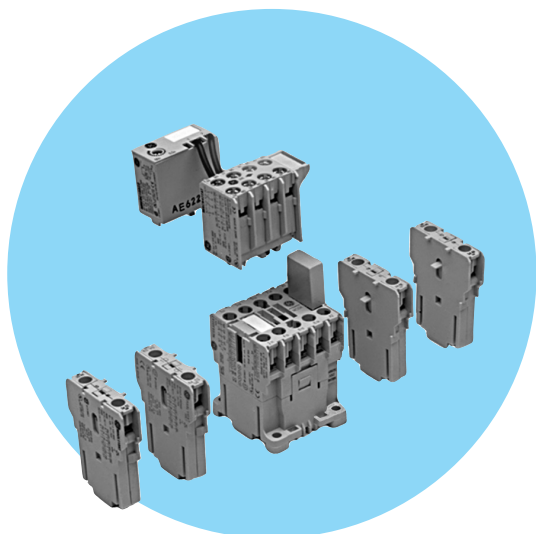




Standards

IEC/EN 60947-5-1	BS 4794
IEC/EN 60947-1	CENELEC HD 420
EN 50002	NFC 63-110
EN 50005	NFC 63-140
EN 50011	CSA C22.2/14
UL 508	VDE 0660

Approvals



cULus

CE

Lloyd's
RegisterBureau
Veritas

RINA

Auxiliary contactors $I_{th} = 16A$

- Control circuit: Alternating current up to 600V
Direct current up to 250V
- Terminal numbering in accordance with EN 50011
- Fixing system for rapid and simple mounting by clamping onto standard 35mm DIN rail (EN 50022).
- 6kV rated impulse withstand strength
- Screw and push-on terminals protected against accidental contacts in accordance with VDE 0106 T.100 and VBG4.
- Printed circuit version.
- Ring terminal version.
- Facility to mount instant or timed auxiliary contact blocks and voltage suppressor blocks.
- Maximum number of auxiliary contacts to add: 6
- Degree of protection IP20 (EN 60529).
- According to IEC/EN 60947-1.

General data

Maximum number of contacts (MCR...)	4
Rated thermal current (I _{th}) θ ≤ 60°	(A) 16
Rated operational voltage (U _e) acc. IEC 60947-1	(V) 690
Insulation voltage (U _i) acc. IEC 60947-1	(V) 750
Utilisation category:	
AC-15	V 110 220/240 380/400 415 440 500 660/690
	A 6 6 4 4 3 2.5 1.5

DC-13	V	24	48	110	220
	A	5	3.5	1.2	0.6

Standard voltages

To complete the catalogue number, replace the symbol $\blacklozenge$ by the code corresponding to the voltage and frequency of the control circuit.

AC Coils

AC	1	2	9	J	K	M	6	7	N	U	W	Y
50/60Hz	24	42	48				220-230	240				
50 Hz				110-115	115-127					380-400	415-440	500
60Hz				110-120		208-220			277	440	480	600

Voltage operating limits of dual-frequency coil:

at 60Hz = $0.85 \alpha 1.1 \times U_s$

at 50Hz = $0.8 \alpha 1.1 \times U_s$ for uninterrupted duty (ED=100%), temperature = 40°C

DC Coils

-	B	D	G	J
Voltage	12	24	48	110

DC Wide Range Coils

-	WD	WG	WI	WJ	WL	WN	WS
Voltage	24	48	72	110	125	220	250

Operating voltage limits with DC coils:

Standard = 0.8 to $1.1 \times U_s$

Wide range = 0.7 to $1.3 \times U_s$

- Order codes ● page B.3
 Auxiliary contacts blocks ● page B.3
 Accessories ● page B.4
 Technical data ● page B.18
 Dimensions ● page B.24



Auxiliary contactors*



Contacts acc. EN 50011			Control circuit: alternating current			Control circuit: direct current		
			Cat. no. ⁽¹⁾	Ref. no. see bottom	Pack.	Cat. no. ⁽¹⁾	Ref. no. see bottom	Pack.
Screw terminal								
40E	4	0	MCRA040AT ♦		5	MCRC040AT ♦		10
31E	3	1	MCRA031AT ♦		5	MCRC031AT ♦		10
22E	2	2	MCRA022AT ♦		5	MCRC022AT ♦		10
13E	1	3	MCRA013AT ♦		5	MCRC013AT ♦		10
04E	0	4	MCRA004AT ♦		5	MCRC004AT ♦		10

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit. (see pag. B.8).

(2) Terminal: - with wire 1.5mm²: I_e = 16A - with wire 1mm²: I_e = 10A

Insulated terminal type B 2.8x0.8 with wire 1mm²: I_e = 8A to DIN 46247

Faston terminal 1x6.3 on request, replace the letter F by H in the catalogue number

(*) Only available order codes listed in the alphabetical index

Auxiliary contactors interface



Contacts acc. EN 50011			Control circuit: direct current 24V / 1.2W ⁽³⁾			Control circuit: direct current 24V / 2W ⁽⁴⁾		
			Operating limits from 19 to 30V (0.8-1.25xUs)			Operating limits from 17 to 30V (0.7-1.25xUs)		
			Cat. no.	Ref. no.	Pack.	Cat. no.	Ref. no.	Pack.
Screw terminal								
40E	4	0	MCRI040ATD	100530	5	MCRK040ATD	100533	10
31E	3	1	MCRI031ATD	100531	5	MCRK031ATD	100534	10
22E	2	2	MCRI022ATD	100532	5	MCRK022ATD	100535	10

(3) No possibility of adding instantaneous auxiliary blocks.

(4) Facility to mount instantaneous auxiliary contact block of two contacts (MARN2...) or two instantaneous auxiliary contact blocks of one contact (MARL1...).

Instantaneous auxiliary contacts blocks



Front mounting



Number of contacts	Combination with MCRA040AT ♦ (40E) according to EN 50011	Contacts acc. to EN 50005			Cat. no.	Ref. no.	Pack.
		Designation (block marking)	.3	.1			
			.4	.2			
Screw terminal							
2	60E	20	2	0	MARN220AT	100994	10
2	51E	11	1	1	MARN211AT	100993	10
2	42E	02	0	2	MARN202AT	100992	10
Screw terminal							
4	80E	40	4	0	MARN440AT	100991	10
4	71E	31	3	1	MARN431AT	100990	10
4	62E	22	2	2	MARN422AT	100989	10
4	53E	13	1	3	MARN413AT	100988	10
4	44E	04	0	4	MARN404AT	100987	10

Instantaneous auxiliary contacts blocks



Front mounting



Number of contacts	Combination with MCRA040AT ♦ (40E) according to EN 50011	Contacts acc. to EN 50005				Cat. no.	Ref. no.	Pack.
		Designation (block marking)						
• One or two blocks to cover combinations of 5 or 6 contacts without increasing the height of the basic unit.								
Screw terminal								
1	50E	10	1	0	MARL110AT	100513	10	
1	-	01	0	1	MARL101AT	100514	10	
• One or two additional blocks, when 9 or 10 contacts are required (combination possible with the front mounting block)								
• One or two additional blocks on both sides, to cover up to 8 contacts (combination only possible with lateral blocks)								
Screw terminal								
1	50E	10	1	0	MARL110ATS	100519	10	
1	-	01	0	1	MARL101ATS	100520	10	

Insulated terminal type B 2.8x0.8 with wire 1mm²: I_e = 8A

Technical data

General

Maximum number of contacts (MCR...)	4
Rated thermal current (Ith) $\theta \leq 60^\circ$	16A
Rated operational voltage (Ue) acc. IEC 60947.1	690V
Insulation voltage (Ui) acc. IEC 60947.1	750V

Conformity to standards

IEC / EN 60947-5-1	IEC / EN 60947-1	BS 4794
EN 50002	EN 50005	EN 50011
NFC 63-110	NFC 63-140	CENELEC HD 420
CSA C22.2/14	VDE 0660	UL 508

Approvals

cULus	DEMKO	NEMKO
SEMKO	SETI	RINA
Lloyd's Register	Bureau Veritas	CE

Ambient conditions

Storage temperature	-55°C to +80°C
Operation temperature	-40°C to +60°C
Altitude	up to 3000m
	from 3000 to 4000m
	from 4000 to 5000m
	Nominal values
	90%le 80%Ue
	80%le 75%Ue

Climatic resistance (IEC 68-2)

Continuous tests	40 / 125 / 56
Cold (72h)	
Temperature	-40°C
Dry heat (96h)	
Temperature	+125°C
Relative humidity	< 50%
Humid heat (56 days)	
Temperature	+40°C
Relative humidity	95%
Cyclical tests (6 cycles)	
Humid heat	
First half-cycle (12h)	
Low temperature	+25°C
Relative humidity	93%
Second half-cycle (12h)	
Low temperature	+55°C
Relative humidity	95%

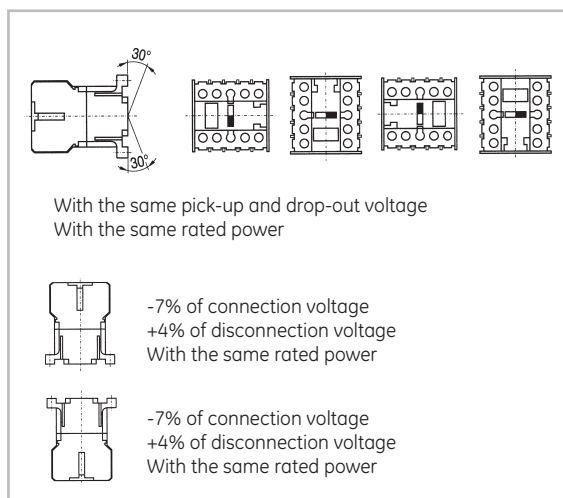
Shock resistance (IEC 68-2-27)

Continuously closed (at 0.8Us)	
Admissible acceleration	25 g
Impulse duration	11ms
Continuously opened (no voltage)	
Admissible acceleration	20 g
Impulse duration	11ms

Vibration resistance (IEC 68-2-6)

Continuously closed (at 0.8Us)	
Admissible acceleration	15 g
Sweep between	10 - 200Hz
Continuously opened (no voltage)	
Admissible acceleration	5 g AC - 3.5g DC
Sweep between	10 - 200Hz

Mounting positions



Terminal capacity

Terminal with screw M3.5 Tightening torque	
(with pozidrive head and safety flange)	0.8 Nm - 7 Lb-in
Solid wire	mm² 0.75 to 2 x 2 w.
Flexible wire without terminal	mm² 0.75 to 2.5 x 2 w.
Flexible wire with terminal with cap	mm² 0.75 to 2.5 x 1 w
	mm² 0.75 to 1 x 2 w
Ring terminal cap	0.8 Nm - 7 Lb/in

Fast-on 2.8 - 2 insulated terminals	mm² 1 x 2 w.
Terminal for printed circuit (Ø of PCB hole)	1.8mm
Ring terminal cap	7.8mm
Fork terminal cap	6.5mm

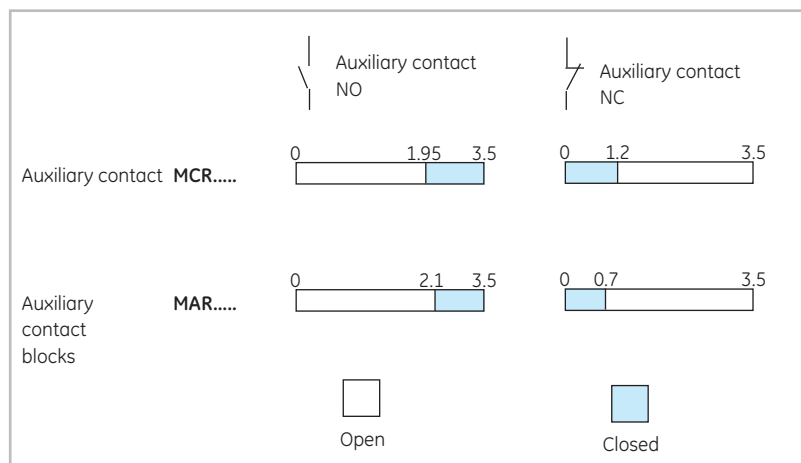
Coil Terminal capacity and tightening torque

Tightening torque	0.8Nm - 7Lb/in
Solid wire	(mm²) 0.75 to 2x2
Flexible wire without terminal	(mm²) 0.75 to 2.5x2
Flexible wire without terminal with cap	(mm²) 0.75 to 2.5x21

Control circuit

		MCRA...	MCRC...	MCRC...	MCRI...	MCRK...
Rated insulation voltage (Ui)	(V)	750	750	750	750	750
Standard voltages (Us)						
50Hz	(V)	24...690	-	-	-	-
60Hz	(V)	6...600	-	-	-	-
DC	(V)	-	6...440	12...440	24	24
Voltage ⁽¹⁾						
Operating limits	xUs	0.8...1.1	0.8...1.1	0.7...1.3	0.8...1.25	0.7...1.25
Drop-out	xUs	0.35...0.55	0.15...0.3	0.15...0.3	0.15...0.3	0.13...0.35
Consumption						
Pick-up	(VA)	26	-	-	-	-
Seal	(VA)	4	-	-	-	-
DC	(W)	-	3	4	1.2	2
Power factor						
Pick-up	(cos φ)	0.8	-	-	-	-
Seal	(cos φ)	0.35	-	-	-	-
Power dissipation	(W)	1.4	3	4	1.2	2
Opening and closing times						
Values between ± %Us	%	+10...-20	+10...-20	+30...-30	+25...-20	+25...-20
Time at energisation NO	(ms)	6...13	22...36	17...28	30...70	20...50
Time at de-energisation NC	(ms)	8...16	9...12	9...12	9...16	9...16
Time at energisation NC	(ms)	5...11	18...27	12...25	20...45	18...35
Time at de-energisation NO	(ms)	6...13	5...7	5...7	5...9	5...9
Values at Us						
Time at energisation NO	(ms)	7...12	24...27	19...23	25...45	25...40
Time at de-energisation NC	(ms)	8...16	9...11	9...11	9...16	9...16
Time at energisation NC	(ms)	6...10	20...26	15...21	25...35	20...30
Time at de-energisation NO	(ms)	6...13	5...8	5...8	5...9	5...9
Maximum time without voltage	(ms)	3	3	3	3	3
(without effecting the closed magnetic circuit)						
Mechanical endurance						
Monofrequency	x10 ⁶ ops.	15	-	-	-	-
Dual-frequency	x10 ⁶ ops.	10	-	-	-	-
DC	x10 ⁶ ops.	-	10	10	10	10
Maximum rate (no load)						
Monofrequency	n° ops./h	9000	-	-	-	-
Dual-frequency	n° ops./h	3600	-	-	-	-
DC	n° ops./h	-	9000	9000	9000	9000

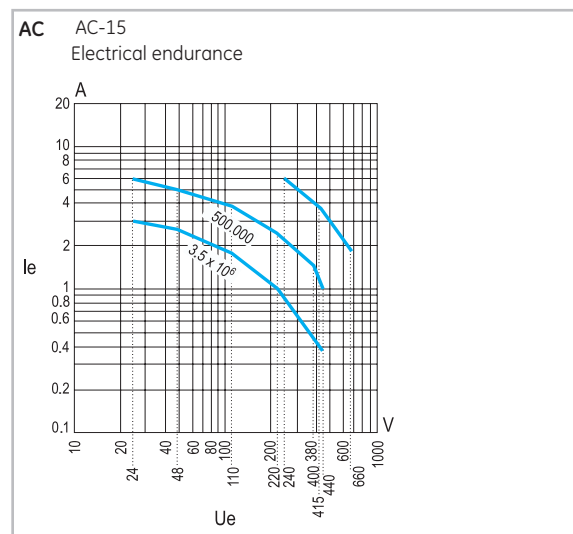
Contact sequence (distance in mm)



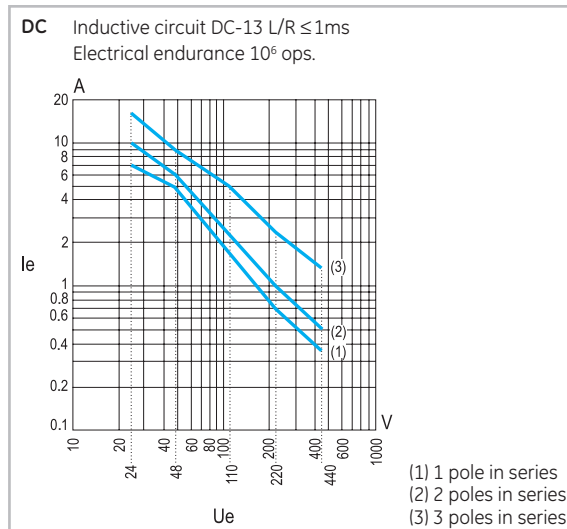
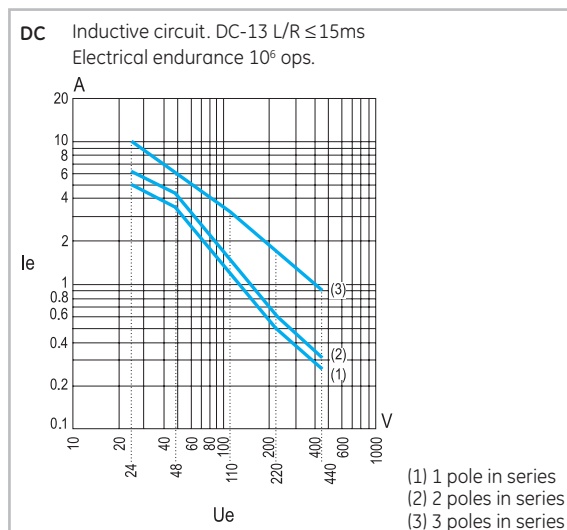
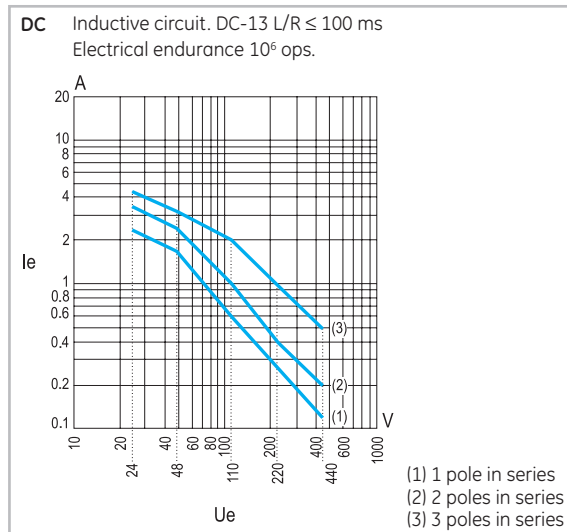
Internal auxiliary contacts

	MCR.....
Rated insulation voltage (Ui) acc. IEC 60947-1	750V
Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$ ⁽¹⁾	16A
Making capacity (r.m.s.) acc. IEC 60947-5	
AC-15 $U_e \leq 440\text{V } 50/60\text{Hz}$	160A
DC-13 $U_e \leq 220\text{V DC}$	3A
Breaking capacity (r.m.s.) acc. IEC 60947-5	
AC-15 $U_e \leq 440\text{V } 50/60\text{Hz}$	106A
DC-13 (L/R = 100 ms) $U_e \leq 220\text{V DC}$	1.2A
$U_e = 110\text{V DC}$	3A
$U_e = 48\text{V DC}$	10A
Rated voltage and rated current U_e -Ie	
AC-15 according to IEC 947	110/120V - 6A 220/240V - 6A 380/400V - 4A 415/440V - 4A 500V - 2.5A 660/690V - 1.5A
DC-13 according to UL, CSA	A600
DC-13 according to IEC	24V - 5A 48V - 3.5 A 110V - 1.2A 220V - 0.6A 440V - 0.25A
according to UL, CSA	P600
Minimum operational power (operational safety)	5mA, 17V
Short-circuit protection	10A
(max.class gI fuse without welding)	
Insulation resistance	
between contacts	> 10M Ω
between contacts and earth	> 10M Ω
between input and output	> 10M Ω
Guaranteed no overlap of the contacts	
Space	1.1mm
minimum time	> 2ms
Impedance	2.3m Ω
Terminal capacity	Same as main circuit

Tripping characteristics (AC)

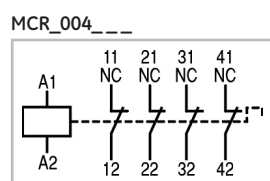
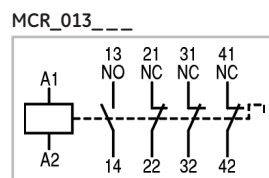
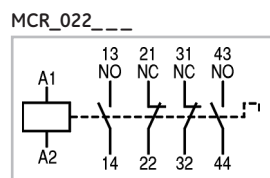
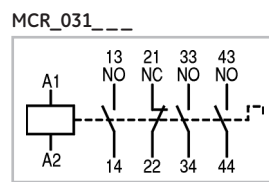
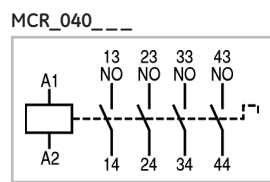


Tripping characteristics Ie/ue



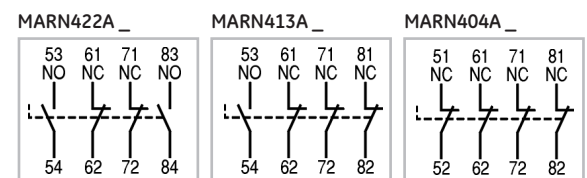
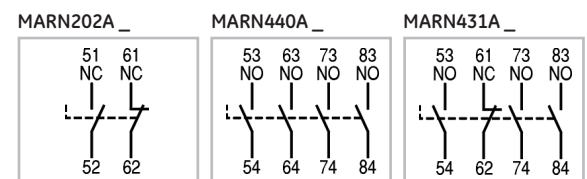
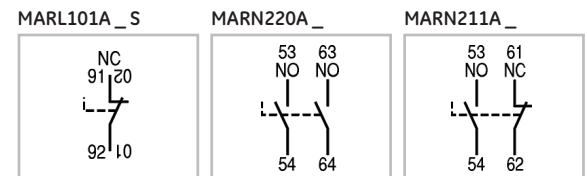
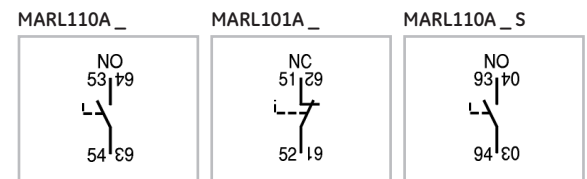
Terminal numbering

Auxiliary contactors. According to EN 50011

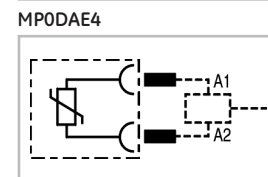
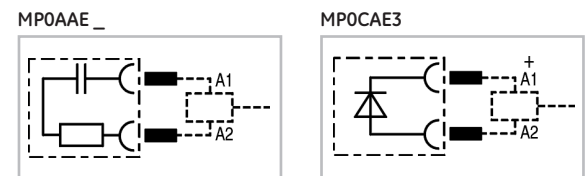


Auxiliary contact blocks

According to EN 50005 & EN 50011



Transient voltage suppressor block

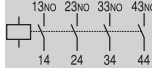
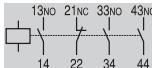
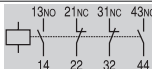
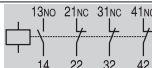
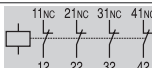
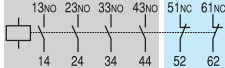
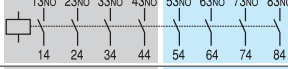
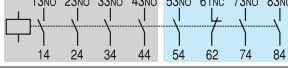
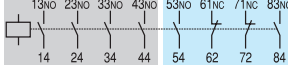
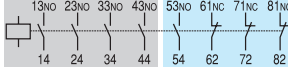
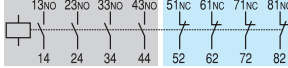
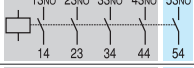
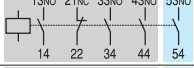
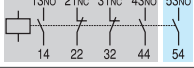
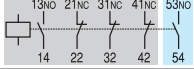


Terminal numbering in accordance with EN 50011

By combining other basic auxiliary contactors with auxiliary contact blocks MAR..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be ten.

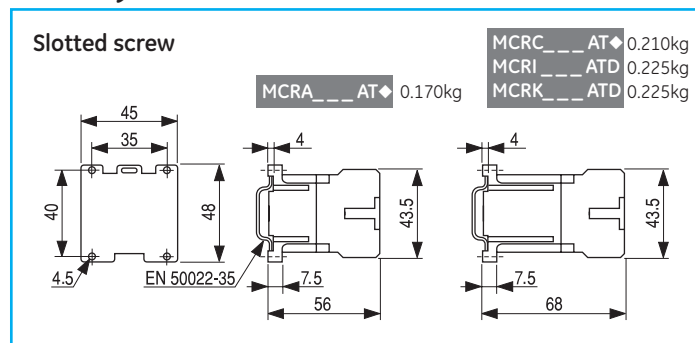
Type E

Standard contact combination in which the interchangeability of the devices does not affect the cabling or the diagram. Specifies a particular contact numbering and positioning.

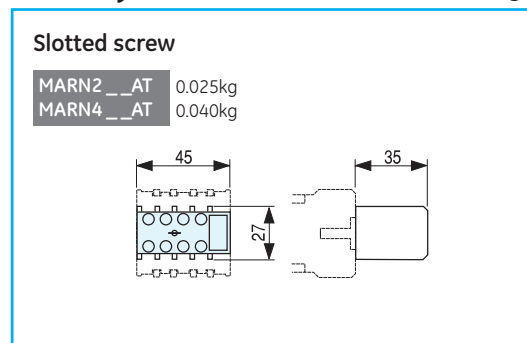
	Final structure of the combination	Auxiliary contacts		Auxiliary contactor + Auxiliary contact blocks to be added		
		Combination				
		Description	NO		NC	
Type E			40E	4	0	MCRA040A..
		31E	3	1	MCRA031A..	
		22E	2	2	MCRA022A..	
		13E	1	3	MCRA013A..	
		04E	0	4	MCRA004A..	
			60E	6	0	MCRA040A.. + MARN220A..
		51E	5	1	MCRA040A.. + MARN211A..	
		42E	4	2	MCRA040A.. + MARN202A..	
			80E	8	0	MCRA040A.. + MARN440A..
		71E	7	1	MCRA040A.. + MARN431A..	
		62E	6	2	MCRA040A.. + MARN422A..	
		53E	5	3	MCRA040A.. + MARN413A..	
		44E	4	4	MCRA040A.. + MARN404A..	
			50E	5	0	MCRA040A.. + MARL110A..
		41E	4	1	MCRA031A.. + MARL110A..	
		32E	3	2	MCRA022A.. + MARL110A..	
		23E	2	3	MCRA013A.. + MARL110A..	
		14E	1	4	MCRA013A.. + MARL101A..	
		05E	0	5	MCRA004A.. + MARL101A..	

Dimensional drawings

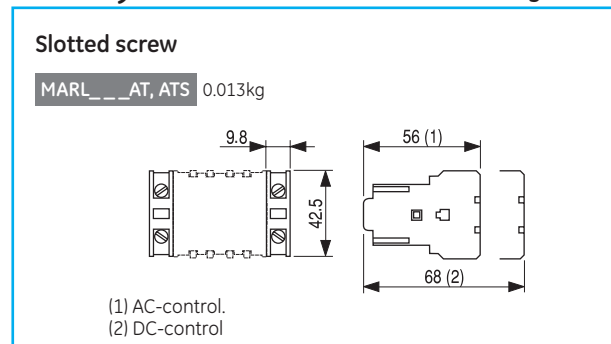
Auxiliary minicontactors



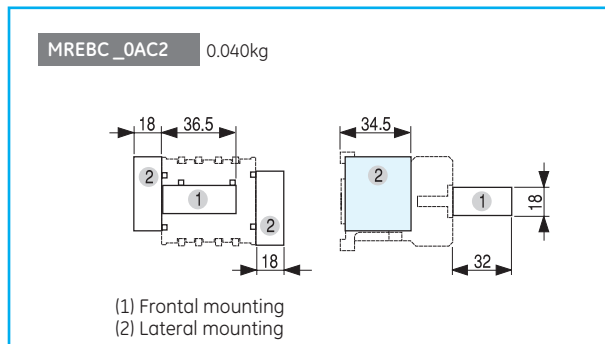
Auxiliary contact blocks. Front mounting



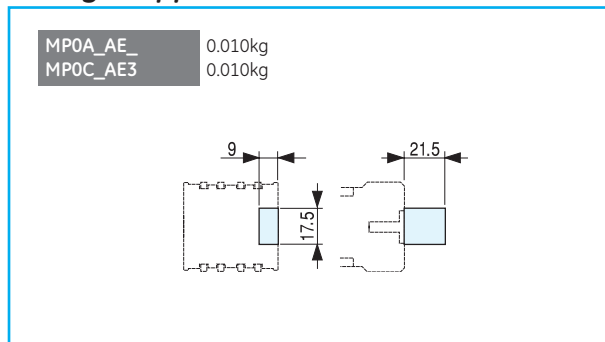
Auxiliary contact blocks. Lateral mounting



Electronic timer block



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