



# 1 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
- Automatic trip indicators
- High reliability and accuracy of tripping.

## Motor protection circuit breakers

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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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**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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**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.



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**SM1PF...**

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



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



# 1 Motor protection circuit breakers

## IEC ratings - short-circuit breaking capacity

### Motor protection (magnetic and thermal protection)



SM1P...

SM1R...

SM2R...

SM3R...

### Starter protection (magnetic protection)



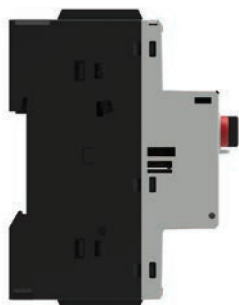
SM1RM...

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	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	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	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	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	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	100
1.6...2.5	100	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	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	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	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	-	-	-	-	-	-	-	-	-	-	

#### 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 optical 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.





# 1 Motor protection circuit breakers

## Fuse monitoring



SM1PF...

0.2A

- 
- 
- 
- 



SM1P...



SM1R... - SM2R... - SM3R...

## UL508 ratings - short-circuit breaking capacity (horse power ratings on page 1-5)

SM1PF...												UL508 / UL 60947-4-1			Manual Motor Controller - Short circuit current in kA						UL508 / UL 60947-4-1							
												Motor Disconnect Group Motor Installation			Protection		Motor Disconnect		Group Motor Installation		Protection		Tap Conductor Protection		Manual Self Protected Combination Motor Controller (Type E) Short circuit current in kA (Type F ratings see on page 1-5)			
												240V	480V	600V		480V	600V	480V	600V		480Y/277V	600Y/347V	240V	480Y/277V	600Y/347V	240V	480Y/277V	600Y/347V
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	
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	
-	-	-	-	-	-	-	-	-	-	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	50
100	100	100	100	100	100	100	100	100	100	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	50
-	-	-	-	-	-	-	-	-	-	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	50
-	-	-	-	-	-	-	-	-	-	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	50
-	-	-	-	-	-	-	-	-	-	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	Fuse or CB	50	50	50	50	50
-	-	-	-	-	-	-	-	-	-	30	30	30	100A Class J	30	30	30	30	Fuse or CB	30	30	30	30	Fuse or CB	30	30	30	30	30
-	-	-	-	-	-	-	-	-	-	30	30	30	100A Class J	30	30	30	30	Fuse or CB	30	30	30	30	Fuse or CB	30	30	30	30	30
-	-	-	-	-	-	-	-	-	-	30	30	30	100A Class J	30	30	30	30	Fuse or CB	30	30	30	30	Fuse or CB	30	30	30	30	30
-	-	-	-	-	-	-	-	-	-	30	30	-	100A Class J	30	30	30	30	200A Class J	65	30	65	65	30	65	30	65	30	
-	-	-	-	-	-	-	-	-	-	30	30	-	100A Class J	30	30	30	30	200A Class J	65	30	65	65	30	65	30	65	30	
-	-	-	-	-	-	-	-	-	-	30	30	-	100A Class J	30	30	30	30	200A Class J	65	-	65	65	-	65	65	-	-	
-	-	-	-	-	-	-	-	-	-	5	5	-	Fuse or CB	30	30	30	30	200A Class J	30	-	30	30	-	30	30	-	-	
-	-	-	-	-	-	-	-	-	-	5	5	-	Fuse or CB	30	30	30	30	200A Class J	30	-	30	30	-	30	30	-	-	
-	-	-	-	-	-	-	-	-	-	5	5	-	Fuse or CB	30	30	30	30	200A Class J	10	-	10	10	-	10	10	-	-	
-	-	-	-	-	-	-	-	-	-	5	5	-	Fuse or CB	30	30	30	30	200A Class J	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	10	50	10	Fuse or CB	50	10	100	50	-	50	10	100	50	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	10	50	10	Fuse or CB	50	10	100	50	-	50	10	100	50	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	10	40	10	Fuse or CB	40	10	100	40	-	40	10	100	40	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	10	40	10	Fuse or CB	40	10	100	40	-	40	10	100	40	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	10	40	10	Fuse or CB	40	10	100	40	-	40	10	100	40	-

① Values valid for SM1RE... only.

### 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.
- 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.





# 1 Motor protection circuit breakers

## 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 protection.

#### FUNCTIONS:

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



- Phase separation barrier (required)
- Motor protection circuit breaker also known as manual motor protector

#### 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).



- Phase separation barrier (required)
- Motor protection circuit breaker also known as manual motor protector
- Rigid connection (optional)
- Contactor

### 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	10ⓘ
SM1R1800 / SM1RE1800	SM1P1800	1	3	5	5	10	15ⓘ
SM1R2300 / SM1RE2300	SM1P2300	1.5	3	5	7.5	15	20ⓘ
SM1R2500 / SM1RE2500	SM1P2500	2	3	5	7.5	15	20ⓘ
SM1R3200 / SM1RE3200	SM1P3200	2	5	10	10	20	30ⓘ
SM1R4000	SM1P4000	3	7.5	10	10	30	30ⓘ
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

ⓘ SM1R... and SM1RE... only

# 1 Motor protection circuit breakers

## 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 [A]	Contactor types	SCCR in kA		
			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	BG06...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	-

● 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 [A]	Contactor types	SCCR in kA		
			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	-



# 1 Motor protection circuit breakers

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



SM1P...



SM1R...

- ① For SM1R... breakers, certified UL Type E, add E letter to the code. Ex. SM1RE1000.
- ② 10In max for 0.1...0.16A and 0.16...0.25A setting ranges.

Order code	Thermal trip adjustment range		Short circuit breaking capacity at 400V		Qty per pkg	Wt [kg]
	[A]	[A]	Icu [kA]	Ics [kA]		
Push button control. For UL ratings see page 1-14.						
SM1P0016	0.1...0.16		100	100	1	0.280
SM1P0025	0.16...0.25		100	100	1	0.280
SM1P0040	0.25...0.4		100	100	1	0.280
SM1P0063	0.4...0.63		100	100	1	0.280
SM1P0100	0.63...1		100	100	5	0.280
SM1P0160	1...1.6		100	100	5	0.280
SM1P0250	1.6...2.5		100	100	5	0.350
SM1P0400	2.5...4		100	100	5	0.350
SM1P0650	4...6.5		100	100	5	0.350
SM1P1000	6.3...10		100	100	5	0.350
SM1P1400	9...14		25	12.5	5	0.350
SM1P1800	13...18		25	12.5	5	0.350
SM1P2300	17...23		15	5	1	0.350
SM1P2500	20...25		15	5	1	0.350
SM1P3200	24...32		10	5	1	0.350
SM1P4000	30...40		10	5	1	0.350
Rotary knob type. For UL ratings see page 1-14.						
SM1R0016	0.1...0.16		100	100	1	0.320
SM1R0025	0.16...0.25		100	100	1	0.320
SM1R0040	0.25...0.4		100	100	1	0.320
SM1R0063	0.4...0.63		100	100	1	0.320
SM1R0100	0.63...1		100	100	5	0.320
SM1R0160	1...1.6		100	100	5	0.320
SM1R0250	1.6...2.5		100	100	5	0.320
SM1R0400	2.5...4		100	100	5	0.390
SM1R0650	4...6.5		100	100	5	0.390
SM1R1000①	6.3...10		100	100	5	0.390
SM1R1400①	9...14		100	100	5	0.390
SM1R1800①	13...18		100	100	5	0.390
SM1R2300①	17...23		50	25	1	0.390
SM1R2500①	20...25		50	25	1	0.390
SM1R3200①	24...32		50	25	1	0.390
SM1R4000	30...40		20	10	1	0.390

### 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 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...①. 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 consents to exclude 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: 13In max.②
- Tripping class: 10A
- Phase failure sensitive
- Mechanical life: 100,000 cycles
- 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.

### Certifications and compliance

Certifications obtained: cULus, EAC. SM1R... circuit breakers 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...

- ② 10In max for 0.1...0.16A and 0.16...0.25A setting ranges.

Order code	Rated and magnetic trip current		Short circuit breaking capacity at 400V		Qty per pkg	Wt [kg]
	Rat. [A]	Tripping [A]	Icu [kA]	Ics [kA]		
Rotary knob type. For UL ratings see page 1-14.						
SM1RM0016	0.16	1.6	100	100	1	0.320
SM1RM0025	0.25	3.2	100	100	1	0.320
SM1RM0040	0.4	5.2	100	100	1	0.320
SM1RM0063	0.63	8.2	100	100	1	0.320
SM1RM0100	1	13	100	100	5	0.320
SM1RM0160	1.6	21	100	100	5	0.320
SM1RM0250	2.5	33	100	100	5	0.320
SM1RM0400	4	52	100	100	5	0.390
SM1RM0650	6.5	85	100	100	5	0.390
SM1RM1000	10	130	100	100	5	0.390
SM1RM1400	14	182	100	100	5	0.390
SM1RM1800	18	234	100	100	5	0.390
SM1RM2300	23	299	50	25	1	0.390
SM1RM2500	25	325	50	25	1	0.390
SM1RM3200	32	416	50	25	1	0.390
SM1RM4000	40	420	20	10	1	0.390

### 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 1-3
- Heat dissipation per phase: 0.7...3.3W
- Magnetic tripping: 13In max.②
- Mechanical life: 100,000 cycles
- 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.

### 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.

# 1 Motor protection circuit breakers

## 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		Qty per pkg	Wt [kg]
		Icu [kA]	Ics [kA]		
	[A]	[kA]	[kA]	n°	[kg]
Rotary knob type. For UL ratings see page 1-14.					
<b>SM2R5000</b>	34...50	50	50	1	1.000
<b>SM2R6300</b>	45...63	50	50	1	1.000
Rotary knob type. For UL ratings see page 1-14.					
<b>SM3R7500</b>	55...75	50	38	1	2.200
<b>SM3R9000</b>	70...90	50	38	1	2.200
<b>SM3R9900</b>	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 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  $U_i$ : 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: 13In 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:  $\varnothing 4\text{mm}/0.16''$
- 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.

## SM1PF... circuit breakers Fuse monitoring function



Order code	Fixed thermal release current	Short circuit breaking capacity at 400V		Qty per pkg	Wt [kg]
		Icu [kA]	Ics [kA]		
	[A]	[kA]	[kA]	n°	[kg]
Push button control. For UL ratings see page 1-14.					
<b>SM1PF0020</b>	0.20	100	100	5	0.280

### General characteristics

SM1PF... are breakers with magnetic-thermal tripping intended specifically for monitoring the status of fuses.

By connecting every phase of the breaker to a fuse, when it blows, the motor protection breaks.

Through the auxiliary contacts fitted on the motor protection, the blown fuses are signalled electrically.

### Operational characteristics

- IEC rated insulation voltage  $U_i$ : 690V
- IEC rated impulse withstand voltage: 6kV
- IEC rated frequency: 50/60Hz
- Rated current: 0.2A
- Magnetic tripping: 1.2A.
- Mechanical life: 100,000 cycles
- Electrical life: 100,000 cycles
- Mounting on 35mm DIN rail (IEC/EN/BS 60715)
- Mounting position: Any
- IEC utilisation category: A
- Padlocking in OFF:  $\varnothing 4\text{mm}/0.16''$
- IEC degree of protection: IP20.

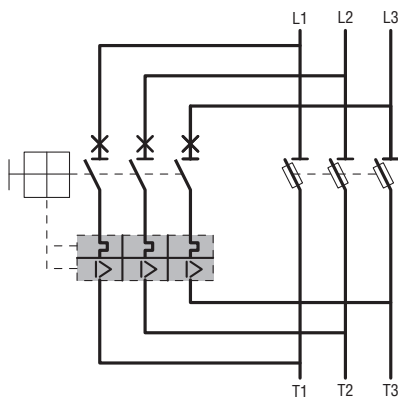
### Certifications and compliance

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.







# 1 Motor protection circuit breakers

Add-on blocks and accessories for SM1...



SM1X11...



SM1X12...

SM1X1311

SM1X1311M



SM1X14...

SM1X15...R

SM1X15...P



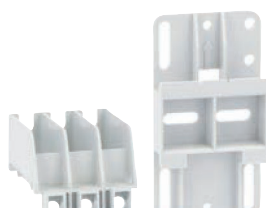
SM1X16...



SM1X18200R



SM1X18S



SM1X9000R

BFX8901

SM1X8902

Order code	Characteristics	Qty per pkg	Wt	
			n°	[kg]

Add-on auxiliary contacts.

<b>SM1X1120</b>	Front mount 2NO	10	0.016
<b>SM1X1111</b>	Front mount 1NO+1NC	10	0.016
<b>SM1X1220</b>	Side mount 2NO	1	0.036
<b>SM1X1211</b>	Side mount 1NO+1NC	10	0.016
<b>SM1X1202</b>	Side mount 2NC	1	0.036
<b>SM1X1311</b>	Side mount. Contacts for thermal and magnetic tripping indication 1NO+1NC	1	0.036
<b>SM1X1311M</b>	Side mount. Contacts for magnetic tripping indication 1NO+1NC	1	0.036

Undervoltage trip releases.

<b>SM1X14024</b>	24VAC 50Hz	1	0.130
<b>SM1X14110</b>	110VAC 50Hz; 120VAC 60Hz	1	0.130
<b>SM1X1422060</b>	220VAC 60Hz	1	0.130
<b>SM1X14230</b>	230VAC 50Hz	1	0.130
<b>SM1X14400</b>	400VAC 50Hz; 440VAC 60Hz	1	0.130
<b>SM1X1457560</b>	575VAC 60Hz	1	0.130
<b>SM1X15024①</b>	With early-make contacts 24VAC 50Hz	1	0.140
<b>SM1X15110①</b>	With early-make contacts 110VAC 50Hz; 120VAC 60Hz	1	0.140
<b>SM1X15230①</b>	With early-make contacts 230VAC 50Hz	1	0.140
<b>SM1X15400①</b>	With early-make contacts 400VAC 50Hz	1	0.140

Shunt trip releases.

<b>SM1X16024</b>	24VAC 50/60Hz	1	0.130
<b>SM1X16110</b>	110VAC 50/60Hz	1	0.130
<b>SM1X16230</b>	230VAC 50/60Hz	1	0.130
<b>SM1X16400</b>	400VAC 50/60Hz	1	0.130

Adjuster sealing kit.

<b>SM1X1812</b>	With wire and lead included	1	0.006
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IP65 (4X) padlockable door coupling handle for SM1R...

<b>SM1X18200R</b>	Red/yellow complete with rod length 200mm/7.87"	1	0.115
<b>SM1X18B200R</b>	Black complete with rod length 200mm/7.87"	1	0.115
<b>SM1X18S②</b>	Support for rod >145mm/5.71"	1	0.030

Phase separation barriers for SM1R...

<b>SM1X9000R</b>	For Type E and Type F as UL60947-4-1	5	0.016
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Three-phase connection busbars 45mm/1.77" spacing.

<b>11SMX9032</b>	For 2 breakers	10	0.028
<b>11SMX9033</b>	For 3 breakers	10	0.050
<b>11SMX9034</b>	For 4 breakers	10	0.071
<b>11SMX9035</b>	For 5 breakers	10	0.092

Three-phase connection busbars 54mm/2.13" spacing.

<b>11SMX9042</b>	For 2 breakers	10	0.031
<b>11SMX9043</b>	For 3 breakers	10	0.056
<b>11SMX9044</b>	For 4 breakers	10	0.081
<b>11SMX9045</b>	For 5 breakers	10	0.090

Terminal block for busbar supply.

<b>11SMX9030</b>	For all busbar types	10	0.048
<b>SM1X9050</b>	For all busbar types Type E and F as per UL508 / UL60947-4-1	10	0.050

Safety cover.

<b>11SMX9031</b>	For unused terminals	10	0.004
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Accessories for motor protection breaker fixing.

<b>SM1X8902</b>	Metal bracket for fixing SM1... motor protection with screws	10	0.006
<b>BFX8901</b>	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 I<sub>th</sub>: 10A (5A for SM1X11...)
- IEC rated insulation voltage U<sub>i</sub>: 690V (300V for SM1X11...)
- Rated impulse withstand voltage U<sub>imp</sub>: 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...2.5mm<sup>2</sup> 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...2.5mm<sup>2</sup> 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...2.5mm<sup>2</sup> 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

- I<sub>max</sub>: 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

- I<sub>max</sub>: 63A
- Screw tightening tool: Phillips 2
- Maximum tightening torque: 2.3Nm / 20lb.in
- Conductor cross section minimum-maximum: 4...25mm<sup>2</sup> 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.

① Complete the order code by indicating P for mounting on SM1P... motor protection circuit breakers, or R for SM1R... motor protection circuit breakers.

② Mounting also possible with side-mount auxiliary contacts SM1X12... and SM1X13...

# 1 Motor protection circuit breakers

Add-on blocks and accessories for SM1...



SM1X30...

SM1X31...  
SM1X32...



SM1Z1701P

SM1Z1702P



SM1Z1705P

SM1Z1715R



SM1Z1725R



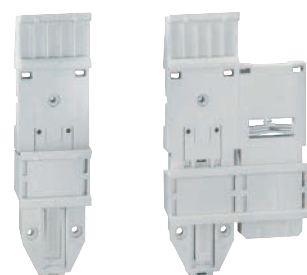
SM1X1740P

SM1X1745P

SM1X1746P



SM1X17024R



11SMX9010

11SMX9012

Order code	Characteristics	Qty per pkg	Wt [kg]
		n°	[kg]
Rigid SM1 breaker-contactor connections.			
<b>SM1X3040P</b>	For motor protection breaker SM1P... with BG... mini-contactors	10	0.019
<b>SM1X3141P</b>	For motor protection breaker SM1P... with BF09..25A contactors	10	0.035
<b>SM1X3241P</b>	For motor protection breaker SM1P... with BF26..38A contactors	10	0.045
<b>SM1X3040R</b>	For motor protection breaker SM1R... with BG... mini-contactors	10	0.019
<b>SM1X3141R</b>	For motor protection breaker SM1R... with BF09..25A contactors	10	0.035
<b>SM1X3142R</b>	For motor protection breaker SM1R... with contactors BF09..25D and BF09...25L	10	0.044
<b>SM1X3241R</b>	For motor protection breaker SM1R... with contactors BF26..38A	10	0.045
Surface mount enclosures IP65 (4X) for SM1P...			
<b>SM1Z1701P</b>	Width 80mm/3.15" <sup>①</sup>	1	0.235
<b>SM1Z1702P</b>	Width 80mm/3.15". With button for emergency stop	1	0.275
<b>SM1Z1711P</b>	Width 100mm/3.94" <sup>①</sup>	1	0.315
<b>SM1Z1712P</b>	Width 100mm/3.94". With button for emergency stop	1	0.345
Flush mount enclosure IP65 (4X) for SM1P...			
<b>SM1Z1705P</b>	Width 87mm/3.42" <sup>①</sup>	1	0.205
Surface mount enclosures IP65 (4X) for SM1R...			
<b>SM1Z1715R</b>	With rotary actuator red/yellow. Width 100mm/3.94"	1	0.350
<b>SM1Z1710R</b>	With black rotary actuator. Width 100mm/3.94"	1	0.350
Flush mount enclosures IP65 for SM1R (UL type 4X)			
<b>SM1Z1725R</b>	With rotary actuator yellow/red. Width 87mm/3.42"	1	0.245
<b>SM1Z1720R</b>	With rotary actuator black. Width 87mm/3.42"	1	0.245
ENCLOSURE ACCESSORIES AND SPARE PARTS. For SM1Z...P enclosures.			
<b>SM1X1740P</b>	Emergency stop button. IP65 (4X)	1	0.044
<b>SM1X1745P</b>	Rubber membrane with rim. IP65 (4X)	1	0.016
<b>SM1X1746P</b>	Lockable block. IP65 (4X)	1	0.030
LED pilot lights IP65. Wire length 200mm/7.87".			
<b>SM1X17024G</b>	Green 24VAC/DC	1	0.007
<b>SM1X17024R</b>	Red 24VAC/DC	1	0.007
<b>SM1X17400G</b>	Green 110...400VAC	1	0.007
<b>SM1X17400R</b>	Red 110...400VAC	1	0.007
Plastic M25 to 1/2" NPT entry adapter.			
<b>11LMM25PG16</b>	For enclosures SM1Z1701P and SM1Z1702P	10	0.009
Starter assembly adapter plates.			
<b>11SMX9010</b>	Adapter plate for direct starter comprising breaker SM1... and contactor BG..., BF09A...BF38A	1	0.058
<b>11SMX9012</b>	Adapter plate for reversing switch comprising breaker for motor protection SM1... contactors BG..., BF09A...BF38A	1	0.095
<b>11SMX9014</b>	Adapter plate for starter star-delta comprising motor protection breaker SM1... and contactors BF09A...BF38A	1	0.118
<b>11SMX9018</b>	35mm rail for passage of wires underneath to contactor; for SMX90 14	1	0.025
<b>11SMX9019</b>	DIN rail extension 35mm/1.38"	1	0.025

## 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 e 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 SM1Z1710R and SM1Z1715R, 2 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".

### STARTER ASSEMBLY ADAPTER PLATES

These accessories permit the assembly of starters, making slim and compact equipment that's easy and quick to install.

The starter adapter plates install on DIN rail 35mm/1.38".

### 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.

① Complete with rubber membrane.



# 1 Motor protection circuit breakers

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



SM2X11...



SM2X12...

SM2X1311



SM2X14...

SM2X16...



SM2X18...

Order code	Characteristics	Qty per pkg	Wt
		n°	[kg]

**Add-on auxiliary contacts.**

<b>SM2X1120</b>	Front mount 2NO	10	0.020
<b>SM2X1111</b>	Front mount 1NO+1NC	10	0.020
<b>SM2X1102</b>	Front mount 2NC	10	0.020
<b>SM2X1220</b>	Side mount 2NO	2	0.040
<b>SM2X1211</b>	Side mount 1NO+1NC	10	0.040
<b>SM2X1202</b>	Side mount 2NC	2	0.040
<b>SM2X1311</b>	Side mount. Indicator contacts for thermal and magnetic tripping 1NO+1NC	2	0.040

**Undervoltage trip releases.**

<b>SM2X14230</b>	230VAC 50/60Hz	5	0.100
<b>SM2X14400</b>	400VAC 50/60Hz	5	0.100
<b>SM2X14440</b>	440VAC 50/60Hz	5	0.100

**Shunt trip releases.**

<b>SM2X16024</b>	24VAC 50/60Hz	5	0.100
<b>SM2X16110</b>	110VAC 50/60Hz	5	0.100
<b>SM2X16230</b>	230VAC 50/60Hz	5	0.100
<b>SM2X16400</b>	400VAC 50/60Hz	5	0.100
<b>SM2X16440</b>	440VAC 50/60Hz	5	0.100

**Padlockable IP65 (4X) door coupling handle for SM2R... and SM3R....**

<b>SM2X18200R</b>	Red/yellow complete with rod length 200mm/7.87"	1	0.115
<b>SM2X18B200R</b>	Black complete with rod with rod length 200mm/7.87"	1	0.115

**Phase separation barriers set for SM3R...<sup>1</sup>**

<b>SM3X9000R</b>	For Type E as per UL60947-4-1	1	0.175
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<sup>1</sup> 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 blocks<sup>2</sup>
- IEC conventional free air thermal current I<sub>th</sub>: 10A (5A for SM2X11...)
- IEC rated insulation voltage U<sub>i</sub>: 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...2.5mm<sup>2</sup> 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<sup>2</sup> 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<sup>2</sup> 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.

<sup>2</sup> Side blocks: n. 1 SM2X12... + SM2X1311.  
It is not possible to mount 2 blocks SM2X12...







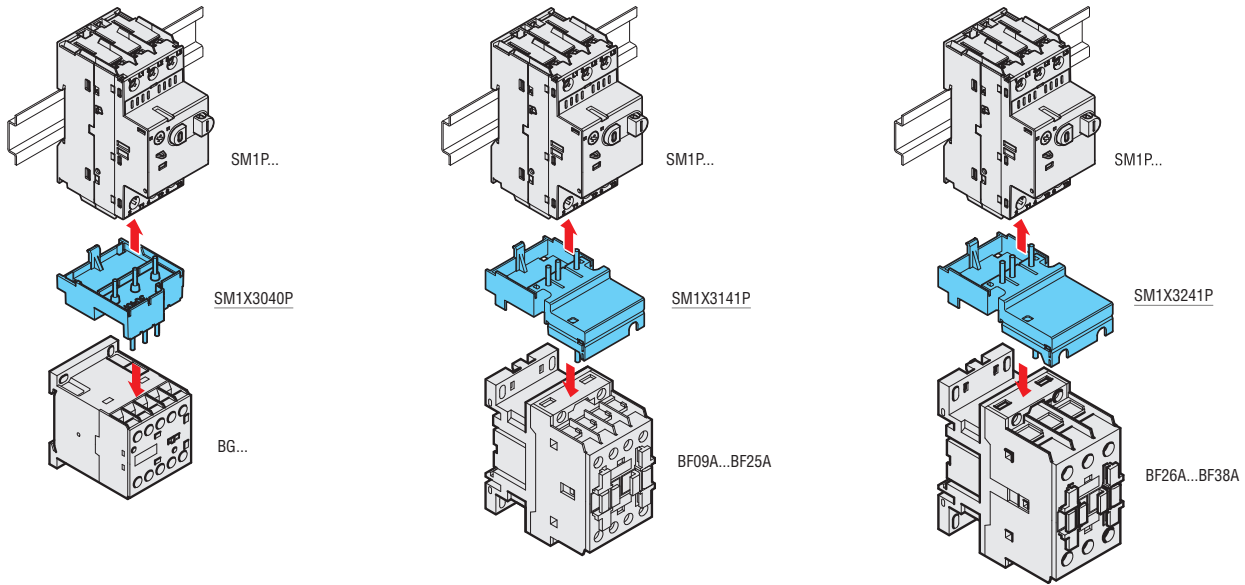


# 1 Motor protection circuit breakers

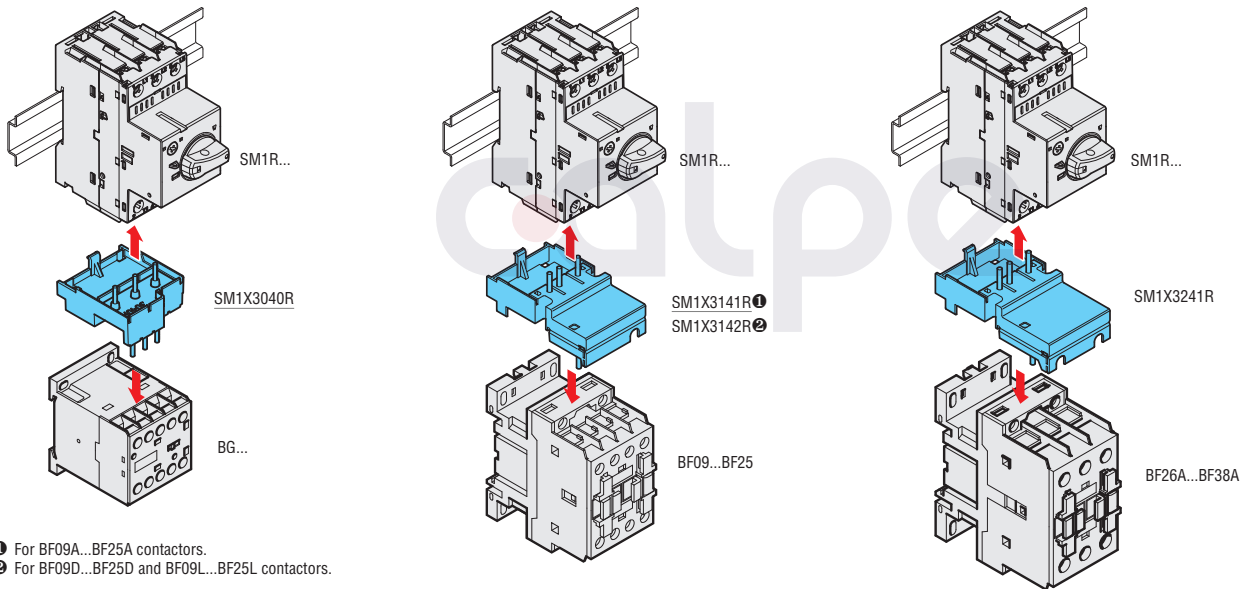
Add-on blocks and accessories for SM1...

## Combinations

Rigid SM1P... breaker - contactor connections.

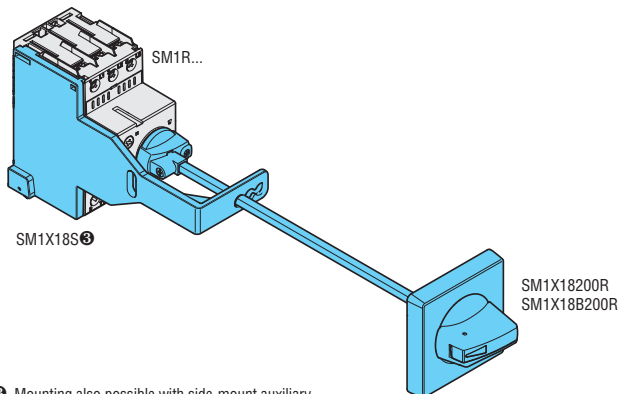


Rigid SM1R... breaker - contactor connections.



- 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...

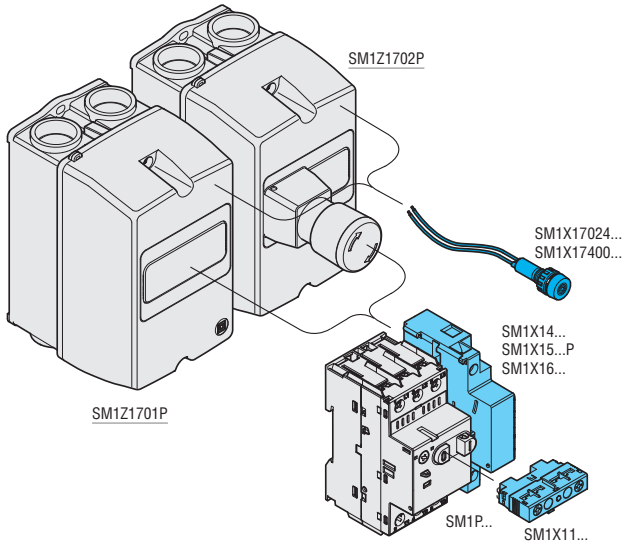


# 1 Motor protection circuit breakers

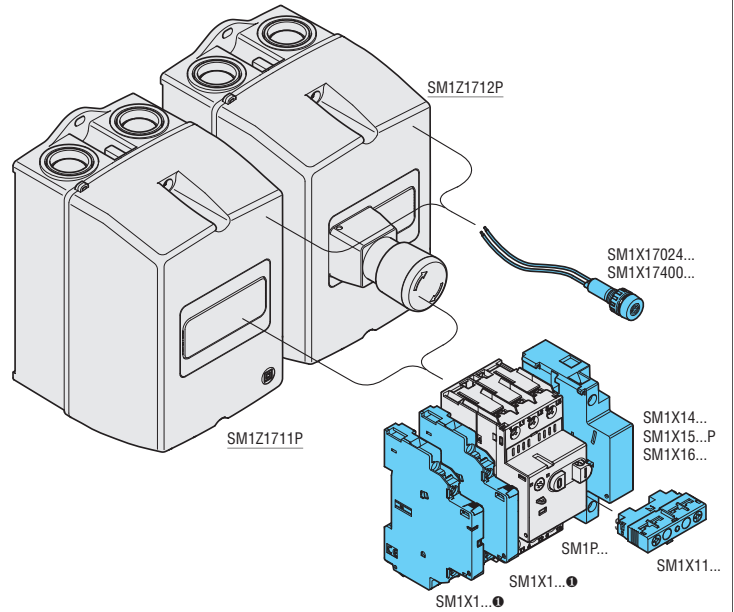
Add-on blocks and accessories for SM1...

## Combinations

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

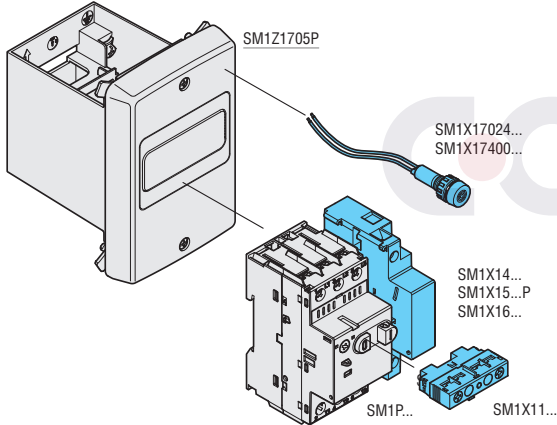


Surface mount enclosures for SM1P... Width 100mm.

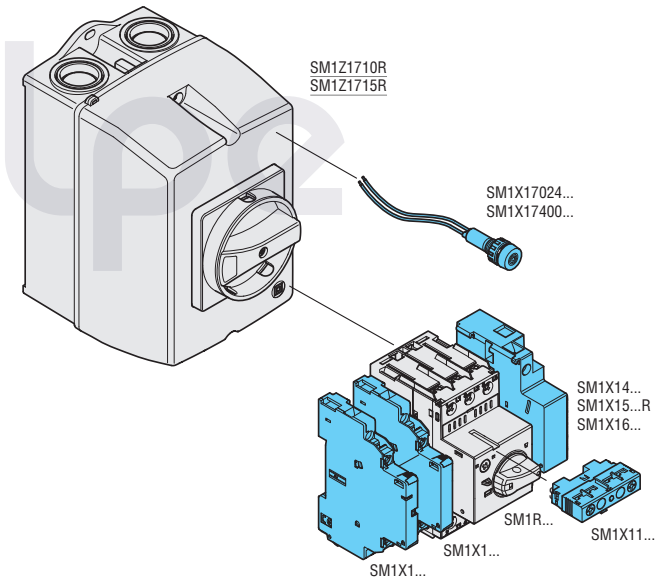


① Contacts for magnetic tripping indication SM1X1311M when mounted in SM1Z1711P and SM1Z1712P, can't be mounted alone, but shall be mounted in combination with SM1X12... on SM1X1311.

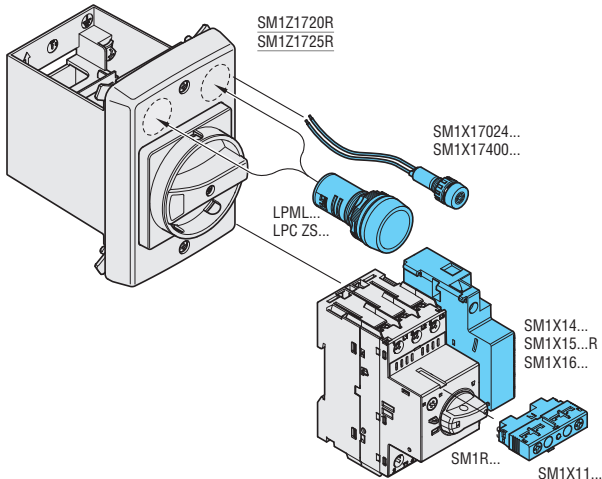
Flush mount enclosures for SM1P... Width 87mm/3.42".



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



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





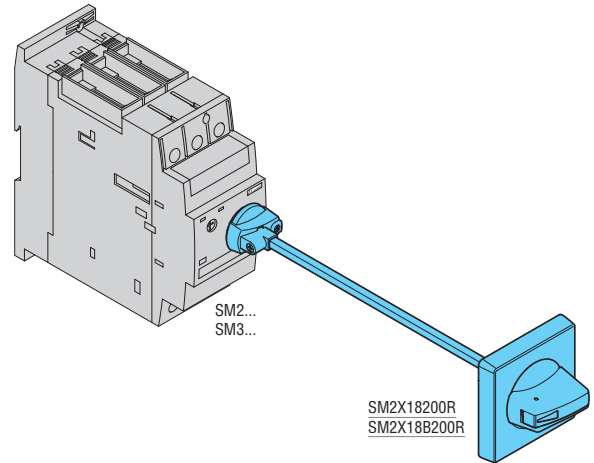
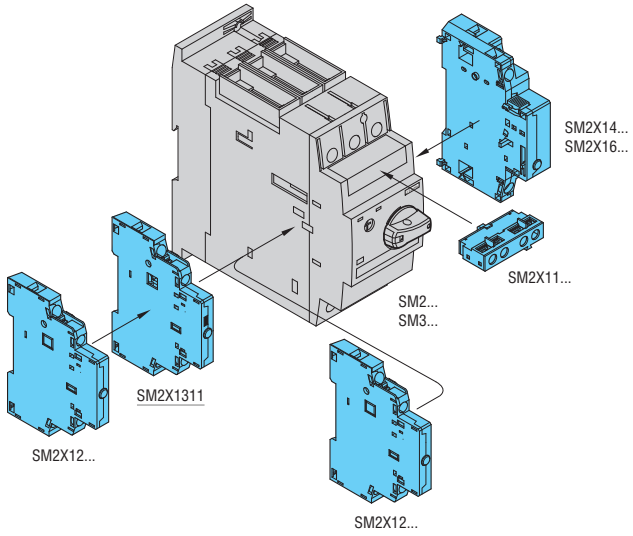
# 1 Motor protection circuit breakers

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

## Combinations

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

Padlockable door coupling handle.

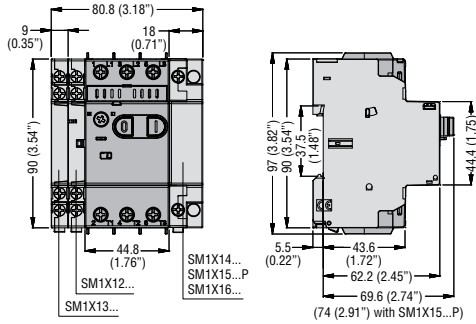




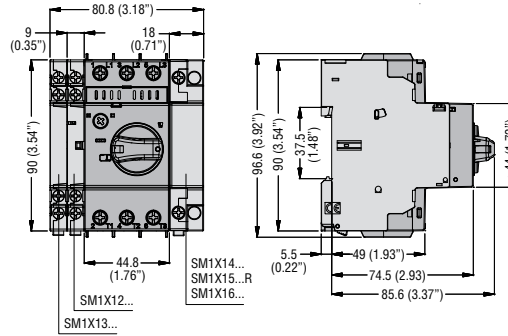
# 1 Motor protection circuit breakers

Dimensions [mm (in)]

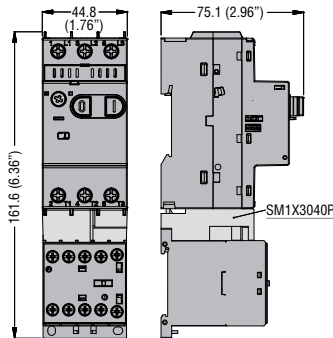
**SM1P... with side-mount auxiliary contacts**



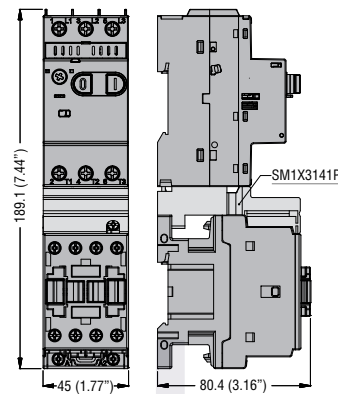
**SM1R... with side-mount auxiliary contacts**



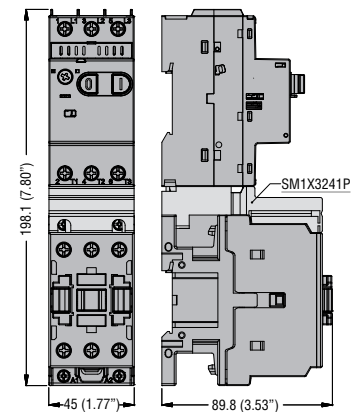
**SM1P... with BG... mini-contacts and connection SM1X3040P**



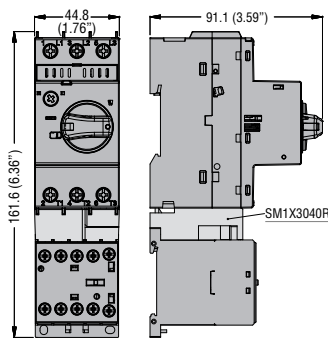
**SM1P... with BF09 A...BF25 A... contactors and connection SM1X3141P**



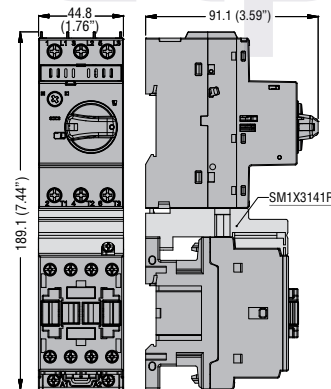
**SM1P... with BF26 A...BF38 A... contactors and connection SM1X3241P**



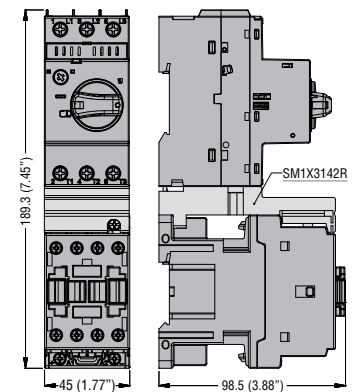
**SM1R... with BG... mini-contacts and connection SM1X3040R**



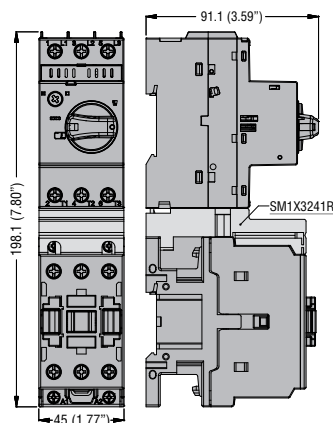
**SM1R... with BF09 A...BF25 A... contactors and connection SM1X3141R**



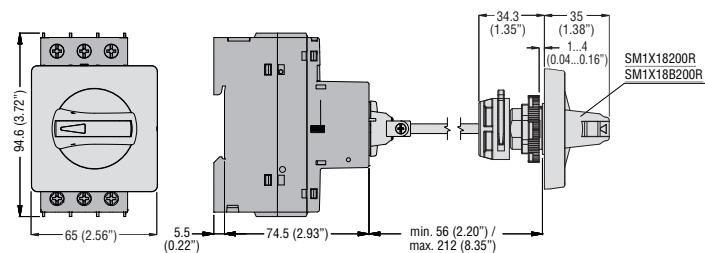
**SM1R... with BF09 D...BF25 D... contactors BF09 L...BF25 L... and connection SM1X3142R**



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



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







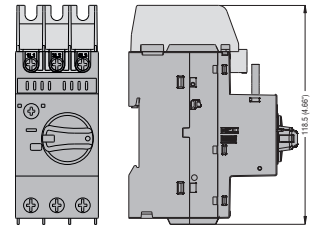
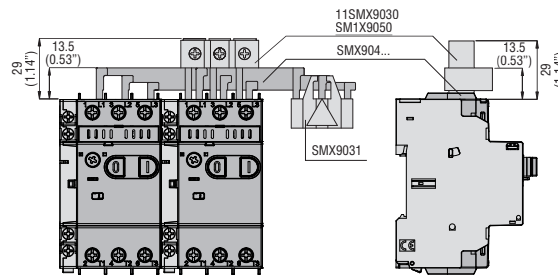
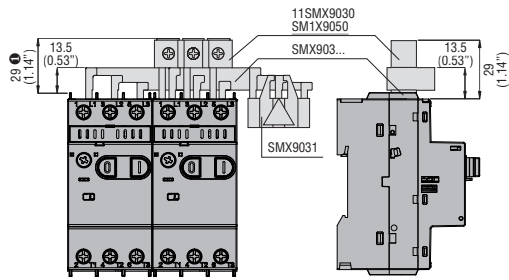
# 1 Motor protection circuit breakers

## Dimensions [mm (in)]

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**

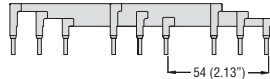
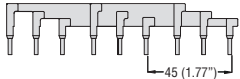
**SM1X9000R**



37mm (1.45") for SM1X9050

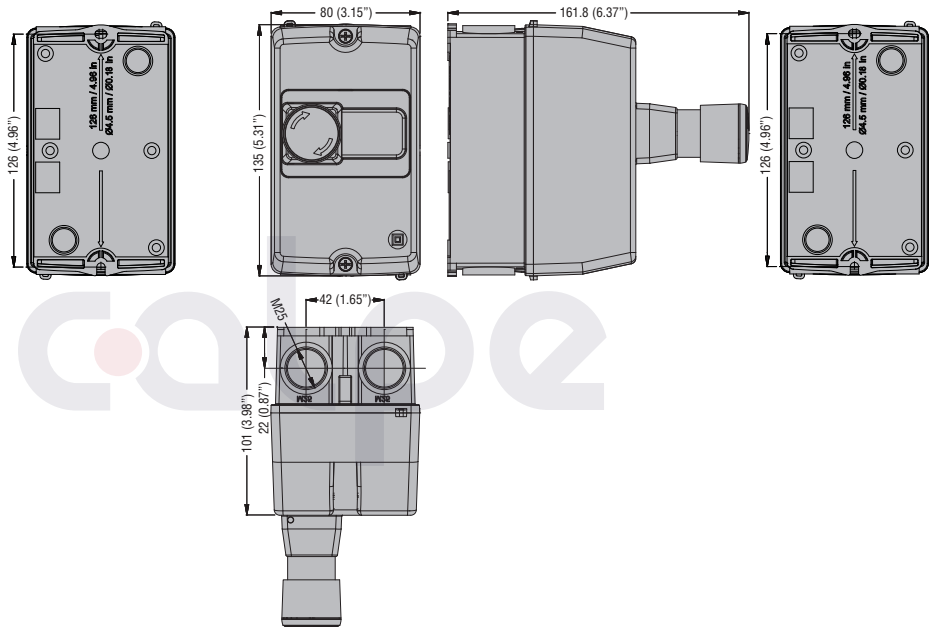
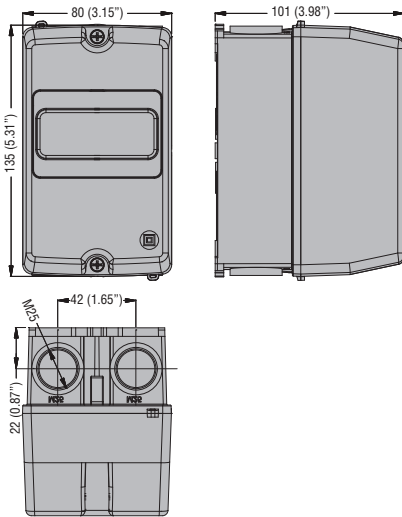
**SMX9032 - SMX9033 - SMX9034 - SMX9035**  
Connection busbars – 45mm/1.77" spacing

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



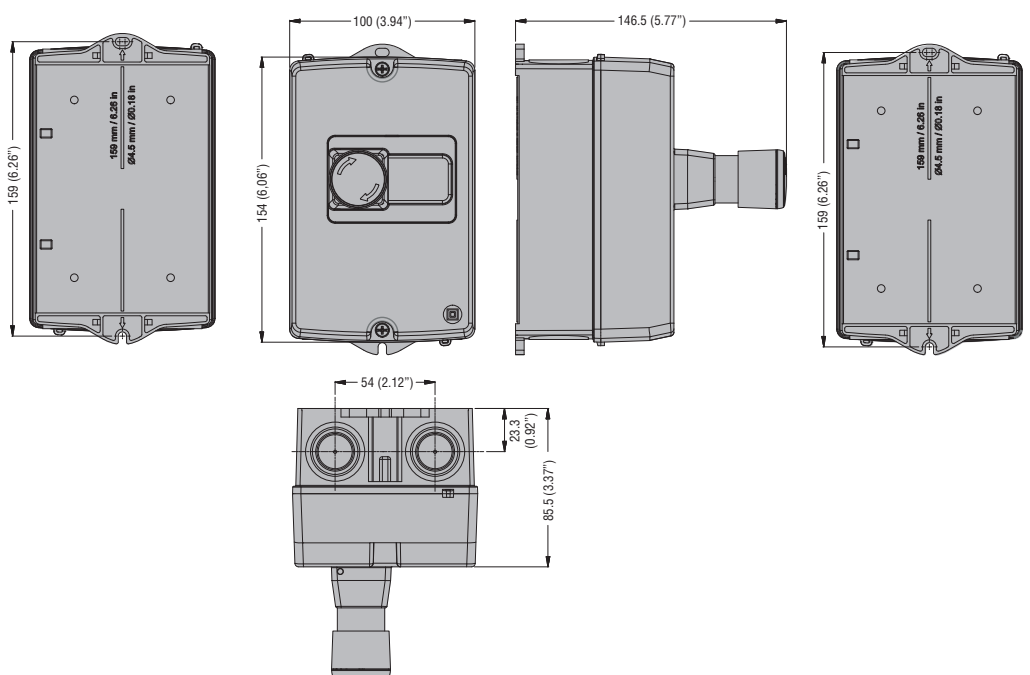
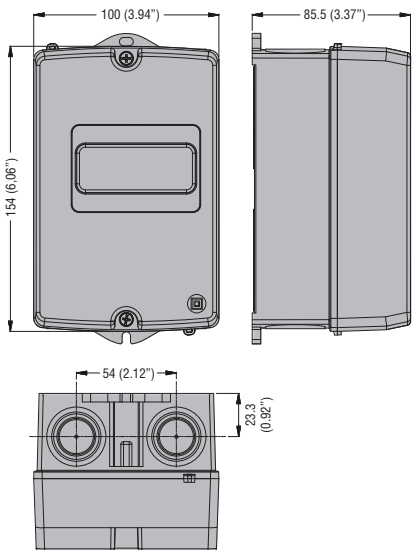
### Enclosures **SM1Z1701P**

### Enclosures **SM1Z1702P**



### Enclosures **SM1Z1711P**

### Enclosures **SM1Z1712P**

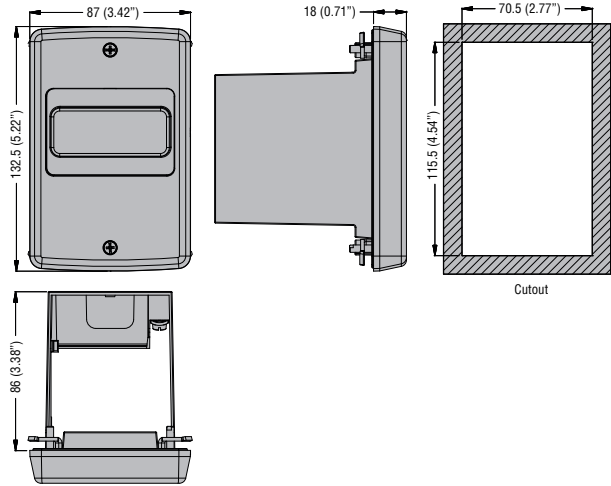


# 1 Motor protection circuit breakers

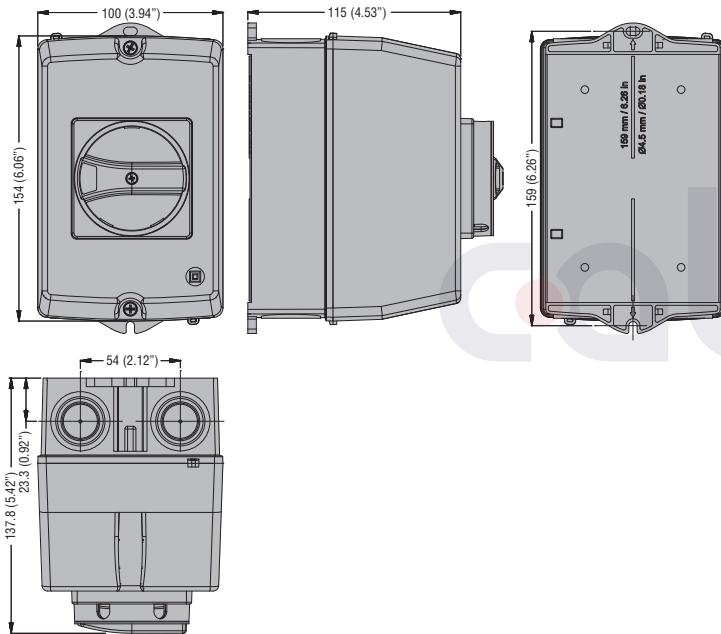
Dimensions [mm (in)]

1

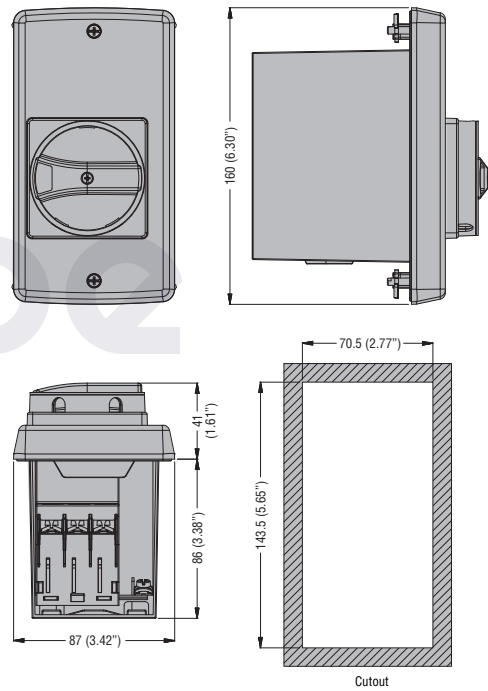
Enclosures **SM1Z1705P**



Enclosures **SM1Z1715R** and **SM1Z1710R**



Enclosures **SM1Z1720R** and **SM1Z1725R**



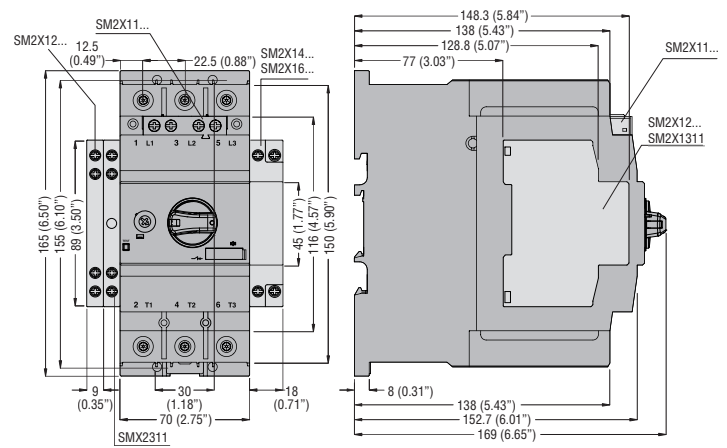
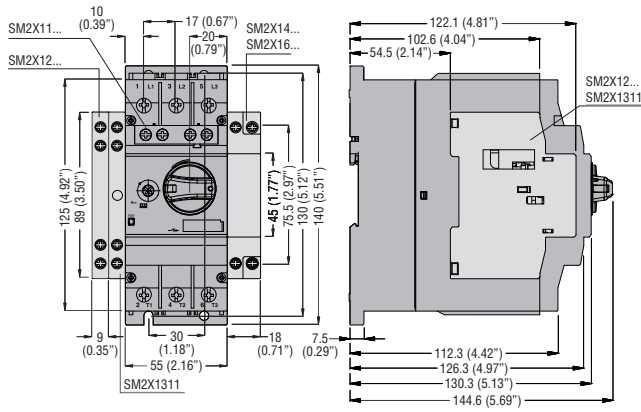


# 1 Motor protection circuit breakers

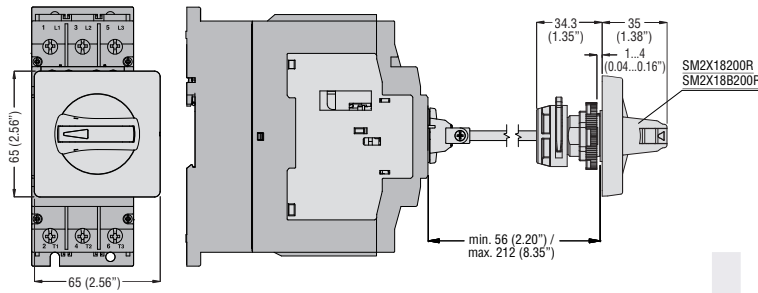
Dimensions [mm (in)]

**SM2... with side-mount auxiliary contacts**

**SM3... with side-mount auxiliary contacts**

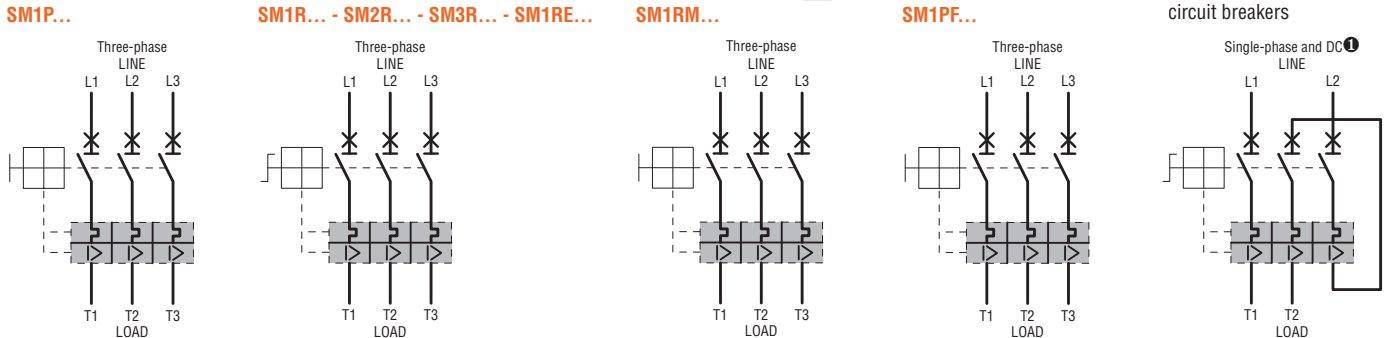


**SM2... and SM3... padlockable door coupling handle**  
**SM2X18200R or SM2X18B200R**



## Wiring diagrams

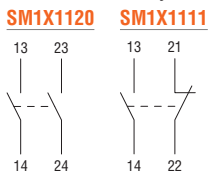
### MOTOR PROTECTION CIRCUIT BREAKERS



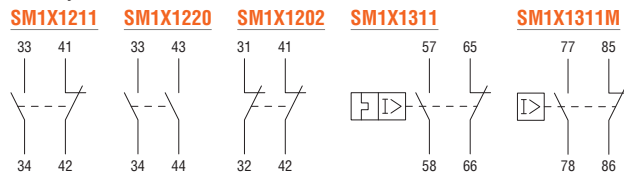
❶ Consult our Technical support for DC use.

### ADD-ON BLOCKS

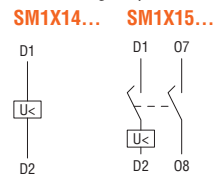
For SM1... types  
Front mount auxiliary contacts



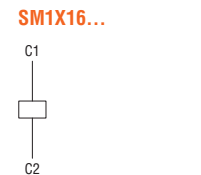
Side mount auxiliary contacts



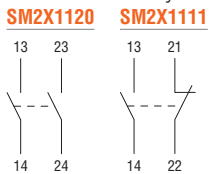
Side mount undervoltage trip releases



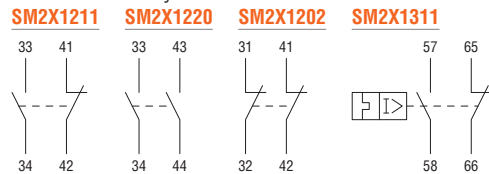
Side mount shunt trip release



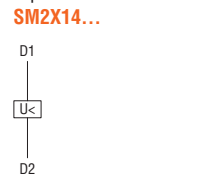
For SM2R... and SM3R... types  
Front mount auxiliary contacts



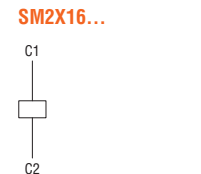
Side mount auxiliary contacts



Side mount undervoltage trip release



Side mount shunt trip release



# 1 Motor protection circuit breakers

## Technical characteristics

TYPE		SM1P...	SM1R...	SM2R...	SM3R...	
Rated insulation voltage $U_i$	V	690		1000		
Rated impulse withstand voltage $U_{imp}$	kV	6				
Rated frequency: 50/60Hz						
Maximum rated current	A	40	40	63	100	
Number of adjustment ranges	No.	16	16	2	3	
Total power dissipation at maximum current	W	5...15	5...15	7.1...20	10...38	
Magnetic tripping	A	$13 \times I_n$ ①	$13 \times I_n$	$13 \times I_n$	$13 \times I_n$	
Mechanical life	cycles	100,000	100,000	50,000	50,000	
Electrical life ( $I_e$ max AC3)	cycles	100,000	100,000	25,000	25,000	
Terminal tightening torque	Nm	2.5...3	2.5...3	3...4.5	4...6	
	lb.in	22...26.5	22...26.5	36	53	
	Tool	PH2	PH2	PZ2	Allen 4mm	
Conductor section minimum and maximum (1 or 2 wires)	AWG	No. 16...8	16...8	18...3	10...1/0	
Flexible without lug	mm <sup>2</sup>	1...10	1...10	0.75...25	10...50	
<b>AMBIENT CONDITIONS</b>						
Temperature	operating	°C	-20...+60 ②	-20...+60 ②	-20...+70 ②	-20...+70 ②
	storage	°C	-50...+80	-50...+80	-50...+80	-50...+80
	compensation	°C	-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		

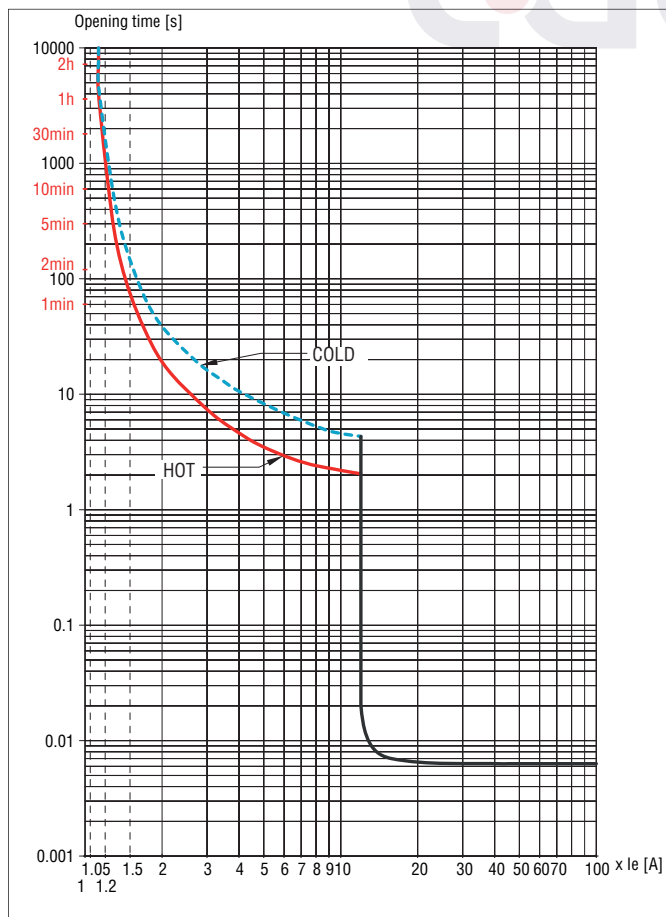
E.g. PH = Phillips; PZ = Pozidriv; Allen is metric type.

① SM1PF0020 has a single 0.2A thermal adjustment and magnetic tripping at  $6 \times I_n$  (1.2A).

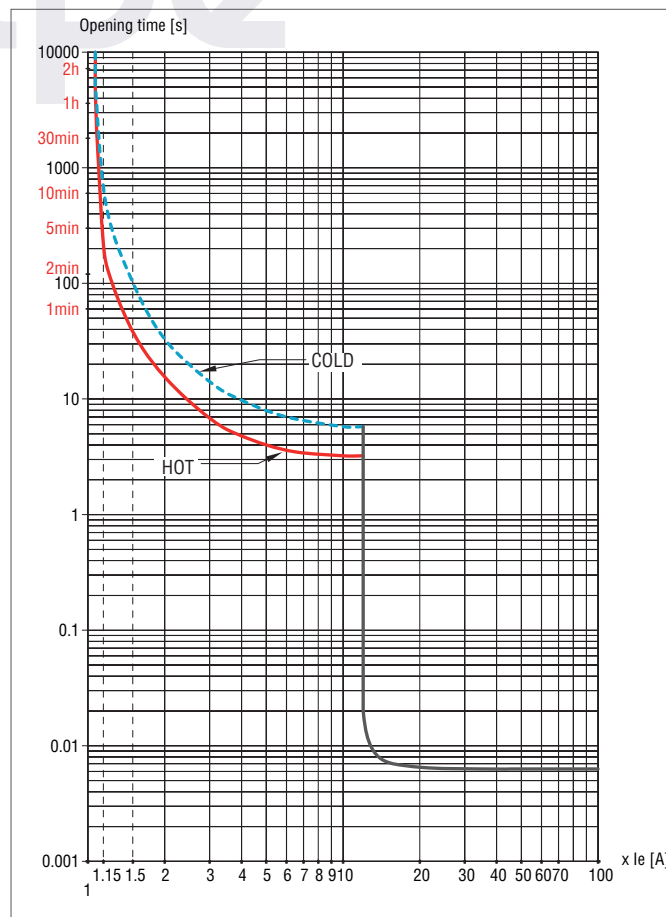
② When fitting more than one breaker side by side, without leaving space between each to consent free air circulation on the breaker sides, and have simultaneous operation, the thermal trip adjuster must be positioned at a value 15% higher than the rated motor current.

### THERMAL TRIPPING CURVE (AVERAGE TIMES)

#### Three-phase balanced operation



#### Two-phase operation (phase failure/single phasing)



Tripping times can have a  $\pm 20\%$  deviation with respect to the average tripping curve value above.