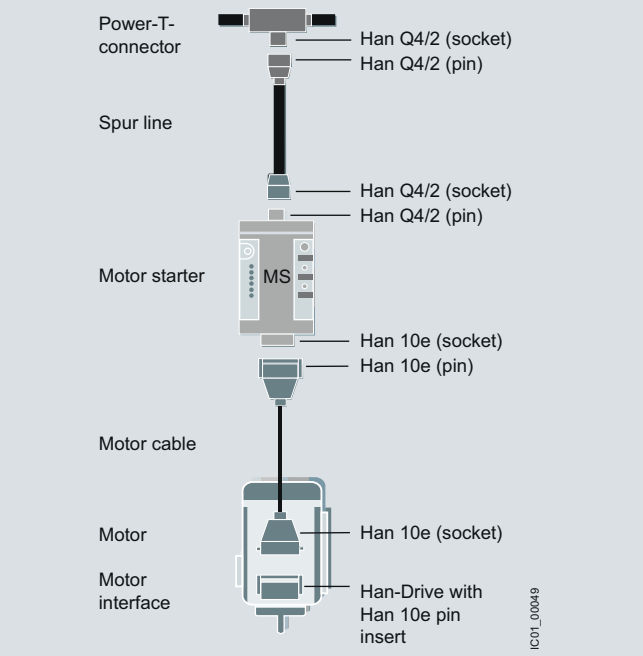
Interruption-free thanks to power terminal connectors

In finger-safe connection technology the power T connectors (② see page 10/17) and power TT terminal connectors (③ see page 10/17) connect the components of a feeder to the power bus. They ensure interruption-free operation, i.e. when the components are plugged in the power bus is not interrupted.

Motor connection cables

This section describes only the motor cables for the connection of the motor with Han10e plug-in connectors on the motor starter. (+ motor connection cables see page 10/18)

Han Q8 plug-in connectors on the motor starter are required:
- For ET 200pro motor starters (see Catalog ST 70, Accessories for ET 200pro motor starters)
- For M200D motor starters (see Chapter 6, Accessories for M200D motor starters)
- For MCU motor starters (see Chapter 6) the M screw is used for the load feeder.



Power feeder from power bus with spur line to the motor starter and motor cable for connection of the motor
- Connection via Han10e plug-in connection on the motor starter (for ET 200pro/M200D in HAN Q8 version)
- Connection via HanDrive/10e plug-in connector on the motor
- Motor connection cable as shielded or non-shielded design: Use of a frequency converter requires EMC shielding

Selection and ordering data

Cross-section mm²	Fixed length m	Any length [1] m	Order No.
① Power bus cables, non-assembled			
5 x 4	20	–	**3RK1 911-0AG60**
	50	–	**3RK1 911-0AG70**
	100	–	**3RK1 911-0AG80**
5 x 6	20	–	**3RK1 911-0AH60**
	50	–	**3RK1 911-0AH70**
	100	–	**3RK1 911-0AH80**
Power cables (new), preassembled			
④ Spur line/connection of switching devices/motor starters both ends with Han Q4/2 (pin/socket), axial cable routing			
5 x 4	–	< 3	**3RK1 911-0CP21**
	–	> 3.1 ... < 5	**3RK1 911-0CP31**
	–	> 5.1 ... < 10	**3RK1 911-0CP41**
	–	> 10.1 ... < 15	**3RK1 911-0CP51**
5 x 6	–	< 3	**3RK1 911-0CP22**
	–	> 3.1 ... < 5	**3RK1 911-0CP32**
	–	> 5.1 ... < 10	**3RK1 911-0CP42**
	–	> 10.1 ... < 15	**3RK1 911-0CP52**

[1] When ordering, specify the length as well (example: length = 7.50 m). Orders possible for minimum 10 cm module widths.

Enclosures	Usage	Contacts	Order No.
Connector set for energy supply HAN Q4/2			
2.5 mm² / 4 mm² / 6 mm², comprising:			
• Angled, e.g. for energy supply to motor starter			
1 cable-end connector hood with Pg16	1 female insert	5 female contacts 2.5 mm²	**3RK1 911-2BE50**
1 cable-end connector hood with Pg16	1 female insert	5 female contacts 4 mm²	**3RK1 911-2BE10**
1 cable-end connector hood with Pg16	1 female insert	5 female contacts 6 mm²	**3RK1 911-2BE30**
• Straight, e.g. for energy supply to motor starter			
1 cable-end connector hood with Pg16	1 female insert	5 female contacts 2.5 mm²	**3RK1 911-2BR50**
1 cable-end connector hood with Pg16	1 female insert	5 female contacts 4 mm²	**3RK1 911-2BR10**
1 cable-end connector hood with Pg16	1 female insert	5 female contacts 6 mm²	**3RK1 911-2BR30**
Connector set for power loop-through HAN Q4/2			
2.5 mm² / 4 mm² / 6 mm², comprising:			
• Angled e.g. for connection P&CM			
1 coupling enclosure with Pg16	1 pin insert	5 male contacts 2.5 mm²	**3RK1 911-2BF60**
1 coupling enclosure with Pg16	1 pin insert	5 male contacts 4 mm²	**3RK1 911-2BF20**
1 coupling enclosure with Pg16	1 pin insert	5 male contacts 6 mm²	**3RK1 911-2BF40**
• Straight e.g. for connection on power T terminal connector			
1 coupling enclosure with Pg16	1 pin insert	5 male contacts 2.5 mm²	**3RK1 911-2BS60**
1 coupling enclosure with Pg16	1 pin insert	5 male contacts 4 mm²	**3RK1 911-2BS20**
1 coupling enclosure with Pg16	1 pin insert	5 male contacts 6 mm²	**3RK1 911-2BS40**
Control cabinet gland HAN Q4/2 e.g. for installation in control cabinet or local switchboxes			**3RK1 911-1BF00**

Selection and ordering data (continued)

Version	Order No.
② **Power T terminal connectors**	
For 400 V AC for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection	
Use of preassembled bus segments	
• 2.5 mm²/4 mm²	**3RK1 911-2BF01**
• 4 mm² / 6 mm²	**3RK1 911-2BF02**
③ **Power double-T terminal connectors**	
For 400 V AC for connection of feeders (e.g. motor starters) by means of standard round cable at any point of the power bus, by insulation displacement connection	
• Use of preassembled bus segments	
• Connection of two motor starters possible	
• 4 mm² / 6 mm²	**3RK1 911-2BG02**
Sealing set (comprising 2 seals)	
For power T / power double T terminal connector	
• For power cables with Ø 10 ... 13 mm	**3RK1 911-5BA00**
• For power cables with Ø 13 ... 16 mm	**3RK1 911-5BA10**
• For power cables with Ø 16 ... 19 mm	**3RK1 911-5BA20**
• For power cables with Ø 19 ... 22 mm	**3RK1 911-5BA30**
• Blanking plugs	**3RK1 911-5BA50**

Version	Order No.
Miscellaneous accessories	
Crimping tools	
For male and female contacts	
• 1.5 and 2.5 mm²	**3RK1 902-0AH00**
• 1.5, 2.5 and 4 mm²	**3RK1 902-0CT00**
Dismantling tools	
• For male and female contacts for 9-pole inserts (e.g. HAN Q8)	**3RK1 902-0AJ00**
• For male and female contacts for 9-pole HAN Q4/2 inserts	**3RK1 902-0AB00**
Sealing caps	
For power socket connectors	
• 1 unit per pack	**3RK1 902-0CK00**
• 10 units per pack	**3RK1 902-0CJ00**

Selection and ordering data (continued)

Cross-section mm²	Fixed length m	Any length [1] m	Order No.
⑦ **Motor connection cables**			
• Preassembled at both ends with Han 10e (pin/socket), unshielded			
11 x 1.5	1.5	–	**3RK1 911-0BK10**
	–	< 2.9	**3RK1 911-0CK20**
	3	–	**3RK1 911-0BK20**
	–	> 3.1 ... < 4.9	**3RK1 911-0CK30**
	5	–	**3RK1 911-0BK30**
7 x 1.5	1.5	–	**3RK1 911-0BH10**
	–	< 2.9	**3RK1 911-0CH20**
	3	–	**3RK1 911-0BH20**
	–	> 3.1 ... < 4.9	**3RK1 911-0CH30**
	5	–	**3RK1 911-0BH30**
• Preassembled at both ends with Han 10e (pin/socket), shielded			
4 x 2.5 4 x 0.75	1.5	–	**3RK1 911-0BU10**
	–	< 2.9	**3RK1 911-0CU20**
	3	–	**3RK1 911-0BU20**
	–	> 3.1 ... < 4.9	**3RK1 911-0CU30**
	5	–	**3RK1 911-0BU30**
• Preassembled at one end with Han 10e (pin), unshielded			
11 x 1.5	1.5	–	**3RK1 911-0BJ10**
	–	< 2.9	**3RK1 911-0CJ20**
	3	–	**3RK1 911-0BJ20**
	–	> 3.1 ... < 4.9	**3RK1 911-0CJ30**
	5	–	**3RK1 911-0BJ30**
7 x 1.5	1.5	–	**3RK1 911-0BG10**
	–	< 2.9	**3RK1 911-0CG20**
	3	–	**3RK1 911-0BG20**
	–	> 3.1 ... < 4.9	**3RK1 911-0CG30**
	5	–	**3RK1 911-0BG30**
• Preassembled at one end with Han 10e (pin), shielded			
4 x 2.5 4 x 0.75	1.5	–	**3RK1 911-0BV10**
	–	< 2.9	**3RK1 911-0CV20**
	3	–	**3RK1 911-0BV20**
	–	> 3.1 ... < 4.9	**3RK1 911-0CV30**
	5	–	**3RK1 911-0BV30**
• Non-assembled			
4 x 2.5 4 x 0.75	20	–	**3RK1 911-0BW60**
	50	–	**3RK1 911-0BW70**
	100	–	**3RK1 911-0BW80**

[1] When ordering, specify the length as well (example: length = 7.50 m).
Orders possible for minimum 10 cm module widths.

Selection and ordering data (continued)

Enclosures	Usage	Contacts	Order No.
Connector set for motor connection Han 10e			
• Unshielded			
1 coupling enclosure with Pg13, low	1 pin insert	6 male contacts 1.5 mm^2	**3RK1 911-2BK00**
1 coupling enclosure with Pg21, high	1 pin insert	6 male contacts 1.5 mm^2	**3RK1 911-2BL00**
Connection on motor			
1 cable-end connector hood with Pg16, low	1 female insert	6 female contacts 1.5 mm^2	**3RK1 911-2BM00**
1 cable-end connector hood with Pg21, high	1 female insert	6 female contacts 1.5 mm^2	**3RK1 911-2BN00**
• Shielded			
Outgoing feeder on motor starter			
1 coupling enclosure with M25	1 pin insert	7 male contacts 3 × 2.5 mm^2 + 4 × 0.75 mm^2	**3RK1 911-2BL10**
Connection on motor including star bridge			
One cable-end connector hood with M25	1 female insert	7 female contacts 3 × 2.5 mm^2 + 4 × 0.75 mm^2	**3RK1 911-2BN10**

Note:

More connection technology products can be found at "Siemens Solution Partners Automation" under the "Distributed Field Installation System" technology.

More information can be found on the Internet at: www.siemens.com/automation/partnerfinder.

Accessories: ECOFAST selection module

Overview

ECOFAST selection module

The selection module enables the selective shutdown of feeders on the power bus, e.g. for servicing purposes. The module is equipped accordingly with a lockable switch (repair switch). In addition it provides line protection for cross sectional transitions on the power bus and can be used for increasing the size of the power bus segments.

Spectrum:

- Modules with 8, 16 and 25 A rated current
- With feedback contact through M12 plug
- Generally with 6 mm^2 wiring

Selection and ordering data

Version A	**Order No.**
Selection module For the selective switch-off of feeders with maintenance switching function for line protection for cross-sectional transitions and for increasing the segment size with feedback contact M12	
• 8	**3RK1 911-4AB08**
• 16	**3RK1 911-4AB16**
• 25	**3RK1 911-4AB25**