

TÜV Rheinland

FUJI
ELECTRIC



MANUAL MOTOR STARTERS MAGNETIC CONTACTORS



DUO SERIES

Advanced Motor Protection and Control – Fuji DUO series

Fuji's new motor control system for the international market.

The DUO series adds a new family of compact, high-performance combination starters to manual motor starters BM3 series, magnetic contactors SC-M and SC-E series and thermal overload relays TK-E series to form a complete line-up of motor control products.

Responding to today's market needs, Fuji DUO series was designed to provide various distinctive features.

ULTIMATE COST SAVING SOLUTION

- The number of components like Circuit Breakers can be reduced. (See page 4 to 7 for detail.)
- Combination starters combined with manual motor starters and contactors, provides 52% reduction for mounting space and 90% reduction for wiring work to make a control panel.

RESPONSE TO THE INTERNATIONAL MARKET

- Short-circuit protective coordination between protective devices and the equipment to be protected.
- Conformance to UL including Type E, Type F, CSA, IEC and other international standards.

SAFETY AND ECOLOGICAL CONSIDERATION

- Application of international standards in safety features such as terminals with finger protection.
- Use of recycled materials to help conserve the environment and save resources.

FUJI meets emerging needs with a new form of motor protection.

DUO SERIES

Manual motor starters (MMS)

BM3 series

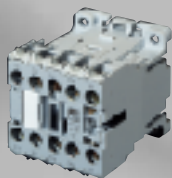


Manual Motor Starters that provide optimal protection by integrating the functions of a molded case circuit breaker and thermal overload relay into a highly compact unit.

Rated current: 0.16 to 32A, 10 to 63A
Short circuit current rating : 22, 50kA 480VAC
Width: 45mm, 55mm

Contactors and thermal overload relays

SC-M series



Compact magnetic contactors and small capacity motor control for 3 to 5HP, 480VAC.

Rated capacity: AC-3 3 to 5HP, 480VAC
Width: 45mm

SC-E series



TK-E series



Magnetic contactors and thermal overload relays featuring terminals with finger protection for 5 to 100HP.

Rated capacity: AC-3 5 to 100HP
Width: 43,54,67mm (5 to 50HP)
88,100,115mm (60 to 100HP)

Combination starters

Provide the ability to configure combination starters for compact, reliable motor protection by combining a manual motor starter and a magnetic contactor.



Manual motor starters BM3 series

Conforming to international standards and combining compactness with high breaking performance, this versatile series features leading-edge motor protection.

Molded case circuit breaker and thermal overload relay functions integrated into a highly compact unit.

Circuit breaker functions

- Short-circuit protection
- Overcurrent protection
- Line protection



Thermal overload relay functions

- Overload protection
- Phase-loss protection
- Rated current adjustment
- Ambient temperature compensation



Manual motor starter advantages



Compactness

Mounting space: MCCB + Thermal overload relay: 100%
MMS: **43%** (57% reduction)

Reduction in wiring work

MCCB + Contactor + Thermal overload relay: 100%
MMS + Contactor: **50%** (50% reduction)

Standards

• IEC 60947-1, 60947-2, 60947-4-1, UL 508, CSA C22.2 No.14

Approved

• cUL (File No. E163944, E211710), TÜV (R205062B)

Ecological design

- Recyclable thermoplastic resin used in plastic parts
- Indication of materials used
- Cadmium-free contacts

Magnetic contactors SC-M and SC-E series

A full line-up consisting of the mini-contactor SC-M series for 3 to 5HP, 480VAC use and the SC-E series for 5 to 100HP 480VAC use.

- Finger protection standard
- Lug terminal

SC-M series



SC-M01, M02

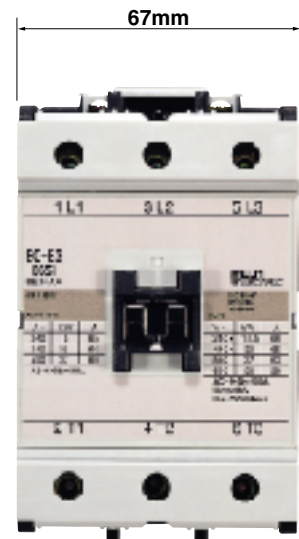
SC-E series



SC-E02 to E05



SC-E1 to E2S

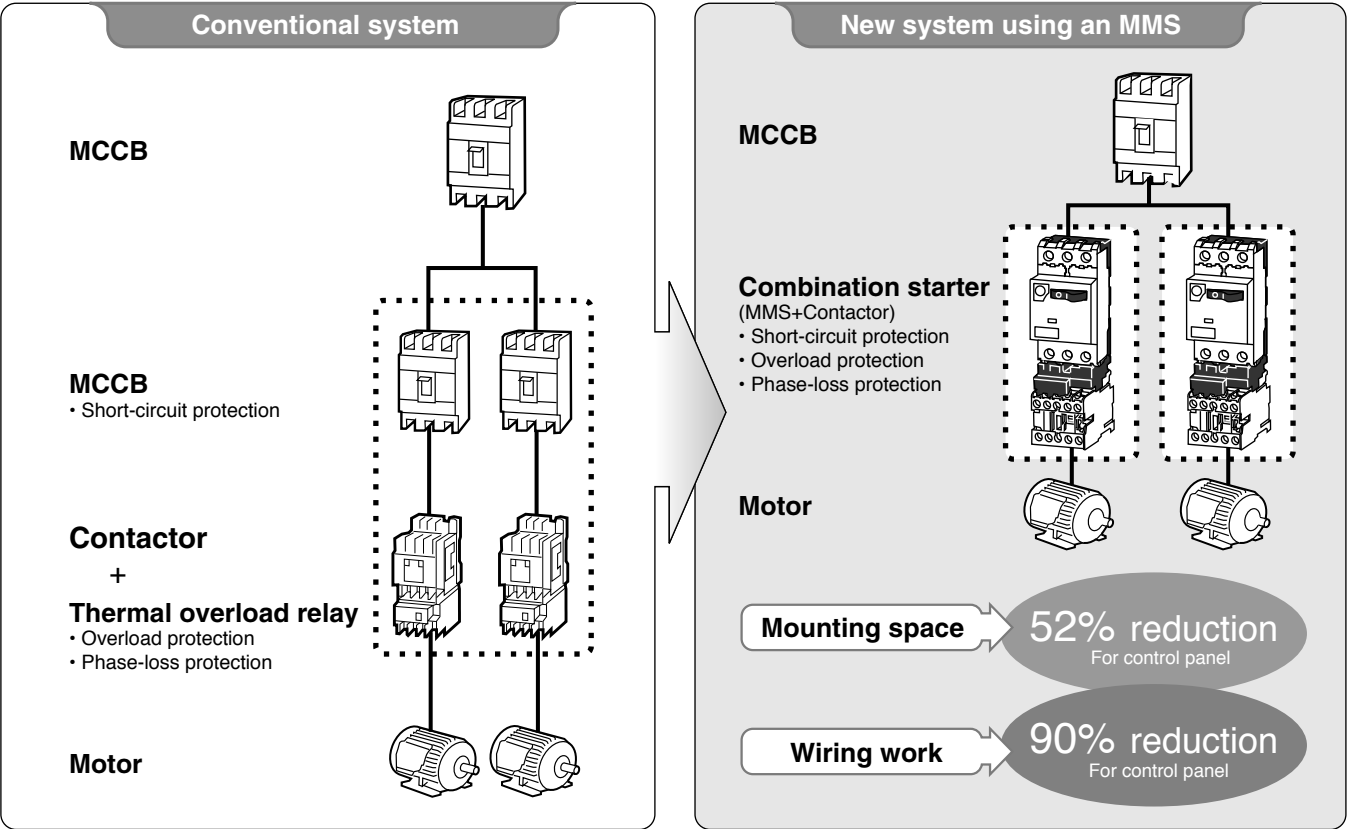


SC-E3, E4

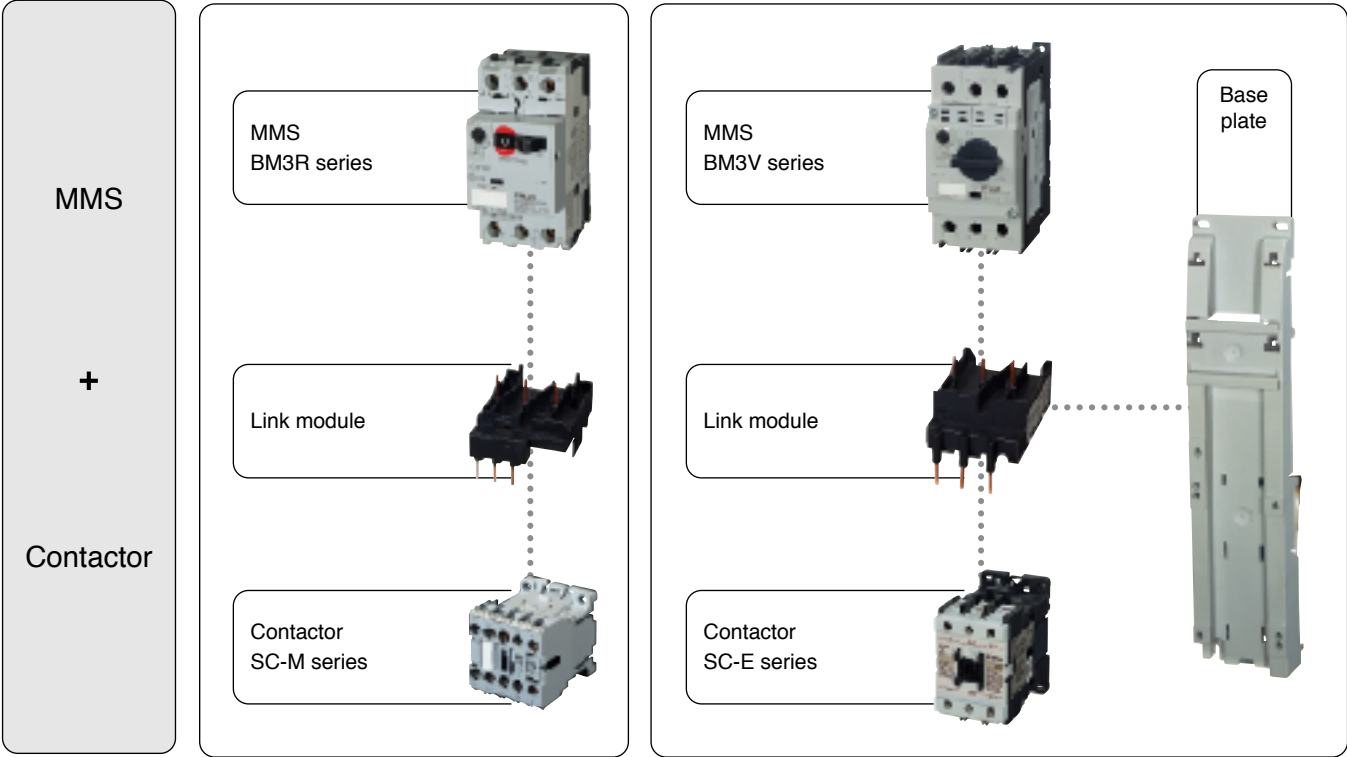
Combination of manual motor starters and magnetic contactors

A line-up that aims to set a new world standard for compactness, high performance, and utility in combination starters.

Space-saving, reliable motor protection achieved by combining a manual motor starter and magnetic contactor.



Combination starters can be easily configured with a manual motor starter, magnetic contactor and other parts.



Fuji proposes ultimate cost saving solution with DUO series

Fuji Manual Motor Starter (MMS) intends to apply for manual motor starting application.

As UL listed manual motor controller per UL508, they provide overload protection but are required to be installed with short circuit protection devices (Fuses or Circuit Breakers) on the upstream.

However, according to National Electrical Code (NEC), you can save the cost of short circuit protection devices and can make a smaller panel using DUO series.

The following are case studies for the cost saving use of Fuji DUO series.

Case study 1 : Group Motor Installation

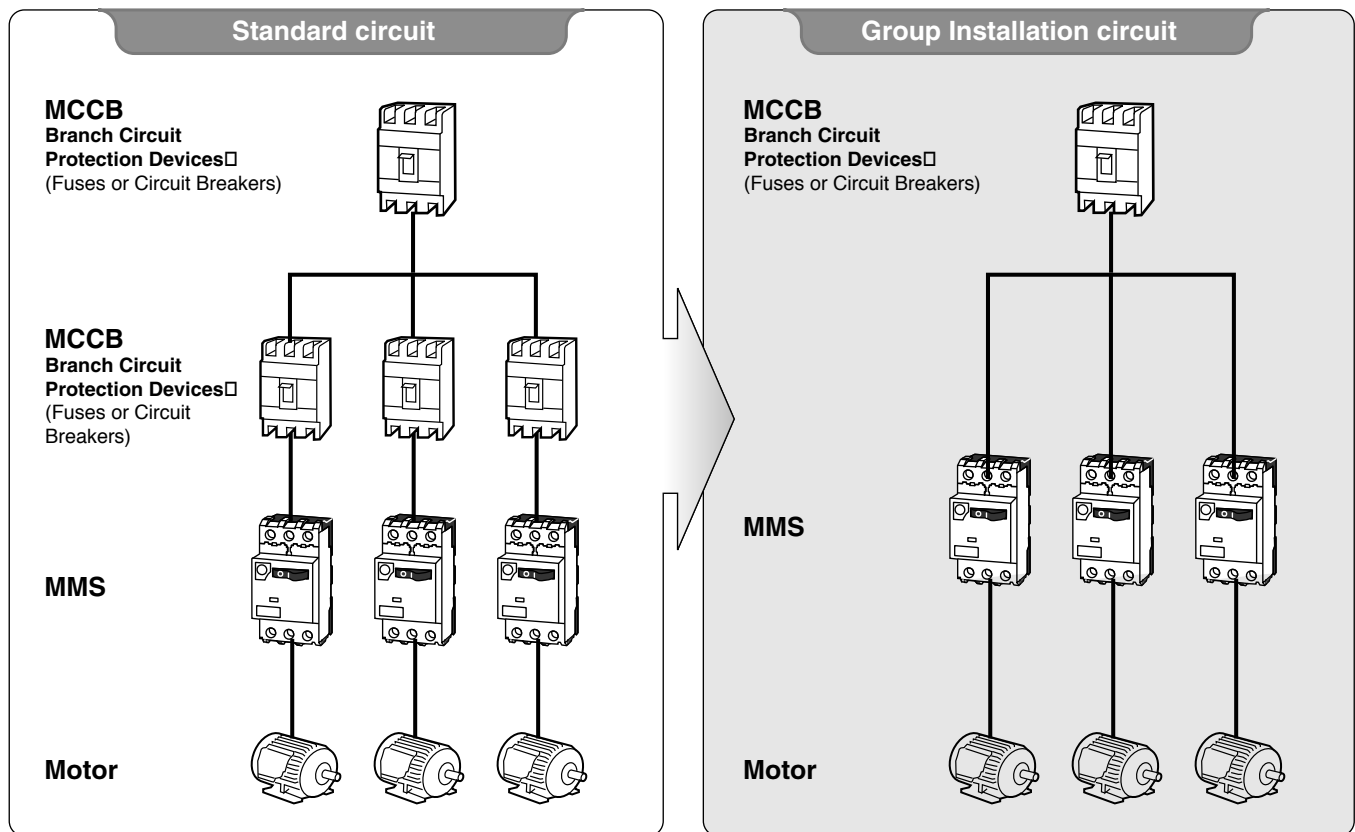
Per NEC430-52 and -53, the combination with a specific rated Fuse or Circuit Breaker allows several motors in a circuit composition.

Fuji MMS are cUL listed per group installation regulations of NEC.

Two or more motors can be connected to one branch circuit when the MMS is used with a specific current rated branch circuit protection device (see remarks below).

The advantages of Group Installation are as follows.

- **The number of components like Circuit Breakers can be reduced**
- **The wire size can be reduced by 1/3 - 1/10 under certain conditions**
- **The area inside the control panel can be minimized**



Remarks :

Per NEC regulations, to connect several motors on one branch circuit protection device, note the following conditions (A) or (B) or (C) and condition (D) listed NEC article 430.53 must be complied.

- (A) : Not over 1 horsepower
- (B) : If smallest rated motor protected
- (C) : Other group installation
- (D) : Single motor taps.

For complete details, please refer to NEC book.

Case study 2 : Self-Protected Combination Motor Controller / TYPE E and TYPE F

Fuji MMS are cUL listed as a Self-Protected Combination Controller such as Type E and Type F.

To apply MMS as Self-Protected Combination Controller, MMS must be attached to short circuit alarm contact block (**BZ0TKUAB**).
32A frame type, BM3R series must also be attached to the line side terminal cover (**BZ0TCRE**) because the Self-Protected Combination Controller has the clearance and creepage distance requirements as UL489 regulation.
(63A frame type, BM3V series complies with their regulation without terminal cover.)

- (1) Combination motor controller, **Type E**, when only MMS is used.
(Manual Self-Protected Combination Motor Controller according to UL508)
- (2) Combination motor controller, **Type F**, when MMS is used with Fuji SC-E, SC-M contactor.
(Manual Self-Protected Combination Motor Controller + Magnetic contactor according to UL508)

The advantage of a Self-Protected Combination Motor Controller is that it can replace a **UL489 Circuit Breaker**.

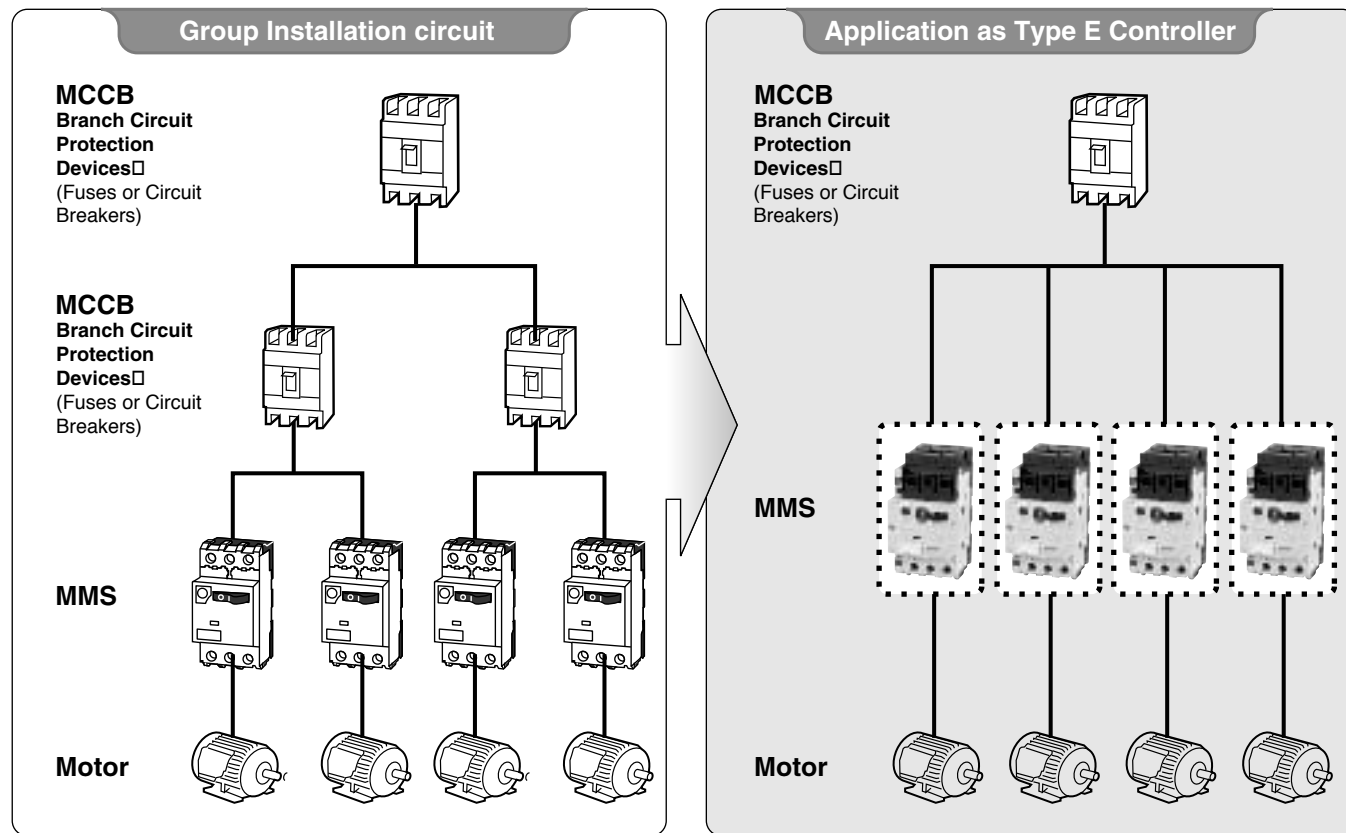
This means that in a motor branch circuit, the UL489 Circuit Breaker upstream can be eliminated.

MMS has a trip function like a Circuit Breaker for the purpose of protection against short-circuit.

Therefore, the number of components can be reduced and will result in saving more space than the ordinary Group Installation.

* The self-protected combination motor controller can be used as branch circuit protection in *Motor Circuit only*.
They cannot be applied to any other loads such as resistance load.

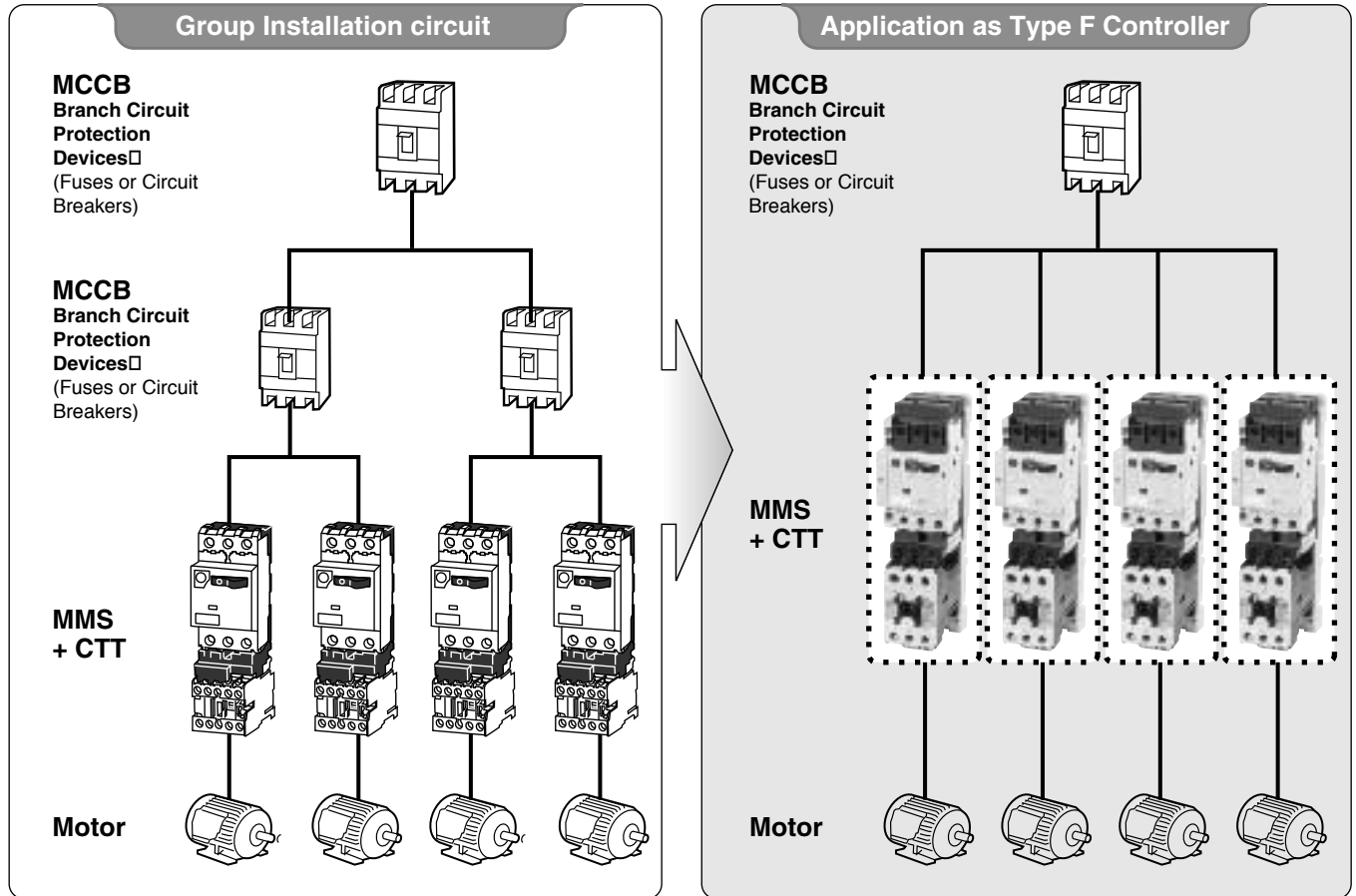
Example of Type E application



Requirements for Type E construction

- Terminal cover (BZ0TCRE) except for BM3V series.
- Short-circuit alarm contact block (BZ0TKUAB) for all MMS.

Example of Type F application



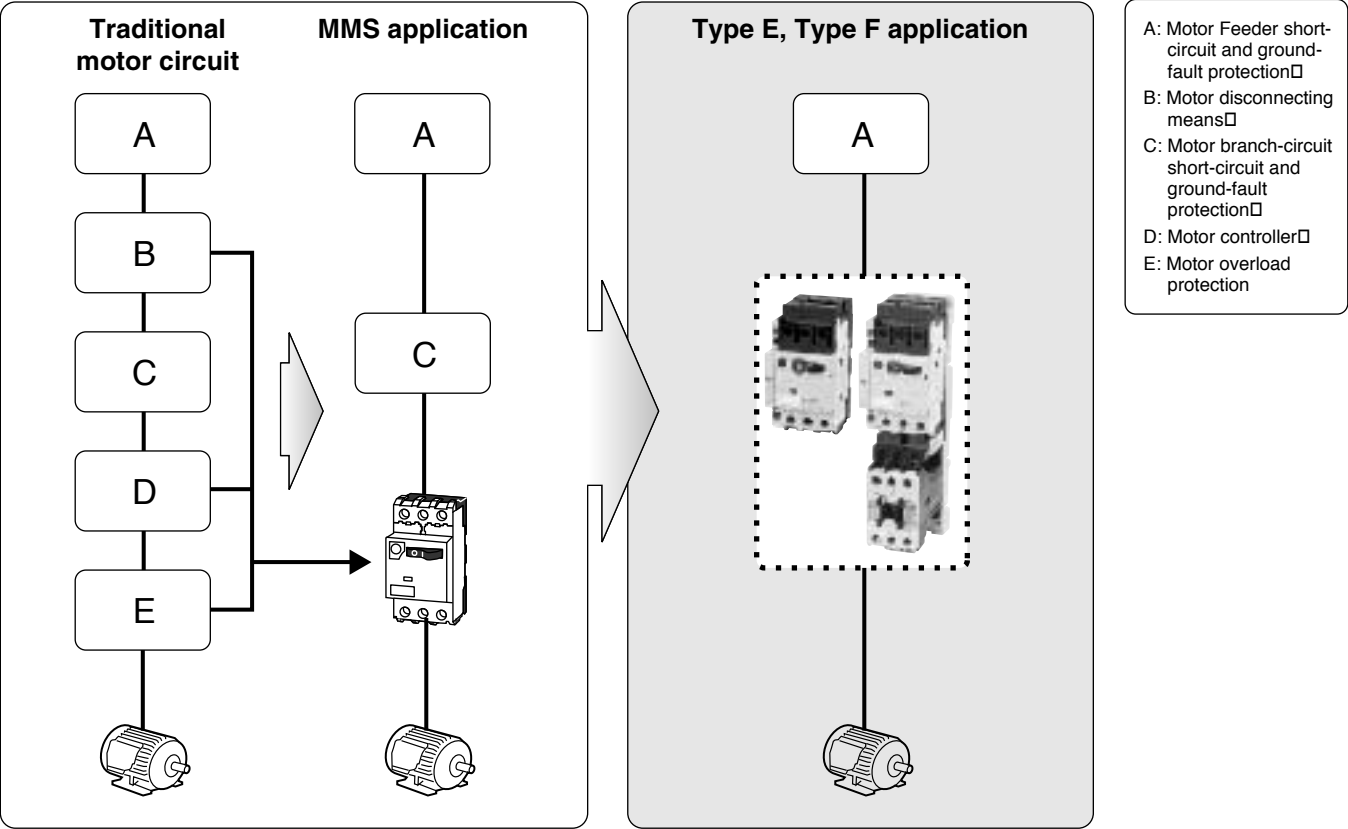
Requirements for Type F construction□

- Must be used with contactor for motor control function.□
- Terminal cover (BZ0TCRE) except for BM3V series.□
- Short-circuit alarm contact block (BZ0TKUAB) for all MMS.

Case study 3 : Motor Disconnecting Means

Per NEC 430.102, a disconnecting means must be applied to each controller.
Fuji MMS are also cUL listed as **"Suitable as Motor disconnect"** and can be applied as a Motor disconnect.

The advantage of using MMS for disconnect means :
- An extra component will not be needed because the MMS has a dual function, which will lead to smaller space requirement and less components.



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Manual Motor Starters

Quick reference guide

■ 32A Frame types and ratings

Adjustable thermal-magnetic trip type		Standard breaking capacity BM3RSB-□  KK01-317									
Number of poles		3									
Handle type		Rocker									
Rated current Ie (A)		0.16 to 32									
Rated operational voltage Ue (V)		200 to 690									
Rated frequency (Hz)		50/60									
Rated insulation voltage Ui (V)		690									
Rated impulse withstand voltage Uimp (kV)		6									
Utilization category IEC 60947-2 Circuit breaker		Cat. A									
IEC 60947-4-1 Motor starter		AC-3									
Trip class IEC 60947-4-1		10									
Instantaneous trip characteristic		13 × Ie max.									
Power loss (total of 3-pole)		7W: In=0.16 to 25A 8.5W: In=32A									
Mechanical durability (operations)		100,000: In=0.16 to 25A 70,000: In=32A									
Electrical durability (operations)		100,000: In=0.16 to 25A 70,000: In=32A									
Max. operations per hour (motor start-up)		25									
Phase-loss protection		Provided									
Trip indicator		Provided									
Test trip function		Provided									
Adjustable current range		UL/CSA 3phase HP rating (HP) *2				Instantaneous trip current (A)	UL/CSA Short circuit current rating (kA) *3			Maximum listed branch circuit protection *3 Fuse or MCCB (A)	
Code *1	Ie: Min.–Max. (A)	200-208VAC	220-240VAC	440-480VAC	550-600VAC		240VAC	480VAC	600VAC		
P16	0.1–0.16	In accordance with Motor full load current				2.1	100	50	10	500	
P25	0.16–0.25					3.3	100	50	10	500	
P40	0.25–0.4					5.2	100	50	10	500	
P63	0.4–0.63					8.2	100	50	10	500	
001	0.63–1						1/2	13	100	50	10
1P6	1–1.6			3/4	3/4	20.8	100	50	10	500	
2P5	1.6–2.5	1/2	1/2	1	1-1/2	32.5	100	50	10	500	
004	2.5–4	3/4	3/4	2	3	52	100	50	10	500	
6P3	4–6.3	1	1-1/2	3	5	81.9	100	50	10	500	
010	6.3–10	2	3	5	7-1/2	130	100	22	10	500	
013	9–13	3	3	7-1/2	10	169	100	22	10	500	
016	11–16	3	5	10	10	208	100	22	10	500	
020	14–20	5	5	10	15	260	50	22	10	500	
025	19–25	7-1/2	7-1/2	15	20	325	50	22	10	500	
032	24–32	10	10	20	30	416	50	22	10	500	
Dimensions (mm) W x H x D		45 x 90 x 66									
Mass (g)		350									
Optional accessory	Auxiliary contact block	○									
	Alarm contact block	○									
	Auxiliary and alarm contact block	○									
	Short-circuit alarm contact block	○									
	Shunt trip device	○									
	Undervoltage trip device	○									
	External operating handle	—									
Standard		IEC 60947-1, 60947-2, 60947-4-1, UL 508, CSA C22.2 No.14									

Notes: *1 Replace the □ mark in the part number by current range codes.

*2 The BM3RSB is cUL listed as HP rated motor controllers.

*3 The BM3RSB is cUL listed for group Installation as per NEC430-53(C).

○ Available

– Not available

■ 32A Frame types and ratings

Adjustable thermal-magnetic trip type		High breaking capacity BM3RHB-□  AF01-42									
Number of poles		3									
Handle type		Rotary									
Rated current Ie (A)		0.16 to 32									
Rated operational voltage Ue (V)		200 to 690									
Rated frequency (Hz)		50/60									
Rated insulation voltage Ui (V)		690									
Rated impulse withstand voltage Uimp (kV)		6									
Utilization category IEC 60947-2 Circuit breaker		Cat. A									
IEC 60947-4-1 Motor starter		AC-3									
Trip class IEC 60947-4-1		10									
Instantaneous trip characteristic		13 × Ie max.									
Power loss (total of 3-pole)		7W: In=0.16 to 25A 8.5W: In=32A									
Mechanical durability (operations)		100,000: In=0.16 to 25A 70,000: In=32A									
Electrical durability (operations)		100,000: In=0.16 to 25A 70,000: In=32A									
Max. operations per hour (motor start-up)		25									
Phase-loss protection		Provided									
Trip indicator		Provided									
Test trip function		Provided									
Adjustable current range		UL/CSA 3phase HP rating (HP) *2				Instantaneous trip current (A)	UL/CSA Short circuit current rating (kA) *3			Maximum listed branch circuit protection *3	
Code *1	Ie: Min.–Max. (A)	200-208VAC	220-240VAC	440-480VAC	550-600VAC		240VAC	480VAC	600VAC		Fuse or MCCB (A)
P16	0.1–0.16	In accordance with Motor full load current				2.1	100	50	10	500	
P25	0.16–0.25					3.3	100	50	10	500	
P40	0.25–0.4					5.2	100	50	10	500	
P63	0.4–0.63					8.2	100	50	10	500	
001	0.63–1					13	100	50	10	500	
1P6	1–1.6					20.8	100	50	10	500	
2P5	1.6–2.5	1/2	1/2	1	1-1/2	32.5	100	50	10	500	
004	2.5–4	3/4	3/4	2	3	52	100	50	10	500	
6P3	4–6.3	1	1-1/2	3	5	81.9	100	50	10	500	
010	6.3–10	2	3	5	7-1/2	130	100	50	10	500	
013	9–13	3	3	7-1/2	10	169	100	50	10	500	
016	11–16	3	5	10	10	208	100	50	10	500	
020	14–20	5	5	10	15	260	100	50	10	500	
025	19–25	7-1/2	7-1/2	15	20	325	100	50	10	500	
032	24–32	10	10	20	30	416	100	50	10	500	
Dimensions (mm) W X H X D		45 x 90 x 79									
Mass (g)		370									
Optional accessory	Auxiliary contact block	○									
	Alarm contact block	○									
	Auxiliary and alarm contact block	○									
	Short-circuit alarm contact block	○									
	Shunt trip device	○									
	Undervoltage trip device	○									
	External operating handle	○									
Standard		IEC 60947-1, 60947-2, 60947-4-1, UL 508, CSA C22.2 No.14									

Notes: *1 Replace the □ mark in the part number by current range codes.

*2 The BM3RHB is cUL listed as HP rated motor controllers.

*3 The BM3RHB is cUL listed for group Installation as per NEC430-53(C).

○ Available

– Not available

Manual Motor Starters

Quick reference guide

■ 63A Frame types and ratings

Adjustable thermal-magnetic trip type		Standard breaking capacity BM3VSB-□ AF01-47									
Number of poles		3									
Handle type		Rotary									
Rated current Ie (A)		10 to 63									
Rated operational voltage Ue (V)		200 to 690									
Rated frequency (Hz)		50/60									
Rated insulation voltage Ui (V)		1000									
Rated impulse withstand voltage Uimp (kV)		8									
Utilization category IEC 60947-2 Circuit breaker		Cat. A									
IEC 60947-4-1 Motor starter		AC-3									
Trip class IEC 60947-4-1		10									
Instantaneous trip characteristic		13 x Ie max.									
Power loss (total of 3-pole)		11W: In=10 to 32A 15W: In=40 to 50A 17W: In=63A									
Mechanical durability (operations)		50,000									
Electrical durability (operations)		25,000									
Max. operations per hour (motor start-up)		25									
Phase-loss protection		Provided									
Trip indicator		Provided									
Test trip function		Provided									
Adjustable current range		UL/CSA 3phase HP rating (HP) *2				Instantaneous trip current (A)	UL/CSA Short circuit current rating (kA) *3			Maximum listed branch circuit protection *3	
Code *1	Ie: Min.–Max. (A)	200-208VAC	220-240VAC	440-480VAC	550-600VAC		240VAC	480VAC	600VAC		
010	6.3–10	2	3	5	7-1/2	130	100	22	10	600	
013	9–13	3	3	7-1/2	10	169	100	22	10	600	
016	11–16	3	5	10	10	208	100	22	10	600	
020	14–20	5	5	10	15	260	100	22	10	600	
025	19-25	7-1/2	7-1/2	15	20	325	100	22	10	600	
032	24-32	10	10	20	30	416	100	22	10	600	
040	28-40	10	10	30	30	520	100	22	10	600	
050	35-50	15	15	30	40	650	100	22	10	600	
063	45-63	20	20	40	60	819	100	22	10	600	
Dimensions (mm) W x H x D		55 x 110 x 96									
Mass (g)		780									
Optional accessory	Auxiliary contact block	○									
	Alarm contact block	○									
	Auxiliary and alarm contact block	○									
	Short-circuit alarm contact block	○									
	Shunt trip device	○									
	Undervoltage trip device	○									
	External operating handle	○									
Standard		IEC 60947-1, 60947-2, 60947-4-1, UL 508, CSA C22.2 No.14									

Notes: *1 Replace the □ mark in the part number by current range codes.

*2 The BM3VSB is cUL listed as HP rated motor controllers.

*3 The BM3VSB is cUL listed for group Installation as per NEC430-53(C).

○ Available

— Not available

63A Frame types and ratings

Adjustable thermal-magnetic trip type		High breaking capacity BM3VHB-□								AF01-43
Number of poles		3								
Handle type		Rotary								
Rated current Ie (A)		10 to 63								
Rated operational voltage Ue (V)		200 to 690								
Rated frequency (Hz)		50/60								
Rated insulation voltage Ui (V)		1000								
Rated impulse withstand voltage Uimp (kV)		8								
Utilization category IEC 60947-2 Circuit breaker		Cat. A								
IEC 60947-4-1 Motor starter		AC-3								
Trip class IEC 60947-4-1		10								
Instantaneous trip characteristic		13 x Ie max.								
Power loss (total of 3-pole)		11W: In=10 to 32A 15W: In=40 to 50A 17W: In=63A								
Mechanical durability (operations)		50,000								
Electrical durability (operations)		25,000								
Max. operations per hour (motor start-up)		25								
Phase-loss protection		Provided								
Trip indicator		Provided								
Test trip function		Provided								
Adjustable current range		UL/CSA 3phase HP rating (HP) *2				Instantaneous trip current (A)	UL/CSA Short circuit current rating (kA) *3			Maximum listed branch circuit protection *3
Code *1	Ie: Min.–Max. (A)	200-208VAC	220-240VAC	440-480VAC	550-600VAC		240VAC	480VAC	600VAC	
010	6.3–10	2	3	5	7-1/2	130	100	50	10	600
013	9–13	3	3	7-1/2	10	169	100	50	10	600
016	11–16	3	5	10	10	208	100	50	10	600
020	14–20	5	5	10	15	260	100	50	10	600
025	19-25	7-1/2	7-1/2	15	20	325	100	50	10	600
032	24-32	10	10	20	30	416	100	50	10	600
040	28-40	10	10	30	30	520	100	50	10	600
050	35-50	15	15	30	40	650	100	50	10	600
063	45-63	20	20	40	60	819	100	50	10	600
Dimensions (mm) W x H x D		55 x 110 x 96								
Mass (g)		780								
Optional accessory	Auxiliary contact block	○								
	Alarm contact block	○								
	Auxiliary and alarm contact block	○								
	Short-circuit alarm contact block	○								
	Shunt trip device	○								
	Undervoltage trip device	○								
	External operating handle	○								
Standard		IEC 60947-1, 60947-2, 60947-4-1, UL 508, CSA C22.2 No.14								

Notes: *1 Replace the □ mark in the part number by current range codes.

*2 The BM3VHB is cUL listed as HP rated motor controllers.

*3 The BM3VHB is cUL listed for group Installation as per NEC430-53(C).

○ Available

– Not available

Manual Motor Starters

Type E ratings

• BM3RSB (Type E ratings)

Manual motor starters		3 phase motor		Short circuit rating(kA)	
Code	I _e ; Min-Max. □ (A)	Rated capacity (HP) 220-240V AC	Rated capacity (HP) 440-480V AC	up to 240V AC	up to 480/277V AC
P16	0.1-0.16	In accordance with Motor full load current		100	50
P25	0.16-0.25			100	50
P40	0.25-0.4			100	50
P63	0.4-0.63			100	50
001	0.63-1.0			100	50
1P6	1-1.6		3/4	100	50
2P5	1.6-2.5	1/2	1	100	50
004	2.5-4	3/4	2	100	50
6P3	4-6.3	1-1/2	3	100	50
010	6.3-10	3	5	100	22
013	9-13	3	7-1/2	100	22
016	11-16	5	10	100	22
020	14-20	5	10	100	22
025	19-25	7-1/2	15	50	22
032	24-32a	10	20	50	22

To make an application for use with Type E controller, you need to prepare BZ0TCRE and BZ0TKUAB accessories for BM3RSB separately.

• BM3RHB (Type E ratings)

Manual motor starters		3 phase motor		Short circuit rating(kA)	
Code	I _e ; Min-Max. □ (A)	Rated capacity (HP) 220-240V AC	Rated capacity (HP) 440-480V AC	up to 240V AC	up to 480/277V AC
P16	0.1-0.16	In accordance with Motor full load current		100	50
P25	0.16-0.25			100	50
P40	0.25-0.4			100	50
P63	0.4-0.63			100	50
001	0.63-1.0			100	50
1P6	1-1.6		3/4	100	50
2P5	1.6-2.5	1/2	1	100	50
004	2.5-4	3/4	2	100	50
6P3	4-6.3	1-1/2	3	100	50
010	6.3-10	3	5	100	50
013	9-13	3	7-1/2	100	50
016	11-16	5	10	100	50
020	14-20	5	10	100	50
025	19-25	7-1/2	15	100	50
032	24-32	10	20	100	50

To make an application for use with Type E controller, you need to prepare BZ0TCRE and BZ0TKUAB accessories for BM3RHB separately.

• BM3VSB (Type E ratings)

Manual motor starters		3 phase motor		Short circuit rating(kA)	
Code	I _e ; Min-Max. □ (A)	Rated capacity (HP) 220-240V AC	Rated capacity (HP) 440-480V AC	up to 240V AC	up to 480/277V AC
010	6.3-10	3	5	100	22
013	9-13	3	7-1/2	100	22
016	11-16	5	10	100	22
020	14-20	5	10	100	22
025	19-25	7-1/2	15	100	22
032	24-32	10	20	100	22
040	28-40	10	30	100	22
050	35-50	15	30	100	22
063	45-63	20	40	100	22

To make an application for use with Type E controller, you need to prepare BZ0TKUAB accessories for BM3VSB separately.

• BM3VHB (Type E ratings)

Manual motor starters		3 phase motor		Short circuit rating(kA)	
Code	I _e ; Min-Max. □ (A)	Rated capacity (HP) 220-240V AC	Rated capacity (HP) 440-480V AC	up to 240V AC	up to 480/277V AC
010	6.3-10	3	5	100	50
013	9-13	3	7-1/2	100	50
016	11-16	5	10	100	50
020	14-20	5	10	100	50
025	19-25	7-1/2	15	100	50
032	24-32	10	20	100	50
040	28-40	10	30	100	50
050	35-50	15	30	100	50
063	45-63	20	40	100	50

To make an application for use with Type E controller, you need to prepare BZ0TKUAB accessories for BM3VHB separately.

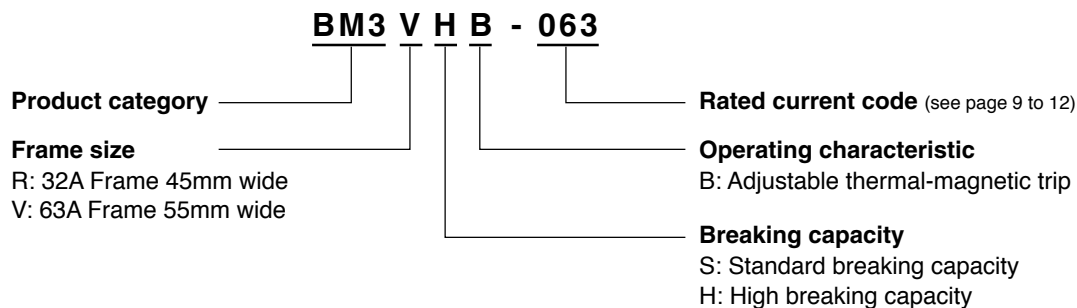
Manual Motor Starters

Ordering information and Characteristics

Ordering information

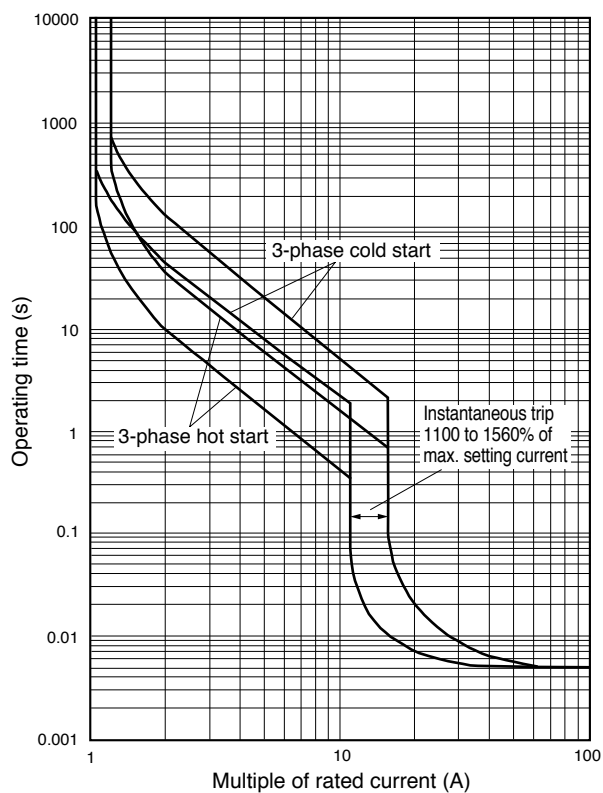
Specify the following:

1. Part number
2. Accessories if required

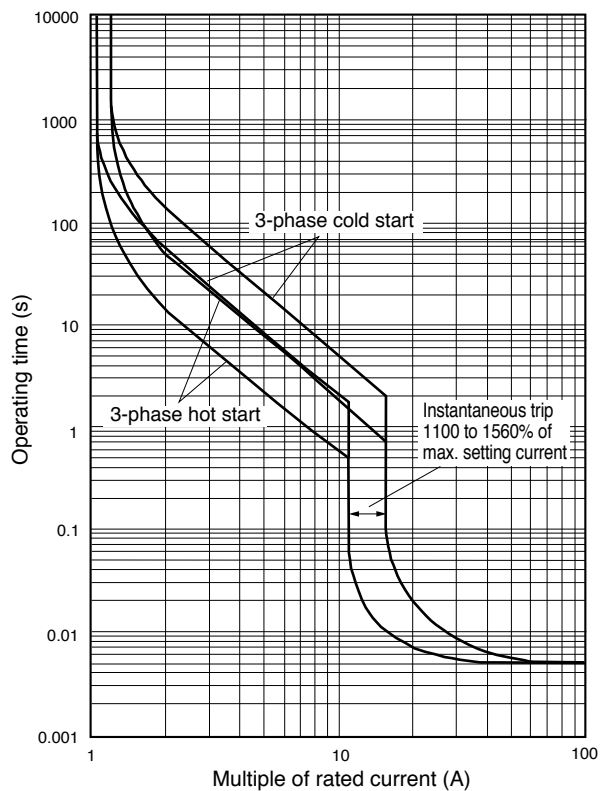


Characteristic curves

• BM3RSB, RHB



• BM3VSB, VHB

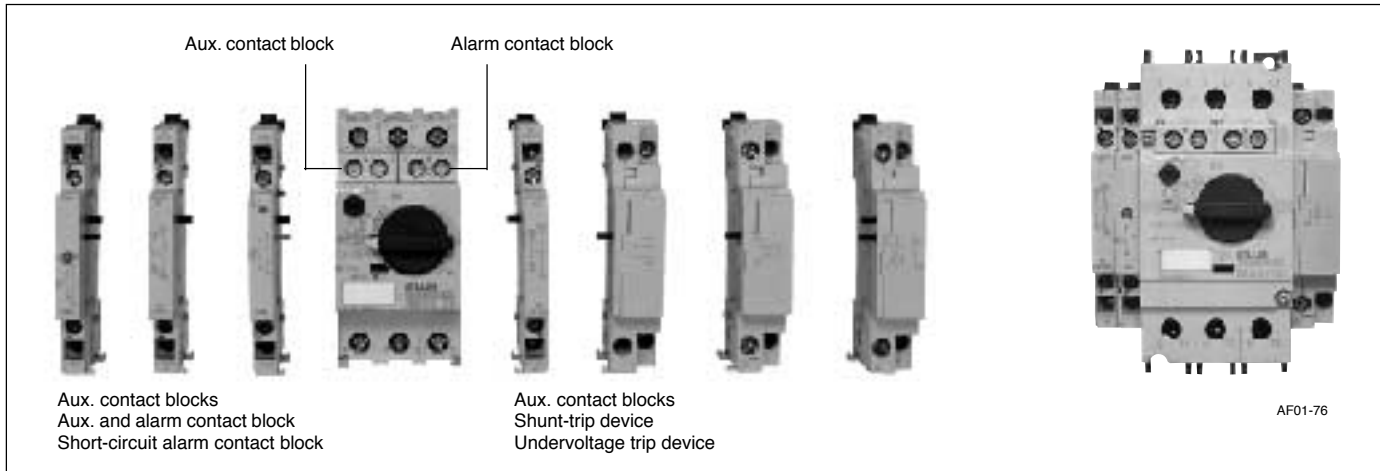


Manual Motor Starters

Optional accessories

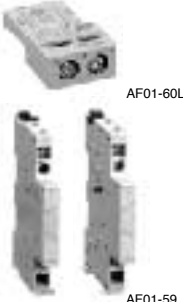
■ Features

- All accessories can be used with BM3R (45mm wide) and BM3V (55mm wide) frames.
 - Accessories are easily mounted.
 - Internal auxiliary contact blocks and alarm contact blocks can be mounted on front side.
 - External auxiliary contact blocks can be mounted on either the right or left side.
- Shunt trip and undervoltage trip devices are available in a wide range of operating voltages.
 - Standard and emergency external handles are available.
 - IP20 terminal cover prevents accidental contact to electrically charged parts.



■ Part number and ratings

• Auxiliary contact blocks (W)

Description	Starter type	Mounting	Contact arrangement	Part number	Mass (g)
 These blocks are linked to the ON/OFF operation of the MMS. Up to two contact blocks can be mounted to the right/left front, and up to two contact blocks can be mounted to the right/left sides.	BM3R BM3V	Front	1NO 1NC	BZ0WIA BZ0WIB	9
		Left side	2NO 1NO+1NC 2NC	BZ0WUAAL BZ0WUABL BZ0WUBBL	45
		Right side	2NO 1NO+1NC 2NC	BZ0WUAAR BZ0WUABR BZ0WUBBR	45

• Alarm contact blocks (K)

Description	Starter type	Mounting	Contact arrangement	Part number	Mass (g)
 This block operates when the MMS trips due to overload, phase-loss, or short-circuit. It is not linked to the ON/OFF operation of the MMS. Note: Operation can be checked with the test trip function.	BM3R BM3V	Front (Right side only)	1NO 1NC	BZ0KIA BZ0KIB	9

Manual Motor Starters

Optional accessories

• Auxiliary and alarm contact blocks (WK)

Description	Starter type	Mounting	Contact arrangement	Part number	Mass (g)
 AF01-57 - This contact block combines auxiliary contact and alarm contact that operate in the event of an overload, phase loss, or short-circuit. Alarm contact is not linked to the ON/OFF operation of the MMS. - An alarm is displayed in the contact block's indicator when the alarm contact operates. Note: Operation can be checked with the test trip function.	BM3R BM3V	Left	1NO (Aux.)+ 1NO (Alarm)	BZ0WKUAA	45
			1NC (Aux.)+ 1NO (Alarm)	BZ0WKUBA	
			1NO (Aux.)+ 1NC (Alarm)	BZ0WKUAB	
			1NC (Aux.)+ 1NC (Alarm)	BZ0WKUBB	

• Short-circuit alarm contact block (KI)

Description	Starter type	Mounting	Contact arrangement	Part number	Mass (g)
 AF01-56 - The contacts operate only when the MMS has tripped due to a short-circuit. - When these contacts operate, the blue reset button extends out, and a trip indication is displayed. - The power to the MMS can be turned ON after pressing the reset button. Note: Operation can be checked with the test trip function. Be sure to press the reset button before mounting to the MMS.	BM3R BM3V	Left	1NO+1NC	BZ0TKUAB	45

• Shunt trip devices (F)

Description	Starter type	Mounting	Coil voltage	Part number	Mass (g)
 AF01-55 This device is used to remotely trip the MMS. Notes: - This device cannot be used together with an undervoltage trip device. - When the MMS has been tripped with the shunt trip device, press the reset button before turning ON the power.	BM3R BM3V	Right	24VAC 50/60Hz 48VAC 60Hz 48VAC 50Hz/60VAC 60Hz 100VAC 50Hz/100–110VAC 60Hz 110–127VAC 50Hz/120VAC 60Hz 200VAC 50Hz/200–220VAC 60Hz 220–230VAC 50Hz/240–260VAC 60Hz 240VAC 50Hz/277VAC 60Hz 380–400VAC 50Hz/400–440VAC 60Hz 415–440VAC 50Hz/460–480VAC 60Hz 500VAC 50Hz/600VAC 60Hz 24–60V DC * 110-240V DC *	BZ0FAZU BZ0FBZU BZ0FCZU BZ0F1ZU BZ0FDZU BZ0FEZU BZ0FFZU BZ0FGZU BZ0FHZU BZ0F4ZU BZ0FJZU BZ0FKZUD BZ0FLZUD	115

Note: * The time rating of coil is 5s.

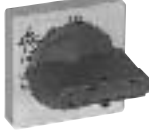
• Undervoltage trip devices (R)

Description	Starter type	Mounting	Coil voltage	Part number	Mass (g)
 AF01-54 R types This device automatically trips the MMS when the control circuit voltage drops below the specified value. Notes: - This device cannot be used together with a shunt trip device. - When the MMS has been tripped with the undervoltage trip device, press the reset button before turning ON the power.	BM3R BM3V	Right	24VAC 50Hz 24VAC 60Hz 48VAC 50Hz 48VAC 60Hz 100VAC 50Hz/100–110VAC 60Hz 110–127VAC 50Hz/120VAC 60Hz 200VAC 50Hz/200–220VAC 60Hz 220–230VAC 50Hz/240–260VAC 60Hz 240VAC 50Hz/277VAC 60Hz 380–400VAC 50Hz/400–440VAC 60Hz 415–440VAC 50Hz/460–480VAC 60Hz 500VAC 50Hz/600VAC 60Hz	BZ0RAZ1U BZ0RAZ2U BZ0RBZ1U BZ0RBZU BZ0R1ZU BZ0RDZU BZ0REZU BZ0RFZU BZ0RGZU BZ0RHZU BZ0R4ZU BZ0RJZU	115

Manual Motor Starters

Optional accessories

• External operating handles

Description	Starter type	Handle type	Part number	Mass (g)
 KK02-305 - Used to operate an MMS installed inside a panel, from the outside of the panel. - Equipped with an interlock mechanism that prevents someone from mistakenly opening the panel door when the MMS is in the ON state. - The shaft can be cut to match the distance between the MMS and the panel door.	BM3RH	Standard (black)	BZ0VBBL	160
		Emergency (red/yellow)	BZ0VYRL	160
	BM3V	Standard (black)	BZ0VBBM	160
		Emergency (red/yellow)	BZ0VYRM	160
 KK02-306 - Door interlock function • OFF lock function - Can be locked OFF with up to three padlocks. Note: Padlocks not included. - Release screw allows the door to be opened with the handle in the ON position. • IP54 enclosure				

• Line side terminal cover

Description	Starter type	Part number	Mass (g)
 Used for making Type E or Type F condition	BM3R	BZ0TCRE	30

• Others

Description	Starter type	Part number	Mass (g)
Push-in lug  Used for screw mounting. 10 pcs/pack	BM3R	BZ0SET	2.0
Terminal cover for IP20  Prevents accidental contact to charged parts. 6 pcs/pack	BM3V	BZ0TCV	0.6
Dummy cover  KK02-39 - Used to cover the open space if an internally mounted accessory should become unnecessary. - Mounts to either the left-front or right-front position. • 10 pcs/pack	BM3R BM3V	BZ0CFG	1.4

■ Ratings of accessories

Accessory type		Auxiliary contact block/front	Auxiliary contact block/side	Alarm contact block	Aux. and alarm contact block	Short-circuit alarm contact block
Part number		BZ0WI	BZ0WU	BZ0KI	BZ0WKU	BZ0TKUAB
Standard		IEC 60947-5-1, UL 508				
Rated operational current (A)	48V AC AC-15	5	6	5	6	6
	125V AC	3	4	3	4	4
	230V AC	1.5	4	1.5	4	4
	400V AC	—	2.2	—	2.2	2.2
	500V AC	—	1.5	—	1.5	1.5
	690V AC	—	0.6	—	0.6	0.6
	48V DC DC-13	1.38	5	1.38	5	5
	110V DC	0.55	1.3	0.55	1.3	1.3
	220V DC	0.27	0.5	0.27	0.5	0.5
Contact rating code UL 508		B300 Q300	A600 P300	B300 Q300	A600 P300	A600 P300
Min. voltage and current		17V 5mA				

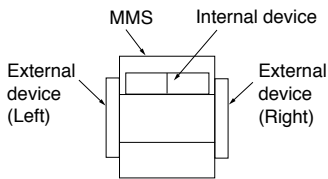
Accessory type		Shunt trip device	Undervoltage device
Part number		BZ0F	BZ0R
Standard		IEC 60947-1, UL 508	
Rated insulation voltage (V AC)	IEC 60947 UL 508	690 600	
No. of ON-OFF operations		5000	
Operating time (ms)		20	
Power consumption	Inrush (VA/W)	21/12	
	Sealed (VA/W)	8/1.2	
Voltage range	Tripping voltage (V)	0.7 to 1.1Ue	0.35 to 0.7Ue
	Closing voltage (V)	—	0.85 to 1.1Ue
Time rating of coil (s)		AC: Continuous DC: 5	AC: Continuous

Note: Ue: Rated Voltage

Manual Motor Starters

Optional accessories

Available accessory configuration



Internal devices

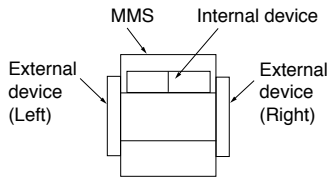
Auxiliary contact block (W) Alarm contact block (K)

External devices

Auxiliary contact (W2) Auxiliary and alarm contact block (WK) Short-circuit alarm contact block (KI)
 Shunt trip device (F) Undervoltage trip device (R)

Adj. thermal-magnetic trip type MMS		BM3RSB, BM3RHB						BM3VSB, BM3VHB					
Internal accessory													
External accessory	W2 (Left)												
	W2 (Right)												
	WK (Left)												
	KI (Left)												
	F (Right)												
	R (Right)												
	W2 (Left)+F												
	W2 (Left)+R												
	WK+F												
	WK+R												
	KI+F												
	KI+R												
	W2 (Left)+W2 (Left)												
	W2 (Left)+W2 (Right)												

■ Available accessory configuration (continued)



Internal devices

□ Auxiliary contact block (W) ■ Alarm contact block (K)

External devices

□ Auxiliary contact (W2) □ Auxiliary and alarm contact block (WK) □ Short-circuit alarm contact block (KI)
 □ Shunt trip device (F) ■ Undervoltage trip device (R)

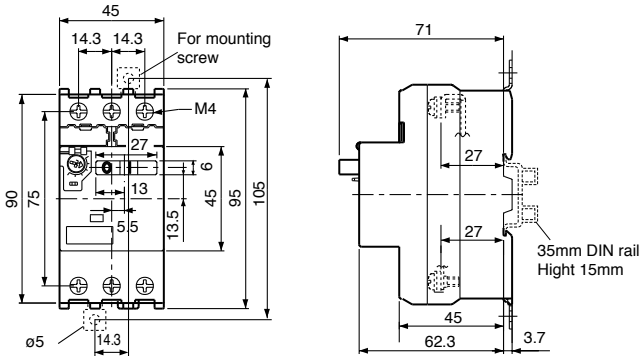
Adj. thermal-magnetic trip type MMS		BM3RSB, BM3RHB						BM3VSB, BM3VHB					
Internal accessory													
External accessory	W2 (Right)+ W2 (Right)												
	W2 (Left)+ WK												
	W2 (Right)+ WK												
	W2 (Left)+ KI												
	W2 (Right)+ KI												
	KI+WK												
	W2 (Left)+ W2 (Left)+F												
	W2 (Left)+ W2 (Left)+R												
	W2 (Left)+ WK+F												
	W2 (Left)+ WK+R												
	W2 (Left)+ KI+F												
	W2 (Left)+ KI+R												
	KI+WK+F												
	KI+WK+R												

Manual Motor Starters

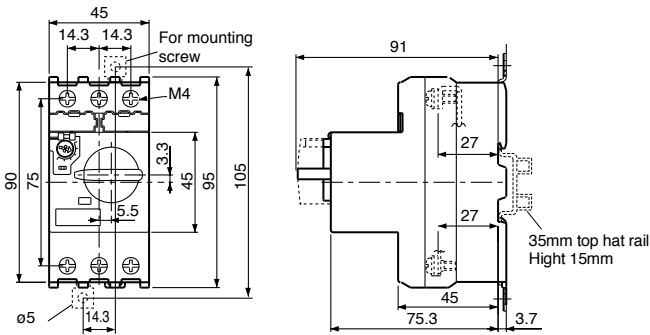
Dimensions

■ Dimensions, mm

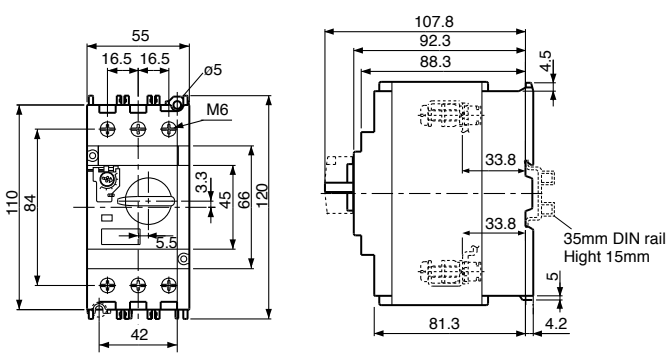
• Rocker handle types BM3RSB



• Rotary handle types BM3RHB

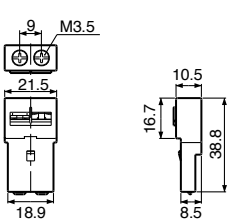


• Rotary handle types BM3VSB, BM3VHB

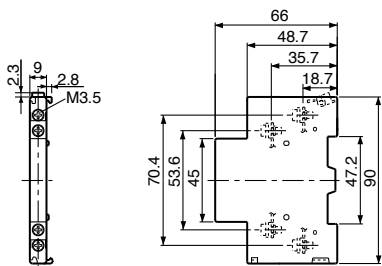


Accessories

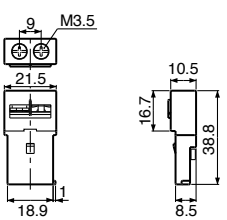
• Auxiliary contact blocks, front mounting BZ0WI



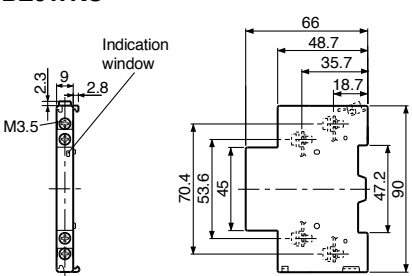
• Auxiliary contact blocks, side mounting BZ0WU



• Alarm contact blocks, front mounting BZ0KI



• Auxiliary and alarm contact blocks BZ0WKU



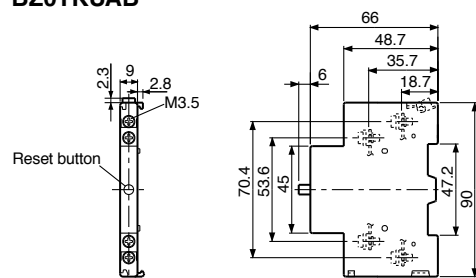
Manual Motor Starters

Dimensions

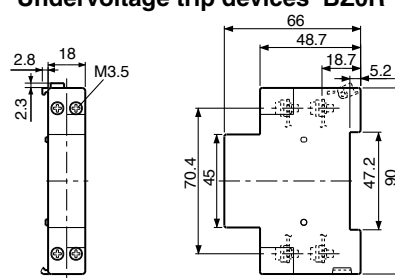
■ Dimensions, mm

Accessories

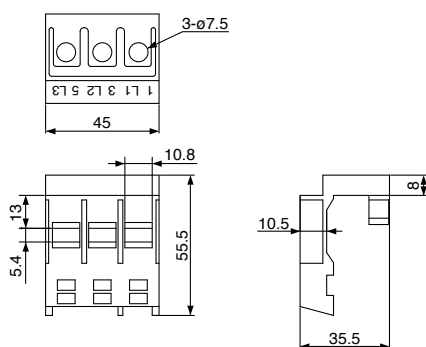
- Short-circuit alarm contact block
BZ0TKUAB



- Shunt trip devices BZ0F
- Undervoltage trip devices BZ0R

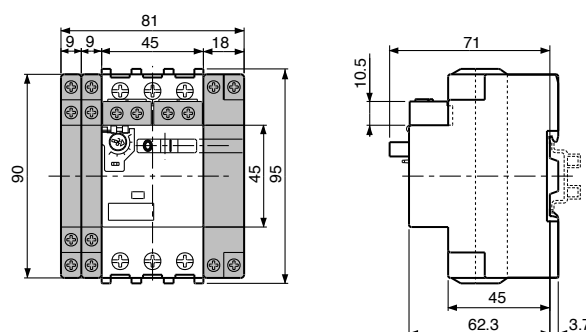


- BZ0TCRE

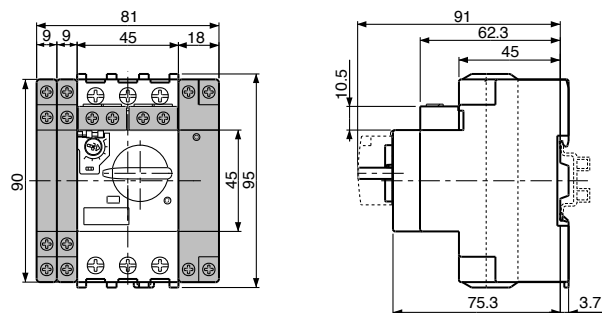


MMS with accessories

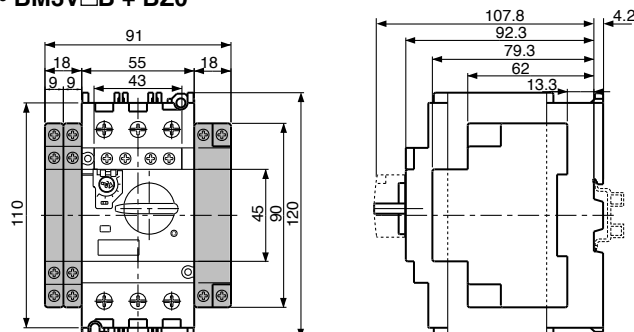
- BM3RSB + BZ0



- BM3RHB + BZ0

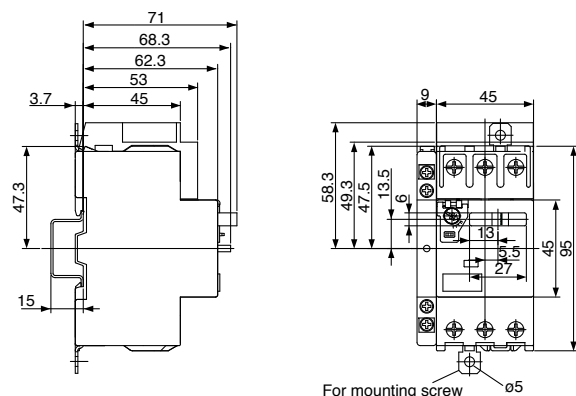


- BM3V□B + BZ0

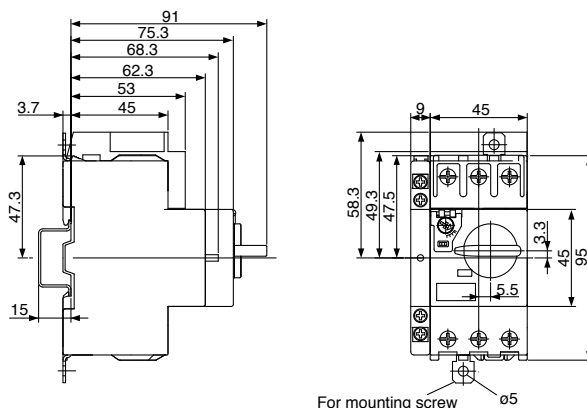


Type E construction

- BM3RSB



- BM3RHB



MMS	Line side terminal cover	Short-circuit alarm contact block	Mass (g)
BM3RSB	BZ0TCRE	BZ0TKUAB	425

MMS	Line side terminal cover	Short-circuit alarm contact block	Mass (g)
BM3RHB	BZ0TCRE	BZ0TKUAB	445

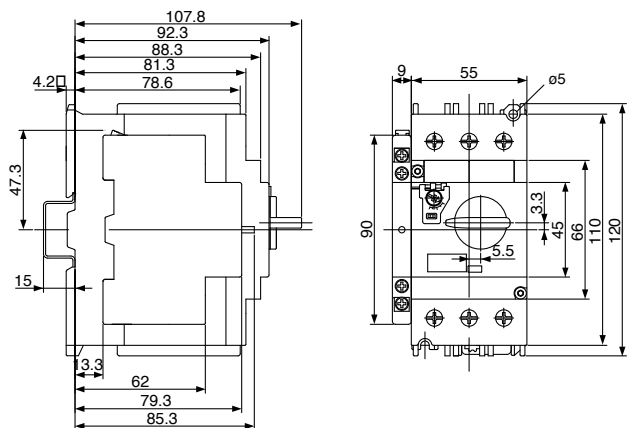
Manual Motor Starters

Dimensions

■ Dimensions, mm

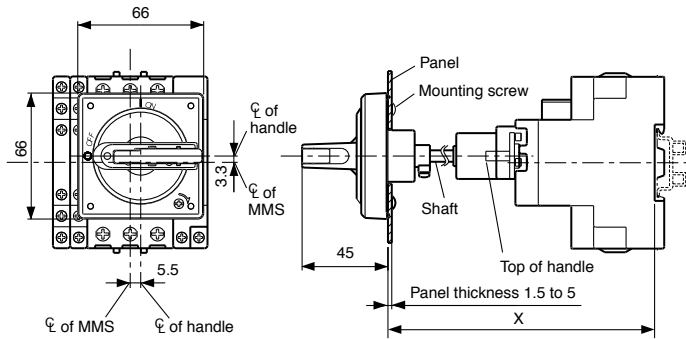
Type E construction

- **BM3VSB, BM3VHB**



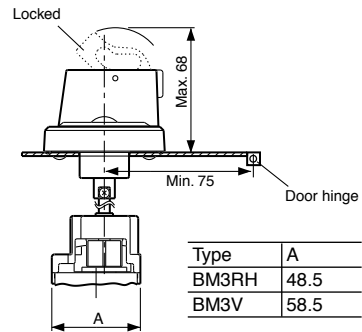
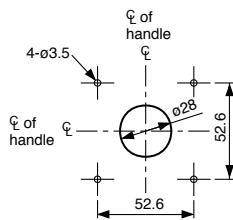
MMS	Line side terminal cover	Short-circuit alarm contact block	Mass (g)
BM3VSB,VHB	-	BZ0TKUAB	825

External operation handle BZ0V



Type	X min.	X max.
BZ0VBBL, BZ0VYRL	139 $\pm$ 2	289 $\pm$ 2
BZ0VBBM, BZ0VYRM	156 $\pm$ 2	306 $\pm$ 2

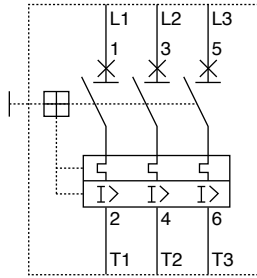
Panel drilling



Type	A
BM3RH	48.5
BM3V	58.5

■ Wiring diagrams

• MMS

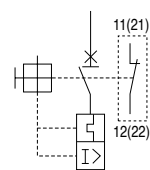
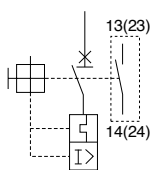


• Auxiliary contact blocks

Front mounting

BZ0WIA

BZ0WIB

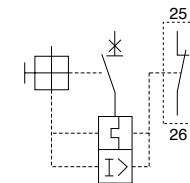
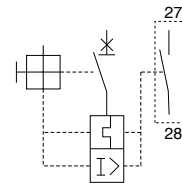


• Alarm contact blocks

Front mounting

BZ0KIA

BZ0KIB

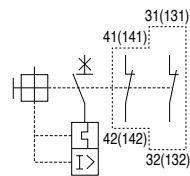
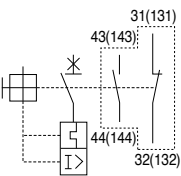
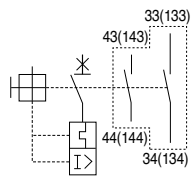


Side mounting

BZ0WUAAL

BZ0WUABL

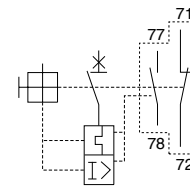
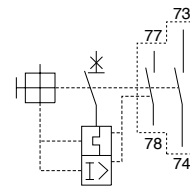
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• Auxiliary and alarm contact blocks

BZ0WKUAA

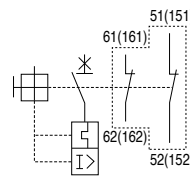
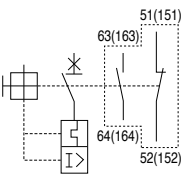
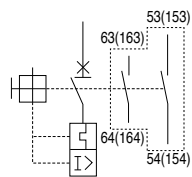
BZ0WKUBA



BZ0WUAAR

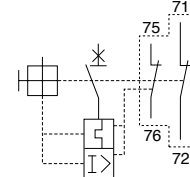
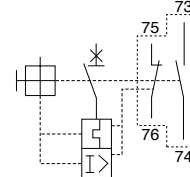
BZ0WUABR

BZ0WUBBR



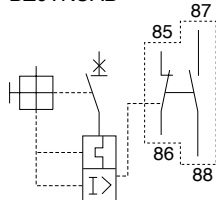
BZ0WKUAB

BZ0WKUBB



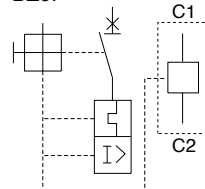
• Short-circuit alarm contact blocks

BZ0TKUAB



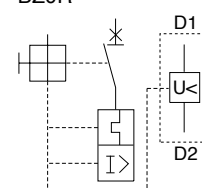
• Shunt trip devices

BZ0F



• Undervoltage trip devices

BZ0R



Manual Motor Starters

Instructions

Standard operating conditions

Ambient temperature	Operating: -5 to +55°C Storage: -40 to +65°C	No sudden temperature changes resulting in condensation or icing.
Humidity	45 to 85%RH	
Altitude	2000m or lower	
Atmosphere	No excessive dust, smoke, corrosive gases, flammable gases, steam or salt.	
Vibration	10 to 55Hz 15m/s²	No abnormal shock or vibration
Shock	50m/s²	

Mountings

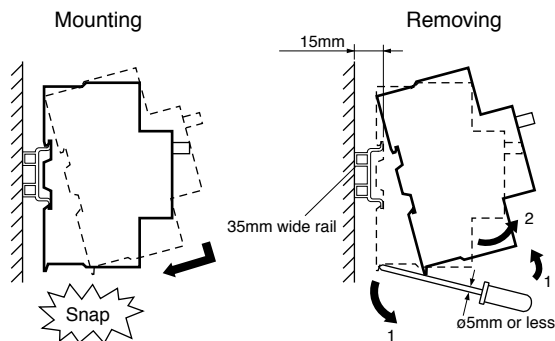
Rail mounting

The MMS can be mounted to a 35mm DIN rail. Secure the rail with screws at mounting pitch of less than 400mm for the BM3R type and less than 300mm for the BM3V type.

Applicable rail:

Use a 15mm-high TH35-15 (FUJI model TH35-15AL) rail conforming to EN-50022 and IEC715.

The standard rail mounting direction is horizontal. When using the MMS on a vertically mounted rail, use FUJI end clamp kits.

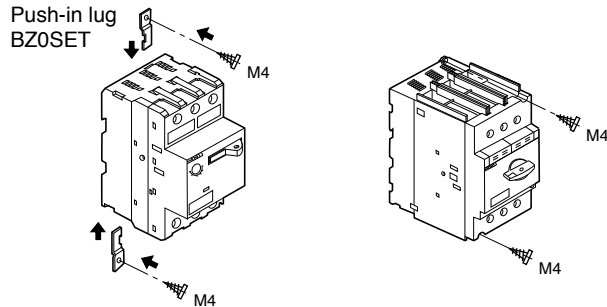


Screw mounting

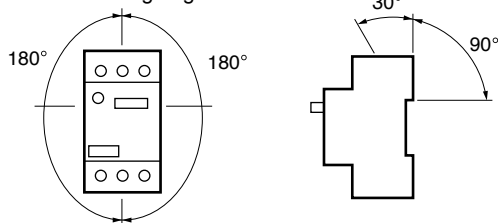
The separately sold push-in lug (BZ0SET) is required for screw mounting the BM3R frame. The BM3V frame can be screw mounted directly to the panel.

BM3RSB
BM3RHB

BM3VSB
BM3VHB



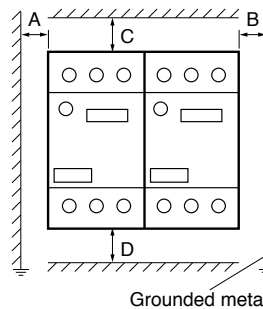
Mounting angle



Arc space

The arc space required when mounting is shown in the table below.

Type	Rated operational voltage U_e (V)	Min. distance to grounded metal (mm)	
		A, B	C, D
BM3RS	Up to 460	15	20
	500	15	30
	Up to 690	40	40
BM3RH	Up to 500	15	30
	Up to 690	40	50
BM3V	Up to 500	15	40
	Up to 690	40	50



When frames are mounted side-by-side, operating conditions such as a high ambient temperature or using the maximum setting for continuous current may cause slight changes in operating characteristics due to temperature rises. Under such conditions, it is recommended that the frames be separated by at least 5mm.

Wirings

While pressing the wire with a screwdriver, tighten the screw to the specified tightening torque.

Type	BM3R	BM3V	BZ0 Accessories
Solid wire (mm)	ø1.6 to 2.6	ø1.6 to 2.6	ø1 to 1.6
Stranded wire (mm ²)	Single-wire	1 to 10	1 to 25
	2-wire	1 to 6	1 to 16
AWG	Single-wire	18 to 8	18 to 4
	2-wire	18 to 10	18 to 4
Sheath stripping length (mm)	Approx.10	Approx.13	Approx.10
Terminal screw	Pan head screw (PZ2) M4	Pan head screw (PZ2) M6	Pan head screw (PZ2) M3.5
Tightening torque (N·m)	2	4	0.8

Note: There is no need for a crimp terminal or any other terminal on the end of the connection wire.

Manual Motor Starters

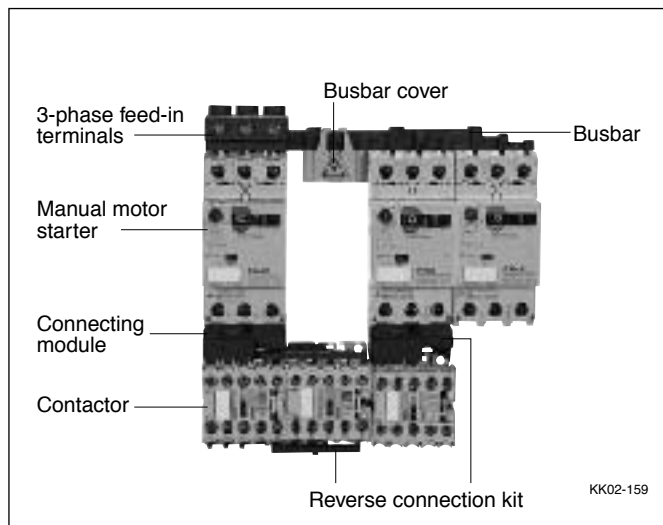
Busbar system

■ Features

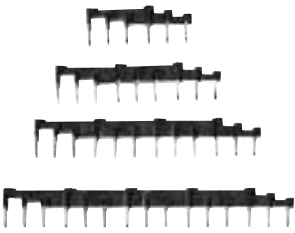
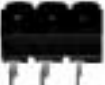
- The busbar system reduces wiring time and saves floorspace.
- The busbar makes it easy to power from 2 to 5 manual motor starters – with no wiring needed.
- The 3-phase feed-in terminals are used to connect the wire for the power supply circuit.
- The busbar cover guards against accidental contact with non-connected busbar terminals (charged parts).

<Note>

If using BZ0TCRE terminal cover with BM3R series MMS, the busbar system can not be used.



■ Part number and ratings

Description	Used with	Specification	Part number	Mass (g)
 KK02-164	BM3R	Continuous current: 64A max. Pin connection	2-BM3R, modular space: 45mm 3-BM3R, modular space: 45mm 4-BM3R, modular space: 45mm 5-BM3R, modular space: 45mm	BZ0BR02A 30 BZ0BR03A 50 BZ0BR04A 70 BZ0BR05A 90
	BM3R+1-external accessory, 9mm wide		2-BM3R, modular space: 54mm 3-BM3R, modular space: 54mm 4-BM3R, modular space: 54mm 5-BM3R, modular space: 54mm	BZ0BR12A 30 BZ0BR13A 55 BZ0BR14A 80 BZ0BR15A 105
	BM3R+2-external accessory, 9mm wide or BM3R+1-external accessory, 18mm wide	Continuous current: 64A max. Fork connection	2-BM3R, modular space: 63mm 4-BM3R, modular space: 63mm	BZ0BR22A 45 BZ0BR24A 100
	BM3V	Continuous current: 126A max. Pin connection	2-BM3V, modular space: 55mm 3-BM3V, modular space: 55mm 4-BM3V, modular space: 55mm	BZ0BV02A 140 BZ0BV03A 240 BZ0BV04A 340
	BM3V+1-external accessory, 9mm wide		2-BM3V, modular space: 64mm 3-BM3V, modular space: 64mm 4-BM3V, modular space: 64mm	BZ0BV12A 150 BZ0BV13A 270 BZ0BV14A 380
	BM3V+2-external accessory, 9mm wide or BM3V+1-external accessory, 18mm wide		2-BM3V, modular space: 73mm 4-BM3V, modular space: 73mm	BZ0BV22A 165 BZ0BV24A 425
	3-phase feed-in terminal			
	 AF01-70R	BM3R	Continuous current: 64A max. Applicable cable size: 25mm ² max.	BZ0BFRA 40
		BM3V	Continuous current: 126A max. Applicable cable size: 50mm ² max.	BZ0BFVA 170
	 AF01-70L	BZ0BR	For pin connection For fork connection	BZ0BCRA 10 BZ0BCRB 5
		BZ0BV	For pin connection	BZ0BCVA 5

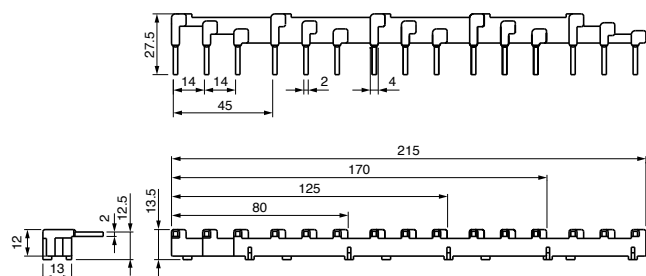
Manual Motor Starters

Busbar system

■ Dimensions, mm

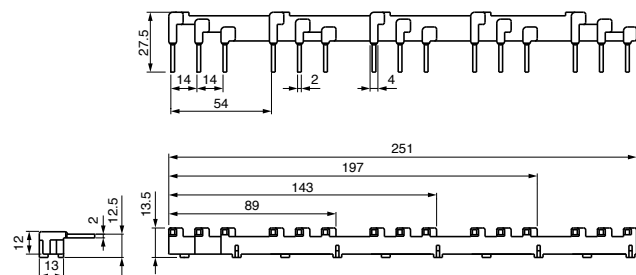
• For BM3R

BZ0BR0 Without external accessory



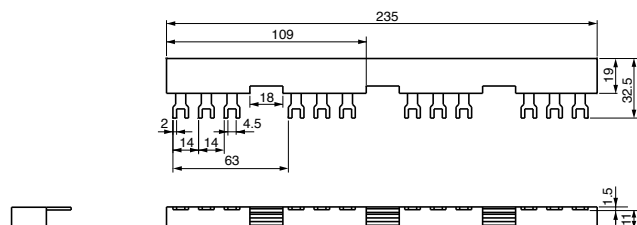
BZ0BR02A: 80mm
 BZ0BR03A: 125mm
 BZ0BR04A: 170mm
 BZ0BR05A: 215mm

BZ0BR1 With 1-external accessory



BZ0BR12A: 89mm
 BZ0BR13A: 143mm
 BZ0BR14A: 197mm
 BZ0BR15A: 251mm

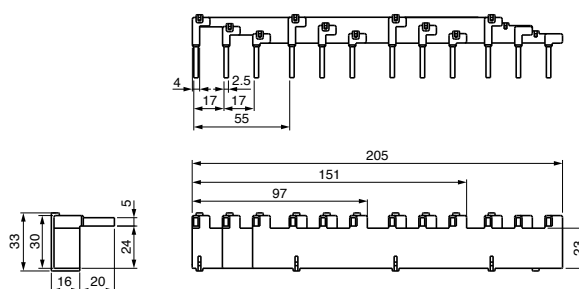
BZ0BR2 With 2-external accessory, 9mm wide With 1-external accessory, 18mm wide



BZ0BR22A: 109mm
 BZ0BR24A: 235mm

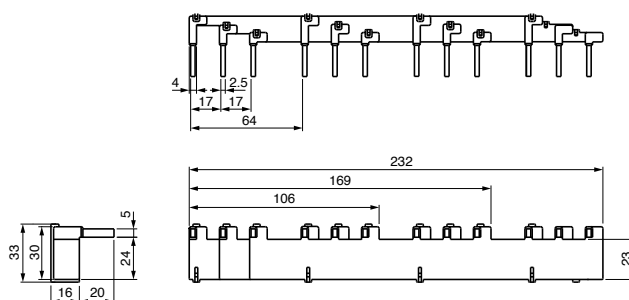
• For BM3V

BZ0BV0 Without external accessory



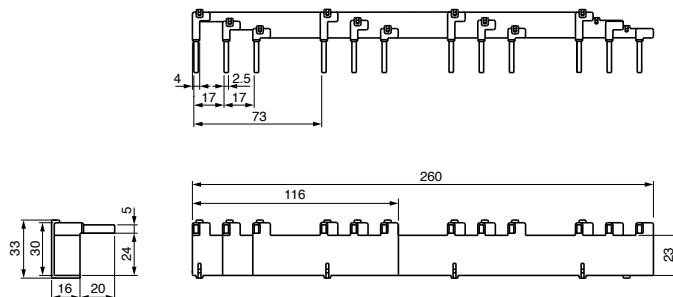
BZ0BV02A: 97mm
 BZ0BV03A: 151mm
 BZ0BV04A: 205mm

BZ0BV1 With 1-external accessory, 9mm wide



BZ0BV12A: 106mm
 BZ0BV13A: 169mm
 BZ0BV14A: 232mm

BZ0BV2 With 2-external accessory, 9mm wide With 1-external accessory, 18mm wide

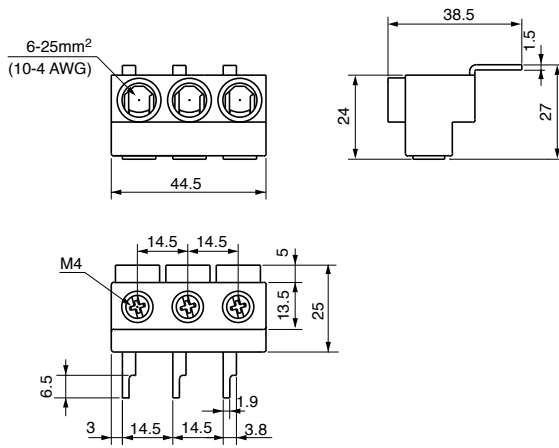


BZ0BV22A: 116mm
 BZ0BV24A: 260mm

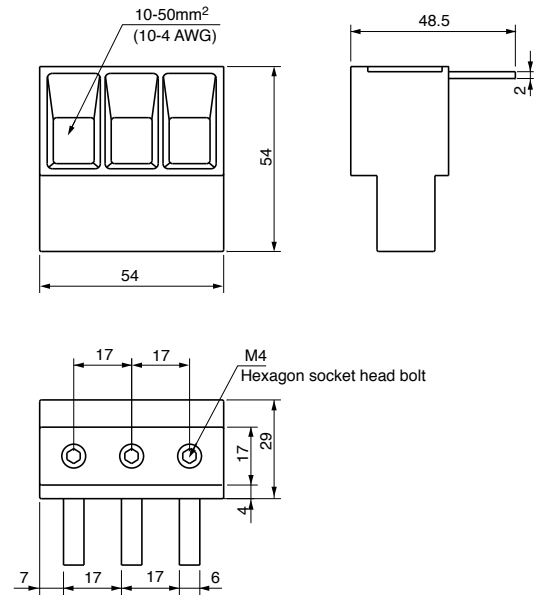
■ Dimensions, mm

- 3-phase feed-in terminals

BZ0BFRA



BZ0BFVA



Manual Motor Starters

Enclosures

■ Features

- Accommodates a variety of manual motor starters (BM3RSB-P16 to 025). Put the manual motor starter inside an enclosure for use in harsh environments. Surface mounting and flush mounting types available.
- IP41 and IP55 enclosure protection degree available.
- Manual motor starters (BM3RSB-P16 to 025) equipped with internal accessories and the following external accessories can be used inside an enclosure.

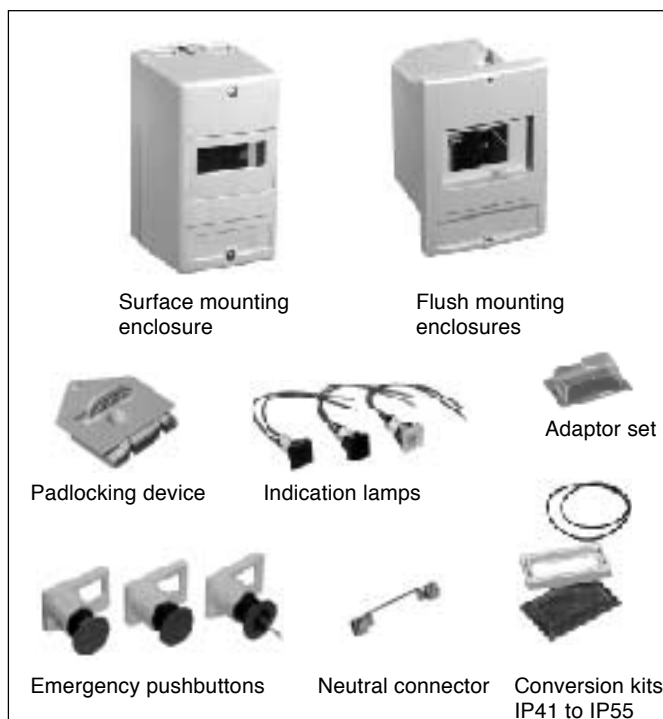
Left side: One auxiliary contact block (W) or one auxiliary and alarm contact block (WK)

Right side: One shunt trip device (F) or one undervoltage trip device (R)
- A wide variety of enclosure accessories are available. Padlocking device, emergency mushroom head pushbutton, conversion kit, and indicator lamps.

■ Part number and ratings

Enclosures for BM3RSB-P16 to 025

Mounting	Specification	Part number	Mass (g)
Surface	IP41	BZ0CSLA	320
	IP55 (with conversion kit)	BZ0CSLB	340
Flush	IP41	BZ0CFLA	240
	IP55 (with conversion kit)	BZ0CFLB	260



Accessories for enclosures

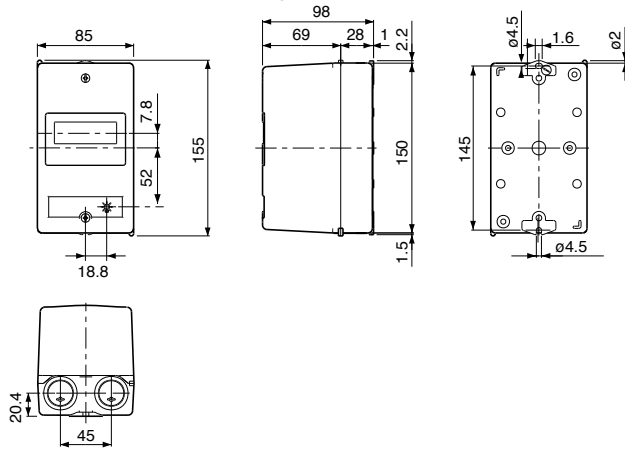
Description	Specification	Part number	Mass (g)
Padlocking device	OFF locking possible using up to three padlocks with a 5 to 8mm shackle diameter.	BZ0CKA	90
Emergency pushbutton	Momentary Push-lock turn reset Key operated	BZ0CPM	55
		BZ0CPL	55
		BZ0CPK	90
Conversion kit	Converts IP41 to IP55	BZ0CCA	25
Adaptor set	For BM3RS + undervoltage trip device with auxiliary contact.	BZ0CUA	20
Neutral connector	Used inside the enclosure for neutral and ground connection.	BZ0CNA	10
Indication lamp	Green, 100–120V AC	BZ0CLGA	15
	Green, 200–240V AC	BZ0CLGB	15
	Green, 380–440V AC	BZ0CLGC	15
	Green, 480–500V AC	BZ0CLGD	15
	Green, 500–600V AC	BZ0CLGE	15
	Red, 100–120V AC	BZ0CLRA	15
	Red, 200–240V AC	BZ0CLRB	15
	Red, 380–440V AC	BZ0CLRC	15
	Red, 480–500V AC	BZ0CLRD	15
	Red, 500–600V AC	BZ0CLRE	15
	White, 100–120V AC	BZ0CLCA	15
	White, 200–240V AC	BZ0CLCB	15
	White, 380–440V AC	BZ0CLCC	15
	White, 480–500V AC	BZ0CLCD	15
	White, 500–600V AC	BZ0CLCE	15

Notes: • The padlocking device cannot be used together with the emergency pushbutton or undervoltage trip device with auxiliary contact.
 • The emergency pushbutton cannot be used together with the undervoltage trip device with auxiliary contact.

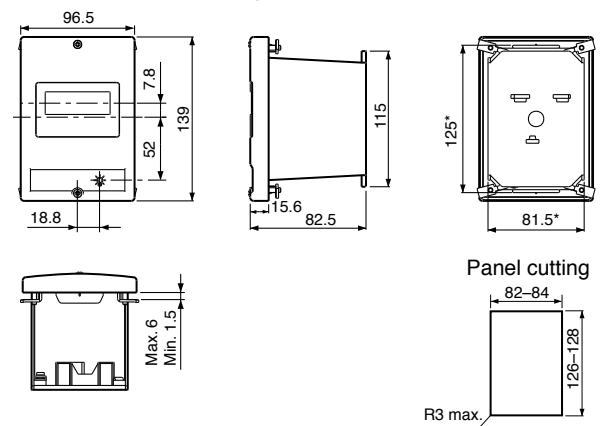
Manual Motor Starters Dimensions

■ Dimensions, mm

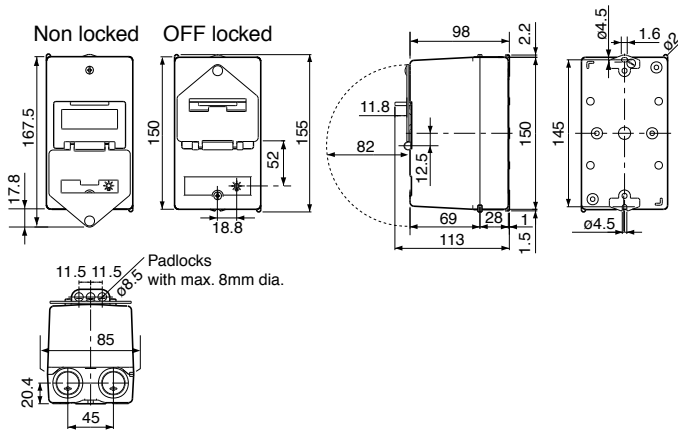
• Surface mounting For without accessory



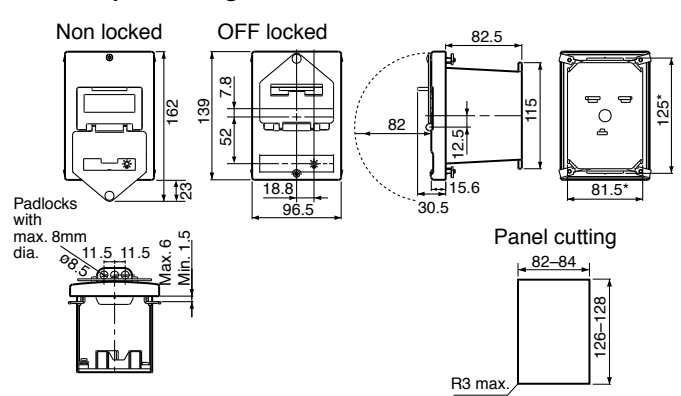
• Flush mounting For without accessory



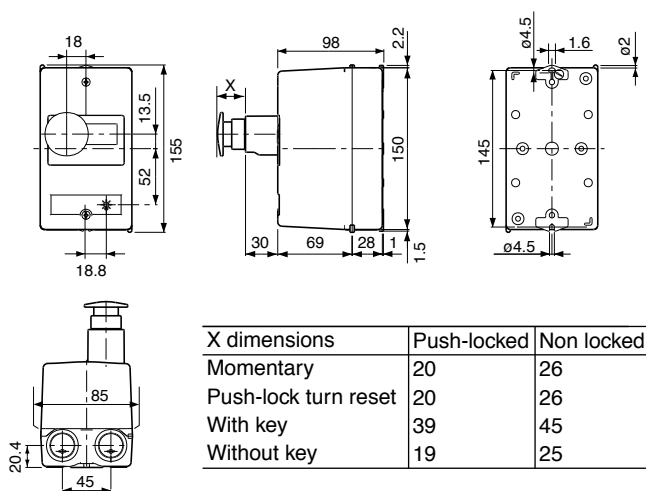
For with padlocking device



For with padlocking device

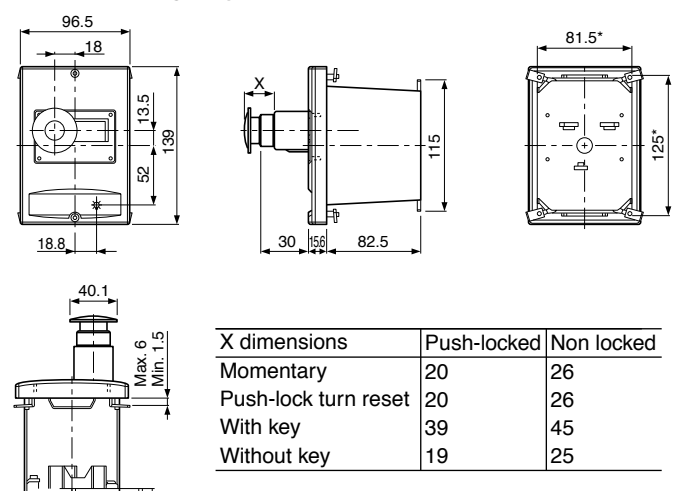


For with emergency pushbutton

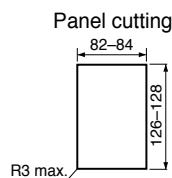


X dimensions	Push-locked	Non locked
Momentary	20	26
Push-lock turn reset	20	26
With key	39	45
Without key	19	25

For with emergency pushbutton



X dimensions	Push-locked	Non locked
Momentary	20	26
Push-lock turn reset	20	26
With key	39	45
Without key	19	25



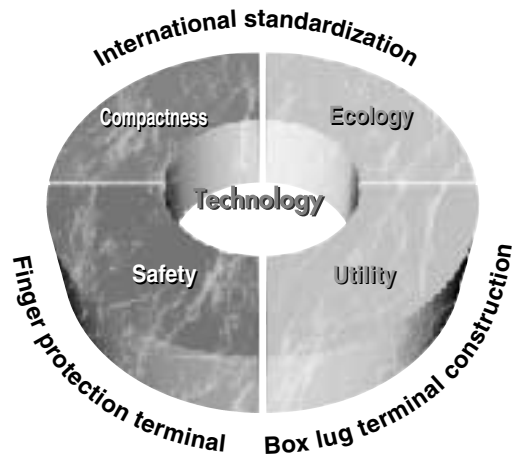
Contactors SC-M and SC-E series

General information

3 to 100HP at 480V AC

The SC-M and SC-E series further enhance the high reliability of the SC series with full conformance to International standards.

In addition to the five basic concepts of the existing SC series magnetic contactors and motor starters — international standardization, compactness, safety, utility, and ecology — the SC-M and SC-E series take the line-up to the next step in utility with a new finger protection terminal and box lug terminal construction.



International standardization

IEC 60947-4-1, EN 60947-4-1, VDE 0660

UL 508, CSA C 22.2, JIS C 8201-4-1

[Approved cUL (File No. E42419, E44592),

TÜV (R2018010, R2150072, R50013402)]

Compactness

- SC-M01, M02: 45mm wide
- SC-E02 to E05: 43mm wide, SC-E1 to E2S: 54mm wide
- SC-E3, E4: 67mm wide, SC-E5: 88mm wide
- SC-E6: 100mm wide, SC-E7: 115mm wide
- Reducing mounting area

Safety

- Terminals with finger-touch protection (DIN 57106/ VDE 0106 Teil100)

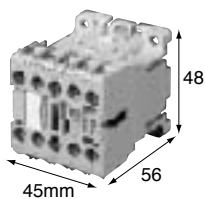
Utility

- Box lug terminal construction
- Long electrical life
- Reduction of wiring work

Ecology

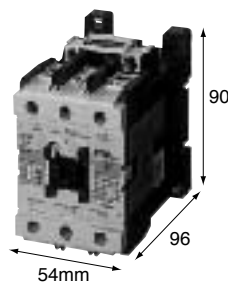
- Reducing power consumption
- Recycled thermoplastic resin used for plastic parts.
- The names of materials are indicated on all major parts to facilitate their recycling.

SC-M series

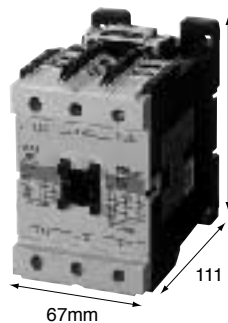


SC-M01, M02

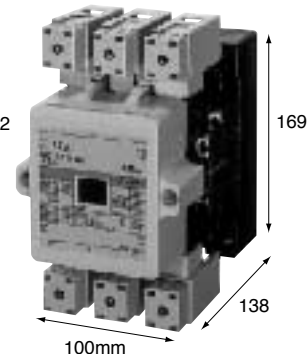
SC-E series



SC-E1 to E2S



SC-E3, E4



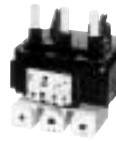
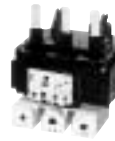
SC-E6 with SUPER magnet

Contactors SC-M and SC-E series Quick reference guide

Contactor	AC operating	SC-M01	SC-M02	SC-E02	SC-E03	SC-E04	SC-E05	SC-E1
	DC operating	SC-M01/G	SC-M02/G	SC-E02/G	SC-E03/G	SC-E04/G	SC-E05/G	SC-E1/G
 								
		KK02-292	KK02-292	AF01-12	AF01-11	AF01-10	KK01-105	AF01-8
	Rating of 3-phase motor (HP)							
	200V	1-1/2	3	2	3	5	5	7 1/2
	220-240V	1-1/2	3	2	3	5	7 1/2	10
400-480V	3	5	5	7 1/2	10	15	25	
550-600V	3	5	5	7 1/2	10	15	25	
Rated operational current (A)								
200V	6.9	11	7.8	11	17.5	17.5	25.3	
220-240V	6	9.6	6.8	9.6	15.2	22	28	
400-480V	4.8	7.6	7.6	11	14	21	34	
550-600V	3.9	6.1	6.1	9	11	17	27	
Rated thermal current AC-1 (A)	20	20	20	20	25	32	50	
Auxiliary contact	1NO, 1NC	1NO, 1NC	—	—	—	—	—	
Dimensions AC operated	45×48×56	43×80×81					54×90×96	
W×H×D (mm) DC operated	45×48×68	43×80×108					54×90×121.5	
Standard	IEC 60947-1, EN 60947-4-1, VDE 0660, UL 508, CSA C22.2							
Thermal overload relay			TK-E02	TK-E02	TK-E02	TK-E02	TK-E2	
 								
			KK01-86	KK01-86	KK01-86	KK01-86	KK01-88	
	Ampere setting range (A)							
			0.1–0.15	0.1–0.15	0.1–0.15	0.1–0.15	4–6	
			0.13–0.2	0.13–0.2	0.13–0.2	0.13–0.2	5–8	
		0.15–0.24	0.15–0.24	0.15–0.24	0.15–0.24	6–9		
		0.2–0.3	0.2–0.3	0.2–0.3	0.2–0.3	7–11		
		0.24–0.36	0.24–0.36	0.24–0.36	0.24–0.36	9–13		
		0.3–0.45	0.3–0.45	0.3–0.45	0.3–0.45	12–18		
		0.36–0.54	0.36–0.54	0.36–0.54	0.36–0.54	18–26		
		0.48–0.72	0.48–0.72	0.48–0.72	0.48–0.72	24–36		
		0.64–0.96	0.64–0.96	0.64–0.96	0.64–0.96			
		0.8–1.2	0.8–1.2	0.8–1.2	0.8–1.2			
		0.95–1.45	0.95–1.45	0.95–1.45	0.95–1.45			
		1.4–2.2	1.4–2.2	1.4–2.2	1.4–2.2			
		1.7–2.6	1.7–2.6	1.7–2.6	1.7–2.6			
		2.2–3.4	2.2–3.4	2.2–3.4	2.2–3.4			
		2.8–4.2	2.8–4.2	2.8–4.2	2.8–4.2			
		4–6	4–6	4–6	4–6			
		5–8	5–8	5–8	5–8			
		6–9	6–9	6–9	6–9			
		7–11	7–11	7–11	7–11			
			9–13	9–13	9–13			
				12–18	12–18			
					16–22			
					20–25			
Dimensions W×H×D (mm)		53×60.5×80.5					54×78.5×97	
Standard		IEC 60947-1, EN 60947-4-1, VDE 0660, UL 508, CSA C22.2						

Contactors SC-M and SC-E series

Quick reference guide

Contactors	AC operating	SC-E2	SC-E2S	SC-E3	SC-E4	SC-E5	SC-E6	SC-E7	
	DC operating	SC-E2/G	SC-E2S/G	SC-E3/G	SC-E4/G				
									
		AF01-7	AF01-6	AF01-5	AF01-4	AF01-3	AF01-2	AF01-1	
	Rating of 3-phase motor (HP)								
	200V		10	15	20	25	30	40	50
	220-240V		15	20	25	30	30	40	50
400-480V		30	30	50	50	60	75	100	
550-600V		30	30	50	50	75	100	125	
Rated operational current (A)									
200V		32.2	48.3	63.1	78.2	92	119.6	149.5	
220-240V		42	54	68	80	80	104	130	
400-480V		40	40	65	65	77	96	124	
550-600V		32	32	52	52	77	99	125	
Rated thermal current AC-1 (A)		60	65	100	105	150	150	200	
Auxiliary contact		—	—	—	—	2NO+2NC	2NO+2NC	2NO+2NC	
Dimensions W×H×D (mm)	AC operated	54×90×96			67×112×111		88×155×132	100×169×138	115×175×140
	DC operated	54×90×121.5			67×112×130				
Standard		IEC 60947-1, EN 60947-4-1, VDE 0660, UL 508, CSA C22.2							
Thermal overload relay		TK-E2	TK-E2	TK-E3	TK-E3	TK-E5	TK-E6	TK-E6	
									
		KK01-88	KK01-88	KK01-87	KK01-87	KK01-85	KK01-84	KK01-84	
	Ampere setting range (A)								
	4–6		4–6	7–11	7–11	18–26	45–65	45–65	
	5–8		5–8	9–13	9–13	24–36	53–80	53–80	
6–9		6–9	12–18	12–18	28–40	65–95	65–95		
7–11		7–11	18–26	18–26	34–50	85–125	85–125		
9–13		9–13	24–36	24–36	45–65		110–160		
12–18		12–18	28–40	28–40	65–95				
18–26		18–26	34–50	34–50	85–105				
24–36		24–36	45–65	45–65					
32–42		32–42	48–68	48–68					
			40–50						
			44–54						
Dimensions W×H×D (mm)		54×78.5×97		68×89.5×107.5		76.5×105×106	100×122×123		
Standard		IEC 60947-1, EN 60947-4-1, VDE 0660, UL 508, CSA C22.2							

Contactors SC-M and SC-E series Quick reference guide

■ Available coil

• AC coil, SC-M01 to SC-M02 and SC-E02 to SC-E4

Code	Coil operating voltage and frequency
24VAC	24V AC 50Hz / 24–26V AC 60Hz
48VAC	48V AC 50Hz / 48–52V AC 60Hz
100VAC	100V AC 50Hz / 100–110V AC 60Hz
110VAC	100–110V AC 50Hz / 110–120V AC 60Hz
120VAC	110–120V AC 50Hz / 120–130V AC 60Hz
200VAC	200V AC 50Hz / 200–220V AC 60Hz
220VAC	200–220V AC 50Hz / 220–240V AC 60Hz
400VAC	380–400V AC 50Hz / 400–440V AC 60Hz
440VAC	415–440V AC 50Hz / 440–480V AC 60Hz
500VAC	480–500V AC 50Hz / 500–550V AC 60Hz

• DC coil, SC-M01/G to SC-M02/G and SC-E02/G to SC-E4/G

Code	Coil operating voltage
12VDC	12V DC
24VDC	24V DC
48VDC	48V DC
100VDC	100V DC
110VDC	110V DC
200VDC	200V DC

• Super Magnet Coil, SC-E5 to SC-E7

Code	Coil operating voltage and frequency
24V	24–25V AC 50/60Hz, 24V DC
48V	48–50V AC 50/60Hz, 48V DC
100V	100–127V AC 50/60Hz, 100–120V DC
200V	200–250V AC 50/60Hz, 200–240V DC
400V	380–450V AC 50/60Hz
500V	460–575V AC 50/60Hz

■ Coil characteristics

• AC operation

Frame size	Power consumption (VA)		Power loss (W)		Pick-up voltage (V) *1	Drop-out voltage (V) *1	Operating time (ms)	
	Inrush 50/60 Hz	Sealed 50/60 Hz	50Hz	60Hz			Coil ON → Contact ON	Coil OFF → Contact OFF
M01, M02	32/36	6/6	1.5	1.6	0.8–1.1 X US	0.35–0.55 X US	7–12	6–13
E02 to E05	90/95	9/9	2.7	2.8	0.85–1.1 X US	0.2–0.75 X US	9–20	5–16
E1 to E2S	120/135	12.7/12.4	3.6	3.8	0.85–1.1 X US	0.2–0.75 X US	10–17	6–13
E3, E4	180/190	13.3/13.4	4.5	5	0.85–1.1 X US	0.2–0.75 X US	10–18	8–18
E5	80/95	4/4.6	3.2	3.6	0.85–1.1 X US	0.2–0.75 X US	39–45	27–33
E6, E7	190/230	4.9/5.8	3.4	3.7	0.8–1.1 X US	0.1–0.65 X US	31–37	30–36

Note: *1 US: Rated coil voltage

• DC operation

Frame size	Power consumption (VA)		Time constant (ms)	Pick-up voltage (V) *1	Drop-out voltage (V) *1	Operating time (ms)	
	Inrush	Sealed				Coil ON → Contact ON	Coil OFF → Contact OFF
M01/G, M02/G	3	3	35	0.8–1.1 X US	0.2–0.4 X US	24–27	5–8
E02/G to E05/G	7	7	50	0.85–1.1 X US	0.1–0.75 X US	45–49	10–26
E1/G to E2S/G	9	9	60	0.85–1.1 X US	0.1–0.75 X US	40–50	8–17
E3/G, E4/G	12	12	70	0.85–1.1 X US	0.1–0.75 X US	60–70	14–21
E5	20	2.8	1	0.85–1.1 X US	0.1–0.75 X US	35–41	26–32
E6, E7	225	3.2	1	0.8–1.1 X US	0.1–0.65 X US	28–34	27–33

Note: *1 US: Rated coil voltage

■ Auxiliary contact ratings for UL and CSA

Frame size	Rated insulation voltage (V)	Rated thermal current (A)	Making and breaking current (A)					
			AC (rating code A600)			DC (rating code Q300)		
			Voltage	Making	Breaking	Voltage	Making	Breaking
M01, M02 M01/G, M02/G	600	16	120V	60	6	125V	0.55	0.55
			240V	30	3	250V	0.27	0.27
			480V	15	1.5	301-600V	0.1	0.1
			600V	12	1.2			
E02 to E4, E02/G to E4/G	–	–	–	–	–	–	–	–
E5 to E7	600	10	120V	60	6	125V	0.55	0.55
			240V	30	3	250V	0.27	0.27
			480V	15	1.5			
			600V	12	1.2			

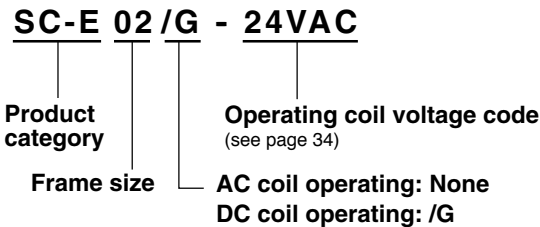
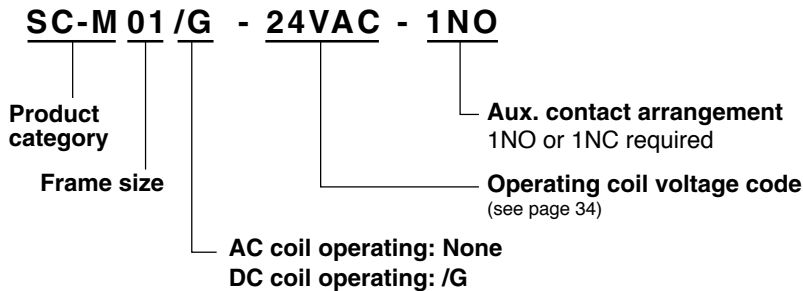
Contactors SC-M and SC-E series

Ordering information and Characteristics

Ordering information

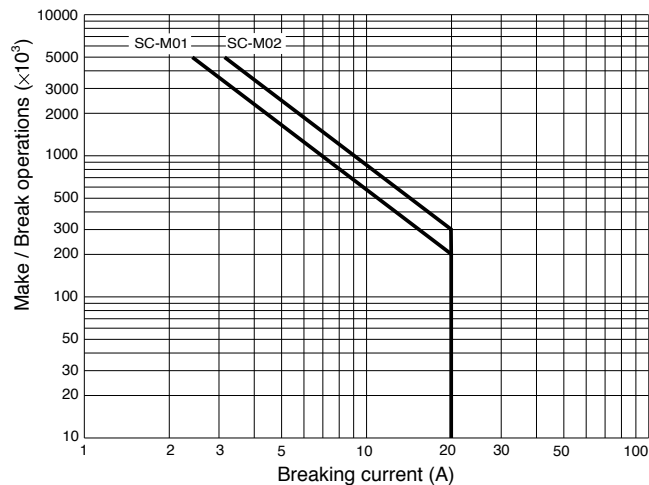
Specify the following :

- 1. Part number
- 2. Operating coil voltage code
- 3. Auxiliary contact arrangement (SC-M series only)

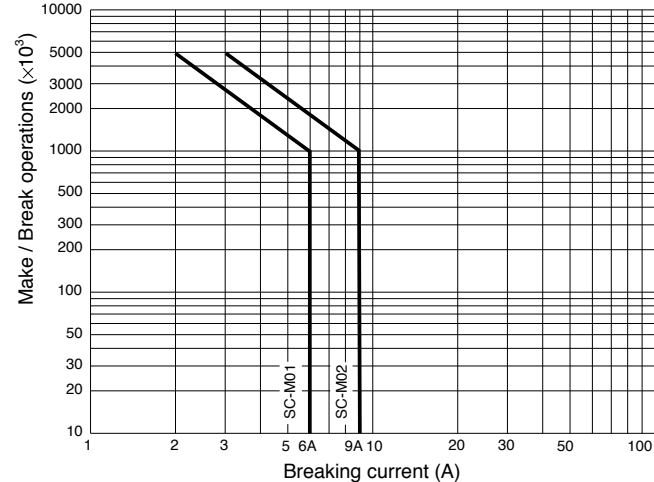


Electrical durability

• AC-1 duty / 380 to 440 V AC / SC-M



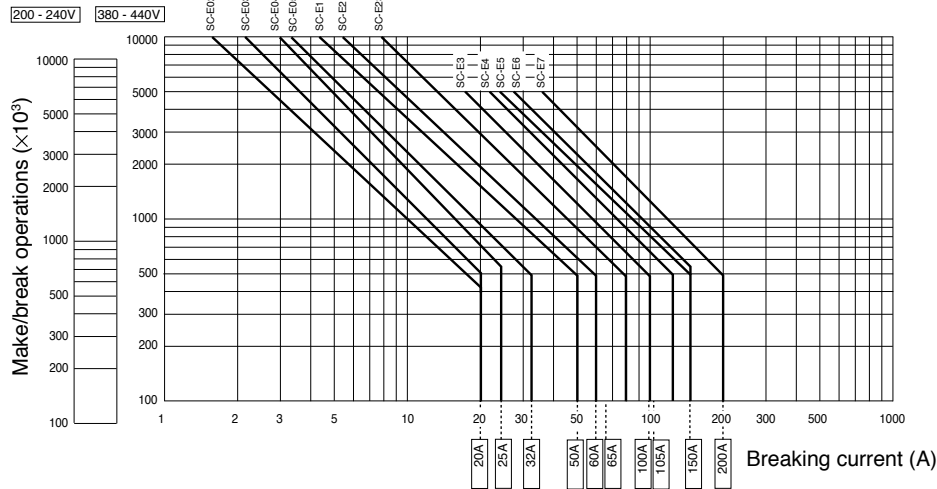
• AC-3 duty / 380 to 440 V AC / SC-M



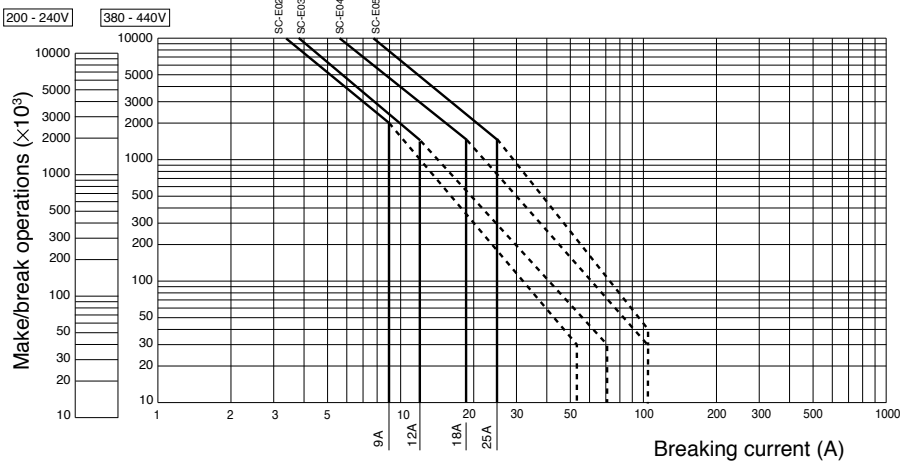
Contactors SC-M and SC-E series Ordering information and Characteristics

■ **Electrical durability**

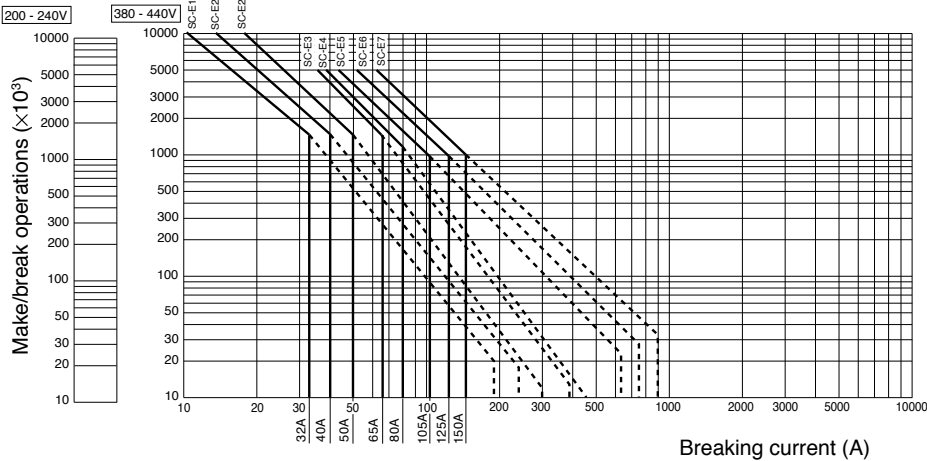
• **AC-1 duty / SC-E02 to SC-E7**



• **AC-3 duty / SC-E02 to SC-E05**



• **AC-3 duty / SC-E1 to SC-E7**



Contactors SC-M and SC-E series

Optional accessories

• Auxiliary contact blocks with terminal covers

Applicable contactor	Mounting	No. of contacts	Contact arrangement	Part number
SC-M01, M02 SC-M01/G, M02/G	Front mounting	4	4NO	SZ-MA40
			3NO+1NC	SZ-MA31
			2NO+2NC	SZ-MA22
			1NO+3NC	SZ-MA13
			4NC	SZ-MA04
		2	2NO	SZ-MA20
			1NO+1NC	SZ-MA11
			2NC	SZ-MA02
		1	1NO	SZ-MAS10
			1NC	SZ-MAS01
SC-E02 to E4 SC-E02/G to E4/G	Front mounting	4	4NO	SZ-A40/T
			3NO+1NC	SZ-A31/T
			2NO+2NC	SZ-A22/T
		2	2NO	SZ-A20/T
			1NO+1NC	SZ-A11/T
			2NC	SZ-A02/T
		2	1NO+1NC	SZ-AS1/T
			1NO+1NC	SZ-AS2/T
		2	1NO+1NC	SZ-AS1/T
			1NO+1NC	SZ-AS2/T
SC-E5, E6, E7	Side mounting	2	1NO+1NC	SZ-AS2/T

Contact ratings

- Based on UL and CSA

Rated thermal current (A)	Making and breaking current (A)					
	AC (rating code A600)			DC (rating code Q300)		
	Volts	Making	Breaking	Volts	Making	Breaking
10	120V	60	6	125V	0.55	0.55
	240V	30	3	250V	0.27	0.27
	480V	15	1.5			
	600V	12	1.2			

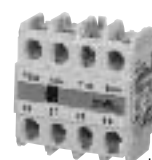
• Main circuit surge suppression units

Applicable contactor	Mounting	Rated voltage and frequency	CR constant	Applicable 3-phase motor	Part number
SC-M01, M02, M01/G, M02/G	—	—	—	—	—
SC-E02 to E05	Front mounting	250V AC	C=0.22 μ F	200–240V AC	SZ-ZM1E
SC-E02/G to E05/G	Side mounting	50/60Hz	R=100 Ω	1-1/2–5HP	SZ-ZM2E
SC-E1 to E4	Front mounting	250V AC	C=0.33 μ F	200–240V AC	SZ-ZM3E
SC-E1/G to E4/G	Side mounting	50/60Hz	R=47 Ω	1-1/2–30HP	SZ-ZM4E

• Coil surge suppression units

Applicable contactor	Operating coil voltage	Device	Operation indicator	Part number
SC-M01, M02	—	CR	—	SZ-MZ1
			—	SZ-MZ2
—	SC-M01/G, M02/G	Diode	—	SZ-MZ3
SC-E02 to E05	SC-E02/G to E05/G	Varistor	—	SZ-Z1
			—	SZ-Z2
			—	SZ-Z3
SC-E02 to E05	SC-E02/G to E05/G		Red LED	SZ-Z6
			Red LED	SZ-Z7
			—	SZ-Z31
SC-E1 to E4	SC-E1/G to E4/G		—	SZ-Z32
			—	SZ-Z33
			—	SZ-Z34
SC-E02 to E05	SC-E02/G to E05/G	CR	—	SZ-Z4
			—	SZ-Z5
			Red LED	SZ-Z8
SC-E02 to E05	SC-E02/G to E05/G		Red LED	SZ-Z9
			—	SZ-Z34
			—	SZ-Z35
SC-E1 to E4	—		—	SZ-Z36
			—	SZ-Z37
			—	SZ-Z37

Front mounting



SZ-A22/T



SZ-A11/T

Side mounting



SZ-AS1/T
SZ-AS2/T



KK01-090

Main circuit surge suppression units



Front mounting
SZ-ZM1E

KK02-077



Side mounting
SZ-ZM4E

KK02-079

Coil surge suppression unit



CR
SZ-Z4

AF88-766

Contactors SC-M and SC-E series

Optional accessories

• Power Connection kit for reversing for SC-M and SC-E contactor

Description	Applicable contactor	Part number	Mass (g)
Line side and load side wire kits	SC-M01, M02, M01/G, M02/G	SZ-MRWC	4.2
Line side wire kit	SC-E02 to E05	SZ-ERW1/A	19
Load side wire kit	SC-E02/G to E05/G	SZ-ERW1/B	17
Load side wire kit for the contactor to be connected with overload relay.		SZ-ERW1/D	13
Line side wire kit	SC-E1 to E2S,	SZ-ERW2/A	48
Load side wire kit	SC-E1/G to E2S/G,	SZ-ERW2/B	42
Load side wire kit for the contactor to be connected with overload relay.		SZ-ERW2/D	31
Line side wire kit	SC-E3,E4	SZ-ERW3/A	162
Load side wire kit	SC-E3/G,E4/G	SZ-ERW3/B	138
Load side wire kit for the contactor to be connected with overload relay.		SZ-ERW3/D	110



• Mechanical interlock unit

Description	Applicable contactor	Part number	Mass (g)
	SC-M01, M02, M01/G, M02/G	SZ-MRM	3
	SC-E02 to E4	SZ-RM	27
	SC-E02/G to E4/G		



• Preparing to make a reversing contactors and motor starters.

<For SC-M contactor>

1. SC-M_ x 2
2. SZ-MRWC x 1
3. SZ-MRM x 1

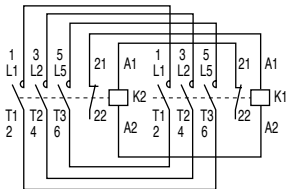
<For SC-E contactor>

1. SC-E_ x 2
2. SZ-ERW_/A x 1
3. SZ-ERW_/B x 1
4. SZ-RM x 1
5. SZ-_A/T x 2

<For SC-E motor starters>

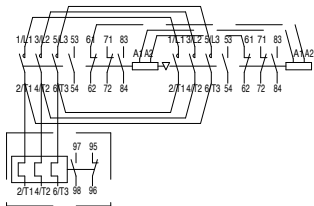
1. SC-E_ x 2
2. TK-E_ X1
3. SZ-ERW_/A x 1
4. SZ-ERW_/D x 1
5. SZ-RM x 1
6. SZ-_A/T x 2

Example of connecting, SC-M reversing contactor

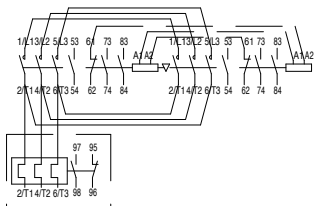


Example of connecting, SC-E reversing motor starter

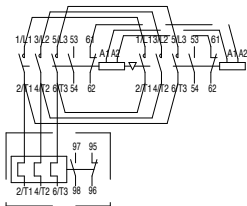
AUX.4P (2NO+1NC) x~2



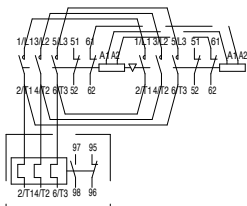
AUX.4P (3NO) x~2



AUX.2P (1NO) x~2



AUX.2P (1NC) x~2



Contactors SC-M and SC-E series

Optional accessories

■ Replacement coils

Replacement coil for SC-M series is not available

Replacement coil for SC-E series, AC coil is available, DC coil is not available

Contactors part number	AC coil part number	Super magnet coil part number
SC-E02 to E05	4NC0H-#MC	N/A

Replace the # symbol with the desired code, shown in the chart below.

Code letter #	AC coil 60Hz	AC coil 50Hz
E	24-26V	24V
F	48-52V	48V
A	100-110V	100V
1	110-120V	100-110V
G	120-130V	110-120V
B	200-220V	200V
2	220-240V	200-220V
C	400-440V	380-400V
4	440-480V	415-440V
5	550-600	500-550V

Contactors part number	AC coil part number (Chart 1)	Super magnet coil part number (Chart 2)
SC-E1, E2 and E2S	SZ-GM/N1-#	N/A
SC-E3 and E4	SZ-GM/N2S-#	N/A
SC-E5	N/A	SZ-GS/N5-#
SC-E6 and E7	N/A	SZ-GS/N6-#

Replace the # symbol with the desired code, shown in the charts below.

Chart 1 : AC coil

Code letter #	AC coil 60Hz	AC coil 50Hz
24	24-26V	24V
48	48-52V	48V
100	100-110V	100V
110	110-120V	100-110V
120	120-130V	110-120V
200	200-220V	200V
220	220-240V	200-220V
400	400-440V	380-400V
440	440-480V	415-440V
500	550-600	500-550V

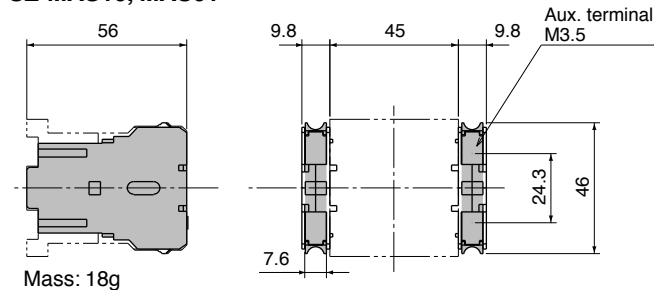
Chart 2 : Super magnet coil

Code letter #	AC coil 50/60Hz	DC
24	24-25V	24V
48	48-50V	48V
100	100-127V	100-120V
200	200-250V	200-240V
400	380-450V	N/A
500	460-575V	N/A

Contactors SC-M and SC-E series Dimensions

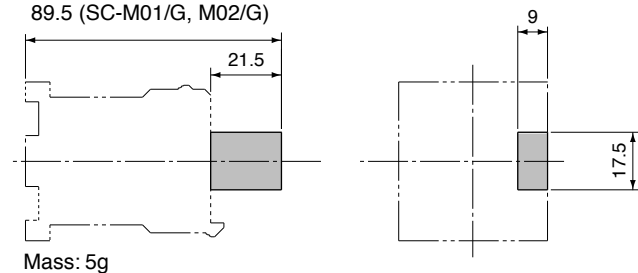
Dimensions, mm

• Aux. contact blocks (Side mounting) SZ-MAS10, MAS01

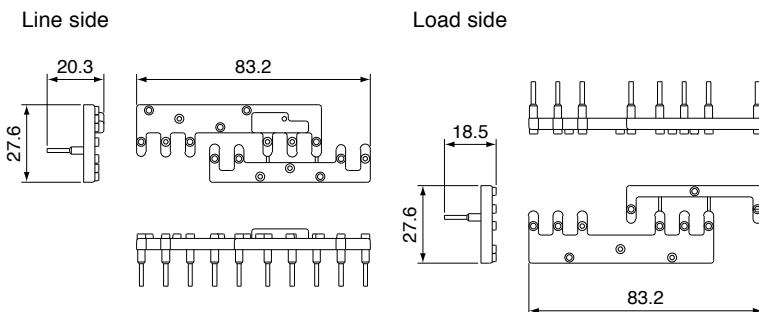


• Coil surge suppression unit SZ-MZ1, MZ2, MZ3

77.5 (SC-M01, M02)
89.5 (SC-M01/G, M02/G)



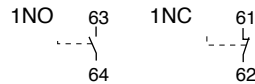
• Power Connection kit for reversing for SC-M



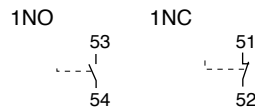
Wiring diagrams

Aux. contact

• Mounted on the right side

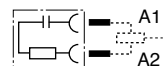


• Mounted on the left side

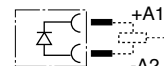


Internal circuit

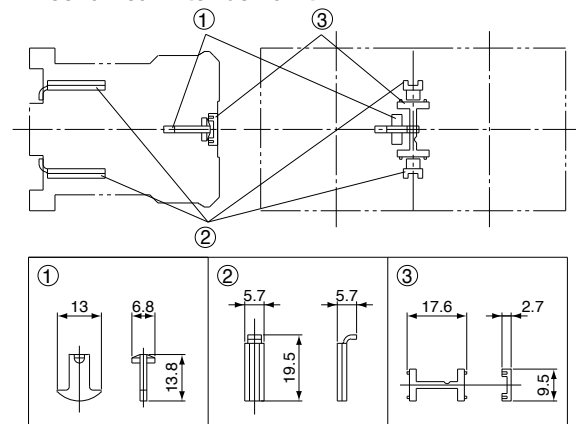
• Built-in CR



• Built-in diode



• Mechanical interlock unit



Standard operating conditions

Ambient temperature	Operating: -5 to 55°C No sudden temperature changes resulting in condensation or icing (The average temperature over a 24-hour period must not exceed 35°C) Storage: -40 to 65°C
Humidity	45 to 85%RH
Altitude	2000m or lower
Atmosphere	No excessive dust, smoke, corrosive gases, flammable gases, steam, or salt.
Vibration	10 to 55Hz 15m/s ²
Shock	50m/s ²
Mounting	Screw mounting, 35mm-wide top hat rail (DIN)
Mounting angle	
Standard	IEC 60947-4-1, EN 60947-4-1, VDE 0660 JIS C 8201-4-1, JEM 1038 UL 508, CSA C22.2

Wiring

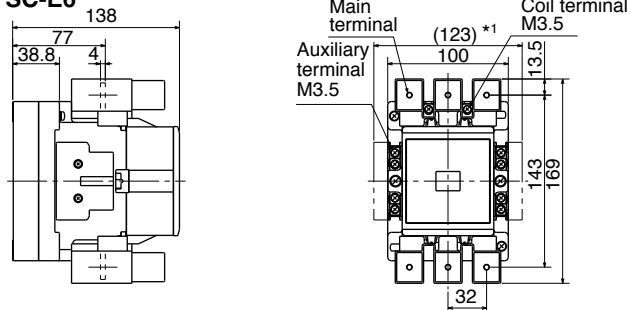
Terminal screw	M3.5
Connectable wire size	1.25 to 2mm ² (ø1.2 to 2mm)
Applicable round crimp terminal	7.5mm (R2-3.5)
Tightening torque	0.8 to 1.0N·m

Contactors SC-M and SC-E series Dimensions

■ Dimensions, mm

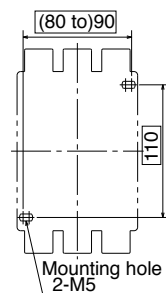
• Non-reversing AC operated

SC-E6

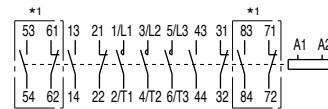


Mass: 2.6kg

Panel drilling

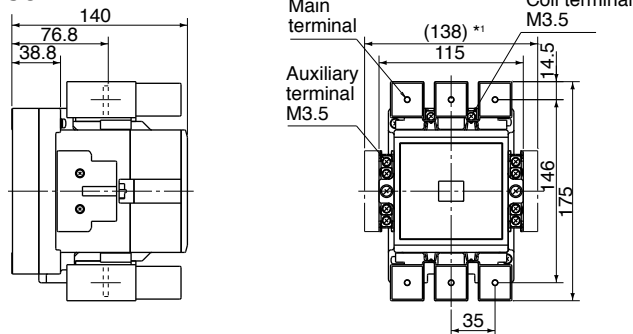


■ Wiring diagrams



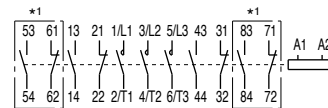
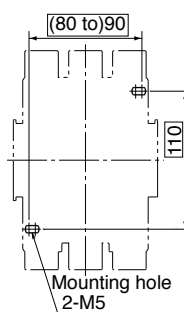
*1 In case of aux. contact 4NO+4NC

SC-E7



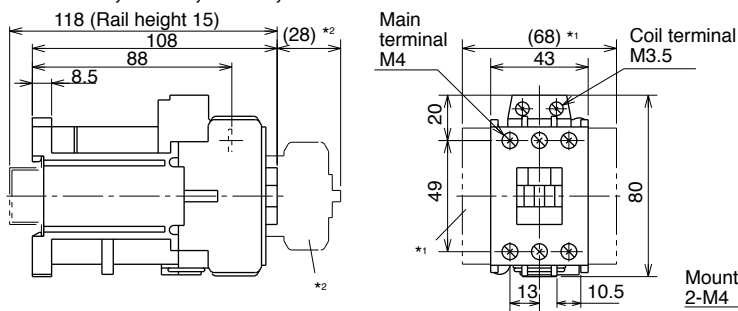
Mass: 2.9kg

Panel drilling



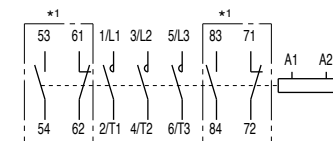
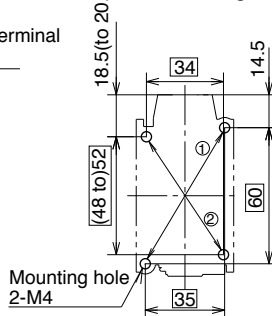
*1 In case of aux. contact 4NO+4NC

• Non-reversing DC operated SC-E02/G, E03/G, E04/G, E05/G



Mass: 0.59kg

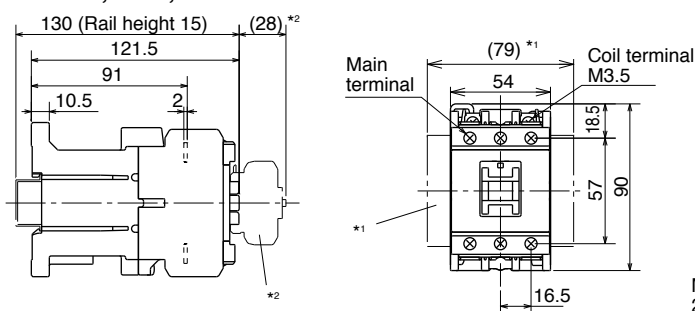
Panel drilling



*1 In case of aux. contact 2NO+2NC

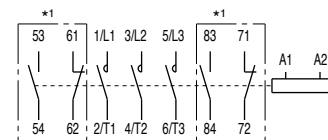
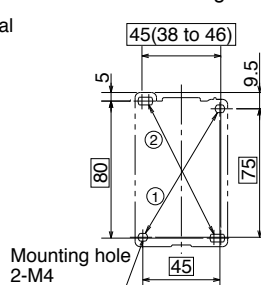
Use the two mounting holes on a diagonal line
① or ② to mount contactor
①: 35 × 60 ②: 35 × (48 to 52)

SC-E1/G, E2/G, E2S/G



Mass: 0.79kg

Panel drilling



*1 In case of aux. contact 2NO+2NC

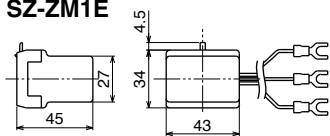
Use the two mounting holes on a diagonal line
① or ② to mount contactor
①: 45 × 75 ②: 45 (38 to 46) × 80

*1 Side mounting aux. contact block
*2 Front mounting aux. contact block

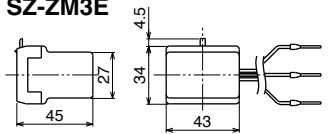
Contactors SC-M and SC-E series **Dimensions**

■ Dimensions, mm

- Main circuit surge suppression units
- SZ-ZM1E**

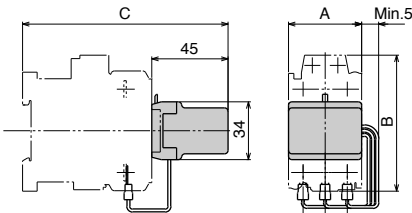


SZ-ZM3E



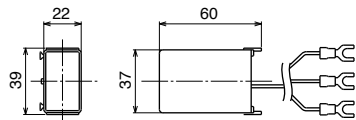
Mass: 60g

Contactor with surge suppression unit

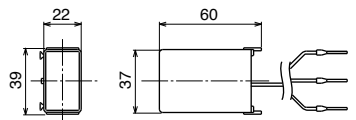


Type□	A□	B□	C□
SC-E02+SZ-ZM1E□	43□	80□	121□
SC-E03□	□	□	□
SC-E04□	□	□	□
SC-E05□	□	□	□
SC-E1+SZ-ZM3E□	54□	90□	136□
SC-E2□	□	□	□
SC-E2S□	□	□	□
SC-E3+SZ-ZM3E□	67	112	151
SC-E4			

SZ-ZM2E

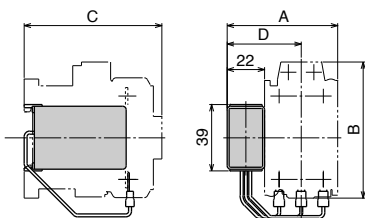


SZ-ZM4E



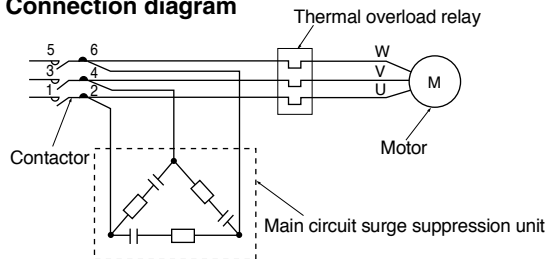
Mass: 60g

Contactor with surge suppression unit

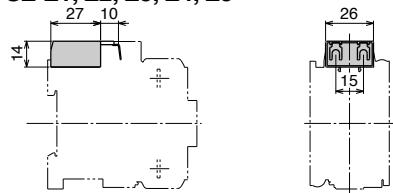


Type□	A□	B□	C□	D□
SC-E02+SZ-ZM2E□	65□	80□	81□	43.5□
SC-E03□	□			
SC-E04□	□			
SC-E05□	□			
SC-E1□				
SC-E2+SZ-ZM2E□	76□	90□	96□	49□
SC-E2S□				
SC-E3+SZ-ZM2E□	89	112	111	55.5
SC-E4				

Connection diagram

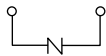


- Coil surge suppression units
- SZ-Z1, Z2, Z3, Z4, Z5**



Mass: 14g

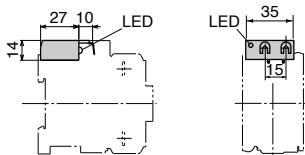
SC-E02 to E05 + SZ-Z1 to Z3
(Built-in varistor)



SC-E02 to E05 + SZ-Z4, Z5
(Built-in CR)

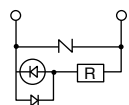


SZ-Z6, Z7, Z8, Z9

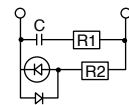


Mass: 16g

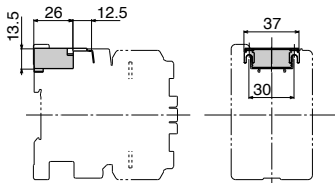
SC-E02 to E05 + SZ-Z6, Z7
(Built-in varistor with operating indicator)



SC-E02 to E05 + SZ-Z8, Z9
(Built-in CR with operating indicator)

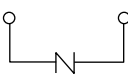


SZ-Z31, Z32, Z33, Z34, Z35, Z36, Z37

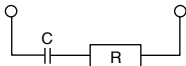


Mass: 15g

SC-E1 to E4 + SZ-Z31 to Z33
(Built-in varistor)



SC-E1 to E4 + SZ-Z34, Z35
(Built-in CR)
SC-E1/G to E4/G + SZ-Z36, Z37
(Built-in CR)

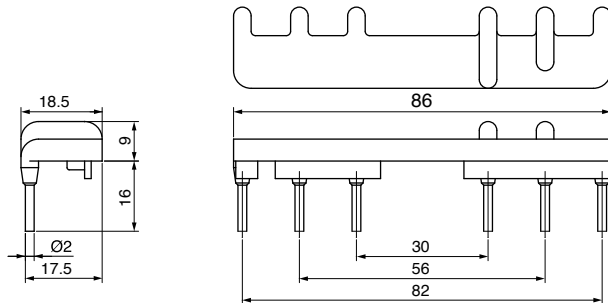


Contactors SC-M and SC-E series **Dimensions**

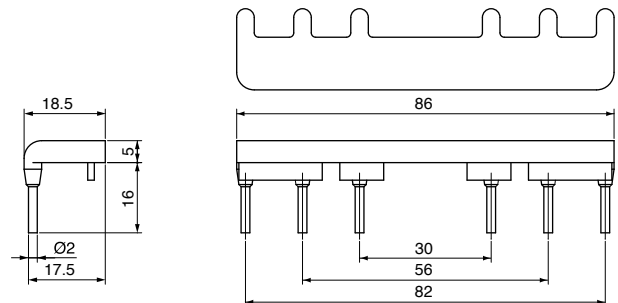
■ Dimensions, mm

- Power connection kit for reversing for SC-E

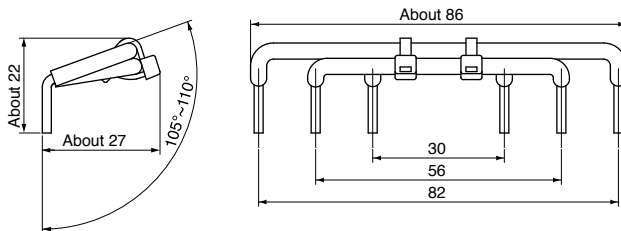
SZ-ERW1/A



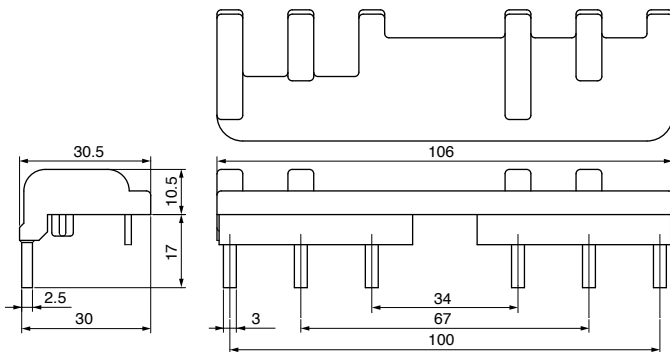
SZ-ERW1/B



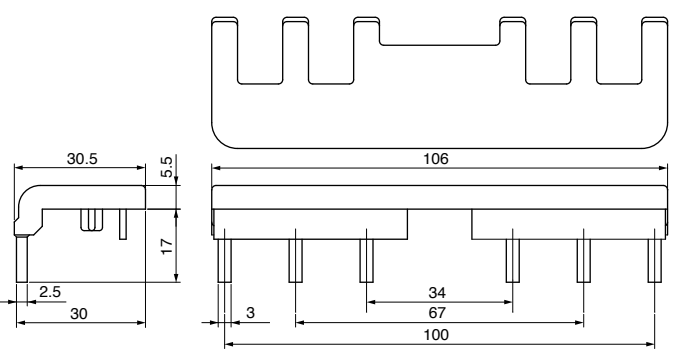
SZ-ERW1/D



SZ-ERW2/A



SZ-ERW2/B



SZ-ERW2/D

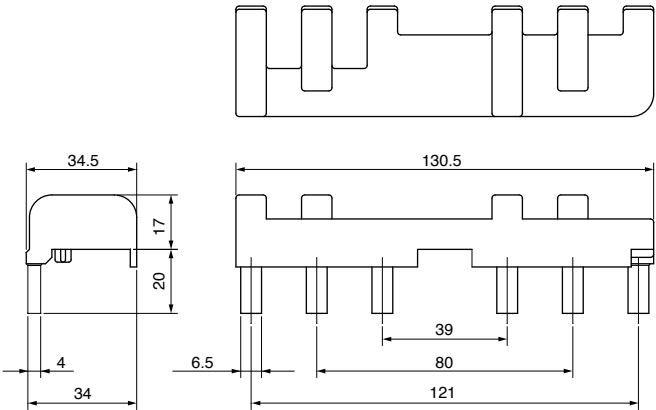
6/T3 - 2/T1	Technical drawing of the SZ-ERW2/D contactor for the 6/T3 - 2/T1 configuration. The side view shows a mounting height of about 31 mm and a distance of about 18.5 mm from the edge to the mounting hole. The front view shows a total width of 106 mm, with terminal spacing of 34 mm, 67 mm, and 100 mm. The mounting height is 17 mm.
4/T2 - 4/T2	Technical drawing of the SZ-ERW2/D contactor for the 4/T2 - 4/T2 configuration. The side view shows a mounting height of about 31 mm and a distance of about 22 mm from the edge to the mounting hole. The front view shows a total width of 106 mm, with terminal spacing of 34 mm, 67 mm, and 100 mm. The mounting height is 17 mm.
2/T1 - 6/T3	Technical drawing of the SZ-ERW2/D contactor for the 2/T1 - 6/T3 configuration. The side view shows a mounting height of about 42 mm and a distance of about 22 mm from the edge to the mounting hole. The front view shows a total width of 106 mm, with terminal spacing of 34 mm, 67 mm, and 100 mm. The mounting height is 17 mm.

Contactors SC-M and SC-E series

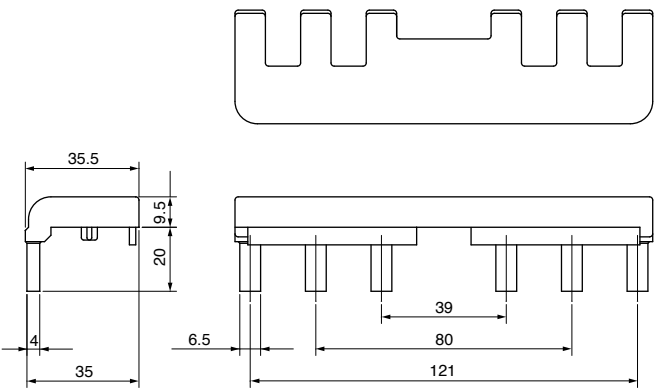
Dimensions

■ Dimensions, mm
Power connection kit for reversing for SC-E

SZ-ERW3/A



SZ-ERW3/B



SZ-ERW3/D

6/T3 - 2/T1	Technical drawing of the SZ-ERW3/D contactor. The top view shows a rectangular unit with a width of 29 mm and a total length of 111 mm. The side view shows a height of 22.5 mm and a base width of 2.5 mm. The front view shows a base width of 111 mm and a total length of 111 mm. The front view also shows a base width of 6.5 mm and a total length of 121 mm. The front view also shows a base width of 6.5 mm and a total length of 121 mm.
4/T2 - 4/T2	Technical drawing of the SZ-ERW3/D contactor. The top view shows a rectangular unit with a width of 70 mm and a total length of 111 mm. The side view shows a height of 28 mm and a base width of 2.5 mm. The front view shows a base width of 111 mm and a total length of 111 mm. The front view also shows a base width of 6.5 mm and a total length of 121 mm. The front view also shows a base width of 6.5 mm and a total length of 121 mm.
2/T1 - 6/T3	Technical drawing of the SZ-ERW3/D contactor. The top view shows a rectangular unit with a width of 111 mm and a total length of 111 mm. The side view shows a height of 28 mm and a base width of 2.5 mm. The front view shows a base width of 111 mm and a total length of 111 mm. The front view also shows a base width of 6.5 mm and a total length of 121 mm. The front view also shows a base width of 6.5 mm and a total length of 121 mm.

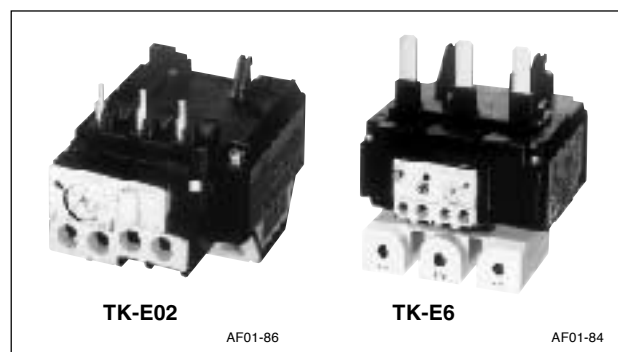
Thermal overload relays TK-E series

Quick reference guide and Ordering information

TK-E series with open-phase protection device

■ Features

- This relay protects motor windings from burning due to overloads, locked rotor current, or open-phases.
- Maintenance and inspection safety has been improved by employing a finger protection mechanism to cover exposed terminals (conforms to DIN 57106, VDE 0106 Teil 100).
- A high-precision scale for the current adjustment dial enables easy and exact current setting.
- The operating status can be visually checked with ease.
- The relays can be manually tripped. A trip-free mechanism is also provided.
- Base unit can be added to enable separate-mounting types of the TK-E02, E2, and E3 models.



■ Part number and specification

Applicable contactor	Part number	Aux. contact	Trip category (JIS)	No. of heater elements	Power consumption per pole	Provided functions
SC-E02 to E05, E02/G to E05/G	TK-E02	1NO+1NC	10A	3	2.2VA	Overload, phase-loss protection□
SC-E1 to E2S, E1/G to E2S/G	TK-E2				3.8VA	Ambient temperature compensation□
SC-E3, E4, E3/G, E4/G	TK-E3				6.6VA	Manual or auto reset selectable□
SC-E5	TK-E5				6.6VA	Manual trip mechanism□
SC-E6, E7	TK-E6				8.0VA	Trip indicator

Note: Separate mounting type is available for TK-E6. The part number is TK-E6H.

■ Ampere ranges

Thermal overload relay type				
TK-E02	TK-E2	TK-E3	TK-E5	TK-E6, E6H *
0.1-0.15				
0.13-0.2				
0.15-0.24				
0.2-0.3				
0.24-0.36				
0.36-0.54				
0.48-0.72				
0.64-0.96				
0.8-1.2				
0.95-1.45				
1.4-2.2				
1.7-2.6				
2.2-3.4				
2.8-4.2				
4-6	4-6			
5-8	5-8			
6-9	6-9			
7-11	7-11	7-11		
9-13	9-13	9-13		
12-18	12-18	12-18		
16-22				
20-25	18-26	18-26	18-26	
	24-36	24-36	24-36	
		28-40	28-40	
	32-42			
		34-50	34-50	
	40-50			
	44-54			
		45-65	45-65	45-65
		48-68		
				53-80
		64-80		
			65-95	65-95
			85-105	
				85-125
				110-160

Note: * Applicable only for separate-mounting type. Not applicable for use in combination with a magnetic contactor

■ Standards

IEC 60947-4-1, EN60947-4-1
VDE 0660, JIS C 8201-4-1
UL 508, CSA C22.2

■ Ordering information

Specify the following:

1. Part number
2. Ampere range

TK-E 02 - 0.1-0.15

Product category | Frame size | Ampere range

Thermal overload relays TK-E series

Characteristics

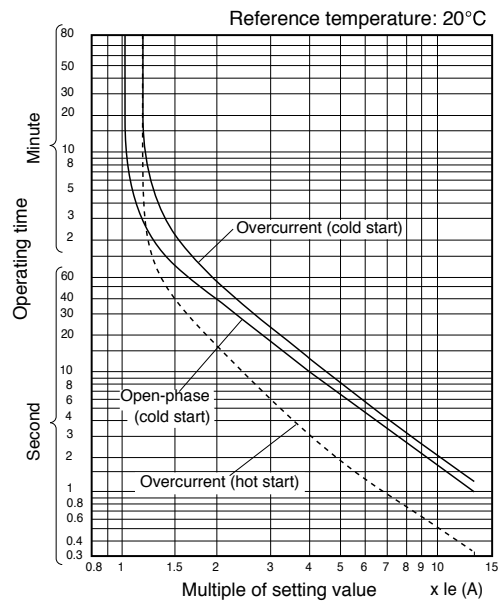
■ Auxiliary contact ratings

• Based on UL and CSA

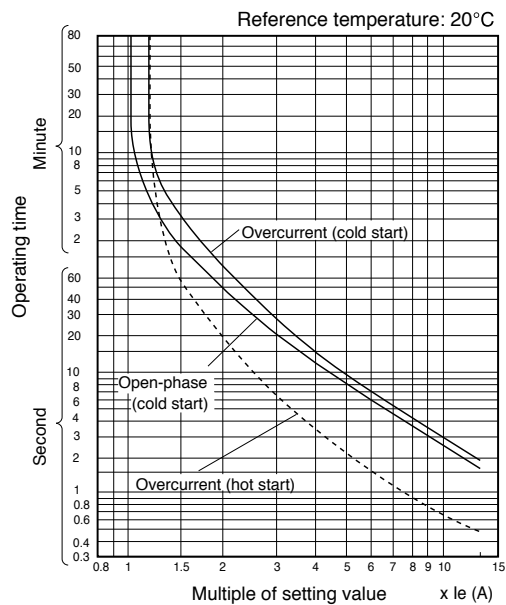
Part number	Rated insulation voltage (V)	Rated thermal current (A)	Making and breaking current (A)					
			AC (rating code B600)			DC (rating code R300)		
			Voltage (V)	Making (A)	Breaking (A)	Voltage (V)	Making (A)	Breaking (A)
TK-E02	600	5	120	30	3	120	0.22	0.22
TK-E2, E3			240	15	1.5	250	0.11	0.11
TK-E5			480	7.5	0.75			
TK-E6			600	6	0.6			

■ Operating characteristics (mean value)

• TK-E02



• TK-E2 to E6, E6H



Thermal overload relays TK-E series

Optional accessories

■ Optional accessories for TK-E series

• Base units for separate mounting

The base unit modifies thermal overload relays to separate mounting that can be mounted to 35mm-wide IEC top hat rail or secured with screws.

Applicable thermal overload relay	Type
TK-E02	SZ-HCE
TK-E2	SZ-HDE
TK-E3	SZ-HEE

• Trip indicator

Reports any tripping action at a thermal overload relay through its LED display.

Applicable thermal overload relay	Rated voltage	Type
TK-E02	100–110V AC, 50/60Hz	SZ-L100
	200–220V AC, 50/60Hz	SZ-L200
TK-E2 to TK-E6	100–110V AC, 50/60Hz	SZ-L100N2
	200–220V AC, 50/60Hz	SZ-L200N2

• Reset release button

Reset a thermal overload relay from the rear side of the board or a distant location.

Applicable thermal overload relay	Load length (mm)	Type
TK-E02	300	SZ-R1
	500	SZ-R2
	700	SZ-R3
TK-E2 to TK-E6	300	SZ-R4
	500	SZ-R5
	700	SZ-R6

• Dial cover

Protects the setting current value of a thermal overload relay from being changed unintentionally.

Applicable thermal overload relay	Type
TK-E02 to TK-E6	SZ-DA

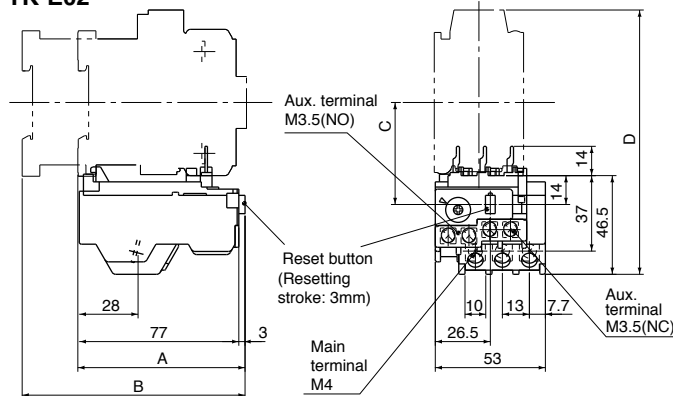


Thermal overload relays TK-E series

Dimensions

■ Dimensions, mm

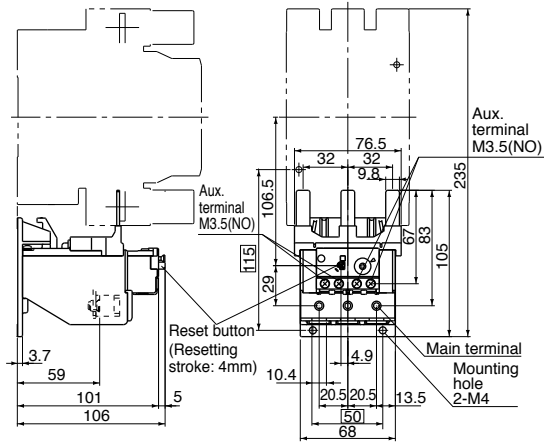
TK-E02



Contactor	A	B	C	D
SC-E02 to 05	80.5	—	49	127.5
SC-E02/G to 05/G	—	107.5	49	127.5

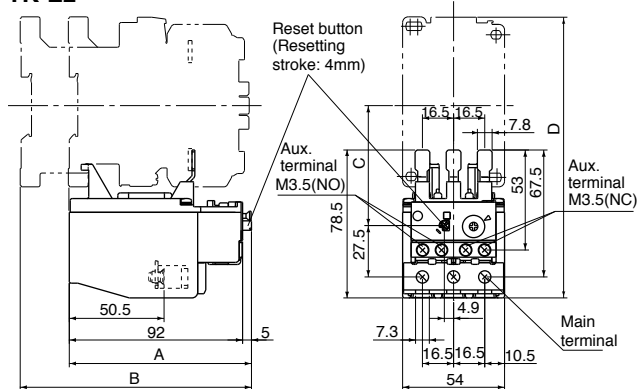
Mass: 0.13kg

TK-E5 On-contactor mounting only



Mass: 0.37kg

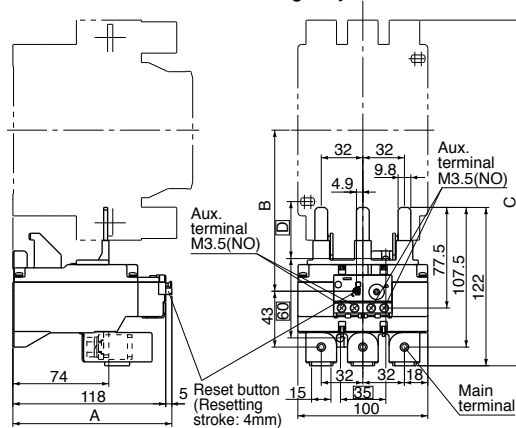
TK-E2



Contactor	A	B	C	D
SC-E1 to E2S	97	—	63.5	149
SC-E1/G to E2S/G	—	123	63.5	149

Mass: 0.25kg

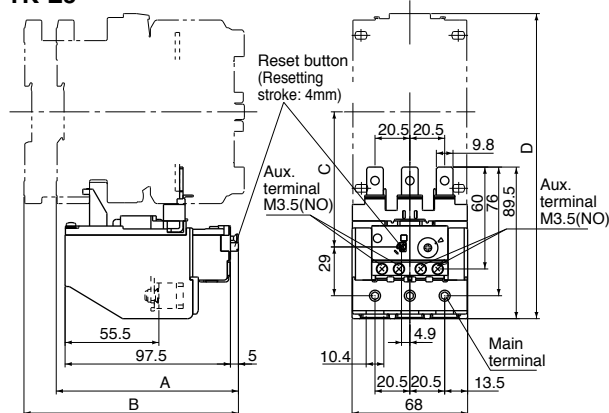
TK-E6 On-contactor mounting only



Contactor	A	B	C	D
SC-E6	123	124	266.5	45
SC-E7	123	129	274	50

Mass: 0.71kg

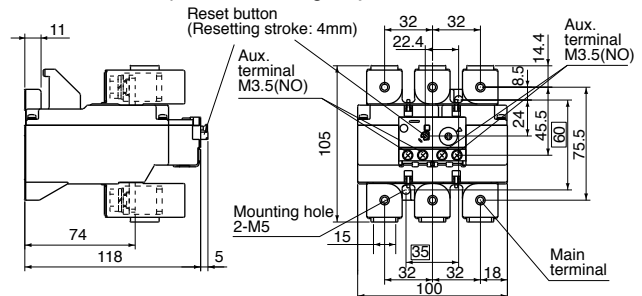
TK-E3



Contactor	A	B	C	D
SC-E3, E4	107.5	—	79.5	180
SC-E3/, E4/G	—	126.5	79.5	180

Mass: 0.34kg

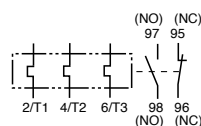
TK-E6H For separate mounting only



Mass: 0.82kg

■ Wiring diagrams

3-heater element



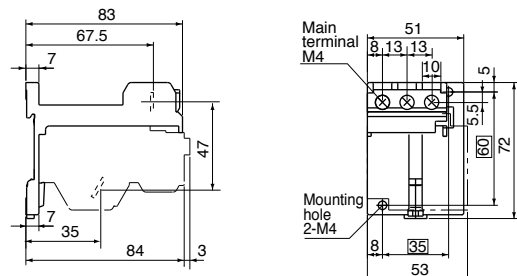
Thermal overload relays TK-E series

Dimensions

■ Dimensions, mm

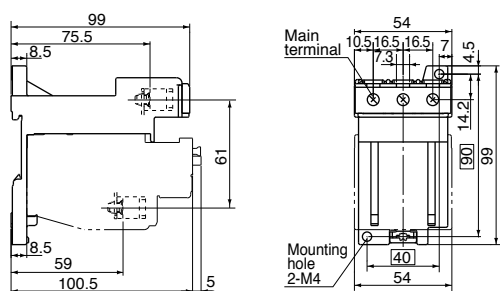
• Base units for separate mounting

SZ-HCE



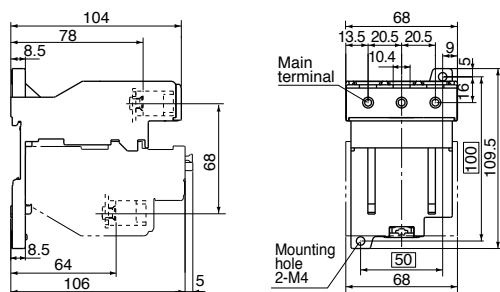
Mass: 55g

SZ-HDE



Mass: 0.1kg

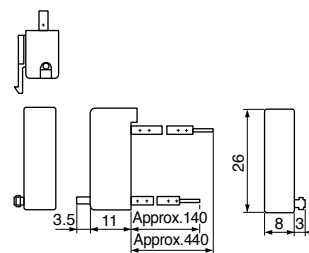
SZ-HEE



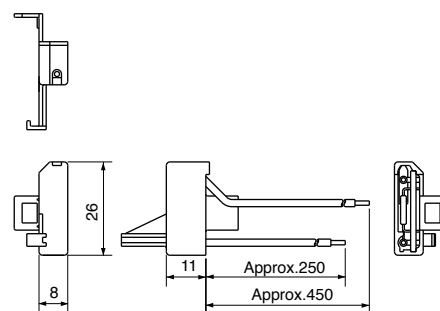
Mass: 0.15kg

• Trip indicators

SZ-L100, L200

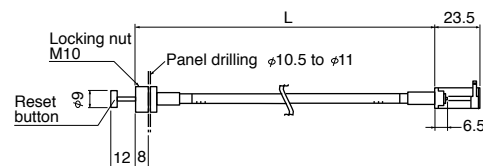


SZ-L100N2, L200N2



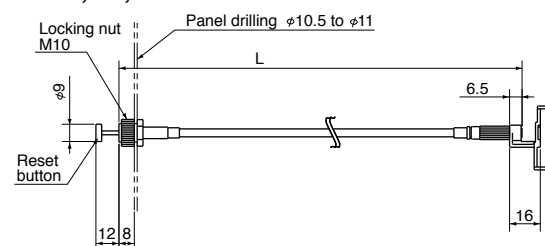
• Reset release button

SZ-R1, R2, R3



Type	L
SZ-R1	300
SZ-R2	500
SZ-R3	700

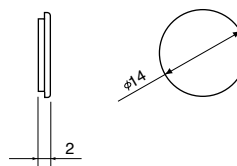
SZ-R4, R5, R6



Type	L
SZ-R4	300
SZ-R5	500
SZ-R6	700

• Dial cover

SZ-DA



Thermal overload relays TK-E series

Instructions

■ Standard operating conditions

The thermal overload relays are manufactured for use in the standard operating conditions given in the table at the right. Consult FUJI before using the thermal overload in different conditions.

■ Wiring

• Connection wires and terminal processing

Be sure to perform wiring correctly referring to the connection diagram. Main terminals for models TK-E02 to TK-E6 are wired using solid wires or stranded wires. Stranded wires or flexible stranded wires can be connected by twisting them together crimping a sleeve (ferrule) onto them before connecting.

• Tightening torque

If wires are not tightened sufficiently, they may become hot or come loose and result in a fire, short-circuit, electric shock, or some other potentially dangerous situation. Be sure to tighten the wires to the torques specified in the tables below.

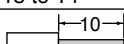
• Wire sizes, tightening tools, tightening torques

Main circuit

Thermal overload relay type	TK-E02	
Base unit type	SZ-HCE	
Solid wire	One	0.75 to 4
(mm ²)	Two	1 to 4
Stranded wire	One	0.75 to 4
(mm ²)	Two	1 to 4
AWG	One	12 max.
	Two	12 max.
Sheath stripping length (mm)		
Terminal screw size	M4	
Tool	⊕ Phillips screwdriver, H-type, No. 2 (ISO 8764) ⊖ Flat-blade screwdriver, 1×5.5×L-type, B (ISO 2830)	
Tightening torque [N·m(lb·in)]	1.2 to 1.5 (11 to 13)	

Ambient temperature	Operating: -5 to 55°C No sudden temperature changes resulting in condensation or icing (The average temperature over a 24-hour period must not exceed 35°C) Storage: -40 to 65°C
Humidity	45 to 85%RH
Atmosphere	No excessive dust, smoke, corrosive gases, flammable gases, steam, or salt
Vibration	10 to 55Hz 15m/s ²
Shock	50m/s ²

Control circuit

Single stranded wire (mm ²)	One	0.75 to 2.5 (ø1 to ø1.6)
	Two	0.75 to 2.5
AWG	One	18 to 14
	Two	18 to 14
Sheath stripping length (mm)		
Fork terminal	Max. 7.7mm wide (R2-3.5)	
Terminal screw size	M3.5	
Tool	⊕ Phillips screwdriver, H-type, No. 2 (ISO 8764) ⊖ Flat-blade screwdriver, 1×5.5×L-type, B (ISO 2830)	
Tightening torque [N·m(lb·in)]	0.8 to 1 (7 to 9)	

Thermal overload relay type	TK-E2	TK-E3	TK-E5	TK-E6, E6H
Base unit type	SZ-HDE	SZ-HEE	—	—
	Single stranded wire (mm ²) *1	0.75 to 16	1.5 to 35	16 to 70
	Flexible stranded wire with sleeve (mm ²) *1	0.75 to 16	1.5 to 35	16 to 70
	Flexible stranded wire without sleeve (mm ²)	0.75 to 16	1.5 to 35	16 to 70
	AWG	6 max.	2 max.	00 max.
	Sheath stripping length (mm) 	18	21	23
	Tool	⊕ Phillips screwdriver, H-type, No. 2 (ISO 8764) ⊖ Flat-blade screwdriver, 1×5.5×L-type, B (ISO 2830)		
	Tightening torque (N·m)	2.5	6	10

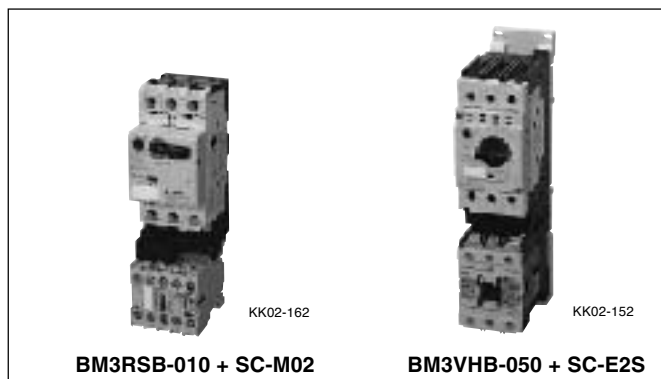
Notes: *1 Stranded wire (0 to 25mm²) consists of 7 wires or less.
Stranded wire (35 to 120mm²) consists of 19 wires or less.
Flexible stranded wire consists of more number wires than the above.

Combination Starters

Quick reference guide

■ Features

- The user can assemble a combination starter by combining a BM3 series manual motor starter and an SC series magnetic contactor according to the load motor capacity.
- The manual motor starter provides overload, phase-loss, and short-circuit protections for the motor circuit, and incorporates a dial for flexible adjustment to match the total load current of the motor.
- The magnetic contactor allows remote ON/OFF operation of the motor circuit with high frequency, and features a electrical durability of one million operations.
- The manual motor starter and magnetic contactor are connected via link module and mounted to a base plate.



■ Combinations meeting for North American market

• BM3RSB, BM3RHB (General)

220-240V AC		440-480V AC		MMS part number		Contactor □ part number	Link module	Base plate
HP rating (HP)	Rated current (A)	HP rating (HP)	Rated current (A)	Part number	Current range (A)			
-	-	-	-	BM3RSB-P16	BM3RHB-P16	0.1-0.16	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
-	-	-	-	BM3RSB-P25	BM3RHB-P25	0.16-0.25	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
-	-	-	-	BM3RSB-P40	BM3RHB-P40	0.25-0.4	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
-	-	-	-	BM3RSB-P63	BM3RHB-P63	0.4-0.63	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
-	-	-	-	BM3RSB-001	BM3RHB-001	0.63-1	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
-	-	3/4	1.6	BM3RSB-1P6	BM3RHB-1P6	1-1.6	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
1/2	2.2	1	2.1	BM3RSB-2P5	BM3RHB-2P5	1.6-2.5	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
3/4	3.2	2	3.4	BM3RSB-004	BM3RHB-004	2.5-4	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
1-1/2	6	3	4.8	BM3RSB-6P3	BM3RHB-6P3	4-6.3	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
-	-	5	7.6	BM3RSB-010	BM3RHB-010	6.3-10	SC-M02, M02/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA - BZ0BPRE22A BZ0BPRE22A
3	9.6	7-1/2	11	BM3RSB-013	BM3RHB-013	10-13	SC-E03 SC-E03/G	BZ0LRE22AA BZ0LRE22GA BZ0BPRE22A BZ0BPRE22A
5	15.2	10	14	BM3RSB-016	BM3RHB-016	11-16	SC-E04 SC-E04/G	BZ0LRE22AA BZ0LRE22GA BZ0BPRE22A BZ0BPRE22A
5	15.2	10	14	BM3RSB-020	BM3RHB-020	14-20	SC-E04 SC-E04/G	BZ0LRE22AA BZ0LRE22GA BZ0BPRE22A BZ0BPRE22A
7-1/2	22	15	21	BM3RSB-025	BM3RHB-025	18-25	SC-E05 SC-E05/G	BZ0LRE22AA BZ0LRE22GA BZ0BPRE22A BZ0BPRE22A
10	28	20	27	BM3RSB-032	BM3RHB-032	24-32	SC-E1 SC-E1/G	BZ0LRE32AA BZ0LRE32GA BZ0BPRE32A BZ0BPRE32A

Combination Starter

Quick reference guide

• BM3RSB, BM3RHB (Type F coordination)

220-240V AC		440-480V AC		MMS part number			Contactor □ part number	Link module	Base plate	Short-circuit ratings at 480Y/277 AC (kA)	
HP rating (HP)	Rated current (A)	HP rating (HP)	Rated current (A)	Part number		Current range (A)				for BM3RSB	for BM3RHB
-	-	-	-	BM3RSB-P16	BM3RHB-P16	0.1-0.16	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	65	65
-	-	-	-	BM3RSB-P25	BM3RHB-P25	0.16-0.25	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	65	65
-	-	-	-	BM3RSB-P40	BM3RHB-P40	0.25-0.4	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	65	65
-	-	-	-	BM3RSB-P63	BM3RHB-P63	0.4-0.63	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	65	65
-	-	-	-	BM3RSB-001	BM3RHB-001	0.63-1	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	65	65
-	-	3/4	1.6	BM3RSB-1P6	BM3RHB-1P6	1-1.6	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	65	65
1/2	2.2	1	2.1	BM3RSB-2P5	BM3RHB-2P5	1.6-2.5	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	50	65
3/4	3.2	2	3.4	BM3RSB-004	BM3RHB-004	2.5-4	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	50	65
1-1/2	6	3	4.8	BM3RSB-6P3	BM3RHB-6P3	4-6.3	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	50	65
-	-	5	7.6	BM3RSB-010	BM3RHB-010	6.3-10	SC-M02, M02/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	25	65
3	9.6	-	-	BM3RSB-010	BM3RHB-010	6.3-10	SC-M02, M02/G SC-E03 SC-E03/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BPRED22A BZ0BPRED22A	25	65
-	-	7-1/2	11	BM3RSB-013	BM3RHB-013	10-13	SC-E03 SC-E03/G	BZ0LRE22AA BZ0LRE22GA	BZ0BPRED22A BZ0BPRED22A	25	65
5	15.2	10	14	BM3RSB-016	BM3RHB-016	11-16	SC-E04 SC-E04/G	BZ0LRE22AA BZ0LRE22GA	BZ0BPRED22A BZ0BPRED22A	25	65
5	15.2	10	14	BM3RSB-020	BM3RHB-020	14-20	SC-E04 SC-E04/G	BZ0LRE22AA BZ0LRE22GA	BZ0BPRED22A BZ0BPRED22A	25	65
7-1/2	22	15	21	BM3RSB-025	BM3RHB-025	18-25	SC-E05 SC-E05/G	BZ0LRE22AA BZ0LRE22GA	BZ0BPRED22A BZ0BPRED22A	25	50
10	28	20	27	BM3RSB-032	BM3RHB-032	24-32	SC-E1 SC-E1/G	BZ0LRE32AA BZ0LRE32GA	BZ0BPRED32A BZ0BPRED32A	25	50

To make an application for Type F condition, You need to prepare BZ0TCRE and BZ0TKUAB accessories separately.

Combination Starter

Quick reference guide

• BM3VSB, BM3VHB (General)

220-240V AC		440-480V AC		MMS part number			Contactor □ part number	Link module	Base plate
HP rating (HP)	Rated current (A)	HP rating (HP)	Rated current (A)	Part number		Current range (A)			
3	9.6	5	7.6	BM3VSB-010	BM3VHB-010	6.3-10	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A
3	9.6	7-1/2	11	BM3VSB-013	BM3VHB-013	10-13	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A
5	15.2	10	14	BM3VSB-016	BM3VHB-016	11-16	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A
5	15.2	10	14	BM3VSB-020	BM3VHB-020	14-20	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A
7-1/2	22	15	21	BM3VSB-025	BM3VHB-025	18-25	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A
10	28	20	27	BM3VSB-032	BM3VHB-032	24-32	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A
10	28	30	40	BM3VSB-040	BM3VHB-040	28-40	SC-E2 SC-E2/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A
15	42	30	40	BM3VSB-050	BM3VHB-050	35-50	SC-E2S SC-E2S/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A
20	54	40	52	BM3VSB-063	BM3VHB-063	45-63	SC-E3 SC-E3/G	BZ0LVE65AA BZ0LVE65GA	BZ0BPVE65A BZ0BPVE65A

• BM3VSB, BM3VHB (Type F coordination)

220-240V AC		440-480V AC		MMS part number			Contactor □ part number	Link module	Base plate	Short-circuit ratings at 480Y/277 AC (kA)	
HP rating (HP)	Rated current (A)	HP rating (HP)	Rated current (A)	Part number		Current range (A)				for BM3VSB	for BM3VHB
3	9.6	5	7.6	BM3VSB-010	BM3VHB-010	6.3-10	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	65
3	9.6	7-1/2	11	BM3VSB-013	BM3VHB-013	10-13	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	65
5	15.2	10	14	BM3VSB-016	BM3VHB-016	11-16	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	65
5	15.2	10	14	BM3VSB-020	BM3VHB-020	14-20	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	65
7-1/2	22	15	21	BM3VSB-025	BM3VHB-025	18-25	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	65
10	28	20	27	BM3VSB-032	BM3VHB-032	24-32	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	65
10	28	30	40	BM3VSB-040	BM3VHB-040	28-40	SC-E2 SC-E2/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	65
15	42	30	40	BM3VSB-050	BM3VHB-050	35-50	SC-E2S SC-E2S/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	65
20	54	40	52	BM3VSB-063	BM3VHB-063	45-63	SC-E3 SC-E3/G	BZ0LVE65AA BZ0LVE65GA	BZ0BPVE65A BZ0BPVE65A	25	65

To make an application for Type F condition, You need to prepare BZ0TKUAB accessories separately.

Optional accessories

• Link modules

Description	Applicable MMS	Applicable magnetic contactor	Operating coil	Type	Mass (g)
 The link module connects the manual motor starter and magnetic contactor electrically and mechanically.	BM3R	SC-M01, M02	AC	BZ0LRC09AA	25
		SC-M01/G, M02/G	DC	BZ0LRC09AA	25
		SC-E02, E03, E04, E05	AC	BZ0LRE22AA	25
		SC-E02/G, E03/G, E04/G, E05/G	DC	BZ0LRE22GA	35
		SC-E1	AC	BZ0LRE32AA	45
		SC-E1/G	DC	BZ0LRE32GA	60
	BM3V	SC-E1, E2, E2S	AC	BZ0LVE51AA	45
		SC-E1/G, E2/G, E2S/G	DC	BZ0LVE51GA	60
		SC-E3	AC	BZ0LVE65AA	65
		SC-E3/G	DC	BZ0LVE65GA	80

(No. KK01-153)

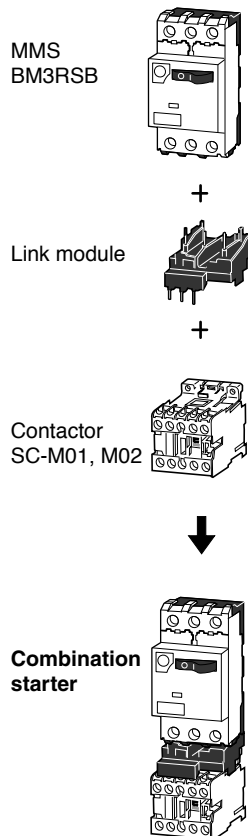
• Base plates

Description	Applicable MMS	Applicable magnetic contactor	Operating coil	Type	Mass (g)
 The base plate is a plastic plate to which the combination starter is mounted. The base plate can then be mounted to a panel with screws or to a DIN rail.	BM3R	SC-E02, E03, E04, E05	AC	BZ0BPVE22A	100
		SC-E02/G, E03/G, E04/G, E05/G	DC	BZ0BPVE22A	100
		SC-E1	AC	BZ0BPVE32A	160
		SC-E1/G	DC	BZ0BPVE32A	160
	BM3V	SC-E1, E2, E2S	AC	BZ0BPVE51A	160
		SC-E1/G, E2/G, E2S/G	DC	BZ0BPVE51A	160
		SC-E3	AC	BZ0BPVE65A	195
		SC-E3/G	DC	BZ0BPVE65A	195

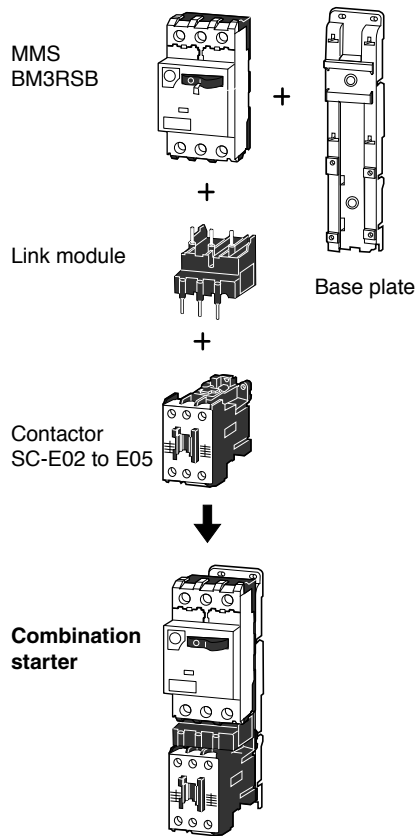
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Combination starter configurations

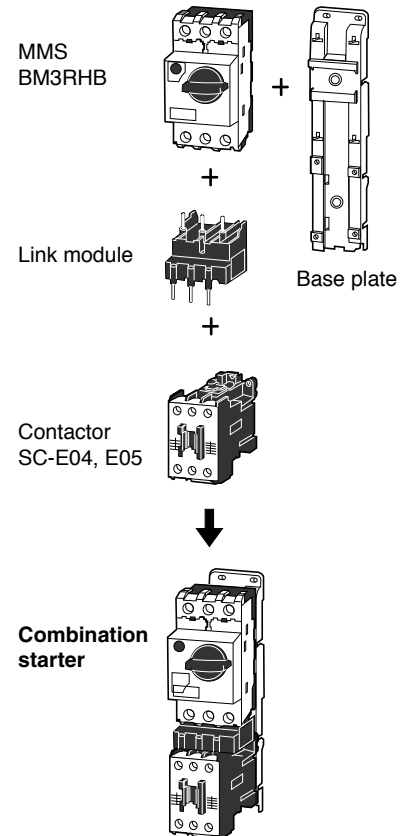
• BM3RSB+SC-M01, M02



• BM3RSB+SC-E02 to E05



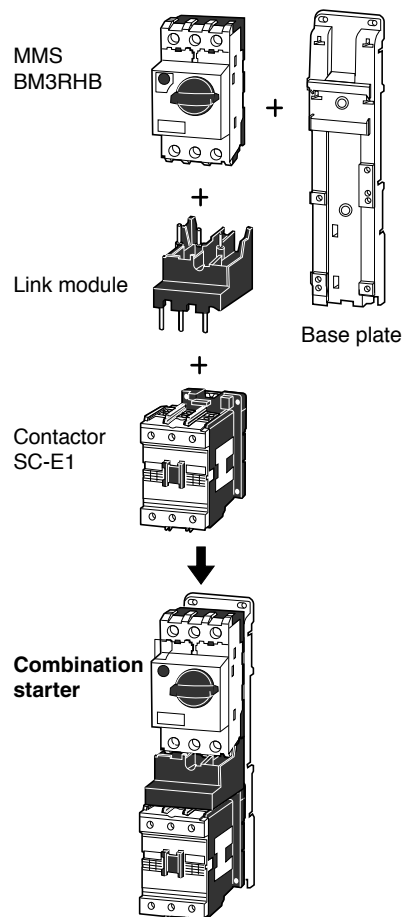
• BM3RHB+SC-E04, E05



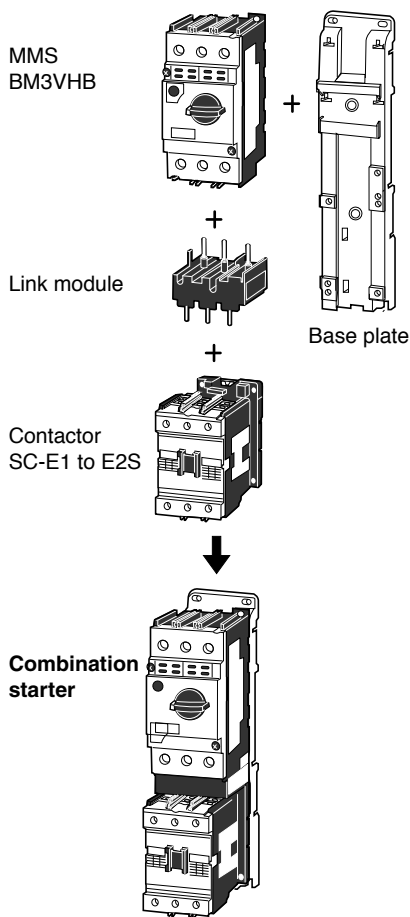
Combination Starters

Optional accessories

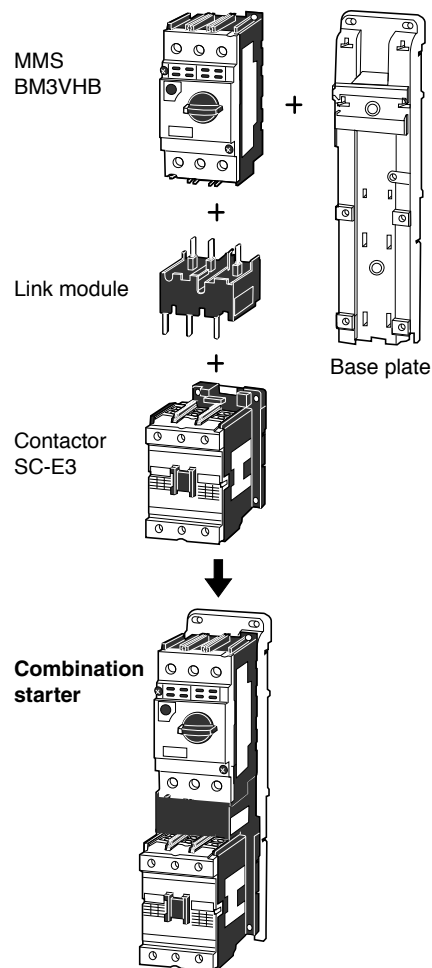
• BM3RHB+SC-E1



• BM3VHB+SC-E1 to E2S



• BM3VHB+SC-E3

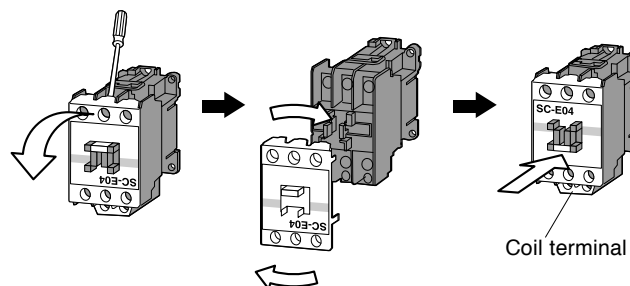


■ Notes for mounting an MMS and contactor

When the manual motor starter and magnetic contactor are configured as a combination starter, the nameplate ends up facing the wrong direction because the coil terminal of the magnetic contactor faces downward. Use the following procedure to turn the nameplate upside down.

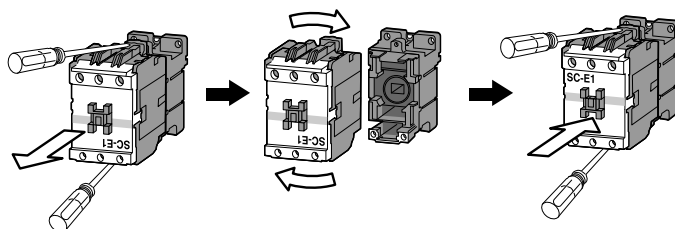
For SC-E02 to SC-E05 magnetic contactors

- Insert a flat-blade screwdriver between the arc-chamber of the S phase or V phase and the terminal screw, and lift the arc-chamber to remove it.
- After removing the cover, turn the cover 180 degrees (top to bottom), then re-mount it onto the magnetic contactor.
- Align the cover with the top and bottom terminals and press it on firmly by hand.



For SC-E1 to SC-E3 magnetic contactors

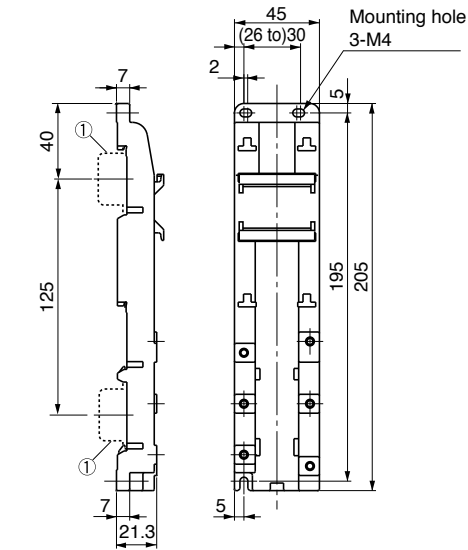
- Use a Phillips screwdriver to remove the two screws securing the front and back bodies.
- Remove the front body and turn it 180 degrees (top to bottom), then re-mount it with the screws.
- Make sure that no foreign matter enters the interior of the magnetic contactor during this removal and re-mounting procedure.



Combination Starters Dimensions

■ Dimensions, mm

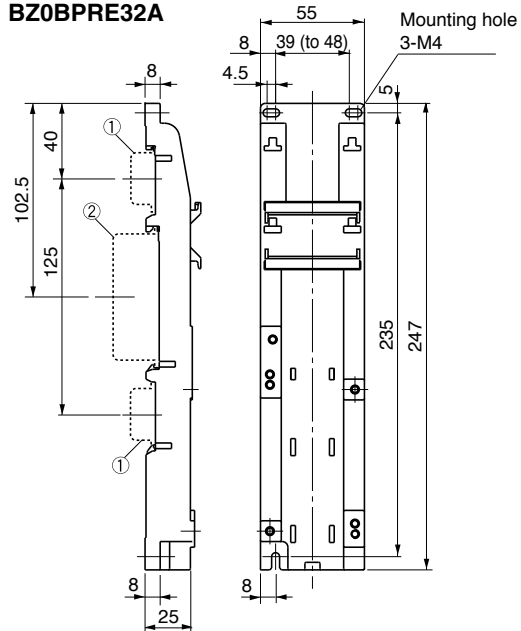
• Base plates BZ0BPRE22A



① 35mm wide rail (height 15mm) x 2

Base plate type	Applicable type	
	MMS	Contactor
BZ0BPRE22A	BM3RSB	SC-E02, E03, E04, E05
	BM3RHB	E02/G, E03/G, E04/G, E05/G

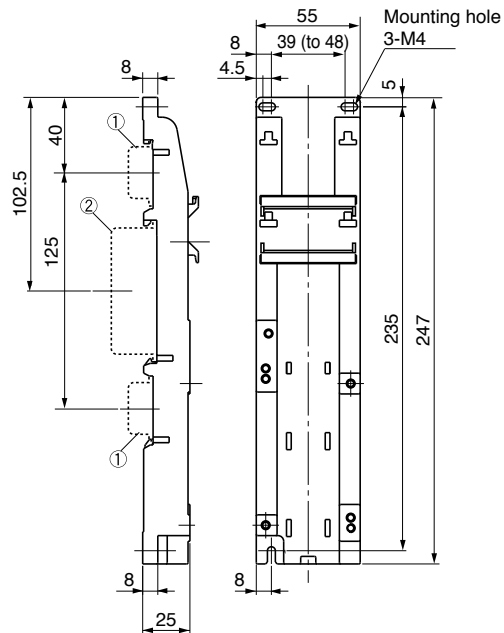
BZ0BPRE32A



① 35mm wide rail (height 15mm) x 2
② 75mm wide rail (height 25mm) x 1

Base plate type	Applicable type	
	MMS	Contactor
BZ0BPRE32A	BM3RSB	SC-E1, E1/G
	BM3RHB	

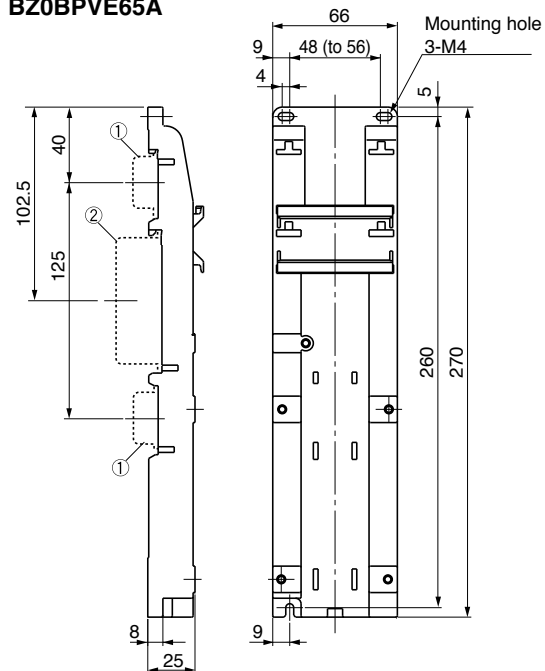
BZ0BPVE51A



① 35mm wide rail (height 15mm) x 2
② 75mm wide rail (height 25mm) x 1

Base plate type	Applicable type	
	MMS	Contactor
BZ0BPVE51A	BM3VSB	SC-E1, E2, E2S,
	BM3VHB	E1/G, E2/G, E2S/G

BZ0BPVE65A



① 35mm wide rail (height 15mm) x 2
② 75mm wide rail (height 25mm) x 1

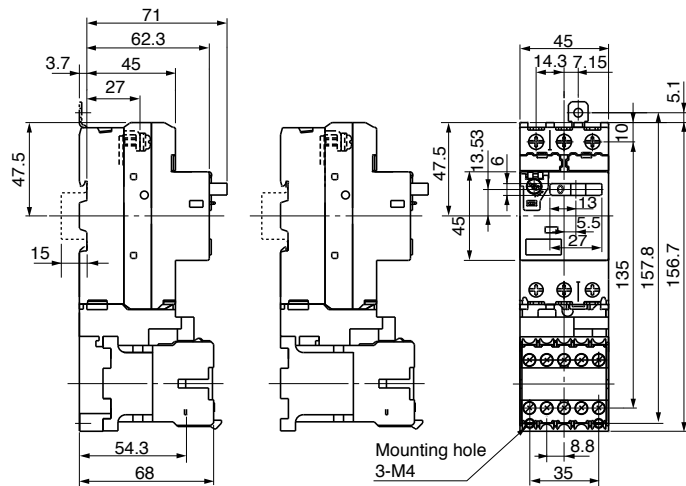
Base plate type	Applicable type	
	MMS	Contactor
BZ0BPVE65A	BM3VSB	SC-E3, E3/G
	BM3VHB	

Combination Starters

Dimensions

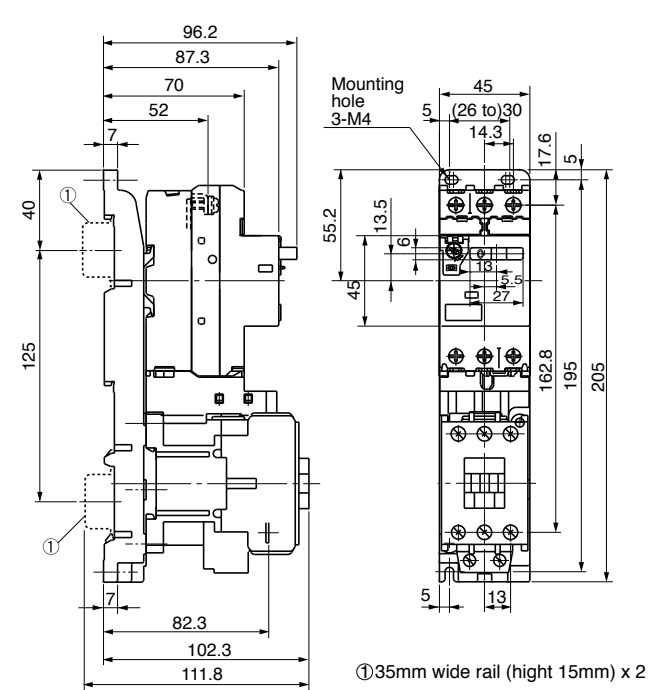
■ Dimensions, mm

- Combination
- BM3RSB + SC-M01, M02
- + SC-M01/G, SC-M02/G



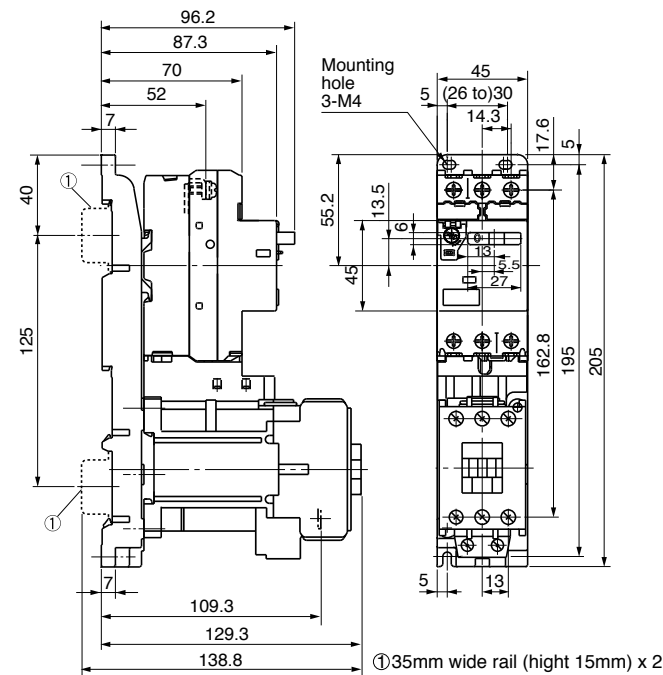
MMS	Contactors	Link module	Mass(g)
BM3RSB	SC-M01, M02	BZ0LRC09AA	540
	SC-M01/G, SC-M02/G	BZ0LRC09AA	600

BM3RSB + SC-E02 to E05



MMS	Contactors	Link module	Base plate	Mass (g)
BM3RSB	SC-E02, E03, E04, E05	BZ0LRE22AA	BZ0BPRE22A	820

BM3RSB + SC-E02/G to E05/G



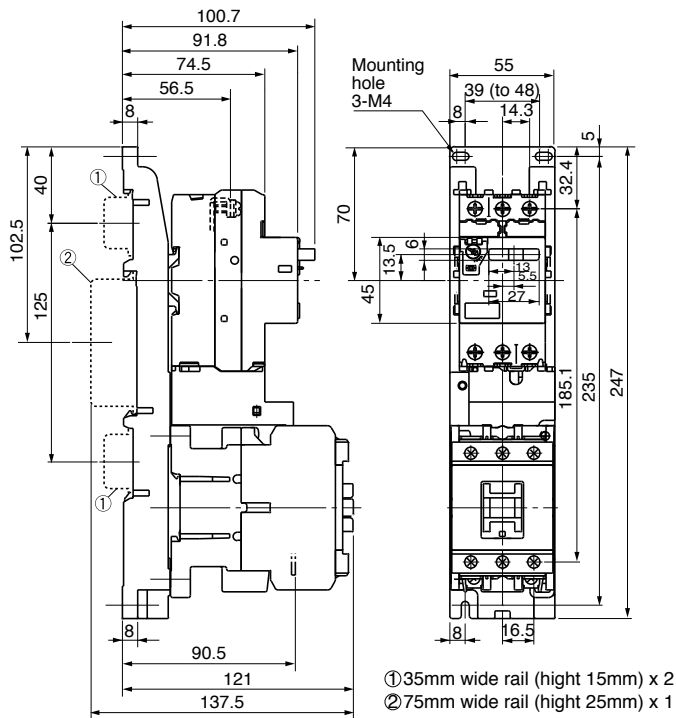
MMS	Contactors	Link module	Base plate	Mass (g)
BM3RSB	SC-E02/G, E03/G, E04/G, E05/G	BZ0LRE22GA	BZ0BPRE22A	1,065

Combination Starters

Dimensions

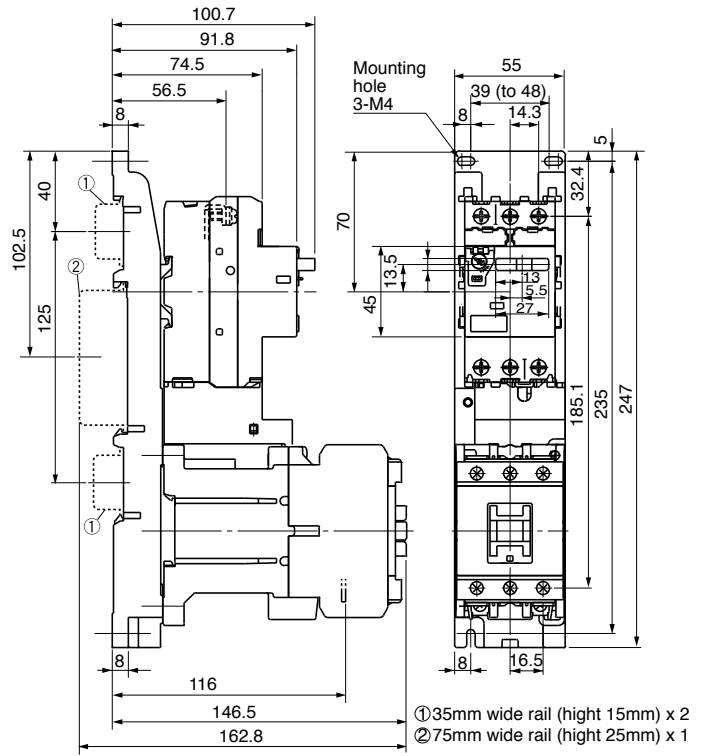
■ Dimensions, mm

• Combination BM3RSB + SC-E1



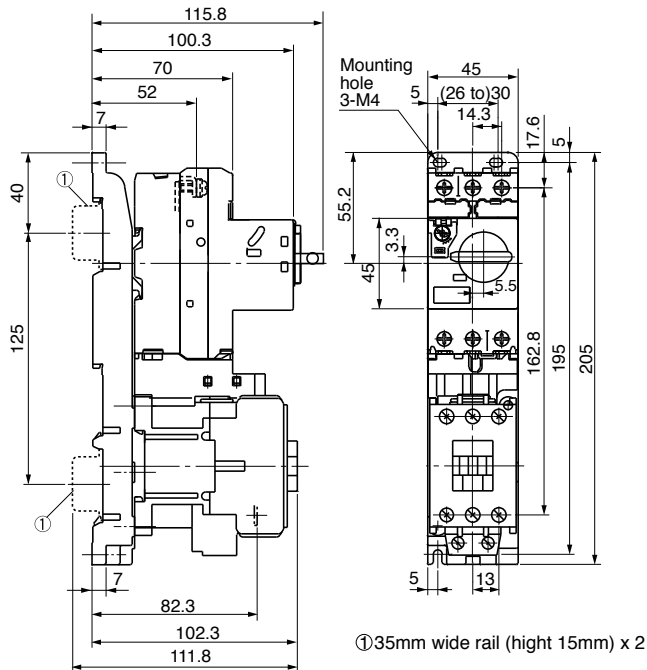
MMS	Contactor	Link module	Base plate	Mass (g)
BM3RSB	SC-E1	BZ0LRE32AA	BZ0BPRES32A	1,135

BM3RSB + SC-E1/G



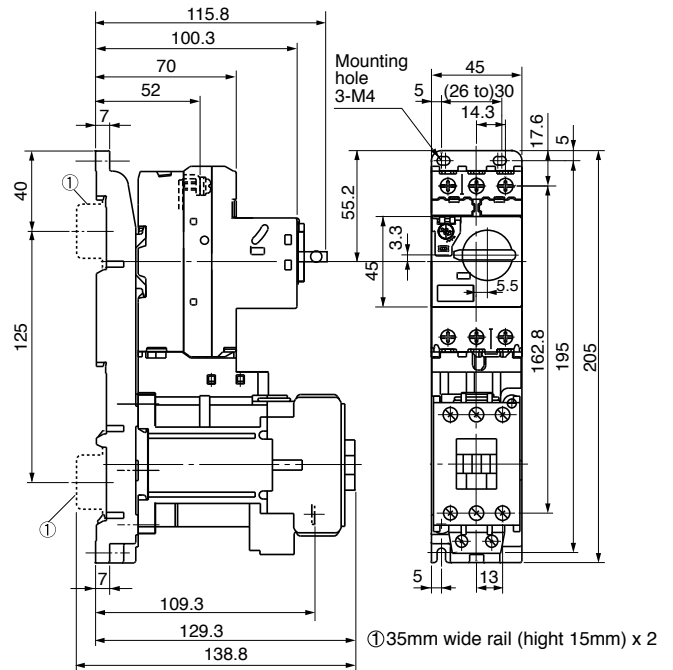
MMS	Contactor	Link module	Base plate	Mass (g)
BM3RSB	SC-E1/G	BZ0LRE32GA	BZ0BPRES32A	1,360

BM3RHB + SC-E02 to E05



MMS	Contactor	Link module	Base plate	Mass (g)
BM3RHB	SC-E02, E03, E04, E05	BZ0LRE22AA	BZ0BPRES22A	840

BM3RHB + SC-E02/G to E05/G



MMS	Contactor	Link module	Base plate	Mass (g)
BM3RHB	SC-E02/G, E03/G, E04/G, E05/G	BZ0LRE22GA	BZ0BPRES22A	1,085

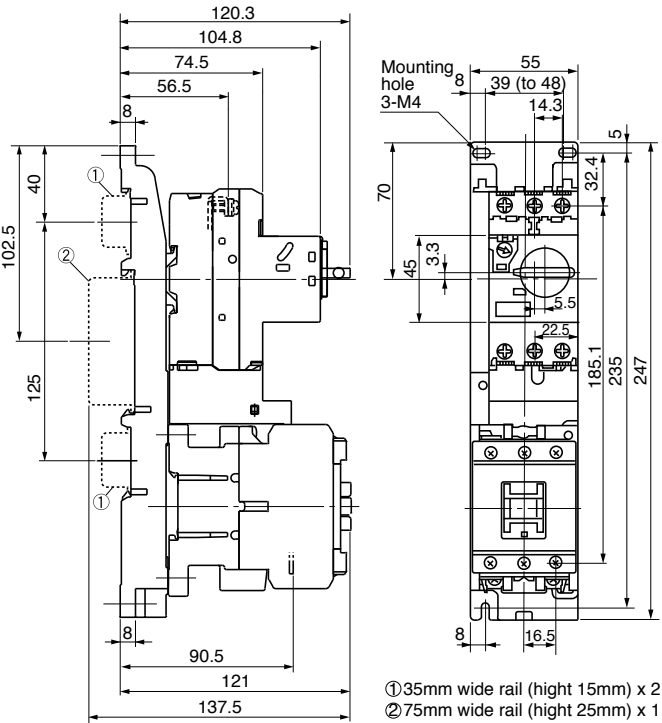
Combination Starters

Dimensions

■ Dimensions, mm

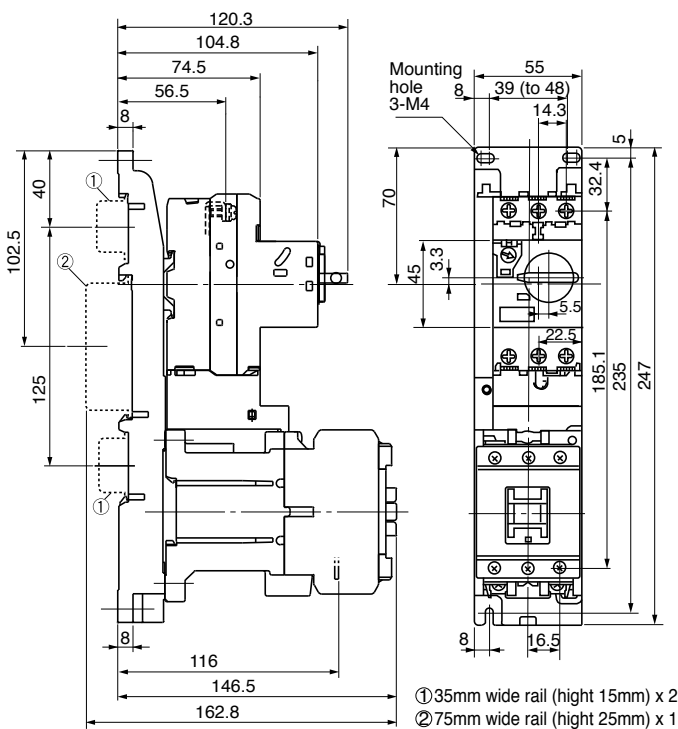
• Combination

BM3RHB + SC-E1



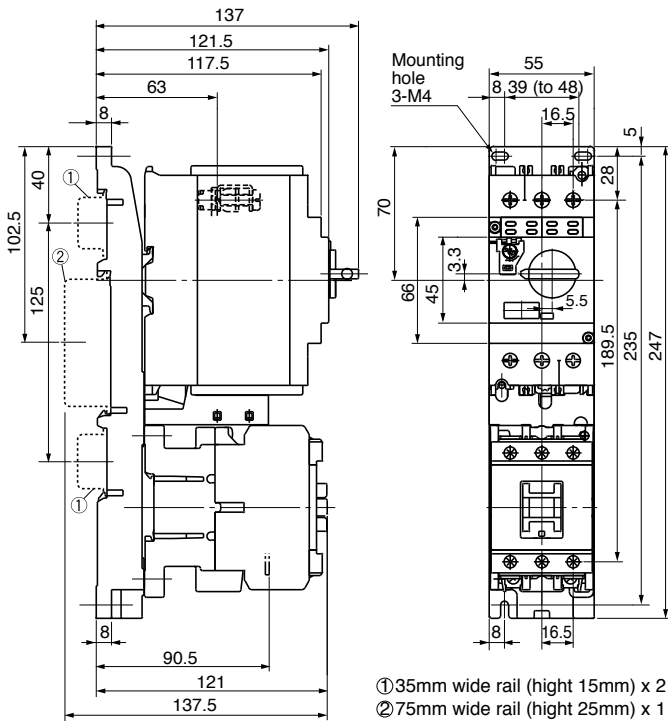
MMS	Contactors	Link module	Base plate	Mass (g)
BM3RHB	SC-E1	BZ0LRE32AA	BZ0BPRE32A	1,155

BM3RHB + SC-E1/G



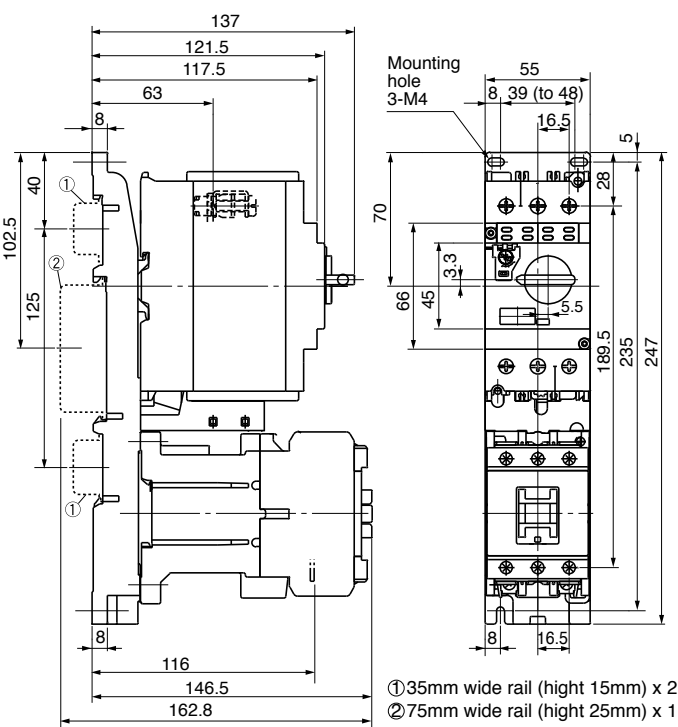
MMS	Contactors	Link module	Base plate	Mass (g)
BM3RHB	SC-E1/G	BZ0LRE32GA	BZ0BPRE32A	1,380

BM3V□B + SC-E1, E2, E2S



MMS	Contactors	Link module	Base plate	Mass (g)
BM3VSB	SC-E1, E2, E2S	BZ0LVE51AA	BZ0BPVE51A	1,580
BM3VHB				

BM3V□B + SC-E1/G, E2/G, E2S/G

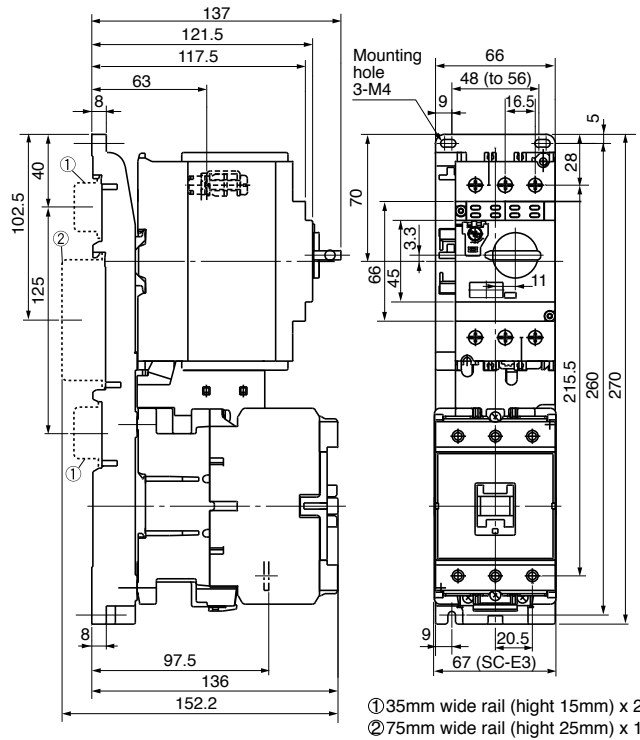


MMS	Contactors	Link module	Base plate	Mass (g)
BM3VSB	SC-E1/G, E2/G, E2S/G	BZ0LVE51GA	BZ0BPVE51A	1,810
BM3VHB				

Combination Starters Dimensions

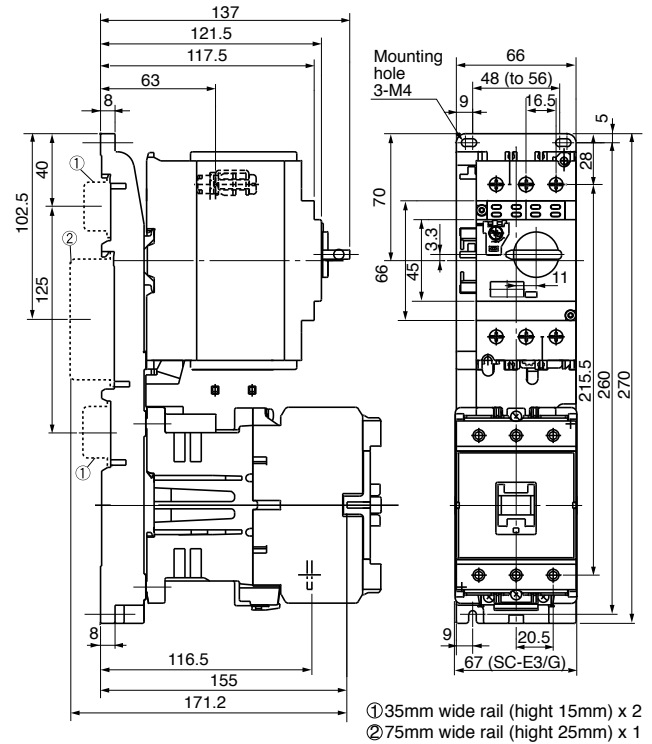
■ Dimensions, mm

• Combination BM3V□B + SC-E3



MMS	Contactors	Link module	Base plate	Mass (g)
BM3VSB	SC-E3	BZ0LVE65AA	BZ0BPVE65A	2,080
BM3VHB				

BM3V□B + SC-E3/G



MMS	Contactors	Link module	Base plate	Mass (g)
BM3VSB	SC-E3/G	BZ0LVE65GA	BZ0BPVE65A	2,400
BM3VHB				

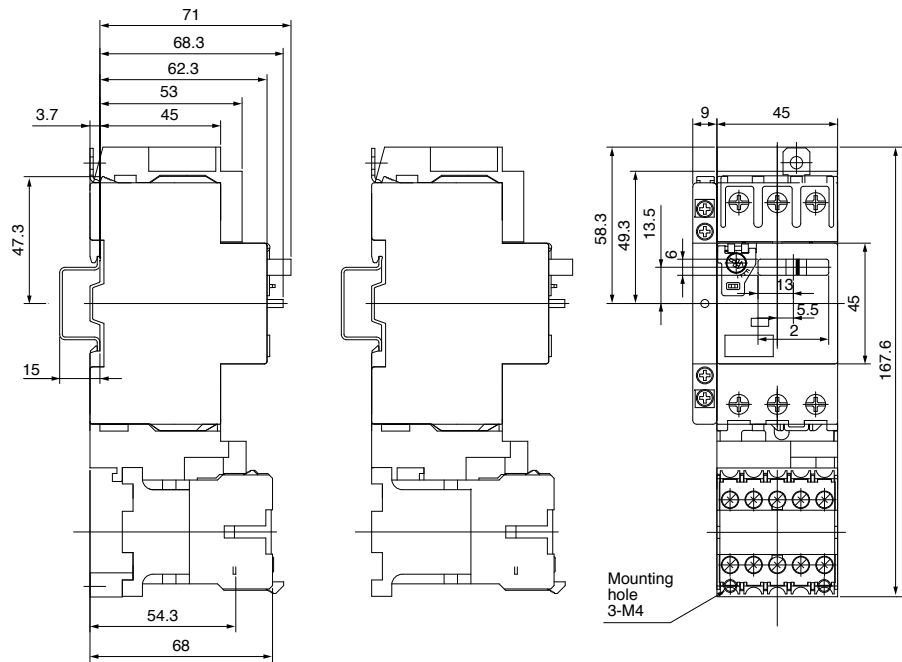
Combination Starters

Dimensions

■ Dimensions, mm

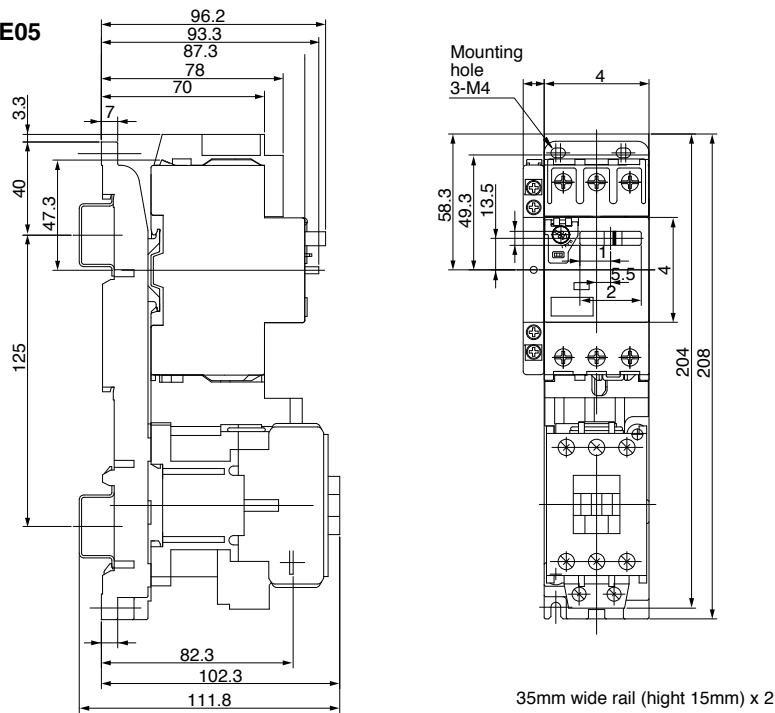
- Type F combination

BM3RSB + SC-M01, M02, M01/G, M02/G



MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RSB	SC-M01, M02	BZ0TCRE	BZ0TKUAB	BZ0LRC09AA	-	615
BM3RSB	SC-M01/G, M02/G	BZ0TCRE	BZ0TKUAB	BZ0LRC09AA	-	675

BM3RSB + SC-E02 to E05



MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RSB	SC-E02, E03, E04, E05	BZ0TCRE	BZ0TKUAB	BZ0LRE22AA	BZ0BPRE22A	895

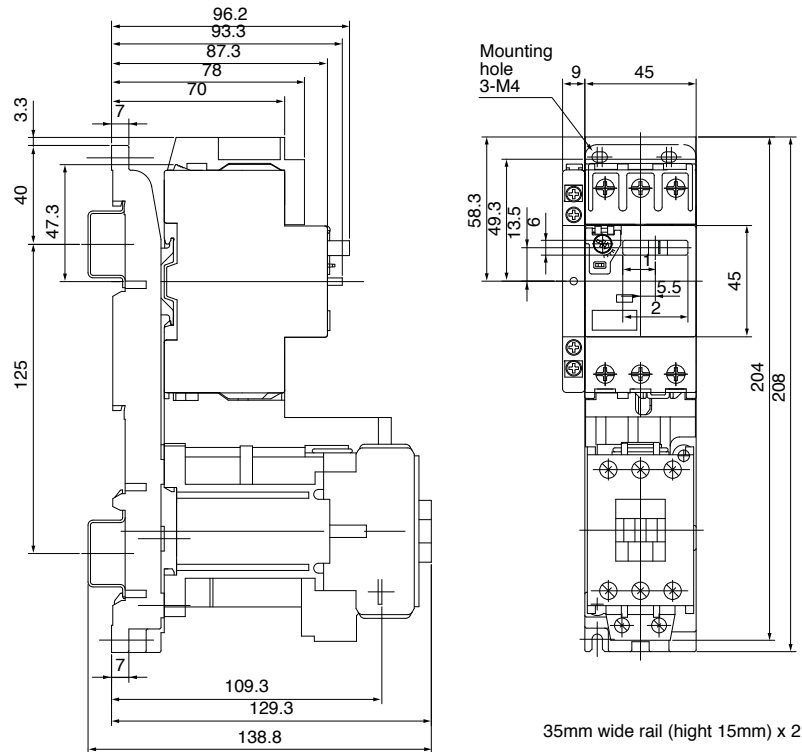
Combination Starters

Dimensions

■ Dimensions, mm

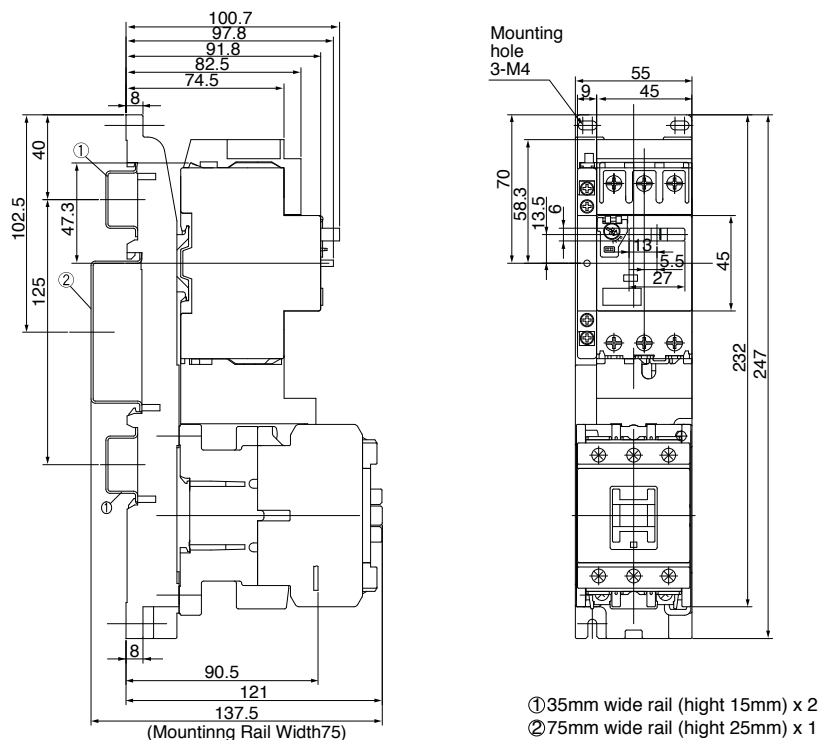
• Type F combination

BM3RSB + SC-E02/G to E05/G



MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RSB	SC-E02/G, E03/G, E04/G, E05/G	BZ0TCRE	BZ0TKUAB	BZ0LRE22GA	BZ0BPPE22A	1,160

BM3RSB + SC-E1

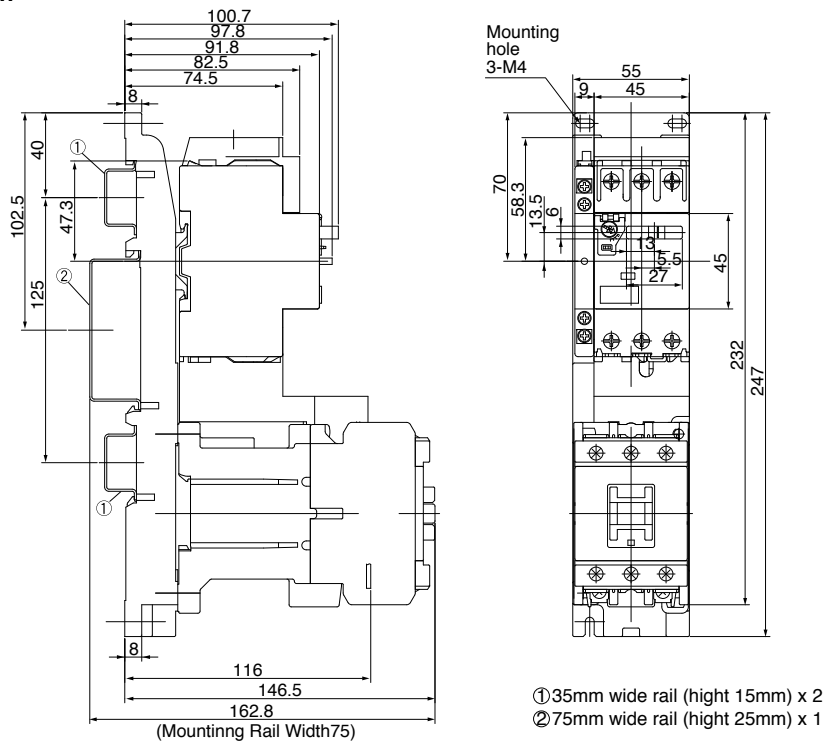


MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RSB	SC-E1	BZ0TCRE	BZ0TKUAB	BZ0LRE32AA	BZ0BPPE32A	1,230

Combination Starters

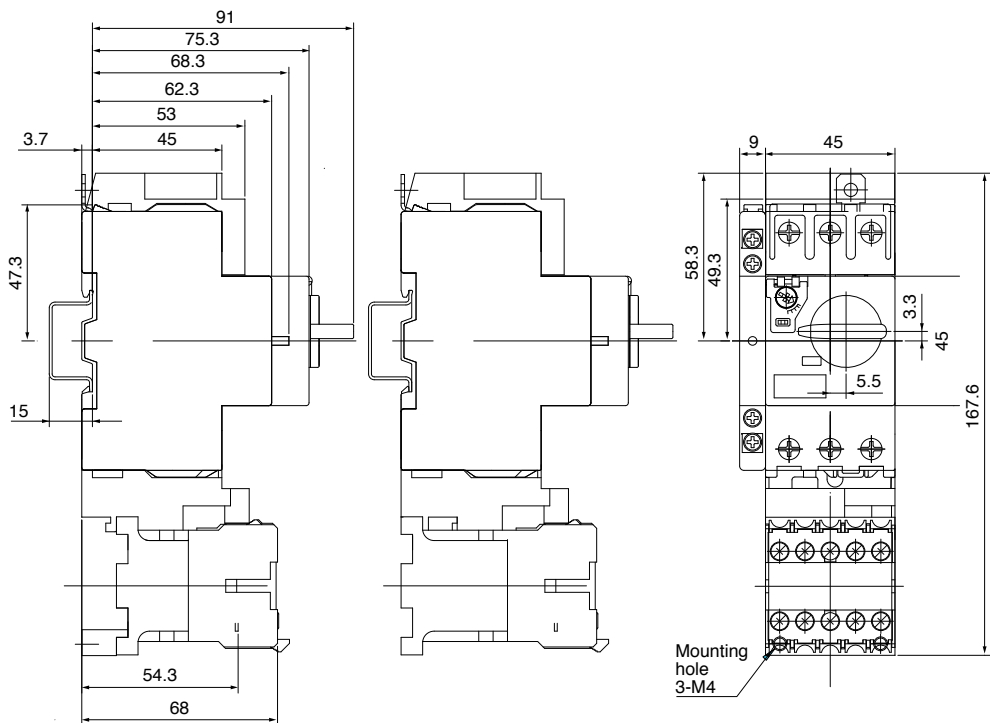
Dimensions

■ Dimensions, mm
• Type F combination
BM3RSB + SC-E1/G



MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RSB	SC-E1/G	BZ0TCRE	BZ0TKUAB	BZ0LRE32GA	BZ0BPRE32A	1,455

BM3RHB + SC-M01, M02, M01/G, M02/G



MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RHB	SC-M01, M02	BZ0TCRE	BZ0TKUAB	BZ0LRC09AA	-	635
BM3RHB	SC-M01/G, M02/G	BZ0TCRE	BZ0TKUAB	BZ0LRC09AA	-	695

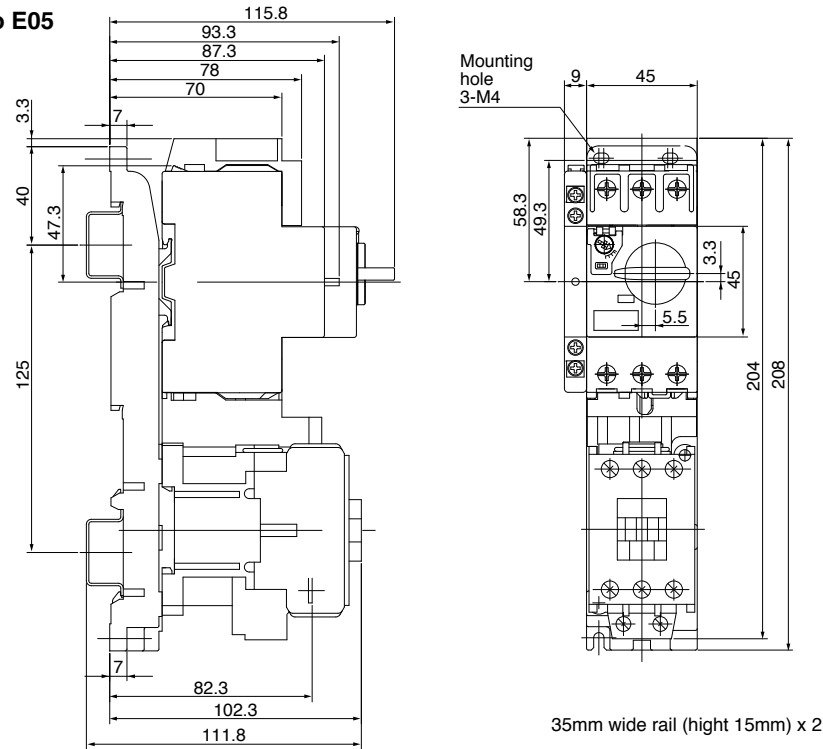
Combination Starters

Dimensions

■ Dimensions, mm

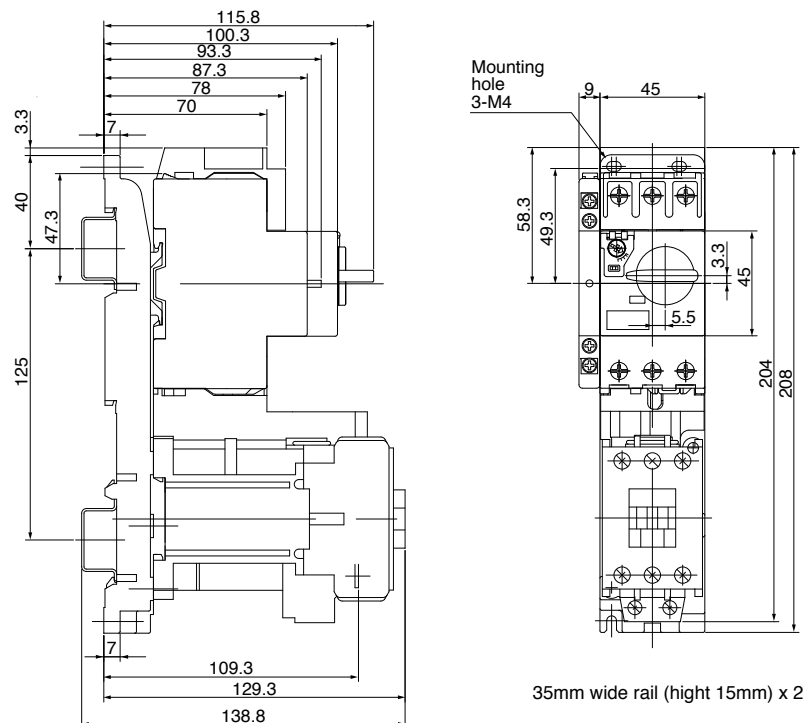
• Type F combination

BM3RHB + SC-E02 to E05



MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RHB	SC-E02, E03, E04, E05	BZ0TCRE	BZ0TKUAB	BZ0LRE22AA	BZ0BPRES22A	915

BM3RHB + SC-E02/G to E05/G

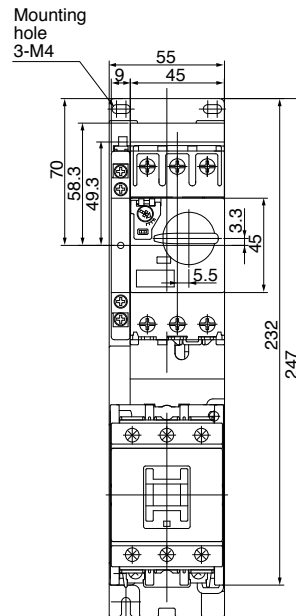
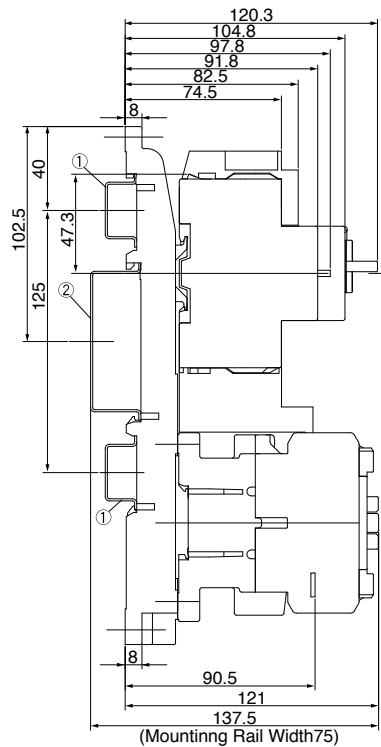


MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RHB	SC-E02/G, E03/G, E04/G, E05/G	BZ0TCRE	BZ0TKUAB	BZ0LRE22GA	BZ0BPRES22A	1,160

Combination Starters

Dimensions

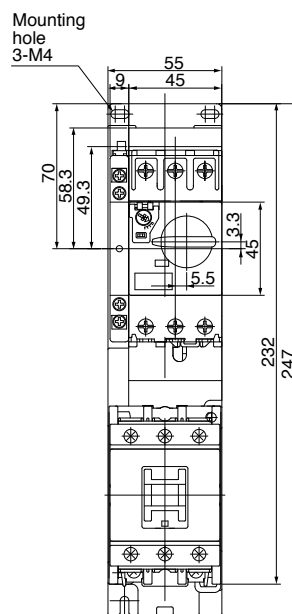
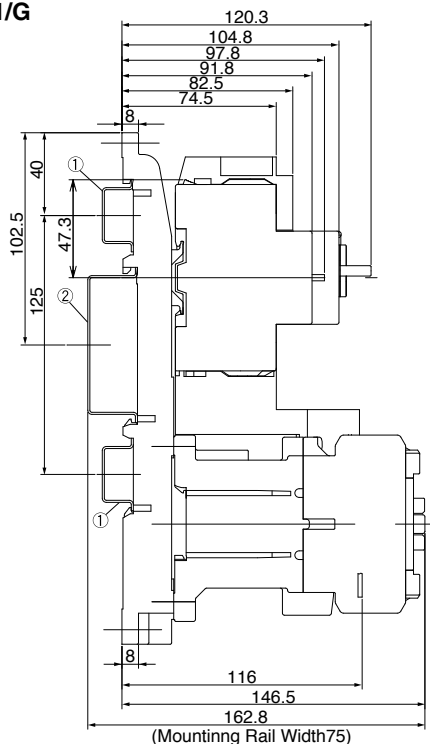
■ Dimensions, mm
• Type F combination
BM3RHB + SC-E1



- ① 35mm wide rail (height 15mm) x 2
② 75mm wide rail (height 25mm) x 1

MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RHB	SC-E1	BZ0TCRE	BZ0TKUAB	BZ0LRE32AA	BZ0BPRES32A	1,230

BM3RHB + SC-E1/G



- ① 35mm wide rail (height 15mm) x 2
② 75mm wide rail (height 25mm) x 1

MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3RHB	SC-E1/G	BZ0TCRE	BZ0TKUAB	BZ0LRE32GA	BZ0BPRES32A	1,455

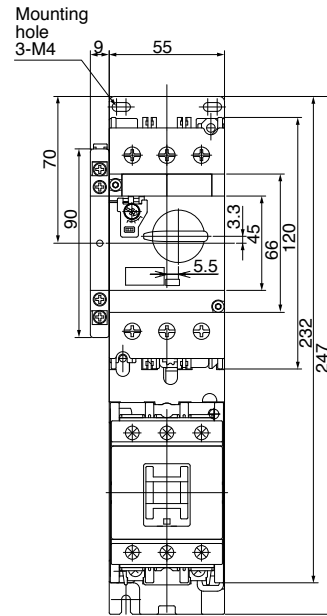
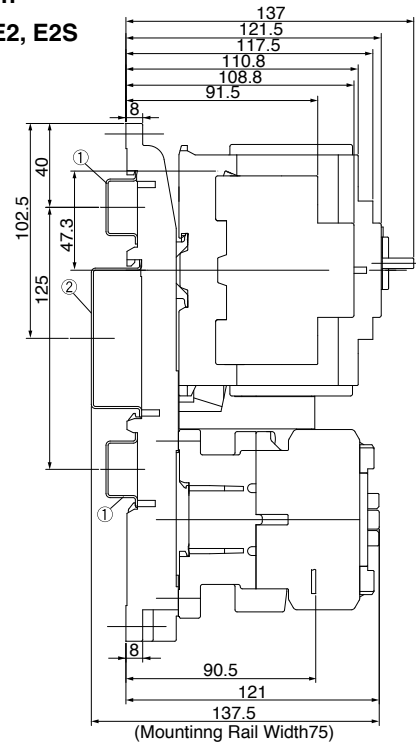
Combination Starters

Dimensions

■ Dimensions, mm

• Type F combination

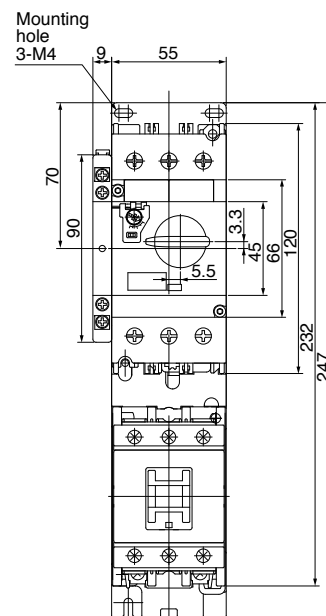
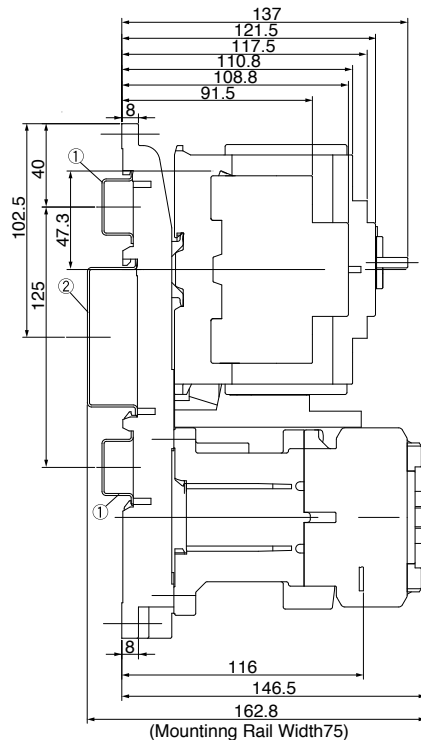
BM3V□B + SC-E1, E2, E2S



- ① 35mm wide rail (height 15mm) x 2
- ② 75mm wide rail (height 25mm) x 1

MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3VSB,VHB	SC-E1,E2,E2S	-	BZ0TKUAB	BZ0LVE51AA	BZ0BPVE51A	1,625

BM3V□B + SC-E1/G, E2/G, E2S/G



- ① 35mm wide rail (height 15mm) x 2
- ② 75mm wide rail (height 25mm) x 1

MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3VSB,VHB	SC-E1/G,E2/G,E2S/G	-	BZ0TKUAB	BZ0LVE51GA	BZ0BPVE51A	1,855

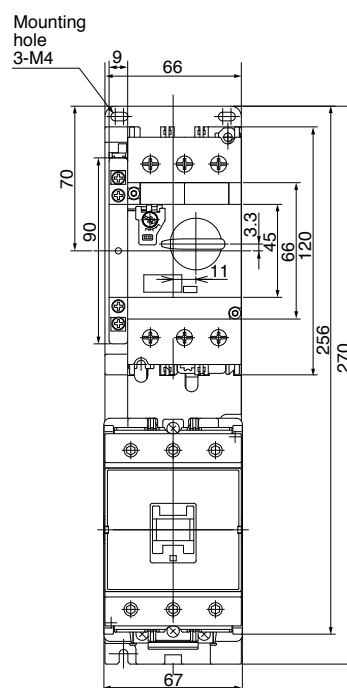
Combination Starters

Dimensions

■ Dimensions, mm

- **Type F combination**

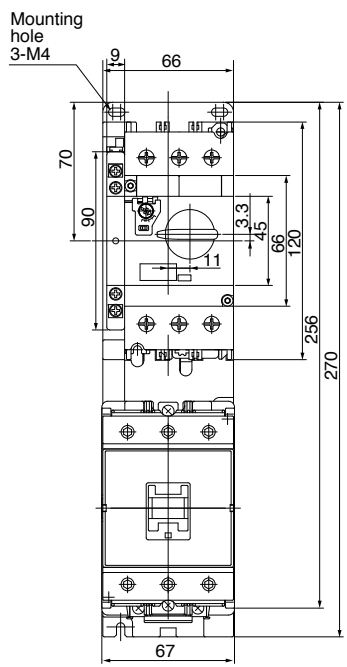
BM3V□B + SC-E3



①35mm wide rail (height 15mm) x 2
②75mm wide rail (height 25mm) x 1

MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3VSB,VHB	SC-E3	-	BZ0TKUAB	BZ0LVE65AA	BZ0BPVE65A	2,125

BM3V□B + SC-E3/G



①35mm wide rail (hight 15mm) x 2
②75mm wide rail (hight 25mm) x 1

MMS	Contactors	Line side terminal cover	Short-circuit alarm contact block	Link module	Base plate	Mass (g)
BM3VSB,VHB	SC-E3/G	-	BZ0TKUAB	BZ0LVE65GA	BZ0BPVE65A	2,445

List Price for BM3 Series Manual Motor Starters

32A Frame types

Standard breaking capacity			High breaking capacity		
Part number	Discount code	List Price	Part number	Discount code	List Price
BM3RSB-P16	D14	80.00	BM3RHB-P16	D14	100.00
BM3RSB-P25	D14	80.00	BM3RHB-P25	D14	100.00
BM3RSB-P40	D14	80.00	BM3RHB-P40	D14	100.00
BM3RSB-P63	D14	80.00	BM3RHB-P63	D14	100.00
BM3RSB-001	D14	80.00	BM3RHB-001	D14	100.00
BM3RSB-1P6	D14	80.00	BM3RHB-1P6	D14	100.00
BM3RSB-2P5	D14	80.00	BM3RHB-2P5	D14	100.00
BM3RSB-004	D14	80.00	BM3RHB-004	D14	100.00
BM3RSB-6P3	D14	80.00	BM3RHB-6P3	D14	100.00
BM3RSB-010	D14	90.00	BM3RHB-010	D14	110.00
BM3RSB-013	D14	90.00	BM3RHB-013	D14	110.00
BM3RSB-016	D14	90.00	BM3RHB-016	D14	110.00
BM3RSB-020	D14	90.00	BM3RHB-020	D14	110.00
BM3RSB-025	D14	100.00	BM3RHB-025	D14	120.00
BM3RSB-032	D14	150.00	BM3RHB-032	D14	170.00

63A Frame types

Standard breaking capacity			High breaking capacity		
Part number	Discount code	List Price	Part number	Discount code	List Price
BM3VSB-010	D14	170.00	BM3VHB-010	D14	260.00
BM3VSB-013	D14	170.00	BM3VHB-013	D14	260.00
BM3VSB-016	D14	170.00	BM3VHB-016	D14	260.00
BM3VSB-020	D14	170.00	BM3VHB-020	D14	260.00
BM3VSB-025	D14	190.00	BM3VHB-025	D14	290.00
BM3VSB-032	D14	210.00	BM3VHB-032	D14	310.00
BM3VSB-040	D14	210.00	BM3VHB-040	D14	310.00
BM3VSB-050	D14	230.00	BM3VHB-050	D14	330.00
BM3VSB-063	D14	230.00	BM3VHB-063	D14	330.00

List Price for BM3 Series Manual Motor Starters accessories

Part number	Description	Discount code	List Price
Auxiliary contact block (W)			
BZ0WIA	Front mounting Auxiliary contact - Internal type 1NO	D14	8.50
BZ0WIB	Front mounting Auxiliary contact - Internal type 1NC	D14	8.50
BZ0WUAAL	Left side mounting Auxiliary contact - Lateral type 2NO	D14	12.00
BZ0WUABL	Left side mounting Auxiliary contact - Lateral type 1NO+1NC	D14	12.00
BZ0WUBBL	Left side mounting Auxiliary contact - Lateral type 2NC	D14	12.00
BZ0WUAAR	Right side mounting Auxiliary contact - Lateral type 2NO	D14	12.00
BZ0WUABR	Right side mounting Auxiliary contact - Lateral type 1NO+1NC	D14	12.00
BZ0WUBBR	Right side mounting Auxiliary contact - Lateral type 2NC	D14	12.00
Alarm contact block (K)			
BZ0KIA	Front (right side only) mounting Alarm contact - Internal type 1NO	D14	9.00
BZ0KIB	Front (right side only) mounting Alarm contact - Internal type 1NC	D14	9.00
Auxiliary and alarm contact blocks (WK)			
BZ0WKUAA	Left side mounting Auxiliary and Alarm contact 1NO(Aux.)+1NO(Alarm)	D14	18.00
BZ0WKUBA	Left side mounting Auxiliary and Alarm contact 1NC(Aux.)+1NO(Alarm)	D14	18.00
BZ0WKUAB	Left side mounting Auxiliary and Alarm contact 1NO(Aux.)+1NC(Alarm)	D14	18.00
BZ0WKUBB	Left side mounting Auxiliary and Alarm contact 1NC(Aux.)+1NC(Alarm)	D14	18.00
Short-circuit alarm contact block (KI)			
BZ0TKUAB	Left side mounting Short Circuit Alarm contact 1NO+1NC	D14	20.00
Shunt trip devices (F)			
BZ0FAZU	Right side mounting Shunt trip / Coil voltage 24VAC 50/60Hz	D14	34.00
BZ0FBZU	Right side mounting Shunt trip / Coil voltage 48VAC 60Hz	D14	34.00
BZ0FCZU	Right side mounting Shunt trip / Coil voltage 48VAC 50Hz / 60VAC 60Hz	D14	34.00
BZ0FIZU	Right side mounting Shunt trip / Coil voltage 100VAC 50Hz / 100-110VAC 60Hz	D14	34.00
BZ0FDZU	Right side mounting Shunt trip / Coil voltage 110-127VAC 50Hz / 120VAC 60Hz	D14	34.00
BZ0FEZU	Right side mounting Shunt trip / Coil voltage 200VAC 50Hz / 200-220VAC 60Hz	D14	34.00
BZ0FFZU	Right side mounting Shunt trip / Coil voltage 220-230VAC 50Hz / 240-260VAC 60Hz	D14	34.00
BZ0FGZU	Right side mounting Shunt trip / Coil voltage 240VAC 50Hz / 277VAC 60Hz	D14	34.00
BZ0FHZU	Right side mounting Shunt trip / Coil voltage 380-400VAC 50Hz / 400-440VAC 60Hz	D14	34.00
BZ0F4ZU	Right side mounting Shunt trip / Coil voltage 415-440VAC 50Hz / 460-480VAC 60Hz	D14	34.00
BZ0FJZU	Right side mounting Shunt trip / Coil voltage 500VAC 50Hz / 600VAC 60Hz	D14	34.00
BZ0FKZUD	Right side mounting Shunt trip / Coil voltage 24-60VDC	D14	34.00
BZ0FLZUD	Right side mounting Shunt trip / Coil voltage 110-240VDC	D14	34.00
Undervoltage trip devices (R)			
BZ0RAZ1U	Right side mounting Undervoltage trip / Coil voltage 24VAC 50Hz	D14	34.00
BZ0RAZ2U	Right side mounting Undervoltage trip / Coil voltage 24VAC 60Hz	D14	34.00
BZ0RBZ1U	Right side mounting Undervoltage trip / Coil voltage 48VAC 50Hz	D14	34.00
BZ0RBZU	Right side mounting Undervoltage trip / Coil voltage 48VAC 60Hz	D14	34.00
BZ0R1ZU	Right side mounting Undervoltage trip / Coil voltage 100VAC 50Hz / 100-110VAC 60Hz	D14	34.00
BZ0RDZU	Right side mounting Undervoltage trip / Coil voltage 110-127VAC 50Hz / 120VAC 60Hz	D14	34.00
BZ0REZU	Right side mounting Undervoltage trip / Coil voltage 200VAC 50Hz / 200-220VAC 60Hz	D14	34.00
BZ0RFZU	Right side mounting Undervoltage trip / Coil voltage 220-230VAC 50Hz / 240-260VAC 60Hz	D14	34.00
BZ0RGZU	Right side mounting Undervoltage trip / Coil voltage 240VAC 50Hz / 277VAC 60Hz	D14	34.00
BZ0RHZU	Right side mounting Undervoltage trip / Coil voltage 380-400VAC 50Hz / 400-440VAC 60Hz	D14	34.00
BZ0R4ZU	Right side mounting Undervoltage trip / Coil voltage 415-440VAC 50Hz / 460-480VAC 60Hz	D14	34.00
BZ0RJZU	Right side mounting Undervoltage trip / Coil voltage 500VAC 50Hz / 600VAC 60Hz	D14	34.00
External operating handles			
BZ0VBBL	External operating handle Standard type (Black) for BM3RH	D14	40.00
BZ0VYRL	External operating handle Emergency type (Red / Yellow) for BM3RH	D14	45.00
BZ0VBBM	External operating handle Standard type (Black) for BM3V	D14	40.00
BZ0VYRM	External operating handle Emergency type (Red / Yellow) for BM3V	D14	45.00
Line side terminal cover			
BZ0TCRE	Line side terminal cover for BM3R	D14	18.00
Others			
BZ0SET	Push-in lug for BM3R (10pcs/pack)	D14	8.00
BZ0TCV	IP 20 Terminal cover for BM3V (6pcs/pack)	D14	12.00
BZ0CFG	Dummy cover (10pcs/pack)	D14	40.00

List Price for BM3 Series Manual Motor Starters accessories

Part number	Description	Discount code	List Price
Busbar system			
BZ0BR02A	Busbar / 2-BM3R, modular space : 45mm	D14	19.00
BZ0BR03A	Busbar / 3-BM3R, modular space : 45mm	D14	23.00
BZ0BR04A	Busbar / 4-BM3R, modular space : 45mm	D14	27.00
BZ0BR05A	Busbar / 5-BM3R, modular space : 45mm	D14	28.00
BZ0BR12A	Busbar / 2-BM3R+1(9mm) external accessory, modular space : 54mm	D14	20.00
BZ0BR13A	Busbar / 3-BM3R+1(9mm) external accessory, modular space : 54mm	D14	24.00
BZ0BR14A	Busbar / 4-BM3R+1(9mm) external accessory, modular space : 54mm	D14	28.00
BZ0BR15A	Busbar / 5-BM3R+1(9mm) external accessory, modular space : 54mm	D14	30.00
BZ0BR22A	Busbar / 2-BM3R+1(18mm) or 2(9mm) external accessories, modular space : 63mm	D14	44.00
BZ0BR24A	Busbar / 4-BM3R+1(18mm) or 2(9mm) external accessories, modular space : 63mm	D14	54.00
BZ0BV02A	Busbar / 2-BM3V, modular space : 55mm	D14	42.00
BZ0BV03A	Busbar / 3-BM3V, modular space : 55mm	D14	53.00
BZ0BV04A	Busbar / 4-BM3V, modular space : 55mm	D14	65.00
BZ0BV12A	Busbar / 2-BM3V+1(9mm) external accessory, modular space : 64mm	D14	46.00
BZ0BV13A	Busbar / 3-BM3V+1(9mm) external accessory, modular space : 64mm	D14	59.00
BZ0BV14A	Busbar / 4-BM3V+1(9mm) external accessory, modular space : 64mm	D14	70.00
BZ0BV22A	Busbar / 2-BM3V+1(18mm) or 2(9mm) external accessories, modular space : 73mm	D14	50.00
BZ0BV24A	Busbar / 4-BM3V+1(18mm) or 2(9mm) external accessories, modular space : 73mm	D14	78.00
BZ0BFRA	3-phase feed-in terminal for BM3R	D14	23.00
BZ0BFVA	3-phase feed-in terminal for BM3V	D14	48.00
BZ0BCRA	Busbar cover for BZ0BR (pin connection)	D14	6.00
BZ0BCRB	Busbar cover for BZ0BR (fork connection)	D14	6.00
BZ0BCVA	Busbar cover for BZ0BV (pin connection)	D14	8.00
Enclosure			
BZ0CSLA	Enclosure Surface mounting type IP41	D14	40.00
BZ0CSLB	Enclosure Surface mounting type IP55 with conversion kits	D14	57.00
BZ0CFLA	Enclosure Flush mounting type IP41	D14	40.00
BZ0CFLB	Enclosure Flush mounting type IP55 with conversion kits	D14	51.00
BZ0CKA	Padlocking device	D14	30.00
BZ0CPM	Emergency pushbutton / Momentary	D14	39.00
BZ0CPL	Emergency pushbutton / Push-lock turn reset	D14	40.00
BZ0CPK	Emergency pushbutton / Key operated	D14	82.00
BZ0CCA	Conversion kit from IP41 to IP55	D14	12.00
BZ0CUA	Adapter set	D14	11.00
BZ0CNA	Neutral connector	D14	4.00
BZ0CLGA	Indication Lamp / Green, 100-120VAC	D14	33.00
BZ0CLGB	Indication Lamp / Green, 200-240VAC	D14	33.00
BZ0CLGC	Indication Lamp / Green, 380-440VAC	D14	33.00
BZ0CLGD	Indication Lamp / Green, 480-500VAC	D14	33.00
BZ0CLGE	Indication Lamp / Green, 500-600VAC	D14	33.00
BZ0CLRA	Indication Lamp / Red, 100-120VAC	D14	33.00
BZ0CLRB	Indication Lamp / Red, 200-240VAC	D14	33.00
BZ0CLRC	Indication Lamp / Red, 380-440VAC	D14	33.00
BZ0CLRD	Indication Lamp / Red, 480-500VAC	D14	33.00
BZ0CLRE	Indication Lamp / Red, 500-600VAC	D14	33.00
BZ0CLCA	Indication Lamp / Transparent, 100-120VAC	D14	33.00
BZ0CLCB	Indication Lamp / Transparent, 200-240VAC	D14	33.00
BZ0CLCC	Indication Lamp / Transparent, 380-440VAC	D14	33.00
BZ0CLCD	Indication Lamp / Transparent, 480-500VAC	D14	33.00
BZ0CLCE	Indication Lamp / Transparent, 500-600VAC	D14	33.00

List Price for SC-E Series Contactors and TK-E Series Overload Relays and accessories

List Price for SC-E Series Contactors and TK-E Series Overload Relays

Contactors

AC operating coil			DC operating coil			Overload Relays		
Part number	Discount code	List Price	Part number	Discount code	List Price	Part number	Discount code	List Price
SC-M01	D14	40.00	SC-M01/G	D14	57.00	-	-	-
SC-M02	D14	40.00	SC-M02/G	D14	57.00	-	-	-
SC-E02	D14	33.00	SC-E02/G	D14	38.00	TK-E02	D14	42.00
SC-E03	D14	40.00	SC-E03/G	D14	60.00	TK-E02	D14	42.00
SC-E04	D14	54.00	SC-E04/G	D14	80.00	TK-E02	D14	42.00
SC-E05	D14	65.00	SC-E05/G	D14	94.00	TK-E02	D14	42.00
SC-E1	D14	78.00	SC-E1/G	D14	99.00	TK-E2	D14	80.00
SC-E2	D14	108.00	SC-E2/G	D14	130.00	TK-E2	D14	80.00
SC-E2S	D14	130.00	SC-E2S/G	D14	158.00	TK-E2	D14	80.00
SC-E3	D14	140.00	SC-E3/G	D14	175.00	TK-E3	D14	90.00
SC-E4	D14	160.00	SC-E4/G	D14	200.00	TK-E3	D14	90.00
Super magnet operating coil								
SC-E5	D14	360.00				TK-E5	D14	100.00
SC-E6	D14	460.00				TK-E6	D14	148.00
SC-E7	D14	535.00				TK-E6	D14	148.00
						TK-E6H	D14	148.00

List Price for SC-E Series Contactors and TK-E Series Overload Relays accessories

Part number	Description	Discount code	List Price
Auxiliary contact block			
SZ-MA40	Front mounting Auxiliary contact block (4NO) for SC-M01(/G), SC-M02(/G)	D14	30.00
SZ-MA31	Front mounting Auxiliary contact block (3NO+1NC) for SC-M01(/G), SC-M02(/G)	D14	30.00
SZ-MA22	Front mounting Auxiliary contact block (2NO+2NC) for SC-M01(/G), SC-M02(/G)	D14	30.00
SZ-MA13	Front mounting Auxiliary contact block (1NO+3NC) for SC-M01(/G), SC-M02(/G)	D14	30.00
SZ-MA04	Front mounting Auxiliary contact block (4NC) for SC-M01(/G), SC-M02(/G)	D14	30.00
SZ-MA20	Front mounting Auxiliary contact block (2NO) for SC-M01(/G), SC-M02(/G)	D14	25.00
SZ-MA11	Front mounting Auxiliary contact block (1NO+1NC) for SC-M01(/G), SC-M02(/G)	D14	25.00
SZ-MA02	Front mounting Auxiliary contact block (2NC) for SC-M01(/G), SC-M02(/G)	D14	25.00
SZ-MAS10	Side mounting Auxiliary contact block (1NO) for SC-M01(/G), SC-M02(/G)	D14	15.00
SZ-MAS01	Side mounting Auxiliary contact block (1NC) for SC-M01(/G), SC-M02(/G)	D14	15.00
SZ-A40/T	Front mounting Auxiliary contact block (4NO) for SC-E02(/G) to SC-E4(/G)	D14	20.00
SZ-A31/T	Front mounting Auxiliary contact block (3NO+1NC) for SC-E02(/G) to SC-E4(/G)	D14	20.00
SZ-A22/T	Front mounting Auxiliary contact block (2NO+2NC) for SC-E02(/G) to SC-E4(/G)	D14	20.00
SZ-A20/T	Front mounting Auxiliary contact block (2NO) for SC-E02(/G) to SC-E4(/G)	D14	14.00
SZ-A11/T	Front mounting Auxiliary contact block (1NO+1NC) for SC-E02(/G) to SC-E4(/G)	D14	14.00
SZ-A02/T	Front mounting Auxiliary contact block (2NC) for SC-E02(/G) to SC-E4(/G)	D14	14.00
SZ-AS1/T	Side mounting Auxiliary contact block (1NO+1NC) for SC-E02(/G) to SC-E4(/G)	D14	22.00
SZ-AS2/T	Side mounting Auxiliary contact block (1NO+1NC) for SC-E5 to SC-E7	D14	22.00
Main circuit surge suppression unit			
SZ-ZM1E	Front mounting Main circuit surge suppression unit for SC-E02(/G) to SC-E05(/G)	D14	38.00
SZ-ZM2E	Side mounting Main circuit surge suppression unit for SC-E02(/G) to SC-E05(/G)	D14	38.00
SZ-ZM3E	Front mounting Main circuit surge suppression unit for SC-E1(/G) to SC-E4(/G)	D14	40.00
SZ-ZM4E	Side mounting Main circuit surge suppression unit for SC-E1(/G) to SC-E4(/G)	D14	40.00

List Price for SC-E Series Contactors and TK-E Series Overload Relays accessories

List Price for SC-E Series Contactors and TK-E Series Overload Relays accessories

Part number	Description	Discount code	List Price
Coil surge suppression unit			
SZ-MZ1	Coil surge suppression unit CR type 12-60VAC for SC-M01, SC-M02	D14	5.00
SZ-MZ2	Coil surge suppression unit CR type 72-250VAC for SC-M01, SC-M02	D14	5.00
SZ-MZ3	Coil surge suppression unit Diode type 6-250VDC for SC-M01/G, SC-M02/G	D14	5.00
SZ-Z1	Coil surge suppression unit Varistor type 24-48VAC/DC for SC-E02(/G) to SC-E05(/G)	D1	13.00
SZ-Z2	Coil surge suppression unit Varistor type 100-250VAC/DC for SC-E02(/G) to SC-E05(/G)	D1	13.00
SZ-Z3	Coil surge suppression unit Varistor type 380-440VAC/DC for SC-E02 to SC-E05	D1	13.00
SZ-Z6	Coil surge suppression unit Varistor type 24-48VAC/DC with LED for SC-E02(/G) to SC-E05(/G)	D1	17.00
SZ-Z7	Coil surge suppression unit Varistor type 100-250VAC/DC with LED for SC-E02(/G) to SC-E05(/G)	D1	17.00
SZ-Z31	Coil surge suppression unit Varistor type 24-48VAC/DC for SC-E1(/G) to SC-E4(/G)	D1	22.00
SZ-Z32	Coil surge suppression unit Varistor type 100-250VAC/DC for SC-E1(/G) to SC-E4(/G)	D1	22.00
SZ-Z33	Coil surge suppression unit Varistor type 380-440VAC/DC for SC-E1 to SC-E4	D1	22.00
SZ-Z4	Coil surge suppression unit CR type 24-48VAC/DC for SC-E02(/G) to SC-E05(/G)	D1	13.00
SZ-Z5	Coil surge suppression unit CR type 100-250VAC/DC for SC-E02(/G) to SC-E05(/G)	D1	13.00
SZ-Z8	Coil surge suppression unit CR type 24-48VAC/DC with LED for SC-E02(/G) to SC-E05(/G)	D1	17.00
SZ-Z9	Coil surge suppression unit CR type 100-250VAC/DC with LED for SC-E02(/G) to SC-E05(/G)	D1	17.00
SZ-Z34	Coil surge suppression unit CR type 24-48VAC/DC for SC-E1 to SC-E4	D1	23.00
SZ-Z35	Coil surge suppression unit CR type 100-250VAC/DC for SC-E1 to SC-E4	D1	23.00
SZ-Z36	Coil surge suppression unit CR type 24-48VAC/DC for SC-E1/G to SC-E4/G	D1	23.00
SZ-Z37	Coil surge suppression unit CR type 100-250VAC/DC for SC-E1/G to SC-E4/G	D1	23.00
Power connection kit for reversing			
SZ-MRWC	Power connection kit for reversing line side and load side for SC-M01(/G), SC-M02(/G)	D14	18.00
SZ-ERW1/A	Power connection kit for reversing line side for SC-E02(/G) to SC-E05(/G)	D14	10.00
SZ-ERW1/B	Power connection kit for reversing load side for Reversing Contactor SC-E02(/G) to SC-E05(/G)	D14	10.00
SZ-ERW1/D	Power connection kit for reversing load side for Reversing Motor Starter SC-E02(/G) to SC-E05(/G)	D14	10.00
SZ-ERW2/A	Power connection kit for reversing line side for SC-E1(/G) to SC-E2S(/G)	D14	20.00
SZ-ERW2/B	Power connection kit for reversing load side for Reversing Contactor SC-E1(/G) to SC-E2S(/G)	D14	20.00
SZ-ERW2/D	Power connection kit for reversing load side for Reversing Motor Starter SC-E1(/G) to SC-E2S(/G)	D14	20.00
SZ-ERW3/A	Power connection kit for reversing line side for SC-E3(/G) to SC-E4(/G)	D14	40.00
SZ-ERW3/B	Power connection kit for reversing load side for Reversing Contactor SC-E3(/G) to SC-E4(/G)	D14	40.00
SZ-ERW3/D	Power connection kit for reversing load side for Reversing Motor Starter SC-E3(/G) to SC-E4(/G)	D14	40.00
Mechanical interlock unit			
SZ-MRM	Mechanical interlock unit for SC-M01(/G), SC-M02(/G)	D14	4.00
SZ-RM	Mechanical interlock unit for SC-E02(/G) to SC-E4(/G)	D1	20.00
Replacement coil			
4NC0H-#MC	Replacement coil for SC-E02 to SC-E05 (# : operating coil voltage code)	D1	30.00
SZ-GM/N1-#	Replacement coil for SC-E1 to SC-E2S (# : operating coil voltage code)	D1	30.00
SZ-GM/N2S-#	Replacement coil for SC-E3 to SC-E4 (# : operating coil voltage code)	D1	31.00
SZ-GS/N5-#	Replacement coil for SC-E5 (# : operating coil voltage code)	D1	250.00
SZ-GS/N6-#	Replacement coil for SC-E6 to SC-E7 (# : operating coil voltage code)	D1	276.00
Base unit for separate mounting			
SZ-HCE	Separate mounting base unit for TK-E02	D14	10.00
SZ-HDE	Separate mounting base unit for TK-E2	D14	20.00
SZ-HEE	Separate mounting base unit for TK-E3	D14	25.00
Trip indicator			
SZ-L100	Trip indicator 100-110VAC for TK-E02	D1	15.00
SZ-L200	Trip indicator 200-220VAC for TK-E02	D1	15.00
SZ-L100N2	Trip indicator 100-110VAC for TK-E2 to TK-E6	D1	15.00
SZ-L200N2	Trip indicator 100-110VAC for TK-E2 to TK-E6	D1	15.00
Reset release button			
SZ-R1	Reset release button 300mm for TK-E02	D1	96.00
SZ-R2	Reset release button 500mm for TK-E02	D1	112.00
SZ-R3	Reset release button 700mm for TK-E02	D1	127.00
SZ-R4	Reset release button 300mm for TK-E2 to TK-E6	D1	100.00
SZ-R5	Reset release button 500mm for TK-E2 to TK-E6	D1	120.00
SZ-R6	Reset release button 700mm for TK-E2 to TK-E6	D1	135.00
Dial cover			
SZ-DA	Dial cover for TK-E02 to TK-E6	D1	2.00

List Price for Combination Starters accessories

Part number	Description	Discount code	List Price
BZ0LRC09AA	Link module for BM3R and SC-M01(/G), SC-M02(/G)	D14	15.00
BZ0LRE22AA	Link module for BM3R and SC-E02 to SC-E05	D14	15.00
BZ0LRE22GA	Link module for BM3R and SC-E02/G to SC-E05/G	D14	20.00
BZ0LRE32AA	Link module for BM3R and SC-E1	D14	18.00
BZ0LRE32GA	Link module for BM3R and SC-E1/G	D14	20.00
BZ0LVE51AA	Link module for BM3V and SC-E1 to E2S	D14	18.00
BZ0LVE51GA	Link module for BM3V and SC-E1/G to E2S/G	D14	22.00
BZ0LVE65AA	Link module for BM3V and SC-E3	D14	24.00
BZ0LVE65GA	Link module for BM3V and SC-E3/G	D14	28.00
Base plates			
BZ0BPRE22A	Base plate for BM3R and SC-E02(/G) to SC-E05(/G)	D14	22.00
BZ0BPRE32A	Base plate for BM3R and SC-E1(/G)	D14	24.00
BZ0BPVE51A	Base plate for BM3V and SC-E1(/G) to SC-E2S(/G)	D14	26.00
BZ0BPVE65A	Base plate for BM3V and SC-E3(/G)	D14	30.00

Appendix 1 : Construction of combination motor controllers

The UL508 standard defines 6 categories depending on the construction type for the combination motor controllers. The type and component function is shown below.

Type	Component	Component standard	Component function per NEC			
			Disconnect	Branch circuit protection	Motor control	Motor overload
A	Manual disconnect	UL98,UL1087	X			
	Fuse	UL248		X		
	Magnetic	UL508			X	
	Overload relay	UL508				X
B	Manual disconnect	UL98,UL1087	X			
	Motor short-circuit Protector	UL508		X		
	Magnetic	UL508			X	
	Overload relay	UL508				X
C	Inverse time Circuit Breaker	UL489	X	X		
	Magnetic	UL508			X	
	Overload relay	UL508				X
D	Instantaneous Circuit Breaker	UL489	X	X		
	Magnetic	UL508			X	
	Overload relay	UL508				X
E	Self-Protected control device	UL508	X	X	X	X
F	Manual Self-protected combination motor controller	UL508	X	X		X
	Magnetic	UL508			X	

Fuji MMS is indicated on the label with "Manual Self-Protected Combination Motor Controller" (TYPE E) and "Combination Motor Controller" (TYPE F).

Appendix 2 : Short circuit coordination comparison

UL508 (Part IV, Combination Motor Controllers) and IEC60947-4-1 are the two major standards concerning the combination of the MMS and the Contactor. In IEC60947-4-1, it only regulates the short-circuit protective coordination between the Contactor and the Circuit Breaker. However, in UL508, it takes the combination of the MMS and Contactor as a united component and requires additional performances besides the short-circuit test.

UL standard is available for another standard related short circuit coordination, that is **UL subject 508E**.

(IEC type "2" Coordination Short Circuit Tests of Electromagnetic Motor Controllers in accordance with IEC Publication 947-4-1)

UL subject 508E is to certify that the coordination between the MMS and Contactor comply with IEC60947-4-1 type 2 requirements.

Fuji combination Starters are also cUL listed UL subject 508E, which means that it conforms to both UL and IEC regulation for short-circuit coordination.

Test	UL508 Type F	IEC60947-4-1		UL subject 508E
		Type 1	Type 2	
Short-Circuit ☐ Coordination	X - The contactor may be damaged - It may not be suitable for further service without repair or replacement.	X - The contactor may be damaged - It may not be suitable for further service without repair or replacement.	X - No damage except light welding of the contacts of the contactor. - It shall be suitable for further use.	X - No damage except light welding of the contacts of the contactor. - It shall be suitable for further use.
Current withstand	X	-	-	-
Dielectric voltage withstand	X	X	X	X
Calibration	X	-	X	X
Temperature	X	-	-	-
Effective region	North America	Europe	Europe	North America

Coordination details between MMS and Contactor as UL508 Type F, please see page 56, 57, as UL subject 508E, please see page 79, 80.

Appendix

• BM3RSB, BM3RHB (UL subject E coordination)

220-240V AC		440-480V AC		MMS part number		Contactor □ part number	Link module	Base plate	Short-circuit ratings at 480V AC (kA)	
HP rating (HP)	Rated current (A)	HP rating (HP)	Rated current (A)	Part number	Current range (A)				for BM3RSB	for BM3RHB
-	-	-	-	BM3RSB-P16	BM3RHB-P16	0.1-0.16	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BP22A BZ0BP22A	50 50
-	-	-	-	BM3RSB-P25	BM3RHB-P25	0.16-0.25	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BP22A BZ0BP22A	50 50
-	-	-	-	BM3RSB-P40	BM3RHB-P40	0.25-0.4	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BP22A BZ0BP22A	50 50
-	-	-	-	BM3RSB-P63	BM3RHB-P63	0.4-0.63	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BP22A BZ0BP22A	50 50
-	-	-	-	BM3RSB-001	BM3RHB-001	0.63-1	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BP22A BZ0BP22A	50 50
-	-	3/4	1.6	BM3RSB-1P6	BM3RHB-1P6	1-1.6	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BP22A BZ0BP22A	50 50
1/2	2.2	1	2.1	BM3RSB-2P5	BM3RHB-2P5	1.6-2.5	SC-M01, M01/G SC-E02 SC-E02/G	BZ0LRC09AA BZ0LRE22AA BZ0LRE22GA	- BZ0BP22A BZ0BP22A	50 50
3/4	3.2	2	3.4	BM3RSB-004	BM3RHB-004	2.5-4	SC-E02 SC-E02/G	BZ0LRE22AA BZ0LRE22GA	BZ0BP22A BZ0BP22A	50 50
1-1/2	6	3	4.8	BM3RSB-6P3	BM3RHB-6P3	4-6.3	SC-E04 SC-E04/G	BZ0LRE22AA BZ0LRE22GA	BZ0BP22A BZ0BP22A	50 50
3	9.6	5	7.6	-	BM3RHB-010	6.3-10	SC-E04 SC-E04/G	BZ0LRE22AA BZ0LRE22GA	BZ0BP22A BZ0BP22A	- 50
3	9.6	7-1/2	11	-	BM3RHB-013	10-13	SC-E05 SC-E05/G	BZ0LRE22AA BZ0LRE22GA	BZ0BP22A BZ0BP22A	- 50
5	15.2	10	14	-	BM3RHB-016	11-16	SC-E05 SC-E05/G	BZ0LRE22AA BZ0LRE22GA	BZ0BP22A BZ0BP22A	- 50
5	15.2	10	14	-	BM3RHB-020	14-20	SC-E05 SC-E05/G	BZ0LRE22AA BZ0LRE22GA	BZ0BP22A BZ0BP22A	- 50
7-1/2	22	15	21	-	BM3RHB-025	18-25	SC-E1 SC-E1/G	BZ0LRE32AA BZ0LRE32GA	BZ0BP32A BZ0BP22A	- 50
10	28	20	27	-	BM3RHB-032	24-32	SC-E1 SC-E1/G	BZ0LRE32AA BZ0LRE32GA	BZ0BP32A BZ0BP22A	- 50

• **BM3VSB, BM3VHB (UL subject E coordination)**

220-240V AC		440-480V AC		MMS part number			Contactor □ part number	Link module	Base plate	Short-circuit ratings at 480V AC (kA)	
HP rating (HP)	Rated current (A)	HP rating (HP)	Rated current (A)	Part number		Current range (A)				for BM3VSB	for BM3VHB
3	9.6	5	7.6	BM3VSB-010	BM3VHB-010	6.3-10	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	50
3	9.6	7-1/2	11	BM3VSB-013	BM3VHB-013	10-13	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	50
5	15.2	10	14	BM3VSB-016	BM3VHB-016	11-16	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	50
5	15.2	10	14	BM3VSB-020	BM3VHB-020	14-20	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	50
7-1/2	22	15	21	BM3VSB-025	BM3VHB-025	18-25	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	50
10	28	20	27	BM3VSB-032	BM3VHB-032	24-32	SC-E1 SC-E1/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	50
10	28	30	40	BM3VSB-040	BM3VHB-040	28-40	SC-E2 SC-E2/G	BZ0LVE51AA BZ0LVE51GA	BZ0BPVE51A BZ0BPVE51A	25	50

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