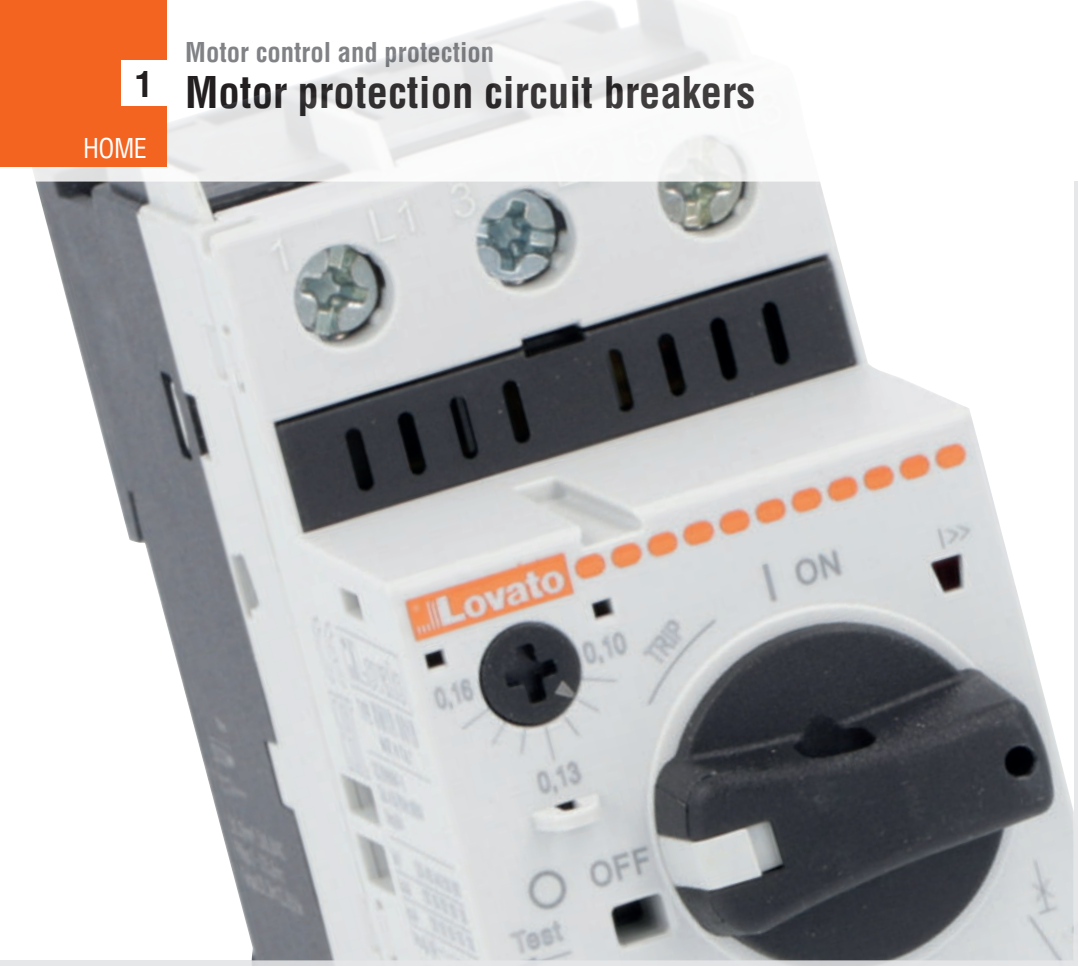
Motor control and protection

Motor protection circuit breakers



- Wide adjustment range 0.1 to 100A
- IEC breaking capacity Icu 50kA (400V) up to 100A
- Suitable for isolation
- Certified UL Type E and Type F
- Comprehensive line of accessories
- Magnetic-only version
- Transformer protection version
- Automatic trip indicators
- High reliability and accuracy of tripping.

Motor protection circuit breakers — SEC. - PAGE

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SM1P...
- Motor protection
- Push button control
- Ranges 0.1...40A (16 choices)
- IEC breaking capacity Icu at 400V: from 100 to 10kA
- Suitable for mounting in modular panels.

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SM1PF...
- Fuse monitoring function
- Push button control
- Fixed thermal protection: 0.2A
- Magnetic trip threshold: 1.2A.

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SM1R...
- Motor protection
- Rotary knob type
- Ranges 0.1...40A (16 choices)
- IEC breaking capacity Icu at 400V: from 100 to 20kA
- Thermal and magnetic trip indicator
- UL 60947-4-1 Type E, Type F.

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SM1RM...
- Starter protection (magnetic only)
- Rotary knob type
- Rated current from 0.16 to 40A
- IEC breaking capacity Icu at 400V: from 100 to 20kA.

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SM1RT...
- Transformer protection
- Rotary knob type
- Ranges 0.1...25A (14 choices)
- Magnetic tripping 20 x In.

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SM2R...
- Motor protection
- Rotary knob type
- Ranges 34...63A (2 choices)
- IEC breaking capacity Icu at 400V: 50kA
- UL 60947-4-1 Type E, Type F.

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SM3R...
- Motor protection
- Rotary knob type
- Ranges 55...100A (3 choices)
- IEC breaking capacity Icu at 400V: 50kA
- Thermal and magnetic trip indicator
- UL 60947-4-1 Type E, Type F.

IE3 READY

LOVATO Electric motor protection circuit breakers are suitable for new motors with high IE3 efficiency values

Lovato electric

IEC ratings - short-circuit breaking capacity

Motor protection (magnetic and thermal protection)

Starter protection (magnetic protection)

	SM1P... ❶	SM1R...	SM2R...	SM3R...	SM1RM...
Rated current	0.1...40A	0.1...40A	34...63A	55...100A	0.1...40A
Thermal protection	●	●	●	●	
Magnetic protection	●	●	●	●	●
TRIP position		●	●	●	●
Phase failure sensitive	●	●	●	●	
Padlockable in O	●	●	●	●	●

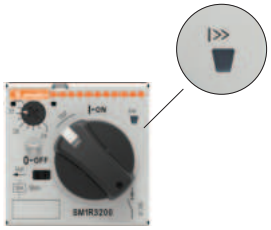
Range	230V		400V		440V		500V		690V		230V		400V		440V		500V		690V		230V		400V		440V		500V		690V	
	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics
[A]	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA	kA
0.1...0.16	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.16...0.25	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.25...0.4	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.4...0.63	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0.63...1	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1...1.6	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1.6...2.5	100	100	100	100	100	100	100	100	3	3	100	100	100	100	100	100	100	100	10	10	100	100	100	100	100	100	100	100	10	10
2.5...4	100	100	100	100	100	100	100	100	3	3	100	100	100	100	100	100	100	100	10	10	100	100	100	100	100	100	100	100	10	10
4...6.5	100	100	100	100	100	100	100	100	3	3	100	100	100	100	100	100	100	100	4	2	100	100	100	100	100	100	100	100	4	2
6.3...10	100	100	100	100	25	12.5	25	12.5	3	3	100	100	100	100	42	42	42	42	4	2	100	100	100	100	42	42	42	42	4	2
9...14	100	100	25	12.5	10	5	10	5	3	3	100	100	100	100	42	42	42	42	4	2	100	100	100	100	42	42	42	42	4	2
13...18	100	50	25	12.5	10	5	10	5	3	3	100	100	100	100	10	5	10	5	4	2	100	100	100	100	10	5	10	5	4	2
17...23	50	50	15	5	10	5	10	5	3	2	100	100	50	25	10	5	10	5	4	2	100	100	50	25	10	5	10	5	4	2
20...25	50	50	15	5	10	5	10	5	3	2	100	100	50	25	10	5	10	5	4	2	100	100	50	25	10	5	10	5	4	2
24...32	50	50	10	5	10	5	10	5	3	2	100	100	50	25	10	5	10	5	4	2	100	100	50	25	10	5	10	5	4	2
30...40	20	20	10	5	10	5	10	5	3	2	100	100	20	10	10	5	10	5	4	2	100	100	20	25	10	5	10	5	4	2
34...50	-	-	-	-	-	-	-	-	-	-	100	100	50	50	35	27	10	8	5	5	-	-	-	-	-	-	-	-	-	-
45...63	-	-	-	-	-	-	-	-	-	-	100	100	50	50	35	27	10	8	5	5	-	-	-	-	-	-	-	-	-	-
55...75	-	-	-	-	-	-	-	-	-	-	100	100	50	38	40	30	8	6	5	4	-	-	-	-	-	-	-	-	-	-
70...90	-	-	-	-	-	-	-	-	-	-	100	100	50	38	40	30	8	6	5	4	-	-	-	-	-	-	-	-	-	-
80...100	-	-	-	-	-	-	-	-	-	-	100	100	50	38	40	30	8	6	5	4	-	-	-	-	-	-	-	-	-	-

❶ The fuse monitoring version is also available (on page 1-6).

SM1P... MODULAR SIZE
- Mounting on front of panels or in modular panels for rapid access to buttons, avoiding the opening of the door by non-technical staff.
- Auxiliary contacts, indicator contacts and releases compatible with modular panels.

40A IN 45mm
- From 0.1A to 40A in a device just 45mm wide.
- High short-circuit breaking capacity up to 40A.
- Small, cost-effective starters.

SM1R... TRIP INDICATION
- Thermal and magnetic trip indication with trip position of knob.
- Specific visual indication for short-circuit tripping; guarantees maximum safety for operators and reliability of the system.
- Auxiliary trip indication contacts with ability to distinguish overload from short circuit.



SM1... HIGH-PERFORMANCE PLASTICS
- IEC/EN/BS 60335-compliant plastics for domestic and similar applications. Can be used in catering equipment.
- EN 45545-compliant plastics: fire behaviour and emissions of fumes. Suitable for railway applications.

DOOR COUPLING HANDLES
- Padlockable door coupling handles for the entire rotary knob type. Make systems compliant with safety regulations.
- Tough, easy and quick to install.

UL508 ratings - short-circuit breaking capacity (horse power ratings on page 1-4)

Transformer protection (magnetic protection 20 x In)

SM1RT...											SM1P...				SM1R...❹ - SM2R... - SM3R...									
0.1...25A											UL508 / UL 60947-4-1 Manual Motor Controller - Short circuit current in kA												UL508 / UL 60947-4-1 Manual Self Protected Combination Motor Controller (Type E) Short circuit current in kA (Type F ratings see on page 1-5)		
●											Motor Disconnect Group Motor Installation			Protection	Motor Disconnect		Group Motor Installation		Protection	Tap Conductor Protection				
●																									
●																									
●																									
230V		400V		440V		500V		690V			240V	480V	600V		480V	600V	480V	600V		480Y/277V	600Y/347V	240V	480Y/277V	600Y/347V
Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics																
kA	kA	kA	kA	kA	kA	kA	kA	kA	kA		kA	kA	kA		kA	kA	kA	kA		kA	kA	kA	kA	kA
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	100	100		50	50	50	❷	65	50	65	50	❷	65	50	65	65	50
100	100	100	100	100	100	100	100	3	3		30	30	30	100A Class J	65	30	65	30	❷	65	30	65	65	30
100	100	100	100	100	100	100	100	3	3		30	30	30	100A Class J	65	30	65	30	❷	65	30	65	65	30
100	100	100	100	100	100	100	100	3	3		30	30	30	100A Class J	65	30	65	30	❷	65	30	65	65	30
100	100	100	100	25	12.5	25	12.5	3	3		30	30	30	100A Class J	30	30	30	30	100A Class J	65❸	30❸	65❸	65❸	30❸
100	100	25	12.5	10	5	10	5	3	3		30	30	-	100A Class J	30	30	30	30	200A Class J	65❸	30❸	65❸	65❸	30❸
100	50	25	12.5	10	5	10	5	3	3		30	30	-	100A Class J	30	30	30	30	200A Class J	65❸	-	65❸	65❸	-
50	50	15	5	10	5	10	5	3	2		5	5	-	❷	30	30	30	30	200A Class J	30❸	-	30❸	30❸	-
50	50	15	5	10	5	10	5	3	2		5	5	-	❷	30	30	30	30	200A Class J	30❸	-	30❸	30❸	-
-	-	-	-	-	-	-	-	-	-		5	5	-	❷	30	30	30	30	200A Class J	10❸	-	10❸	10❸	-
-	-	-	-	-	-	-	-	-	-		5	5	-	❷	30	30	30	30	200A Class J	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	50	10	50	10	❷	50	10	100	50	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	50	10	50	10	❷	50	10	100	50	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	40	10	40	10	❷	40	10	100	40	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	40	10	40	10	❷	40	10	100	40	-
-	-	-	-	-	-	-	-	-	-		-	-	-	-	40	10	40	10	❷	40	10	100	40	-

❷ Fuse or CB. ❸ Values valid for SM1RE... only. ❹ For SM1RT values see page 1-7.

ENCLOSURES

- Various types of plastic enclosures are available for rotating and button-controlled motor protection circuit breakers up to 40A.
- Surface and flush mount.
- Ideal for small machines and isolated motors.
- IP65 (UL Type 4X) protection rating and UV-ray resistant.
- Very robust plastics, IK07; pass even the strict UL "ball impact" test.
- UL-certified.

SM1... PADLOCKABLE

- All of the devices, in both the rotary knob type and push button controlled motor protection circuit breaker range, are padlockable.
  This provides greater operator safety during maintenance and bypassing of equipment.

UL Type E

- The entire rotary knob type is certified UL Type E except for the SM1R4000.
- Type E is a specific requirement of the UL standards that requires, of short-circuit protection devices, increased terminal isolation distances and strict breaking capacity tests.
- Eliminates the need for further short-circuit protection devices upstream of the motor protection.

UL Type F

- Type F starters are a combination of a motor protection circuit breaker and a contactor tested in specified short circuit conditions to verify their coordination.
- The SM1R motor protection circuit breakers are certified UL type F in combination with BG and BF contactors.
- A Type F starter is the most complete and preferred way to control and protect a motor.

UL ratings
Type E and Type F combination motor controllers

The UL standard indicates a combination motor controller, also called a combination starter, as equipment consisting of a protected starter incorporating an isolation function. The protection includes both thermal overload and short circuit.
In the standard of UL508 (now harmonized with IEC as UL 60947-4-1), we can find different construction types of starters stated as Type A, Type B, etc... composed of different type of devices intended to control, disconnect and protect a motor.
Type E and Type F controllers usually provide the best solution to control and protect a motor.

Type E

A Type E starter is a listed combination starter suitable for use without additional upstream circuit short-circuit protection. The typical Type E starter is a motor protection circuit breaker (MPCB), also known as manual motor protector that includes in a single device the following functions: manual motor control, disconnection, short circuit protection and motor overload protection.
A "NON Type E" motor protection circuit breaker, despite including short circuit protection, requires additional upstream short circuit protect ion.

FUNCTIONS:
- Disconnect
- Branch circuit protection
- Motor control
- Motor overload protection.

Type F

A Type F starter has the same functions of Type E but in addition to the motor protection circuit breaker (MPCB) commonly known as manual motor protector, also includes a contactor to have remote or automatic control of the motor.

FUNCTIONS:
- Disconnect (MPCB)
- Branch circuit protection (MPCB)
- Motor control (contactor)
- Motor overload protection (MPCB).

❶ Code SM1X9000R or SM1X9050.

CO-ORDINATION TYPE 1 AND CO-ORDINATION TYPE 2

The concept of co-ordination Type 1 and Type 2 was recently introduced in the UL 60947-4-1.
In the co-ordination Type 1, after a short-circuit, the starter shall cause no danger to persons or installation, but may not be suitable for further service and may need parts repair and replacement.
In the co-ordination Type 2, after a short-circuit, the starter shall cause no danger to persons or installation and is suitable for further use.
On the next page the co-ordination tables are provided.

TAP CONDUCTOR PROTECTION

SM... motor protection circuit breakers are also suitable as Tap Conductor Protection for Group Installation.
When manual motor starters are employed in group installations, in specified conditions by the standard, it is possible to reduce the wire sections.
The use of smaller wires reduces the cost of the panel and makes the wiring easier.
Furthermore, these motor protection circuit breakers can be used for control transformers protection instead of fuses or circuit breaker certified as UL 489.

Maximum UL/CSA horsepower ratings

		Single-phase		Three-phase, 3-pole			
		110V-120V	220V-240V	200V-208V	220-240V	440/-480V	550V-600V
		[HP]	[HP]	[HP]	[HP]	[HP]	[HP]
SM1R0016	SM1P0016	–	–	–	–	–	–
SM1R0025	SM1P0025	–	–	–	–	–	–
SM1R0040	SM1P0040	–	–	–	–	–	–
SM1R0063	SM1P0063	–	–	–	–	–	–
SM1R0100	SM1P0100	–	–	–	–	1/2	1/2
SM1R0160	SM1P0160	–	1/10	–	–	3/4	1
SM1R0250	SM1P0250	–	1/6	1/2	1/2	1	1.5
SM1R0400	SM1P0400	1/8	1/3	3/4	3/4	2	3
SM1R0650	SM1P0650	1/4	1/2	1.5	1.5	3	5
SM1R1000	SM1P1000	1/2	1.5	2	3	5	7.5
SM1R1400 / SM1RE1400	SM1P1400	3/4	2	3	3	10	10❶
SM1R1800 / SM1RE1800	SM1P1800	1	3	5	5	10	15❶
SM1R2300 / SM1RE2300	SM1P2300	1.5	3	5	7.5	15	20❶
SM1R2500 / SM1RE2500	SM1P2500	2	3	5	7.5	15	20❶
SM1R3200 / SM1RE3200	SM1P3200	2	5	10	10	20	30❶
SM1R4000	SM1P4000	3	7.5	10	10	30	30❶
SM2R5000	—	3	10	15	15	30	40
SM2R6300	—	5	10	20	20	40	60
SM3R7500	—	5	15	20	25	50	60
SM3R9000	—	7 1/2	20	25	30	60	75
SM3R9900	—	10	20	30	30	75	100

❶ SM1R... and SM1RE... only.

Combination Motor Controllers (Type F)

Coordination Type 1 - In the co-ordination Type 1, after a short-circuit, the starter shall cause no danger to persons or installation, but may not be suitable for further service and may need parts repair and replacement.

Motor protection circuit breaker type	Thermal setting range	Contactor types	SCCR in kA		
	[A]		240V	480Y/277V	600Y/347V
SM1R0016	0.1...0.16	BG06...BG12, BF09...BF38	65	65	50
SM1R0025	0.16...0.25	BG06...BG12, BF09...BF38	65	65	50
SM1R0040	0.25...0.4	BG06...BG12, BF09...BF38	65	65	50
SM1R0063	0.4...0.63	BG06...BG12, BF09...BF38	65	65	50
SM1R0100	0.63...1	BG06...BG12, BF09...BF38	65	65	50
SM1R0160	1...1.6	BG06...BG12, BF09...BF38	65	65	50
SM1R0250	1.6...2.5	BG06...BG12, BF09...BF38	65	65	30
SM1R0400	2.5...4	BG06...BG12, BF09...BF38	65	65	30
SM1R0650	4...6.5	BG06❶...BG12, BF09...BF38	65	65	30
SM1RE1000	6.3...10	BF09...BF38	65	65	30
SM1RE1400	9...14	BF18...BF38	65	65	30
SM1RE1800	13...18	BF18...BF38	65	65	–
SM1RE2300	17...23	BF18...BF38	30	30	–
SM1RE2500	20...25	BF25...BF38	30	30	–
SM1RE3200	24...32	BF32, BF38	10	10	–
SM2R5000	34...50	BF40...BF150	50	50	–
SM2R6300	45...63	BF50...BF150	50	50	–
SM3R7500	55...75	BF65...BF150	40	40	–
SM3R9000	70...90	BF80...BF150	40	40	–
SM3R9900	80...100	BF115...BF150	40	40	–

❶ BG06 not for 600Y/347V.

Coordination Type 2 - In the co-ordination Type 2, after a short-circuit, the starter shall cause no danger to persons or installation and is suitable for further use.

Motor protection circuit breaker type	Thermal setting range	Contactor types	SCCR in kA		
	[A]		240V	480Y/277V	600Y/347V
SM1R0016	0.1...0.16	BF26, BF32, BF38	65	65	50
SM1R0025	0.16...0.25	BF26, BF32, BF38	65	65	50
SM1R0040	0.25...0.4	BF26, BF32, BF38	65	65	50
SM1R0063	0.4...0.63	BF26, BF32, BF38	65	65	50
SM1R0100	0.63...1	BF26, BF32, BF38	65	65	50
SM1R0160	1...1.6	BF26, BF32, BF38	65	65	50
SM1R0250	1.6...2.5	BF26, BF32, BF38	65	65	30
SM1R0400	2.5...4	BF26, BF32, BF38	65	65	30
SM1R0650	4...6.5	BF26, BF32, BF38	65	65	30
SM1RE1000	6.3...10	BF26, BF32, BF38	65	65	30
SM1RE1400	9...14	BF26, BF32, BF38	65	65	30
SM1RE1800	13...18	BF26, BF32, BF38	65	65	–
SM1RE2300	17...23	BF26, BF32, / BF38	10 / 30	10 / 30	–
SM1RE2500	20...25	BF26, BF32, / BF38	10 / 30	10 / 30	–
SM1RE3200	24...32	BF32, BF38	10	10	–
SM2R5000	34...50	BF95, BF115, BF150	50	50	–
SM2R6300	45...63	BF95, BF115, BF150	50	50	–
SM3R7500	55...75	BF95, BF115, BF150	40	40	–
SM3R9000	70...90	BF95, BF115, BF150	40	40	–
SM3R9900	80...100	BF115, BF150	40	40	–

Motor protection circuit breakers SM1… up to 40A. Magnetic and thermal protection

SM1P…

SM1PF0020
Fuse monitoring function

SM1R…

❶ For SM1R... breakers, certified UL Type E, add E letter to the code. Ex. SM1RE1000.
❷ 10 x In max for 0.1...0.16A and 0.16...0.25A setting ranges.
❸ Intended specifically for monitoring the status of fuses:- rated current: 0.2A- magnetic tripping: 1.2A.

Order code	Thermal trip adjustment range	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[kA]	[kA]	n°	[kg]
Push button control. For UL ratings see page 1-4.					
SM1P0016	0.1...0.16	100	100	1	0.240
SM1P0025	0.16...0.25	100	100	1	0.240
SM1P0040	0.25...0.4	100	100	1	0.240
SM1P0063	0.4...0.63	100	100	1	0.240
SM1P0100	0.63...1	100	100	5	0.260
SM1P0160	1...1.6	100	100	5	0.270
SM1P0250	1.6...2.5	100	100	5	0.300
SM1P0400	2.5...4	100	100	5	0.300
SM1P0650	4...6.5	100	100	5	0.300
SM1P1000	6.3...10	100	100	5	0.300
SM1P1400	9...14	25	12.5	5	0.300
SM1P1800	13...18	25	12.5	5	0.300
SM1P2300	17...23	15	5	1	0.300
SM1P2500	20...25	15	5	1	0.300
SM1P3200	24...32	10	5	1	0.300
SM1P4000	30...40	10	5	1	0.300
SM1PF0020❸	0.20	100	100	5	0.280
Rotary knob type. For UL ratings see page 1-4.					
SM1R0016	0.1...0.16	100	100	1	0.270
SM1R0025	0.16...0.25	100	100	1	0.270
SM1R0040	0.25...0.4	100	100	1	0.278
SM1R0063	0.4...0.63	100	100	1	0.278
SM1R0100	0.63...1	100	100	5	0.280
SM1R0160	1...1.6	100	100	5	0.280
SM1R0250	1.6...2.5	100	100	5	0.340
SM1R0400	2.5...4	100	100	5	0.340
SM1R0650	4...6.5	100	100	5	0.340
SM1R1000❶	6.3...10	100	100	5	0.340
SM1R1400❶	9...14	100	100	5	0.340
SM1R1800❶	13...18	100	100	5	0.340
SM1R2300❶	17...23	50	25	1	0.340
SM1R2500❶	20...25	50	25	1	0.340
SM1R3200❶	24...32	50	25	1	0.340
SM1R4000	30...40	20	10	1	0.340

General characteristics
SM1P... and SM1R... are modern circuit breakers with thermal and magnetic trip releases and high breaking capacity.
Motor control and protection of up to 22kW (400V) are possible by choosing the suitable adjustment range, 0.1 to 40A.
The dimensions of SM1P... breakers are compliant with the DIN 43880 standard, allowing them to be mounted in all modular enclosures on the market.
A magnetic trip indicator integrated on the SM1R... breakers avoids dangerous closing operations during short-circuit conditions, previously disconnected by the breaker.
SM1R... up to 32A breakers, with SM1X9000R or SM1X9050 accessory, are Type E-certified according to UL 60947-4-1; only for range from 6.5 to 32A the Type E version must be ordered with specific code SM1RE...❶. SM1R... motor protection circuit breakers combined with BG... and BF... contactors are Type F certified in compliance with UL 60947-4-1 standard (see page 1-4 and 1-5).
SM1P... and SM1R... motor protection circuit breakers are suitable for isolation in accordance with IEC/EN/BS 60947 standards and can be padlocked in OFF position without using accessories. Their high breaking capacity removes the need for protection fuses on the majority of the installations.

Operational characteristics
- IEC rated insulation voltage Ui: 690V
- IEC rated impulse withstand voltage: 6kV
- IEC rated frequency: 50/60Hz
- Maximum rated current: 40A
- Adjustment ranges: 16
- IEC breaking capacity: see table on page 1-2
- Heat dissipation per phase: 0.7...3.3W
- Magnetic tripping: 13 x In max❷
- Tripping class: 10A
- Phase failure sensitive
- Mechanical and electrical life: 100,000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: any
- IEC utilisation category: A
- Padlocking in OFF: Ø4mm/0.16”
- IEC degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus, EAC.
SM1R... circuit breakers up to 32A are Type E and Type F certified (Self-Protected Combination Motor Controllers) according to UL 60947-4-1.
Certifications pending: CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-2, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials compliant with standards: IEC/EN/BS 60335 and EN/BS 45545.

Motor protection circuit breakers SM1RM… up to 40A. Magnetic protection

SM1RM…

Order code	Rated and magnetic trip current Rat.	Trip.	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[A]	[kA]	[kA]	n°	[kg]
Rotary knob type. For UL ratings see page 1-4.						
SM1RM0016	0.16	1.6	100	100	1	0.270
SM1RM0025	0.25	3.2	100	100	1	0.270
SM1RM0040	0.4	5.2	100	100	1	0.278
SM1RM0063	0.63	8.2	100	100	1	0.278
SM1RM0100	1	13	100	100	5	0.280
SM1RM0160	1.6	21	100	100	5	0.280
SM1RM0250	2.5	33	100	100	5	0.340
SM1RM0400	4	52	100	100	5	0.340
SM1RM0650	6.5	85	100	100	5	0.340
SM1RM1000	10	130	100	100	5	0.340
SM1RM1400	14	182	100	100	5	0.340
SM1RM1800	18	234	100	100	5	0.340
SM1RM2300	23	299	50	25	1	0.340
SM1RM2500	25	325	50	25	1	0.340
SM1RM3200	32	416	50	25	1	0.340
SM1RM4000	40	520	20	10	1	0.340

General characteristics
SM1RM... are motor protection circuit breakers with magnetic tripping only and high breaking capacity.
They are typically used to protect starters where there is a thermal relay or other overload protection.
Starter control and protection of up to 22kW (400V) are possible by choosing the suitable adjustment range, from 0.1 to 40A.

Operational characteristics
- IEC rated insulation voltage Ui: 690V
- IEC rated impulse withstand voltage: 6kV
- IEC rated frequency: 50/60Hz
- Maximum rated current: 40A
- IEC breaking capacity: see table on page 1-2
- Heat dissipation per phase: 0.7...3.3W
- Magnetic tripping: 13 x In max❷
- Mechanical and electrical life: 100,000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: any
- IEC utilisation category: A
- Padlocking in OFF: Ø4mm
- IEC degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus, EAC.
Certifications pending: CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-2, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastic materials compliant with standards: IEC/EN/BS 60335 and EN/BS 45545.

Motor protection circuit breakers SM1RT... up to 25A. Transformer protection

SM1RT...

new

Order code	Thermal trip adjustment range	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[kA]	[kA]	n°	[kg]
Rotary knob type.					
SM1RT0016	0.1...0.16	100	100	1	0.270
SM1RT0025	0.16...0.25	100	100	1	0.270
SM1RT0040	0.25...0.4	100	100	1	0.278
SM1RT0063	0.4...0.63	100	100	1	0.278
SM1RT0100	0.63...1	100	100	5	0.280
SM1RT0160	1...1.6	100	100	5	0.280
SM1RT0250	1.6...2.5	100	100	5	0.340
SM1RT0400	2.5...4	100	100	5	0.340
SM1RT0650	4...6.5	100	100	5	0.340
SM1RT1000	6.3...10	100	100	5	0.340
SM1RT1400	9...14	25	12.5	5	0.340
SM1RT1800	13...18	25	12.5	5	0.340
SM1RT2300	17...23	15	5	1	0.340
SM1RT2500	20...25	15	5	1	0.340

General characteristics
SM1RT... are circuit breakers with thermal and magnetic trip releases intended specifically for transformers control and protection.
The magnetic trip threshold of 20 x In enable the connection of transformers avoiding unintentional tripping due to the high in-rush currents.
The various adjustment ranges from 0.1A to 25A enable control and protection of transformers up to 17kVA (400V).

Operational characteristics
- IEC rated insulation voltage Ui: 690V
- IEC rated impulse withstand voltage: 6kV
- IEC rated frequency: 50/60Hz
- Maximum rated current: 25A
- Max. heat dissipation per phase: 0.7...3.4 W
- Magnetic tripping: 20 x In max (16 x In max for SM1RT0016, SM1RT2300, SM1RT2500)
- Mechanical and electrical life: 100.000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: any
- IEC utilisation category: A
- Padlocking in OFF: Ø4mm/0.16"
- IEC degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-2, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.
Plastics compliant with standards: IEC/EN/BS 60335 and EN/BS 45545.

UL 60947-1 characteristics
Short circuit breaking capacity as per UL 60947-1 at 240V and 480/277V:
– from SM1RT0016 to SM1RT0650 - 65kA
– from SM1RT1000 to SM1RT2500 - 30kA
Only from circuit breakers from SM1RT0650 to SM1RT2500: fuse protection 200A class J.

Motor protection circuit breakers SM2... and SM3... up to 100A. Magnetic and thermal protection

SM2R...

SM3R...

Order code	Thermal trip adjustment range	Short circuit breaking capacity at 400V Icu	Ics	Qty per pkg	Wt
	[A]	[kA]	[kA]	n°	[kg]
Rotary knob type. For UL ratings see page 1-4.					
SM2R5000	34...50	50	50	1	1.000
SM2R6300	45...63	50	50	1	1.000
Rotary knob type. For UL ratings see page 1-4.					
SM3R7500	55...75	50	38	1	2.200
SM3R9000	70...90	50	38	1	2.200
SM3R9900	80...100	50	38	1	2.200

General characteristics
SM2R... and SM3R... are modern circuit breakers with thermal and magnetic trip releases and high breaking capacity.
Motor control and protection, up to 55kW (400V) are possible by choosing the suitable adjustment range, up to 100A.
SM2R... and SM3R... breakers are Type E and Type F according to UL 60947-4-1.
The SM2R... and SM3R... types are suitable for isolation according to IEC/EN/BS 60947 standards and can be padlocked in OFF position without using accessories.
SM2R... and SM3R... have has a trip function which indicates thermal and magnetic tripping.
Their high breaking capacity removes the need for back up fuse protection on the majority of installations.

Operational characteristics
- IEC rated insulation voltage Ui: 1000V
- IEC rated impulse withstand voltage: 8kV
- IEC rated frequency: 50/60Hz
- Maximum rated current:63A (for SM2...); 100A (for SM3...)
- Adjustment ranges: 2 (for SM2...); 3 (for SM3...)
- IEC breaking capacity: see table on page 1-2 and 1-3
- Max. heat dissipation per phase: 7W
- Magnetic tripping: 13 x In max
- Tripping class: 10A
- Phase failure sensitive
- Mechanical life: 50,000 cycles
- Electrical life: 25,000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: any
- IEC utilisation category: A
- Padlocking in OFF: Ø4mm/0.16"
- IEC degree of protection: IP20 on front.

Certifications and compliance
Certifications obtained: cULus, EAC.
SM2... and SM3... circuit breakers are Type E and Type F certified (Self-Protected Combination Motor Controllers) according to UL 60947-4-1; for Type E and Type F, SM3 only with accessory SM3X9000R.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-2, IEC/EN/BS 60947-4-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Motor protection circuit breakers

Add-on blocks and accessories for SM1...

SM1X11...

SM1X12...

SM1X1311

SM1X1311M

SM1X14...

SM1X15...R

SM1X15...P

SM1X16...

SM1X18200R

SM1X18S

SM1X9000R

BFX8901

SM1X8902

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Add-on auxiliary contacts.			
SM1X1120	Front mount 2NO	10	0.016
SM1X1111	Front mount 1NO+1NC	10	0.016
SM1X1220	Side mount 2NO	1	0.036
SM1X1211	Side mount 1NO+1NC	10	0.036
SM1X1202	Side mount 2NC	1	0.036
SM1X1311	Side mount. Contacts for thermal and magnetic tripping indication 1NO+1NC	1	0.036
SM1X1311M	Side mount. Contacts for magnetic tripping indication 1NO+1NC	1	0.036
Undervoltage trip releases.			
SM1X14024	24VAC 50Hz	1	0.130
SM1X14110	110VAC 50Hz; 120VAC 60Hz	1	0.130
SM1X1422060	220VAC 60Hz	1	0.130
SM1X14230	230VAC 50Hz	1	0.130
SM1X14400	400VAC 50Hz; 440VAC 60Hz	1	0.130
SM1X1457560	575VAC 60Hz	1	0.130
SM1X15024❶	With early-make contacts 24VAC 50Hz	1	0.140
SM1X15110❶	With early-make contacts 110VAC 50Hz; 120VAC 60Hz	1	0.140
SM1X15230❶	With early-make contacts 230VAC 50Hz	1	0.140
SM1X15400❶	With early-make contacts 400VAC 50Hz	1	0.140
Shunt trip releases.			
SM1X16024	24VAC 50/60Hz	1	0.130
SM1X16110	110VAC 50/60Hz	1	0.130
SM1X16230	230VAC 50/60Hz	1	0.130
SM1X16400	400VAC 50/60Hz	1	0.130
Adjuster sealing kit.			
SM1X1812	With wire and lead included	1	0.006
IP65 (4X) padlockable door coupling handle for SM1R...			
SM1X18200R	Red/yellow complete with rod length 200mm/7.87”	1	0.115
SM1X18B200R	Black complete with rod length 200mm/7.87”	1	0.115
SM1X18S❷	Support for rod >145mm/5.71”	1	0,030
Phase separation barriers for SM1R...			
SM1X9000R	For Type E and Type F as UL60947-4-1	5	0.016
Three-phase connection busbars 45mm/1.77” spacing.			
11SMX9032	For 2 breakers	10	0.028
11SMX9033	For 3 breakers	10	0.050
11SMX9034	For 4 breakers	10	0.071
11SMX9035	For 5 breakers	10	0.092
Three-phase connection busbars 54mm/2.13” spacing.			
11SMX9042	For 2 breakers	10	0.031
11SMX9043	For 3 breakers	10	0.056
11SMX9044	For 4 breakers	10	0.081
11SMX9045	For 5 breakers	10	0.090
Terminal block for busbar supply.			
11SMX9030	For all busbar types	10	0.048
SM1X9050	For all busbar types Type E and F as per UL508 / UL60947-4-1	10	0.050
Safety cover.			
11SMX9031	For unused terminals	10	0.004
Accessories for motor protection breaker fixing.			
SM1X8902	Metal bracket for fixing SM1... motor protection with screws	10	0.006
BFX8901	Universal plastic base for screw-fixing SM1... motor protection circuit breaker	2	0.016

General and operational characteristics

ADD-ON AUXILIARY CONTACTS
- Connectable to the left side of the breaker or on the front
- Maximum combinations: 3 SM1X... blocks with 6 auxiliary contacts in total of which 1 front block and 2 side blocks
- IEC conventional free air thermal current Ith: 10A (5A for SM1X11...)
- IEC rated insulation voltage Ui: 690V (300V for SM1X11...)
- Rated impulse withstand voltage Uimp: 4kV
- UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 - Q600 (C300 - R300 for SM1X11...)
- Maximum tightening torque: 1Nm / 9lb.in
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm² or 18...14AWG.
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 1Nm / 9lb.in
- Width of side-mount auxiliary contacts equal to 0.5 DIN 46880 modules
- IEC degree of protection: IP20.

UNDERVOLTAGE TRIP RELEASES
- Snap on to the right side of the breaker
- Consumption inrush/holding: 12/3.5VA
- Release voltage: 0.35...0.7Us
- Operating voltage: 0.85...1.1Us
- Maximum tightening torque: 1Nm / 9lb.in
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm² or 18...14AWG.
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 1Nm / 9lb.in
- Width of side-mount undervoltage trip releases equal to 1 DIN 46880 module
- IEC degree of protection: IP20.

SHUNT TRIP RELEASES
- Snap on to the right side of the breaker
- In-rush consumption: 20VA
- Operating voltage: 0.7...1.1Us
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm² or 18...14AWG
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 1Nm / 9lb.in
- Width of side-mount shunt trip releases equal to 1 standard DIN 46880 module
- IEC degree of protection: IP20.

PADLOCKABLE DOOR COUPLING HANDLE FOR SM1R...
- IEC degree of protection: IP65
- Degree of protection according to UL: Type 1, 2, 3R, 12, 12K, 4, 4X; external use
- Adjustable rod from 48 to 212mm (1.89” to 8.35”)
- Ring-fixing in 22mm/0.87” hole.

THREE-PHASE CONNECTION BUSBARS
- Imax: 63A
- SMX903... 45mm/1.77” spacing to reduce the width to the minimum
- SMX904... 54mm/2.13” spacing to consent to fit one side-mount auxiliary contact block on the breaker.

TERMINAL BLOCKS FOR BUSBAR SUPPLY
- Imax: 63A
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 2.3Nm / 20lb.in
- Conductor cross section minimum-maximum: 4...25mm² or 10...4AWG.

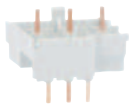
Certifications and compliance

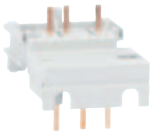
Certifications obtained: cULus (except terminal block for busbar supply), EAC.
Certifications pending: CCC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

❶ Complete the order code by indicating P for mounting on SM1P... motor protection circuit breakers, or R for SM1R... motor protection circuit breakers.
❷ Mounting also possible with side-mount auxiliary contacts SM1X12... and SM1X13...

Dimensions page 1-15 and 16
Wiring diagrams page 1-18

Motor protection circuit breakers
Add-on blocks and accessories for SM1...


SM1X30...


SM1X31...
SM1X32...

SM1Z1701P

SM1Z1702P

SM1Z1705P

SM1Z1715R

SM1Z1725R

SM1X1740P

SM1X1745P

SM1X1746P

SM1X17024R

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]
Rigid SM1 breaker-contactor connections.			
SM1X3040P	For motor protection breaker SM1P... with BG... mini-contactors	10	0.019
SM1X3141P	For motor protection breaker SM1P... with BF09..25A contactors	10	0.035
SM1X3241P	For motor protection breaker SM1P... with BF26..38A contactors	10	0.045
SM1X3040R	For motor protection breaker SM1R... with BG... mini-contactors	10	0.019
SM1X3141R	For motor protection breaker SM1R... with BF09..25A contactors	10	0.035
SM1X3142R	For motor protection breaker SM1R... with contactors BF09..25D and BF09...25L	10	0.044
SM1X3241R	For motor protection breaker SM1R... with contactors BF26..38A	10	0.045
Surface mount enclosures IP65 (4X) for SM1P...			
SM1Z1701P	Width 80mm/3.15"❶	1	0.235
SM1Z1702P	Width 80mm/3.15". With button for emergency stop	1	0.275
SM1Z1711P	Width 100mm/3.94"❶	1	0.315
SM1Z1712P	Width 100mm/3.94". With button for emergency stop	1	0.345
Flush mount enclosure IP65 (4X) for SM1P...			
SM1Z1705P	Width 87mm/3.42"❶	1	0.205
Surface mount enclosures IP65 (4X) for SM1R...			
SM1Z1715R	With rotary actuator red/yellow. Width 100mm/3.94"	1	0.350
SM1Z1710R	With black rotary actuator Width 100mm/3.94"	1	0.350
Flush mount enclosures IP65 for SM1R (UL type 4X)			
SM1Z1725R	With rotary actuator yellow/red Width 87mm/3.42"	1	0.245
SM1Z1720R	With rotary actuator black Width 87mm/3.42"	1	0.245
ENCLOSURE ACCESSORIES AND SPARE PARTS. For SM1Z...P enclosures.			
SM1X1740P	Emergency stop button. IP65 (4X)	1	0.044
SM1X1745P	Rubber membrane with rim. IP65 (4X)	1	0.016
SM1X1746P	Lockable block. IP65 (4X)	1	0.030
MX02	Earth / Neutral terminal	10	0.035
LED pilot lights IP65. Wire length 200mm/7.87".			
SM1X17024G	Green 24VAC/DC	1	0.007
SM1X17024R	Red 24VAC/DC	1	0.007
SM1X17400G	Green 110...400VAC	1	0.007
SM1X17400R	Red 110...400VAC	1	0.007
Plastic M25 to ½" NPT entry adapter.			
11LMM25PG16	For enclosures SM1Z1701P and SM1Z1702P	10	0.009

❶ Complete with rubber membrane.

General and operational characteristics
RIGID SM1 BREAKER-CONTACTOR CONNECTIONS
The SM1X3... connections electrically and mechanically fasten the motor protection breaker together with the contactor.
This forms a highly compact single-unit starter for quick installation on a single 35mm DIN rail.
The SM1X3... connections can also be mounted in combination with reversing and star-delta starters made with the rigid connections indicated in section 2.

SURFACE MOUNT ENCLOSURES
- Top or bottom cable entry:
  - SM1Z1701P and SM1Z1702P 4 M25-threaded knock-outs
  - SM1Z1711P and SM1Z1712P 4 knock-out with Ø20.5mm/0.81" or Ø26.5mm/1.04"
  - SM1Z1710R and SM1Z1715R 4 - knock-out with Ø20.5mm/0.81" or Ø26.5mm/1.04"
- Possibility of rear entry too
- Protection rating: IP65 (UL Type 4X)
- Holds a breaker, one front-mount auxiliary contact block either one shunt or undervoltage release and one pilot light; only for enclosures 100mm/3.94" width side mount auxiliary contact blocks can be fitted as well
- The SM1Z1710R and SM1Z1715R rotary actuators can be padlocked with a maximum of 3 padlocks Ø4...8mm/0.16...0.31"
- Earth/ground terminal included
- Operating temperature: -25...+60°C
- Storage temperature: -50...+80°C.

FLUSH MOUNT ENCLOSURES FOR SM1P AND SM1R
- Holds a SM1P breaker, one front-mount auxiliary contact block and either one shunt or undervoltage release
- Protection rating: IP65 (UL Type 4X)
- Earth/ground terminal included
- 70x115mm/2.76x4.53" cutout for SM1P
  70x143mm/2.77x5.65" cutout for SM1R
- Operating temperature: -25...+60°C
- Storage temperature: -50...+80°C.

ENCLOSURE ACCESSORIES
Emergency stop button:
- Turn to release
- Red button Ø35mm/1.38".

Lockable block:
- Prevents closing operation; 3 padlocks maximum Ø4...8mm/0.16...0.31".

Certifications and compliance
Certifications obtained: cULus except SM1X17024..., SM1X17400..., SMX90.... and 11LMM25PG16), EAC.
Certifications pending: CCC for rigid connections and enclosures (maximum current enclosures for cULus: 25A).
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

Motor protection circuit breakers

Add-on blocks and accessories for SM2... and SM3...

SM2X11...

SM2X12...

SM2X1311

SM2X14...

SM2X16...

SM2X18...

Order	Characteristics	Qty per pkg	Wt
		n°	[kg]
Add-on auxiliary contacts.			
SM2X1120	Front mount 2NO	10	0.020
SM2X1111	Front mount 1NO+1NC	10	0.020
SM2X1102	Front mount 2NC	10	0.020
SM2X1220	Side mount 2NO	2	0.040
SM2X1211	Side mount 1NO+1NC	10	0.040
SM2X1202	Side mount 2NC	2	0.040
SM2X1311	Side mount. Indicator contacts for thermal and magnetic tripping 1NO+1NC	2	0.040
Undervoltage trip releases.			
SM2X14230	230VAC 50/60Hz	5	0.100
SM2X14400	400VAC 50/60Hz	5	0.100
SM2X14440	440VAC 50/60Hz	5	0.100
Shunt trip releases.			
SM2X16024	24VAC 50/60Hz	5	0.100
SM2X16110	110VAC 50/60Hz	5	0.100
SM2X16230	230VAC 50/60Hz	5	0.100
SM2X16400	400VAC 50/60Hz	5	0.100
SM2X16440	440VAC 50/60Hz	5	0.100
Padlockable IP65 (4X) door coupling handle for SM2R... and SM3R....			
SM2X18200R	Red/yellow complete with rod length 200mm/7.87”	1	0.115
SM2X18B200R	Black complete with rod with rod length 200mm/7.87”	1	0.115
Phase separation barriers set for SM3R...❶			
SM3X9000R	For Type E as per UL60947-4-1	1	0.175

❶ Note: SM2R... motor protection circuit breakers are UL Type E without the need of phase separation barriers.

General and operational characteristics

ADD-ON AUXILIARY CONTACTS
- Insert on the top front or snap on the left side of the breaker
- Maximum combinations: 3 SM2X... blocks with 6 auxiliary contacts in total of which 1 front block and 2 side blocks❷
- IEC conventional free air thermal current Ith: 10A (5A for SM2X11...)
- IEC rated insulation voltage Ui: 690V (250V for SM2X11...)
- UL/CSA and IEC/EN/BS 60947-5-1 designation: A600 – Q300 (B300 - R300 for SM1X11...)
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5m^2 or 18...14AWG
- Screw tightening tool: Pz 2
- Maximum tightening torque: 1Nm / 9lb.in
- Width of side-mount auxiliary contacts equal to 0.5 DIN 46880 modules.

UNDERVOLTAGE TRIP RELEASES
- Snap on to the right side of the breaker for motor protection
- Consumption in-rush/holding: 8.5/3VA
- Release voltage: 0.35...0.7Us
- Operating limits: 0.85...1.1Us
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm^2 or 18...14AWG
- Screw tightening tool: Pz 2
- Maximum tightening torque: 1.2Nm / 10lb.in
- Width of side-mount undervoltage trip releases equal to 1 DIN 46880 module.

SHUNT TRIP RELEASES
- Snap on to the right side of the breaker
- In-rush consumption: 20VA
- Operating limits: 0.85...1.1Us
- Conductor cross section minimum-maximum (1 or 2 wires): 0.75...2.5mm^2 or 18...14AWG
- Screw tightening tool: Pz 2
- Maximum tightening torque: 1.2Nm / 10lb.in
- Width of side-mount shunt trip releases equal to 1 standard DIN 46880 module.

PADLOCKABLE DOOR COUPLING HANDLE FOR SM2R and SM3R
- IEC degree of protection: IP65
- Degree of protection according to UL: Type 1, 2, 3R, 12, 12K, 4, 4X; external use
- Adjustable rod from 48 to 212mm (1.89” to 8.35”)
- Ring-fixing in 22mm/0.87” hole.

Certifications and compliance

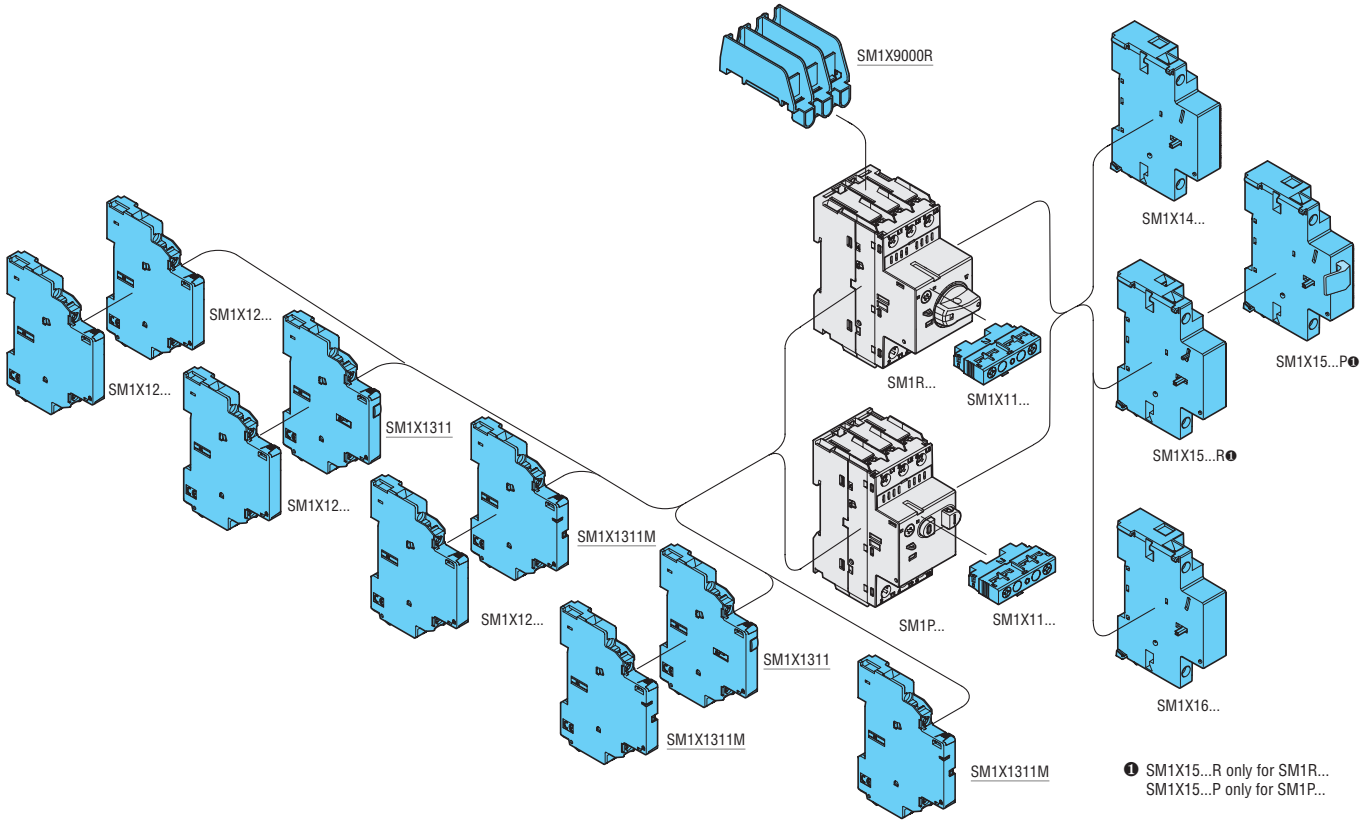
Certifications obtained: cULus, EAC.
Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, UL 60947-4-1, CSA C22.2 n° 60947-1, CSA C22.2 n° 60947-4-1.

❷ Side blocks: n. 1 SM2X12... + SM2X1311.
It is not possible to mount 2 blocks SM2X12...

Dimensions page 1-18

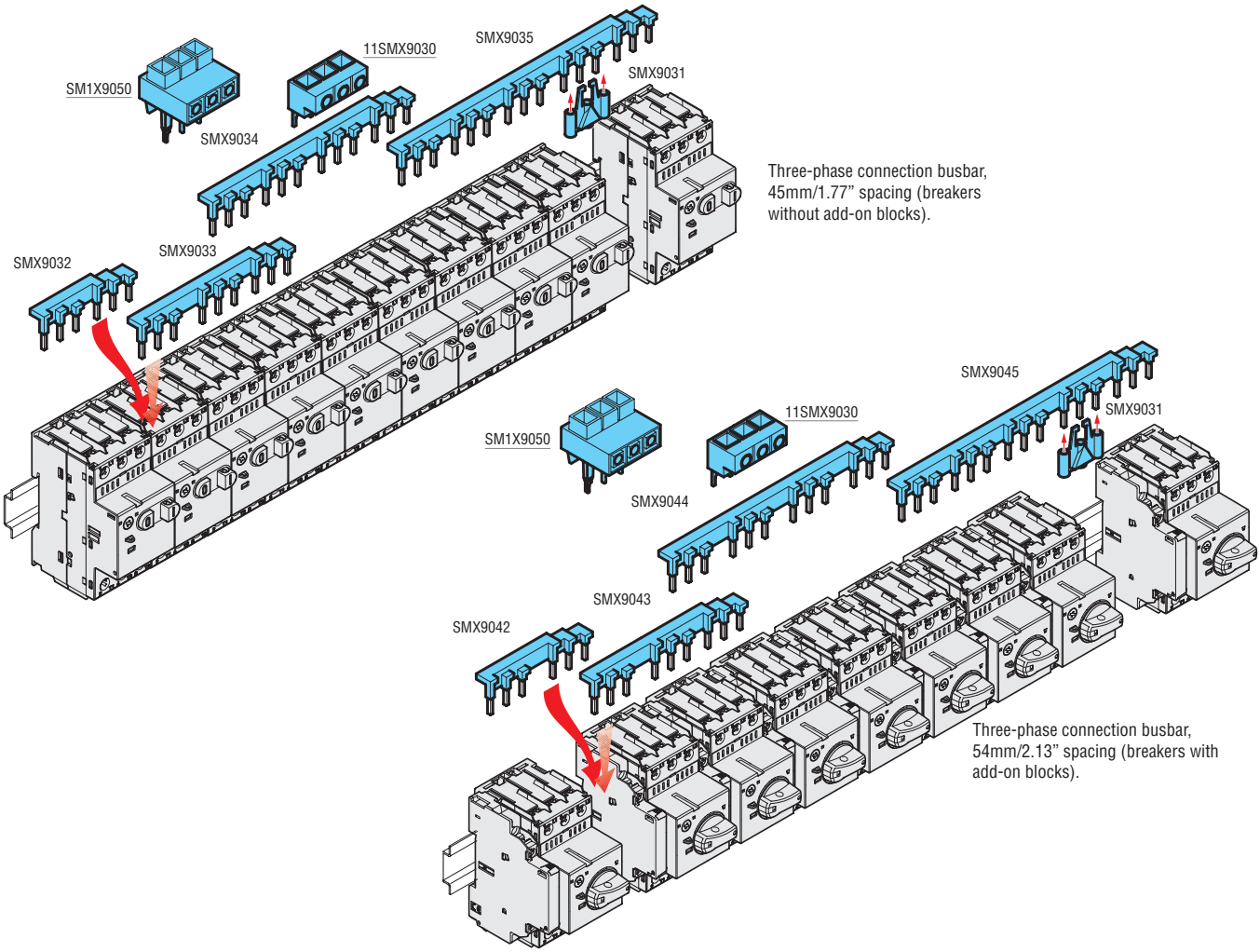
Wiring diagrams page 1-18

Combinations



❶ SM1X15...R only for SM1R...
SM1X15...P only for SM1P...

Three-phase connection busbars.

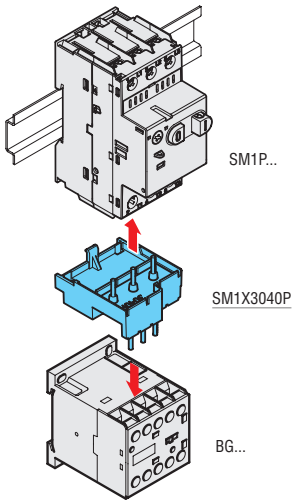


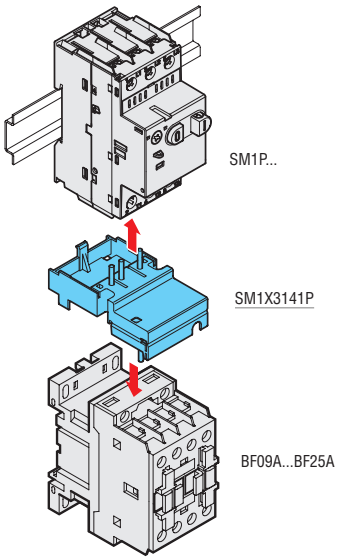
Three-phase connection busbar, 45mm/1.77" spacing (breakers without add-on blocks).

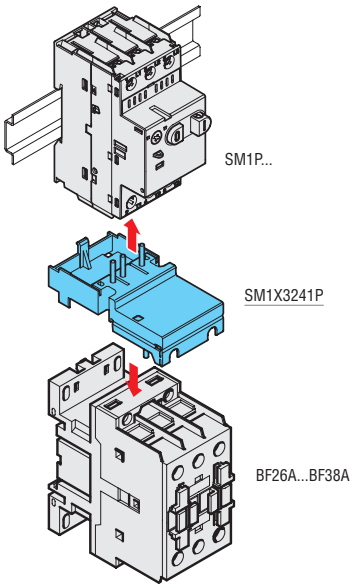
Three-phase connection busbar, 54mm/2.13" spacing (breakers with add-on blocks).

Combinations

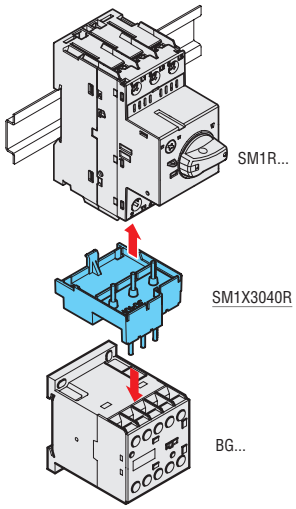
Rigid SM1P... breaker - contactor connections.

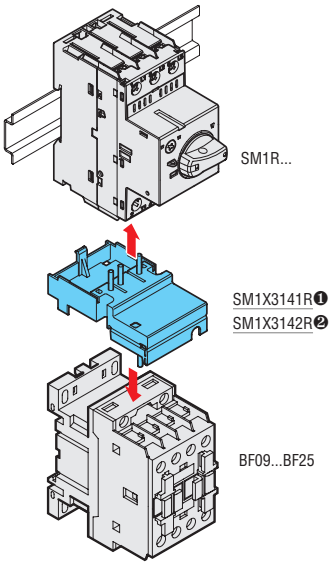


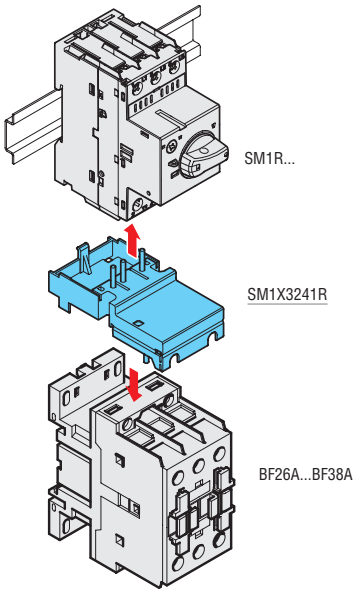




Rigid SM1R... breaker - contactor connections.

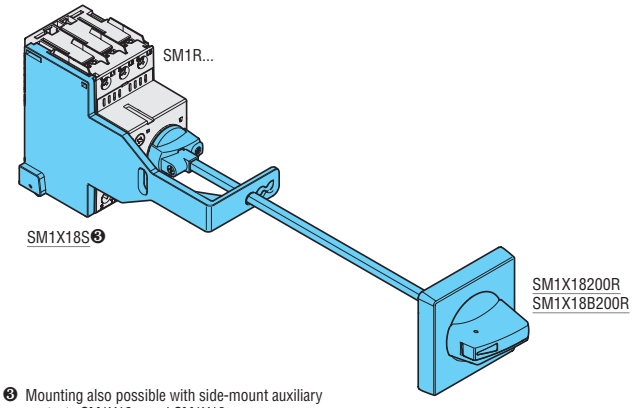






❶ For BF09A...BF25A contactors.
❷ For BF09D...BF25D and BF09L...BF25L contactors.

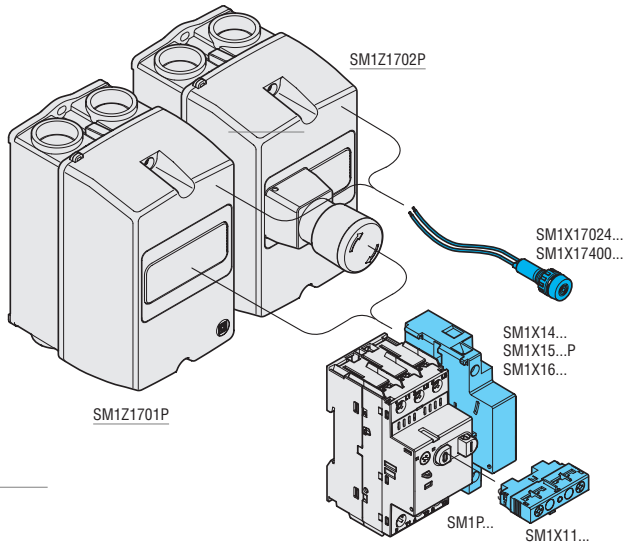
Padlockable door coupling handle.



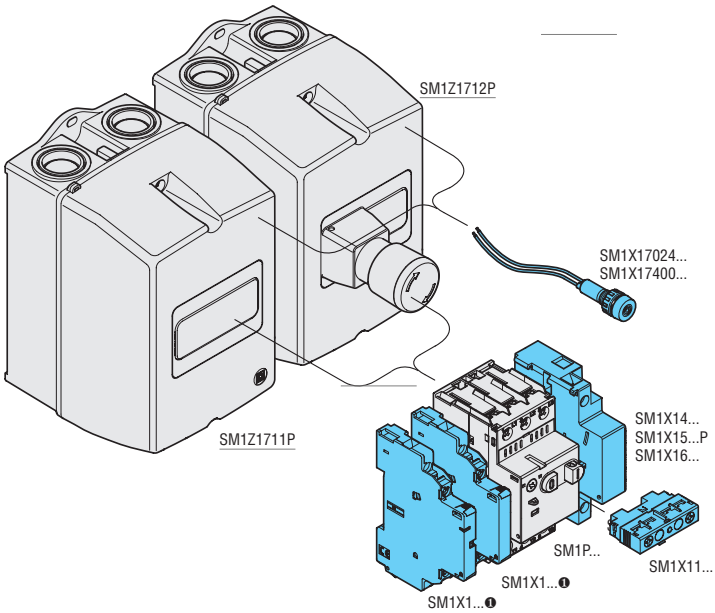
❸ Mounting also possible with side-mount auxiliary contacts SM1X12... and SM1X13...

Combinations

Surface mount enclosures for SM1P... Width 80mm.

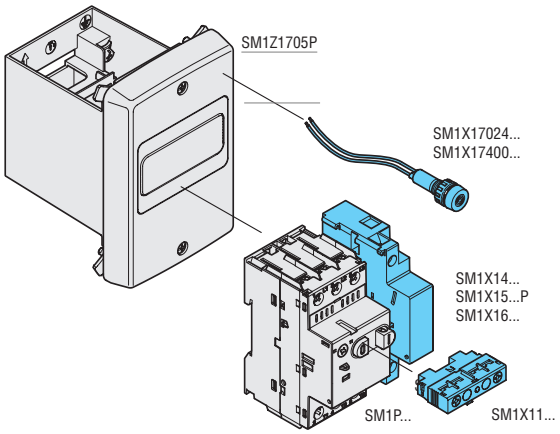


Surface mount enclosures for SM1P... Width 100mm.

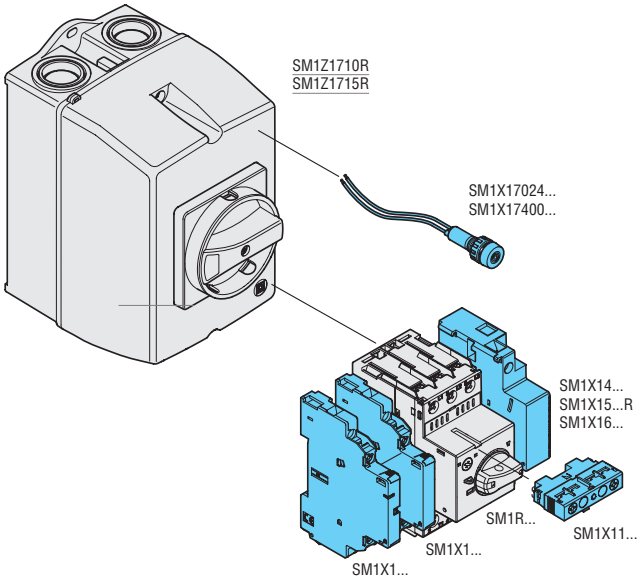


❶ Contacts for magnetic tripping indication SM1X1311M when mounted in SM1Z1711P and SM1Z1712P, can't be mounted alone, but shall be mounted in combination with SM1X12... on SM1X1311.

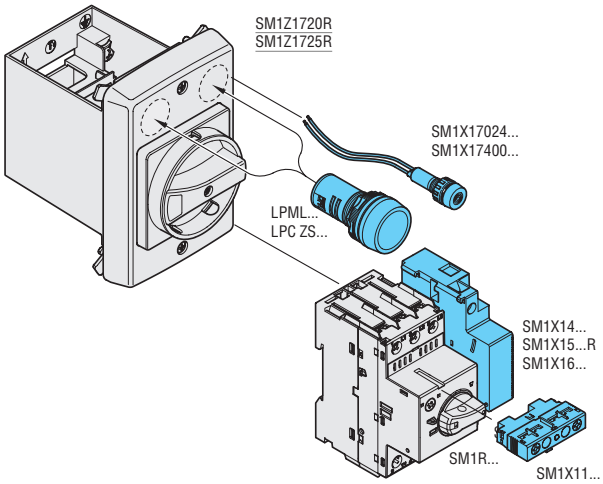
Flush mount enclosures for SM1P... Width 87mm/3.42".



Surface mount enclosures for SM1R... Width 100mm/3.94".

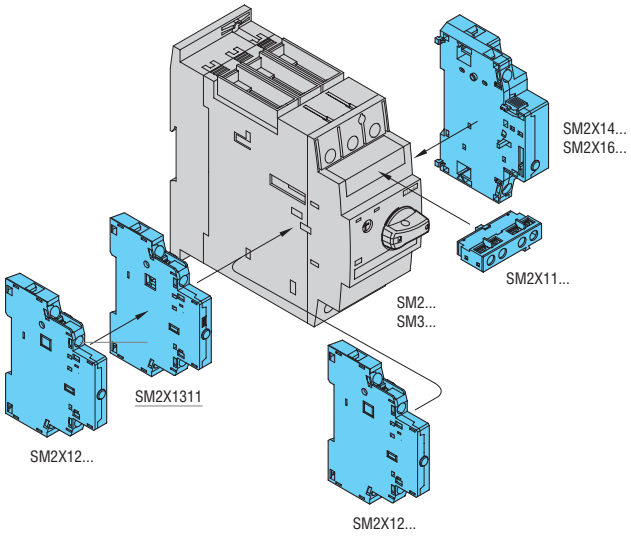


Flush mount enclosures for SM1R... width 87mm/3.42".

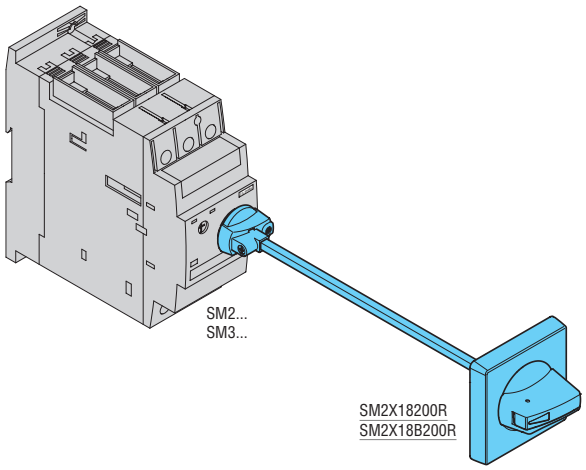


Combinations

Combinations of SM2... and SM3... motor protection circuit breakers.

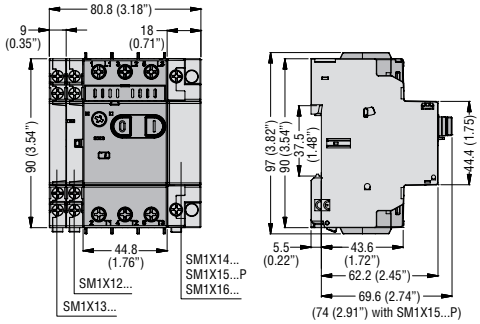


Padlockable door coupling handle.

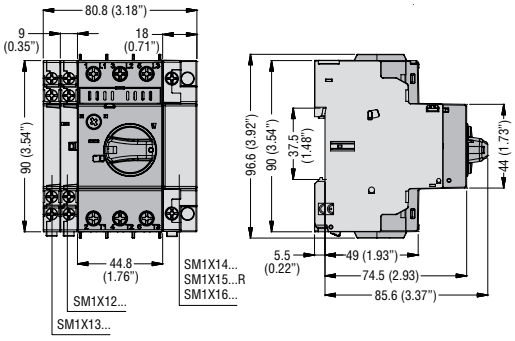


Motor protection circuit breakers
Dimensions [mm (in)]

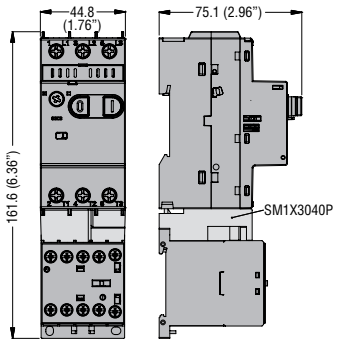
SM1P... with side-mount auxiliary contacts



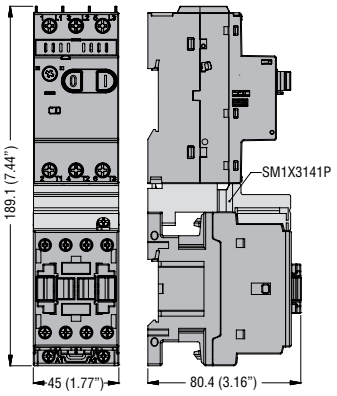
SM1R... with side-mount auxiliary contacts



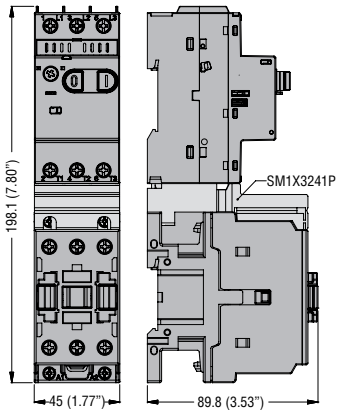
SM1P... with BG... mini-contactors and connection **SM1X3040P**



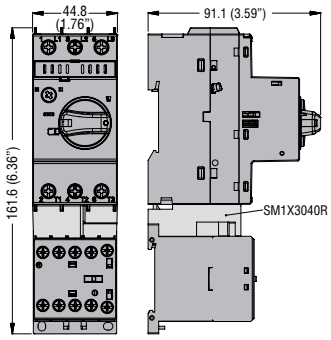
SM1P... with BF09 A...BF25 A... contactors and connection **SM1X3141P**



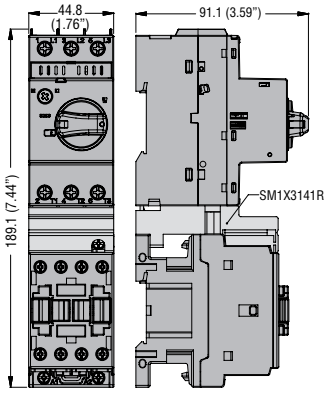
SM1P... with BF26 A...BF38 A... contactors and connection **SM1X3241P**



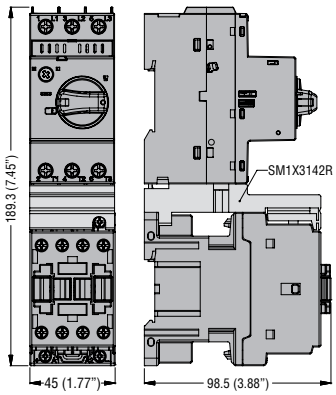
SM1R... with BG... mini-contactors and connection **SM1X3040R**



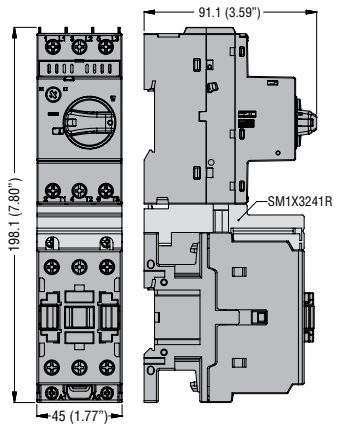
SM1R... with BF09 A...BF25 A... contactors and connection **SM1X3141R**



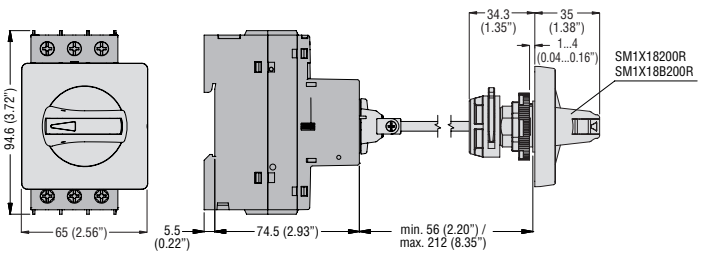
SM1R... with BF09 D...BF25 D... contactors BF09 L...BF25 L... and connection **SM1X3142R**



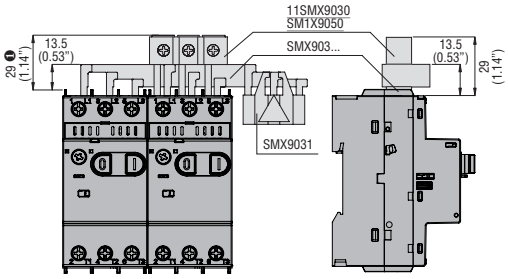
SM1R... with BF26 A...BF38 A... contactors and connection **SM1X3241R**



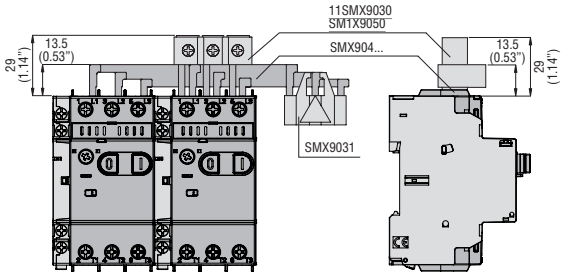
SM1R... padlockable door coupling handle **SM1X18200R** or **SM1X18B200R**



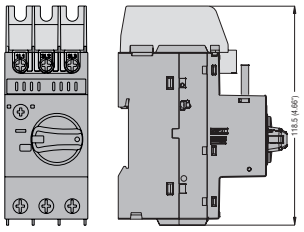
These elements mounted with **SM1… breakers**
without side-mount auxiliary contacts



These elements mounted with **SM1… breakers**
with side-mount auxiliary contacts **SMX12…** or **SMX13 11**

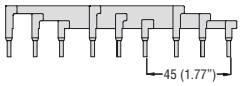


SM1X9000R

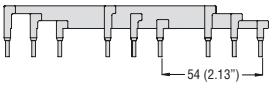


❶ 37mm (1.45") for SM1X9050

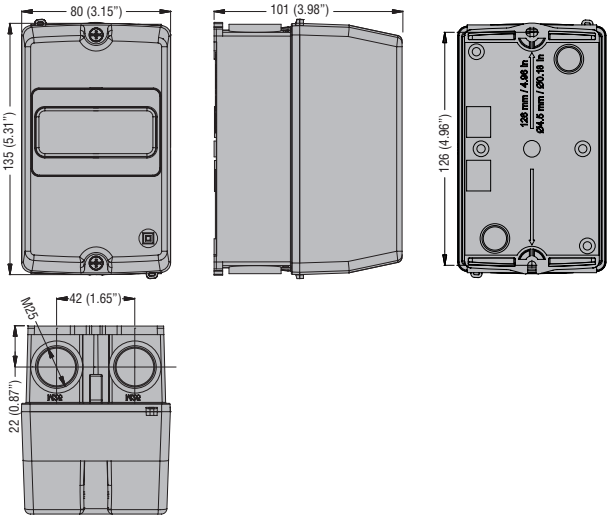
SMX9032 - SMX9033 - SMX9034 - SMX9035
Connection busbars – 45mm/1.77" spacing



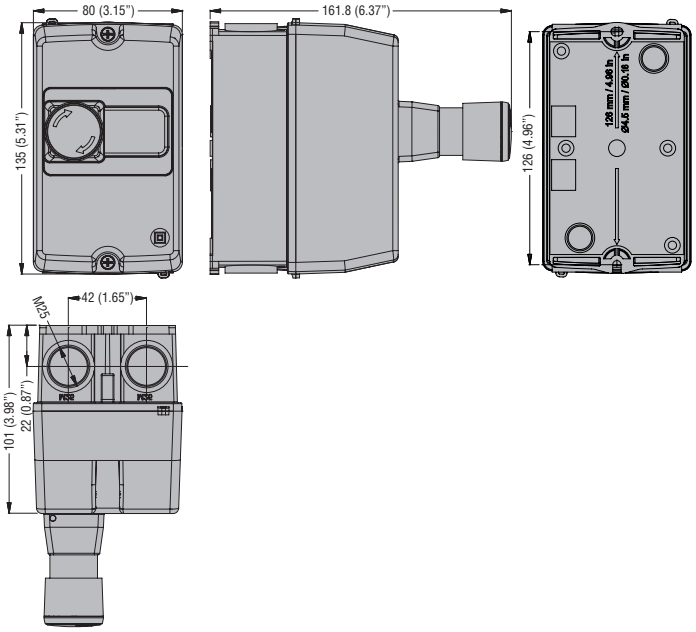
SMX9042 - SMX9043 - SMX9044 - SMX9045
Connection busbars – 54mm/2.13" spacing



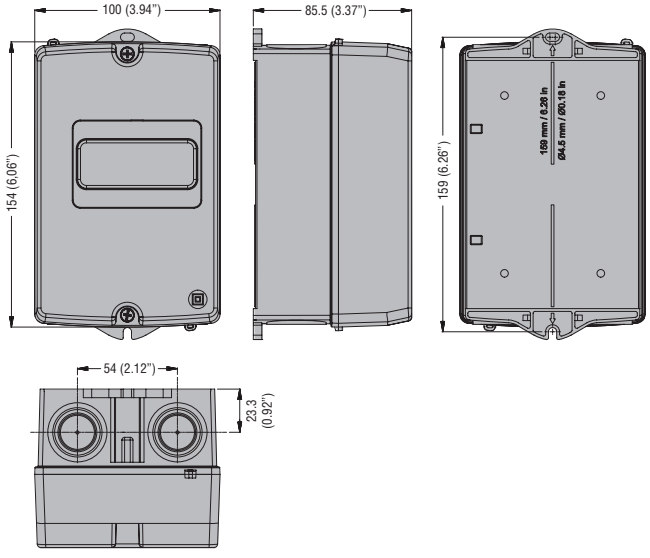
Enclosures **SM1Z1701P**



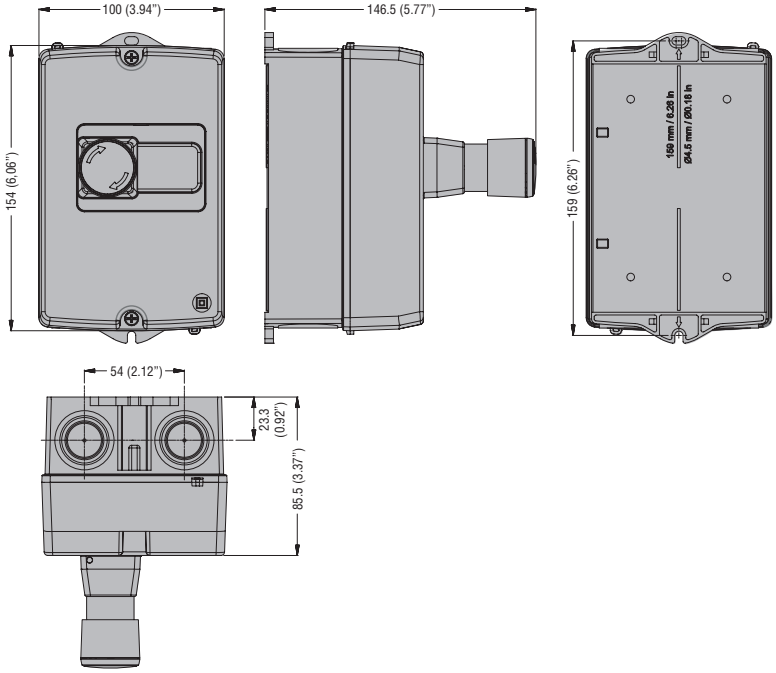
Enclosures **SM1Z1702P**



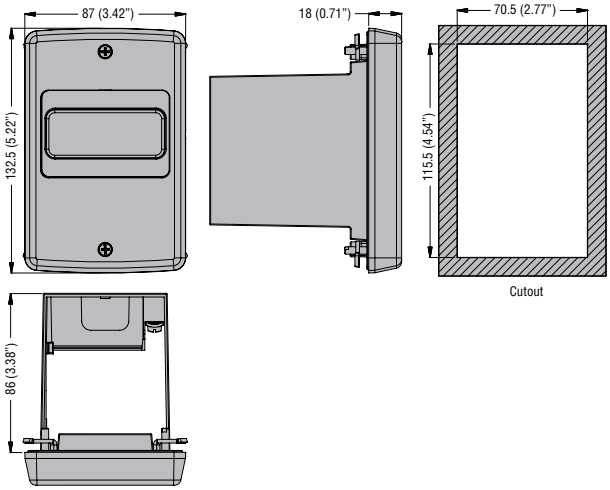
Enclosures **SM1Z1711P**



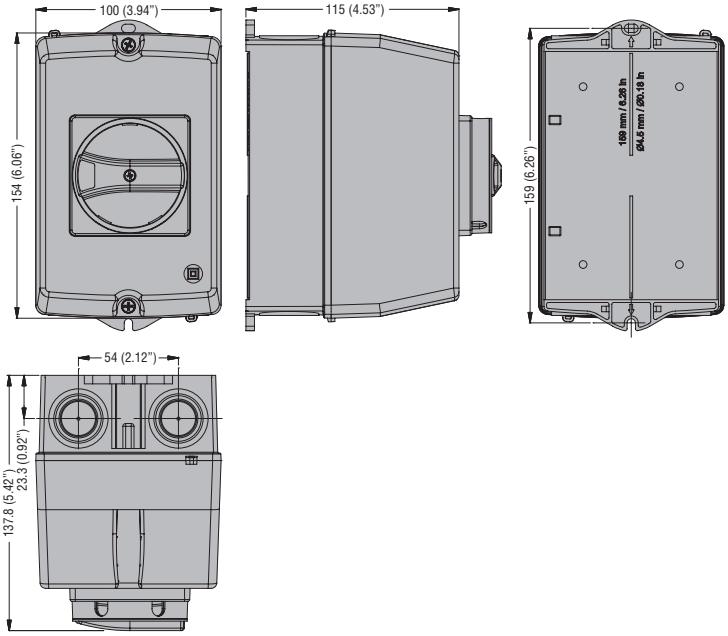
Enclosures **SM1Z1712P**



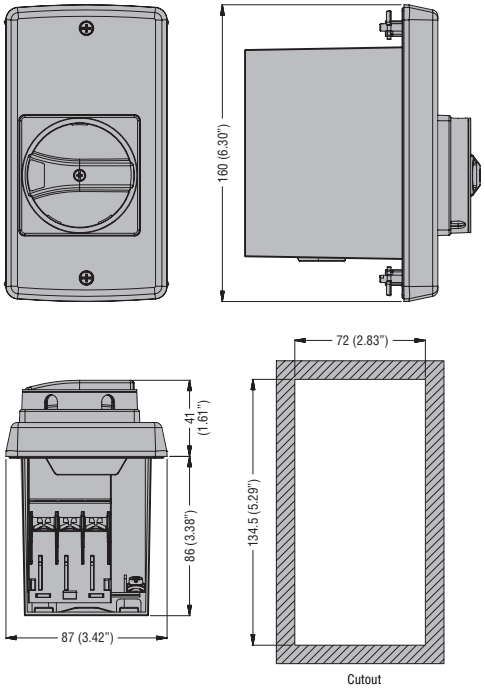
Enclosures SM1Z1705P



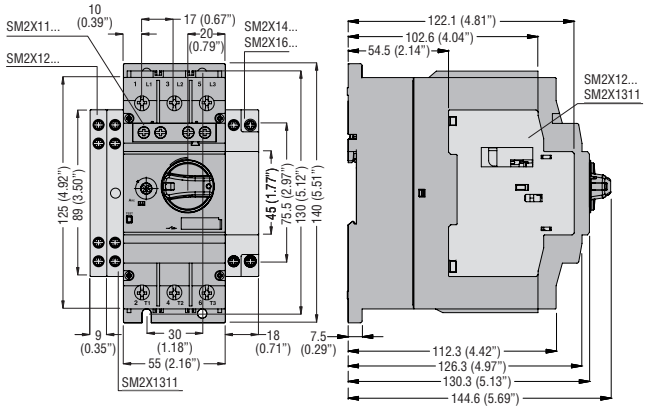
Enclosures SM1Z1715R and SM1Z1710R



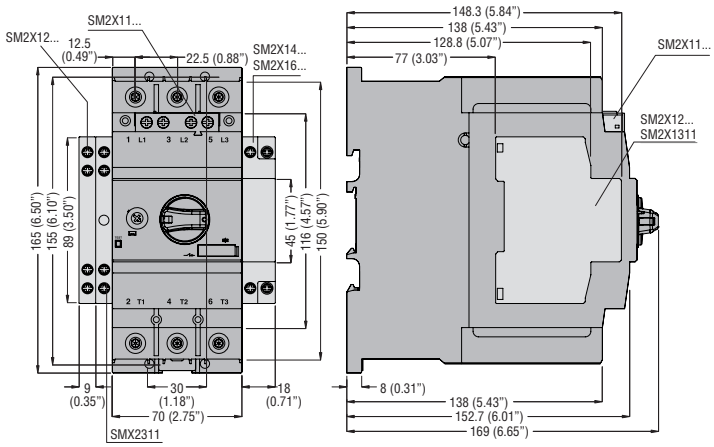
Enclosures SM1Z1720R and SM1Z1725R



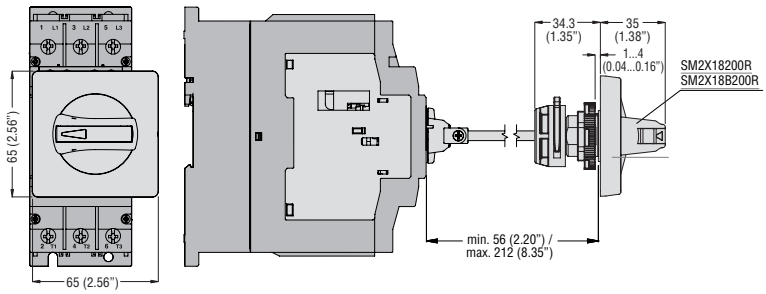
SM2… with side-mount auxiliary contacts



SM3… with side-mount auxiliary contacts



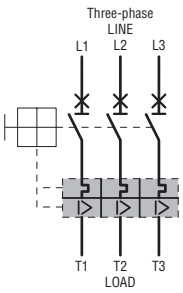
SM2… and **SM3…** padlockable door coupling handle
SM2X18200R or **SM2X18B200R**



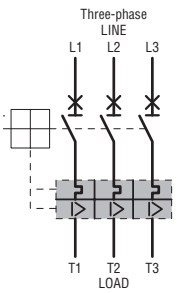
Wiring diagrams

MOTOR PROTECTION CIRCUIT BREAKERS

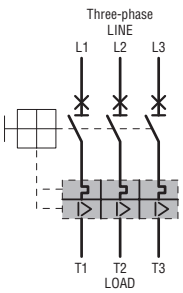
SM1P…



SM1R… - SM1RT… - SM2R… - SM3R… - SM1RE…

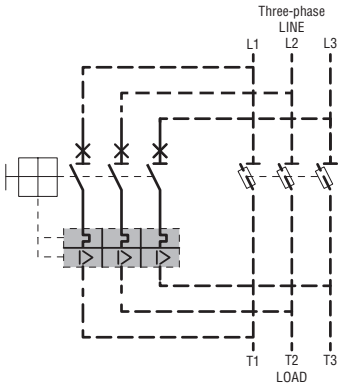


SM1RM…

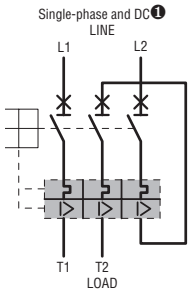


CIRCUIT BREAKERS

SM1PF…



For all motor protection circuit breakers

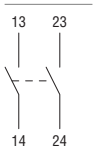


❶ Consult our Technical support for DC use.

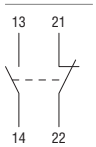
ADD-ON BLOCKS

For SM1... types
Front mount auxiliary contacts

SM1X1120

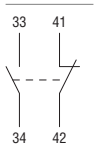


SM1X1111

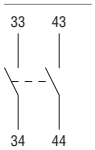


Side mount auxiliary contacts

SM1X1211

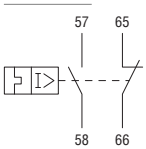


SM1X1220

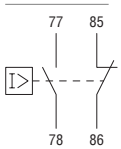


SM1X1202

SM1X1311



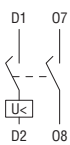
SM1X1311M



Side mount undervoltage trip releases

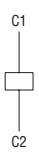
SM1X14…

SM1X15…



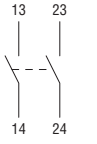
Side mount shunt trip release

SM1X16…

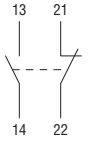


For SM2R... and SM3R... types
Front mount auxiliary contacts

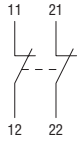
SM2X1120



SM2X1111

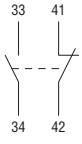


SM2X1102

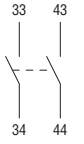


Side mount auxiliary contacts

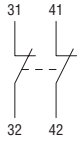
SM2X1211



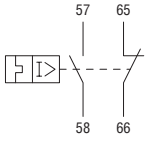
SM2X1220



SM2X1202



SM2X1311

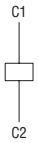


Side mount undervoltage trip release

SM2X14…

Side mount shunt trip release

SM2X16…



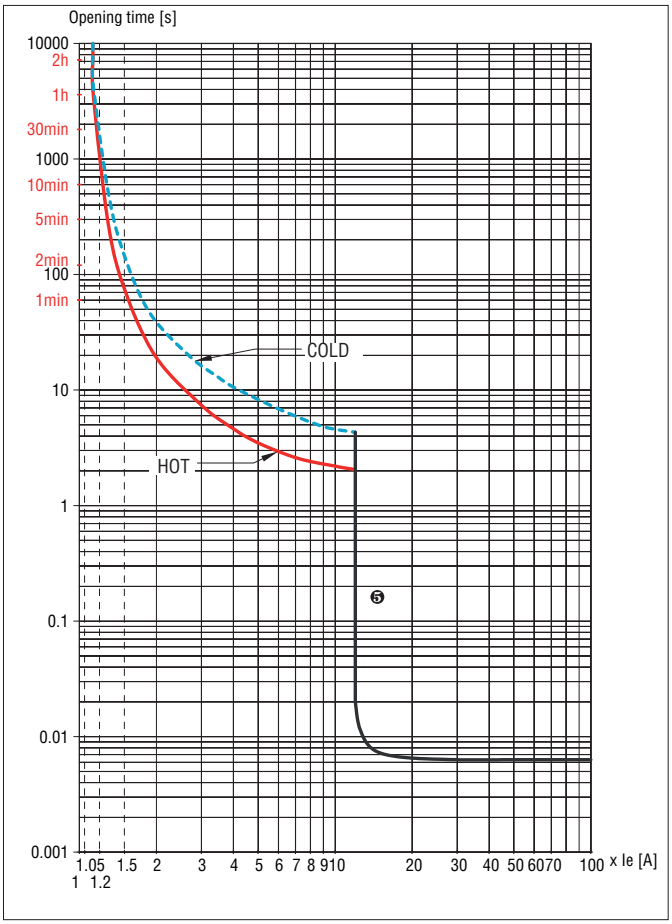
TYPE			SM1P...	SM1R...- SM1RM...	SM1RT...	SM2R...	SM3R...
Rated insulation voltage Ui		V	690			1000	
Rated impulse withstand voltage Uimp		kV	6				
Rated frequency		Hz	50/60Hz				
Maximum rated current		A	40	40	25	63	100
Number of adjustment ranges		No.	16	16	14	2	3
Total power dissipation at maximum current		W	2.1...18.3	2.1...18.3	2.1...10.2	6.1...21	5.4...18
Magnetic tripping		A	13 x In❶	13 x In max❷	20 x In max❸	13 x In	13 x In
Mechanical life		cycles	100,000	100,000	100,000	50,000	50,000
Electrical life (Ie max AC3)		cycles	100,000	100,000	100,000	25,000	25,000
Terminal tightening torque		Nm	2.5...3	2.5...3	2.5...3	3...4,5	4...6
		lb.in	22...26.5	22...26.5	22...26.5	36	53
		Tool	PH2	PH2	PH2	PZ2	Allen 4mm
Conductor section minimum and maximum (1 or 2 wires)	AWG	No.	16...8	16...8	16...8	18...3	10...1/0
Flexible without lug		mm^2	1...10	1...10	0.75...25	0.75...25	10...50
AMBIENT CONDITIONS							
Temperature	operating	°C	-20...+60❹	-20...+60❹	-20...+60❹	-20...+70❹	-20...+70❹
	storage	°C	-50...+80	-50...+80	-50...+80	-50...+80	-50...+80
	compensation	°C	-20...+50	-20...+50	-20...+50	-5...+40	-5...+40
Maximum altitude		m	3000				
Mounting position			Any				
Fixing			On 35mm DIN rail or screw via accessory			On 35mm DIN rail or screw	

E.g. PH = Phillips; PZ = Pozidriv; Allen is metric type.

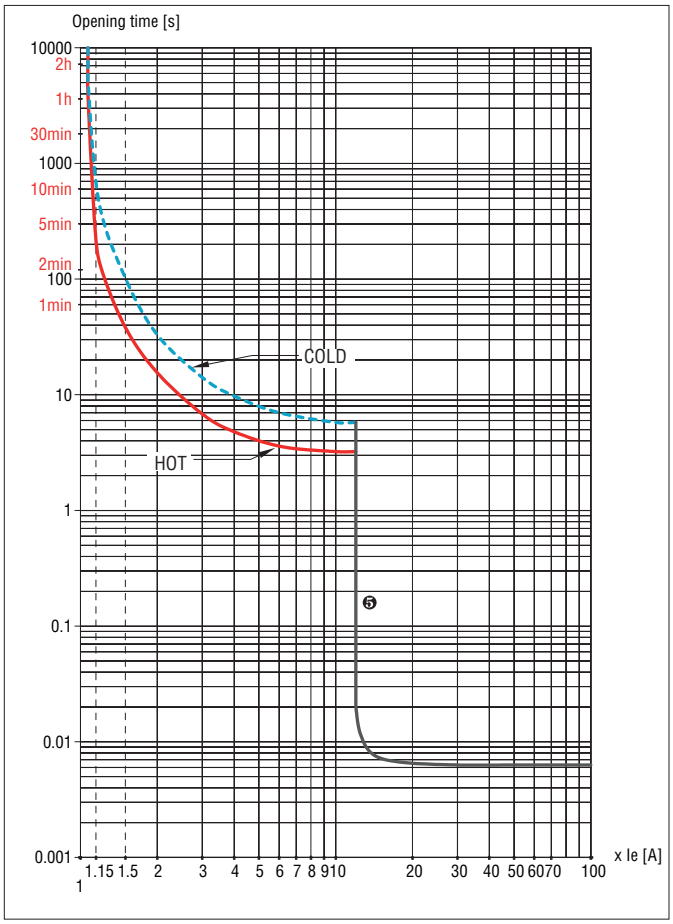
❶ SM1PF0020 has a single 0.2A thermal adjustment and magnetic tripping at 6 x In (1.2A).
❷ 10 x In max for 0.1...0.16A and 0.16...0.25A setting ranges.
❸ 16 x In max for 0.1...0.16A setting range.
❹ When fitting more than one breaker side by side, without leaving space between each to consent free air circulation on the breaker sides, and have simultaneous operation, the thermal trip adjuster must be positioned at a value 15% higher than the rated motor current.

THERMAL TRIPPING CURVE (AVERAGE TIMES)

Three-phase balanced operation



Two-phase operation (phase failure/single phasing)



Tripping times can have a ±20% deviation with respect to the average tripping curve value above.
❺ 20 x Ie for SM1RT....