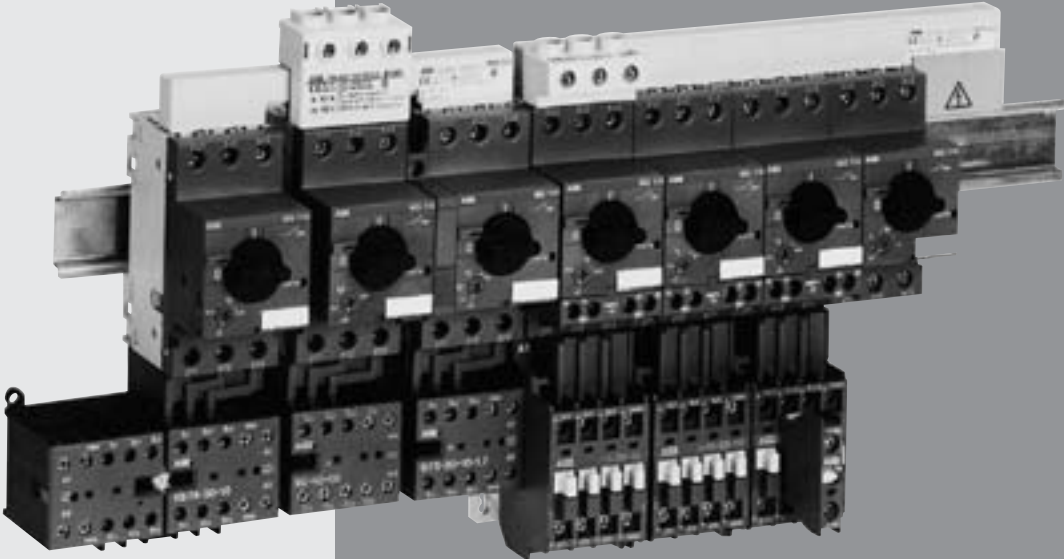
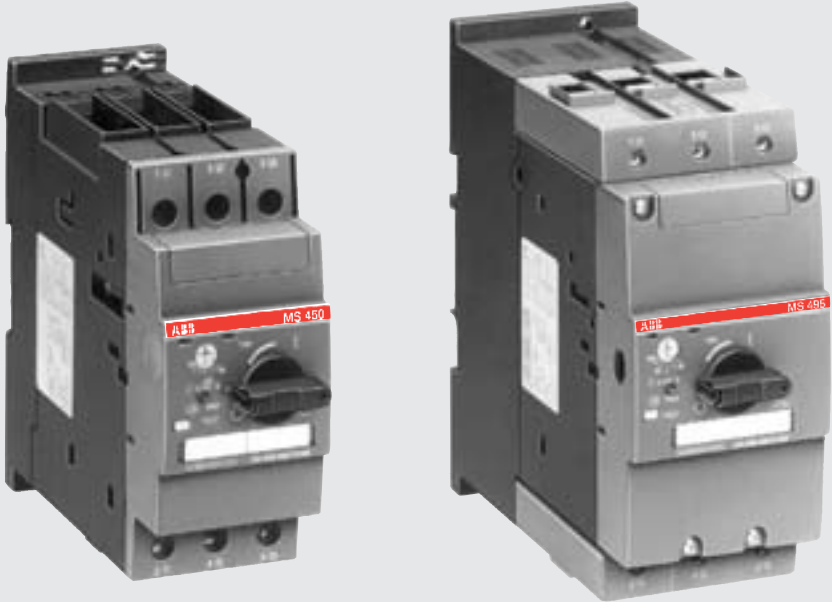
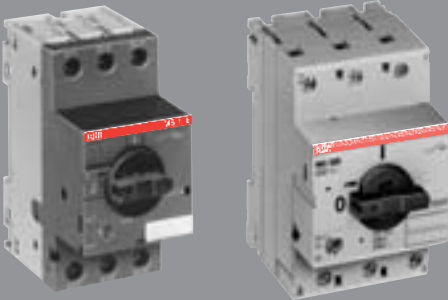


AC1010



# Manual Motor Protectors and Motor Starter Combinations

Manual motor protectors from ABB properly switch motors ON and OFF and protect them in case of overload and short circuit.

Thus, ABB's manual motor protector know-how increases the reliability and availability of applications thanks to the extremely quick short circuit cut-off in cases that could cause motor damage.

ABB motor starter combinations constitute a reliable, cost-efficient solution for all your motor protection needs, for examples in:

- General engineering and plants
- Industries
- Conveyor systems
- Chemical industries including process engineering
- Pharmaceutical industries
- Automation of buildings, e. g. in air-conditioning
- Environmental plants
- Power stations
- Fresh water and sewage plants
- Machine tools

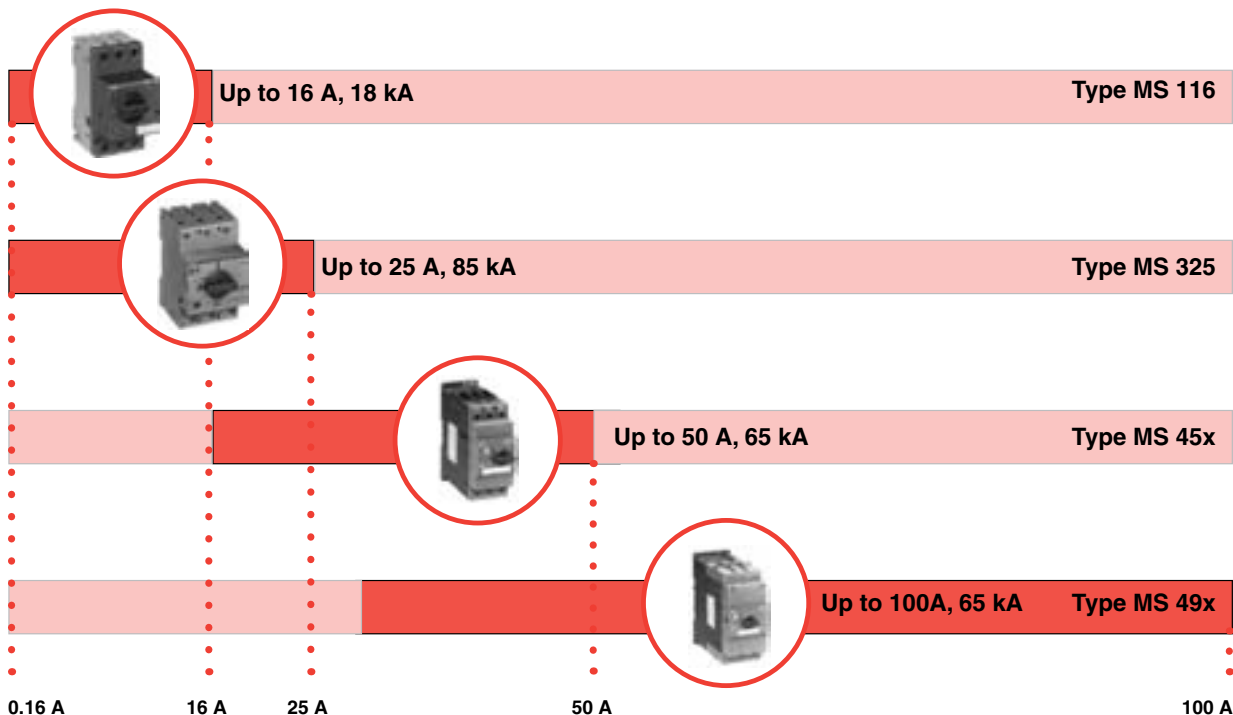
Manual motor protectors provide protection against:

- Overload
- Short circuit
- Phase failure
- Undervoltage

Fuseless protection saves costs and space and provides for quick reaction under short circuit condition, switching the motor off within 3 ms. It is therefore an easy to handle, cost effective motor protection solution.



## Switching capabilities of ABB's manual motor protectors



# Manual motor Protectors



## Manual motor protectors

Type MS116

Type MS325

Type MS45X

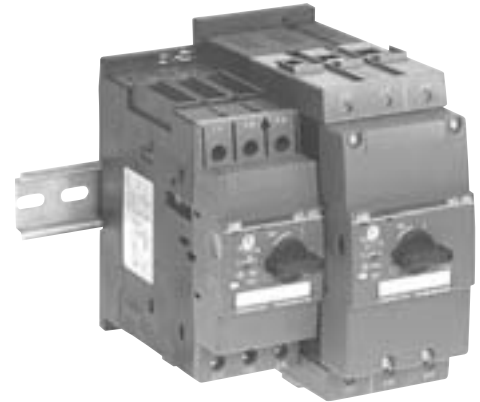
Type MS49X



MS116



MS325



MS45X

MS49X

### Description

#### Type MS116

- Suitable for use with 3-phase motors up to 10 HP @ 600V
- UL Listed and CSA certified for Group Motor Installations up to 18 KA
- 12 Setting ranges from 0.1 to 16 amps.
- 35mm DIN rail snap-on mounting
- Wide range of accessories

#### Type MS325

- Suitable for use with 3-phase motors up to 20 HP @ 600V
- UL Listed and CSA certified for Group Motor Installations up to 85 KA
- 14 Setting ranges from 0.1 to 25 amps.
- 35mm DIN rail snap-on mounting
- Wide range of accessories

#### Type MS45x

- Suitable for use with 3-phase motors up to 50 HP @ 600V
- UL Listed and CSA certified for Group Motor Installations up to 65 KA
- 7 Setting ranges from 11 to 50 amps
- 35mm DIN rail snap-on mounting
- Wide range of accessories

#### Type MS49x

- Suitable for use with 3-phase motors up to 100 HP @ 600V
- UL Listed and CSA certified for Group Motor Installations up to 65 KA
- 6 Setting ranges from 28 to 100 amps
- 35mm DIN rail snap-on mounting
- Wide range of accessories

### Single motor applications

Single motor applications employing a manual motor protector (MMP) result in a simple, compact and economical alternative to conventional magnetic motor controllers for manual operation of a single motor. Upstream short circuit and overcurrent protection in the form of fuses or a circuit breaker is required but the MMP can replace the overload relay, contactor and associated electrical components and wiring for controlling the contactor.

### Group motor applications

Group motor installations offer several advantages when controlling two or more motors or other loads over conventional single motor starters. Several MMPs can be grouped together and fed from a single set of fuses or a circuit breaker. These devices can be installed together on a single DIN rail and fed power through three phase insulated busbars and a power feed terminal. Protecting this group of MMPs is a single circuit breaker or fusible switch, sized specifically for the load. Excellent coordination and short circuit protection can be achieved, as high as 85 KA, when using the MS325 product in this manner. Close coupling adapters are offered to connect contactors to the load side of each MMP for automatic operation of each motor. If a single motor experiences an overload, the associated MMP trips and allows the other motors to continue running. Numerous accessories are available for signaling in the event of a trip, to indicate status, to provide shunt trip and for undervoltage release. The main benefits of group installation are quick, fool proof assembly, minimal wiring and a reduction of the necessary enclosure size. The only constraint is that the upstream circuit protective device must be sized specifically for the load – a highly desirable feature in order to provide the closest coordination and the greatest level of circuit protection. Rule 28.206(b) of the CEC specifies the requirements for group motor installations; all ABB MMPs meet these requirements.

## Selection

Group installation is an approach to building multi-motor control systems in accordance with Section 28-206 of the Canadian Electrical Code. The selection of components used in group installations is a simple process which consists of several steps.

- First is the selection of the appropriate fuse as Branch Circuit Protective Device (BCPD).
- Second is the selection of the appropriate motor starter and protector.
- Third, the selected MMP must be checked for CSA listing with the selected BCPD and the available short circuit current at the application location.
- Fourth, conductor size.

### 1. Fused disconnect

Calculate maximum fuse size according to CEC 28-206 (b).  $I_{max}$  (fuse size) =  $175\% \times FLC$  (full load current for largest motor) + the sum of FLC values for other motors on that branch using CEC Table 44 on the right. Select fuse from CEC Table D12. Where  $I_{max}$  falls between two fuse ampere ratings permits go to the next high ampere rating.

### 2. Motor protector selection

Select the proper MMP catalog number for each motor load from the following pages based on the actual motor full load current (FLA) using the "Thermal setting range" column for reference.

### 3. MMP Interruption ratings

Using the interruption ratings table on page 13, identify the system application voltage and interrupting capacity for the type of fuse selected in step 1 above.

CEC Table D12 Standard fuse amperes

15, 20, 25, 30, 40, 45, 50, 60, 70, 80, 90, 110, 125, 150, 175, 200, 225, 250, 300, 350, 400, 450, 500, 600, 700, 800, 1000, 1200, 1600

Examples: Select components for protecting the following 3-phase, 460VAC, squirrel cage induction motors. The nameplate data are:

1/2 HP, 1.0 FLA; 3 HP, 4.8 FLA; 5 HP, 7.6 FLA; 7.5 HP, 11 FLA; 10 HP, 14 FLA.

Example: using fused disconnect

- $I_{max} = 175\% \times 14 + (11 + 7.6 + 4.8 + 1) = 48.9A$
  - Fuse rating using Table CEC Table D12 = 50A
  - Minimum disconnect size =  $115\% \times \text{Total FLA}$
  - CEC Rule 28-602 =  $115\% \times (14 + 11 + 7.6 + 4.8 + 1) = 44.16$
- Disconnect for 50A fuses is ok.

### 4. Conductors

The ampacity of the tap conductors to individual motor starters cannot be less than 1/3 the ampacity of the branch circuit conductors. The length of the tap conductors is limited to a maximum of 7.5 meters. CEC 28-106 (3).

## CEC Table 44 full load current, 3ph AC motor

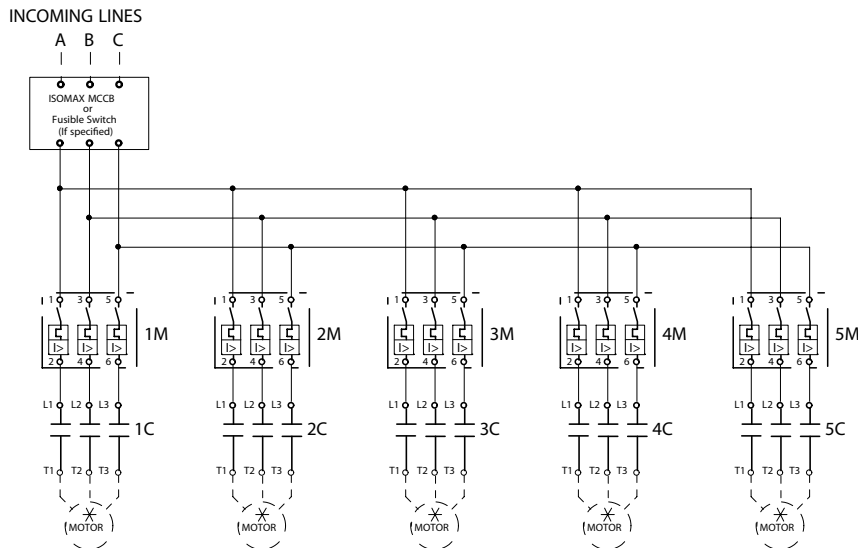
Horsepower	Induction type squirrel cage & wound rotor ①		
	230V amps	460V amps	575V amps
1/2	2	1	.8
3/4	2.8	1.4	1.1
1	3.6	1.8	1.4
1.5	5.2	2.6	2.1
2	6.8	3.4	2.7
3	9.6	4.8	3.9
5	15.2	7.6	6.1
7.5	22	11	9
10	28	14	11
15	42	21	17
20	54	27	22
25	68	34	27

Note: Refer to CEC 28-106 for cable sizing.

For full load currents of 208 and 200 volt motors, increase the corresponding 230 volt motor full-load current by 10% and 15%, respectively.

## MS325 data

Horsepower	Motor rating at 460V	MS325	Contactor
	FLA, AC3		
1/2	1.0	MS325-1.0	A9
3	4.8	MS325-6.3	A9
5	7.6	MS325-9.0	A9
7.5	11	MS325-12.5	A12
10	14	MS325-16	A16



① These values of full-load current are for motors running at speeds usual for belted motors and motors with normal torque characteristics. Motors built for especially low speeds or high torques may require more running current, and multispeed motors will have full-load current varying with speed, in which case the nameplate current rating shall be used.

The voltage listed are rated motor voltages. The currents listed shall be permitted for system voltage ranges of 110 to 120, 220 to 240, 440 to 480, and 550 to 600 volts.

# Type MS116 – MS325



MS116

## Manual motor protectors — Type MS116 — Short circuit ratings 5KA, group installation up to 18KA

Thermal setting range (Amps)	Single-phase horsepower ratings ①		3-phase horsepower ratings			Catalog number	List price
	115V	230V	230V	460V	575V		
<b>MS116</b>							
0.10 – 0.16	—	—	—	—	—	MS116-0.16	<b>\$ 100</b>
0.16 – 0.25	—	—	—	—	—	MS116-0.25	
0.25 – 0.40	—	—	—	—	—	MS116-0.40	
0.40 – 0.63	—	—	—	—	—	MS116-0.63	
0.63 – 1.0	—	—	—	1/2	1/2	MS116-1.0	
1.0 – 1.6	—	1/10	—	3/4	3/4	MS116-1.6	
1.6 – 2.5	—	1/6	1/2	1	1.5	MS116-2.5	
2.5 – 4.0	1/8	1/3	1	2	3	MS116-4.0	
4.0 – 6.3	1/4	1/2	1.5	3	5	MS116-6.3	
6.3 – 10	1/2	1.5	3	5	7.5	MS116-10	
8.0 – 12	1/2	2	3	7.5	10	MS116-12	<b>120</b>
10.0 – 16	1	2	5	10	10	MS116-16	

UL File # E137861, CSA File # 1112525



MS325

## Manual motor protectors — Type MS325 — Short circuit ratings 5KA, group installation up to 85KA

Thermal setting range (Amps)	Single-phase horsepower ratings ①		3-phase horsepower ratings			Catalog number	List price	
	115V	230V	230V	460V	575V			
0.10 – 0.16	—	—	—	—	—	MS325-0.16	<b>\$ 140</b>	
0.16 – 0.25	—	—	—	—	—	MS325-0.25		
0.25 – 0.40	—	—	—	—	—	MS325-0.40		
0.40 – 0.63	—	—	—	—	—	MS325-0.63		
0.63 – 1.0	—	—	—	1/2	1/2	MS325-1.0	<b>160</b>	
1.0 – 1.6	—	1/10	—	3/4	3/4	MS325-1.6		
1.6 – 2.5	—	1/6	1/2	1	1.5	MS325-2.5		
2.5 – 4.0	1/8	1/3	1	2	3	MS325-4.0		
4.0 – 6.3	1/4	1/2	1.5	3	5	MS325-6.3		
6.3 – 9.0	1/3	1	2.5	5	7.5	MS325-9.0		
9.0 – 12.5	1/2	2	3	7.5	10	MS325-12.5		
12.5 – 16	1	2.5	5	10	10	MS325-16		
16 – 20	1.5	3	5	10	15	MS325-20		<b>200</b>
20 – 25	2	3	7.5	15	20	MS325-25		

UL File #E137861, CSA File #1083130

## Manual motor protectors — Type MS325E — Short circuit ratings 5KA

Thermal setting range (Amps)	Single-phase horsepower ratings ①		3-phase horsepower ratings			Catalog number	List price	
	115V	230V	230V	460V	575V			
0.10 – 0.16	—	—	—	—	—	MS325-0.16E	<b>\$ 232</b>	
0.16 – 0.25	—	—	—	—	—	MS325-0.25E		
0.25 – 0.40	—	—	—	—	—	MS325-0.40E		
0.40 – 0.63	—	—	—	—	—	MS325-0.63E		
0.63 – 1.0	—	—	—	1/2	—	MS325-1.0E	<b>252</b>	
1.0 – 1.6	—	1/10	—	3/4	—	MS325-1.6E		
1.6 – 2.5	—	1/6	1/2	1	—	MS325-2.5E		
2.5 – 4.0	1/8	1/3	1	2	—	MS325-4.0E		
4.0 – 6.3	1/4	1/2	1.5	3	—	MS325-6.3E		
6.3 – 9.0	1/3	1	2.5	5	—	MS325-9.0E		
9.0 – 12.5	1/2	2	3	7.5	—	MS325-12.5E		
12.5 – 16	1	2.5	5	10	—	MS325-16E		
16 – 20	1.5	3	5	10	—	MS325-20E		<b>292</b>
20 – 25	2	3	7.5	15	—	MS325-25E		

① Single phase motor ratings are based upon wiring all three poles in series.

## Type MS116 Accessories



HK1-11



HKF1-11



SK1-11

UA1-120



IB116

GEH-USES

### Auxiliary contact blocks for Type MS116 (side mount)

Contact configuration	Catalog number	List price
1 NO & 1 NC	MS116-HK1-11	<b>\$ 30</b>
2 NO	MS116-HK1-20	
2 NC	MS116-HK1-02	

### Auxiliary contact blocks for Type MS116 (front mount)

Contact configuration	Catalog number	List price
1 NO & 1 NC	MS116-HKF1-11	<b>\$ 30</b>

### Bell alarm contact blocks for Type MS116

Contact configuration	Catalog number	List price
1 NO & 1 NC	MS116-SK1-11	<b>\$ 30</b>
2 NO	MS116-SK1-20	
2 NC	MS116-SK1-02	

### Undervoltage trip for Type MS116

Voltage (VAC)	Catalog number	List price
24	MS116-UA1-24	<b>\$ 100</b>
48	MS116-UA1-48	
60	MS116-UA1-60	
120	MS116-UA1-120	
208	MS116-UA1-208	
230	MS116-UA1-230	
400	MS116-UA1-400	
415	MS116-UA1-415	

### Undervoltage trip with 1NO & 1NC auxiliary contact for Type MS116

Voltage (VAC)	Catalog number	List price
24	MS116-UA1-HK-24	<b>\$ 125</b>
48	MS116-UA1-HK-48	
60	MS116-UA1-HK-60	
120	MS116-UA1-HK-120	
208	MS116-UA1-HK-208	
230	MS116-UA1-HK-230	
400	MS116-UA1-HK-400	
415	MS116-UA1-HK-415	

### Locking device for Type MS116

Description	Catalog number	List price
Adaptor for padlock Type SA1	MS325-SA1	<b>\$ 10</b>
Complete padlock locking kit (adaptor, padlock & 3 keys)	MS325-SA3	<b>30</b>

### Molded plastic enclosures for Type MS116

Item description	Catalog number	List price
Gray enclosure with black handle, IP65	IB116-G	<b>\$ 100</b>
Yellow enclosure with red handle, IP65	IB116-Y	<b>100</b>

### Plastic adaptors for enclosures for Type MS116

Description	Catalog number	List price
PG16 to 1/2NPT	PG16-50	<b>\$ 5</b>

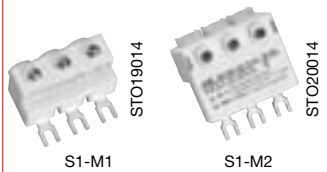
### Shunt trip for Type MS116

Voltage (VAC)	Catalog number	List price
24V	MS116-AA1-24	<b>\$ 100</b>
110V	MS116-AA1-110	
200 – 240V	MS116-AA1-230	
350 – 415V	MS116-AA1-400	

# Type MS116 Accessories

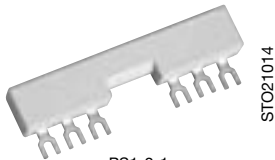


OHB2AJM + OXS5X105 + MS116-MSMN

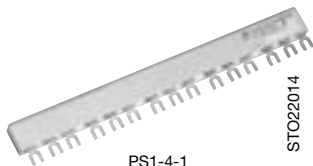


S1-M1

S1-M2



PS1-2-1



PS1-4-1



MS116 + A16



MS116 + A16

## Door mounting hardware for Type MS116 ①

Description	Catalog number	List price
Shaft coupler adaptor	MS116-MSMN	\$ 8
NEMA 1, 3R, 12 Black selector handle	OHB2AJM	30
NEMA 1, 3R, 12 Red, yellow selector handle	OHY2AJM	30
105 mm length shaft	OXS5X105	6
180 mm length shaft	OXS5X180	8

NOTE: Use Discount schedule MA for shaft coupler; use Discount schedule H for handles and shafts.

## Power feed terminal blocks for Type MS116

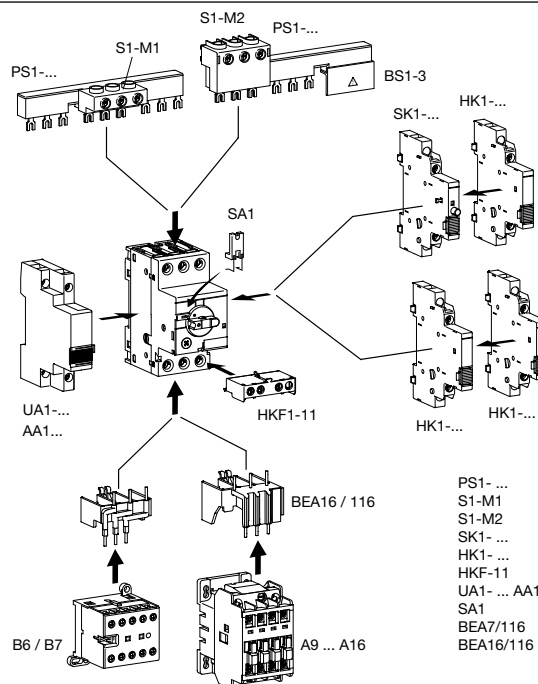
Description	Catalog number	List price
for 4 AWG wire	MS116-S1-M1	\$ 20
for busbar	MS116-S1-M2	

## Busbars for Type MS116, maximum 63A, 600VAC

Description	Catalog number	List price
for 2 devices without auxiliary contacts	MS116-PS1-2-0	\$ 26
for 3 devices without auxiliary contacts	MS116-PS1-3-0	30
for 4 devices without auxiliary contacts	MS116-PS1-4-0	36
for 5 devices without auxiliary contacts	MS116-PS1-5-0	40
for 2 devices with 1 auxiliary contact	MS116-PS1-2-1	26
for 3 devices with 1 auxiliary contact	MS116-PS1-3-1	30
for 4 devices with 1 auxiliary contact	MS116-PS1-4-1	36
for 5 devices with 1 auxiliary contact	MS116-PS1-5-1	40
for 2 devices with 2 auxiliary contacts	MS116-PS1-2-2	26
for 3 devices with 2 auxiliary contacts	MS116-PS1-3-2	30
for 4 devices with 2 auxiliary contacts	MS116-PS1-4-2	36
for 5 devices with 2 auxiliary contacts	MS116-PS1-5-2	40

## Busbar for direct mounting of contactors

Description	Catalog number	List price
MS116 + B6/B7	BEA7/116	\$ 20
MS116 + A9/A12/A16	BEA16/116	
MS116 + AL9/AL12/A26	BEA16/116L	
MS116 + A26	BEA26/116	



PS1- ... phase busses  
 S1-M1 infeed block, flat  
 S1-M2 infeed block, high  
 SK1- ... signal contacts for lateral mounting  
 HK1- ... auxiliary contacts for lateral mounting  
 HKF-11 auxiliary contact for front mounting  
 UA1- ... AA1... undervoltage release or shuntrelease  
 SA1 locking device  
 BEA7/116 mounting adapter for mini-contactors  
 BEA16/116 mounting adapter for A9-A16-contactors

① Must have shaft coupler, handle and shaft for through-the-door operation.

## Type MS325 Accessories



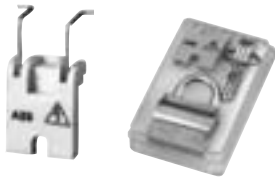
MS325-HK11 MS325-AS



MS325-HKF11



MS325-UA24



MS325-SA1 MS325-SA3



IB325G

GEH-USE5

### Auxiliary contact blocks for Type MS325 (side mount)

Item description	Catalog number	List price
1 NO & 1 NC 2 NO 2 NC	MS325-HK11 MS325-HK20 MS325-HK02	<b>\$ 30</b>

### Auxiliary contact blocks for Type MS325 (front mount)

Item description	Catalog number	List price
1 NO & 1 NC 2 NO	MS325-HKF11 MS325-HKF20	<b>\$ 30</b>

### Bell alarm contact blocks for Type MS325

Item description	Catalog number	List price
1 NO & 1 NC	MS325-SK11	<b>\$ 30</b>

### Shunt trips for Type MS325

Item description	Catalog number	List price
24 – 60 VAC/DC, 60 Hz 110 – 240 VAC/VDC, 60 Hz	MS325-AA1 MS325-AA2	<b>\$ 100</b>

### Undervoltage trip for Type MS325

Item description	Catalog number	List price
24V 48V 110V 230V 480V	MS325-UA24 MS325-UA48 MS325-UA110 MS325-UA230 MS325-UA480	<b>\$ 100</b>

### Supporting terminal for Type MS325

Item description	Catalog number	List price
for UA or as N/LS clamp	MS325-AS	<b>\$ 12</b>

### Padlocking devices for Type MS325

Item description	Catalog number	List price
Adapter for padlock type SA1 Complete padlock kit (includes adaptor, padlock & 3 keys)	MS325-SA1 MS325-SA3	<b>\$ 10</b> <b>30</b>

### Molded plastic enclosures for Type MS325

Item description	Catalog number	List price
Light gray enclosure with black handle, IP65 Light gray enclosure with red/yellow handle, IP65	IB325-G IB325-Y	<b>\$ 100</b> <b>100</b>

### Plastic adaptors for enclosures for Type MS325

Item description	Catalog number	List price
PG16 TO 1/2 NPT	PG16-50	<b>\$ 5</b>



# Type MS325 Accessories



OHB2AJM + OXS5X105 + MS116-MSMN



MS325-BB1

MS325-SM1



PS3-2-0



PS3-4-0



PM26-13

## Door mounting hardware for Type MS325 ①

Item description	Catalog number	List price
Shaft coupler adaptor	MS116-MSMN	\$ 8
NEMA 1, 3R, 12 black selector handle	OHB2AJM	30
NEMA 1, 3R, 12 red/yellow selector handle	OHY2AJM	30
105mm length shaft	OXS5X105	6
180mm length shaft	OXS5X180	8

NOTE: Use Discount schedule MA for shaft coupler; use Discount schedule H for handles and shafts.

## Power feed terminal blocks for Type MS325

Item description	Catalog number	List price
Standard, accepts 4 AWG wire	MS325-SM1	\$ 20
Low profile, accepts 4 AWG wire	MS325-BB1	20

## Busbars for Type MS325 ② Maximum 75A, 600VAC

Item description	Catalog number	List price
for 2 devices; without auxiliary switch	MS325-PS3-2-0	\$ 36
for 3 devices; without auxiliary switch	MS325-PS3-3-0	50
for 4 devices; without auxiliary switch	MS325-PS3-4-0	60
for 5 devices; without auxiliary switch	MS325-PS3-5-0	70
for 2 devices; with 1 auxiliary switch	MS325-PS3-2-1	44
for 3 devices; with 1 auxiliary switch	MS325-PS3-3-1	50
for 4 devices; with 1 auxiliary switch	MS325-PS3-4-1	68
for 5 devices; with 1 auxiliary switch	MS325-PS3-5-1	70
for 2 devices; with 2 auxiliary switches	MS325-PS3-2-2	44
for 4 devices; with 2 auxiliary switches	MS325-PS3-4-2	68

Busbars can be daisy chained to connect additional MS325s.

## Close coupling adapters

Device	Catalog number	List price
MS325 + B6/B7 contactor	BEA7/325	\$ 20
MS325 + A9, A12, A16 contactor	BEA16/325	
MS325 + AL9, AL12, AL16 contactor	BEA16/325AL	
MS325 + A26 contactor	BEA26/325	
MS325 + AL26	BEA26/325AL	

## Mounting plate for DOL

Item description	Catalog number	List price
Single mounting plate for DOL starters	PM26-13	\$ 28
Double mounting plate for reversing starters	PM26-23	56

## UL508 Type E Accessoires - Required

Device	Catalog number	List price
Line Side Infeed block	MS325-S3-M3	\$ 30
Short circuit trip signal	MS325-CK11	49

① Must have shaft coupler, handle and shaft for through-the-door operation.  
② UL file # E167205; CSA file# LR98427M7-11

## Type MS450 – MS496



MS450



MS496

### Manual motor protectors - Type MS4XX - Short circuit ratings 25KA, group installation up to 65 KA

FLA adjustment range	Horsepower ratings						Catalog number	List price
	Single-phase <sup>①</sup>		Three-phase					
	115V	230V	200V – 208V	230V	460V	575V		
<b>MS450</b>								
<b>Overload tripping class 10</b>								
11 – 16	1	3	5	5	10	15	MS450-16	\$ 360
14 – 20	1.5	3	5	7.5	15	20	MS450-20	360
18 – 25	2	5	7.5	10	20	25	MS450-25	410
22 – 32	3	5	10	10	25	30	MS450-32	440
28 – 40	3	7.5	15	15	30	40	MS450-40	510
36 – 45	5	7.5	15	15	30	40	MS450-45	560
40 – 50	5	10	15	20	40	50	MS450-50	570
<b>MS495</b>								
<b>Overload tripping class 10</b>								
28 – 40	3	7.5	15	15	30	40	MS495-40	625
36 – 50	5	10	15	20	40	50	MS495-50	625
45 – 63	5	15	20	25	50	60	MS495-63	625
57 – 75	7.5	15	25	25	60	75	MS495-75	650
70 – 90	10	20	30	30	75	100	MS495-90	700
80 – 100	10	25	40	40	75	100	MS495-100	770
<b>MS451</b>								
<b>Overload tripping class 20</b>								
11 – 16	1	3	5	5	10	15	MS451-16	460
14 – 20	1.5	3	5	7.5	15	20	MS451-20	460
18 – 25	2	5	7.5	10	20	25	MS451-25	510
22 – 32	3	5	10	10	25	30	MS451-32	540
28 – 40	3	7.5	15	15	30	40	MS451-40	610
36 – 45	5	7.5	15	15	30	40	MS451-45	660
40 – 50	5	10	15	20	40	50	MS451-50	670
<b>MS496</b>								
<b>Overload tripping class 20</b>								
28 – 40	3	7.5	15	15	30	40	MS496-40	1025
36 – 50	5	10	15	20	40	50	MS496-50	1025
45 – 63	5	15	20	25	50	60	MS496-63	1025
57 – 75	7.5	15	25	25	60	75	MS496-75	1050
70 – 90	10	20	30	30	75	100	MS496-90	1100
80 – 100 <sup>②</sup>	10	25	40	40	75	100	MS496-100	1170

UL File # E167205  
CSA File # 702751

① Single phase motor ratings are based upon wiring all three poles in series.  
② Maximum motor current 95A.

# Type MS450 – MS496 for CSA22.2 no.14 & UL 508 Type E Applications



MS450-50E



MS495-100E

## Manual motor protectors - Type MS4XX - Short circuit ratings 25KA, group installation up to 65 KA

FLA adjustment range	Horsepower ratings						Catalog number ③	List price	
	Single-phase①		Three-phase						
	115V	230V	200V – 208V	230V	460V	575V			
<b>MS450</b>									
<b>Overload tripping class 10</b>	11 – 16	1	3	5	5	10	15	MS450-16E	\$ 435
	14 – 20	1.5	3	5	7.5	15	20	MS450-20E	435
	18 – 25	2	5	7.5	10	20	25	MS450-25E	485
	22 – 32	3	5	10	10	25	30	MS450-32E	515
	28 – 40	3	7.5	15	15	30	40	MS450-40E	585
	36 – 45	5	7.5	15	15	30	40	MS450-45E	635
	40 – 50	5	10	15	20	40	50	MS450-50E	645
	<b>MS495</b>								
<b>Overload tripping class 10</b>	28 – 40	3	7.5	15	15	30	40	MS495-40E	745
	36 – 50	5	10	15	20	40	50	MS495-50E	745
	45 – 63	5	15	20	25	50	60	MS495-63E	745
	57 – 75	7.5	15	25	25	60	75	MS495-75E	770
	70 – 90	10	20	30	30	75	100	MS495-90E	820
	80 – 100	10	25	40	40	75	100	MS495-100E	890
<b>MS451</b>									
<b>Overload tripping class 20</b>	11 – 16	1	3	5	5	10	15	MS451-16E	535
	14 – 20	1.5	3	5	7.5	15	20	MS451-20E	535
	18 – 25	2	5	7.5	10	20	25	MS451-25E	585
	22 – 32	3	5	10	10	25	30	MS451-32E	616
	28 – 40	3	7.5	15	15	30	40	MS451-40E	685
	36 – 45	5	7.5	15	15	30	40	MS451-45E	735
	40 – 50	5	10	15	20	40	50	MS451-50E	745
	<b>MS496</b>								
<b>Overload tripping class 20</b>	28 – 40	3	7.5	15	15	30	40	MS496-40E	1145
	36 – 50	5	10	15	20	40	50	MS496-50E	1145
	45 – 63	5	15	20	25	50	60	MS496-63E	1145
	57 – 75	7.5	15	25	25	60	75	MS496-75E	1170
	70 – 90	10	20	30	30	75	100	MS496-90E	1220
	80 – 100②	10	25	40	40	75	100	MS496-100E	1290

① Single phase motor ratings are based upon wiring all three poles in series.

② Maximum motor current 95A.

③ Catalog number includes all parts required for UL508/E applications.

## Accessories Type MS450 – MS496



HK4-11



SST06598

HKS4-02



UA4-HK-220

AA4-24



MS495+A95

ST114-02



KA450

### Auxiliary contact— top mount

Item description	Catalog number	List price
1 N.O. + 1 N.C.	MS495-HK4-11	\$ 30

### Auxiliary contact — mounts on left side, max. 1

Item description	Catalog number	List price
1 N.O. + 1 N.C. 2 N.O. 2 N.C.	MS495-HKS4-11 MS495-HKS4-20 MS495-HKS4-02	\$ 30

### Auxiliary release

- Only one auxiliary release per manual motor protector
- Mounts on right side of manual motor protector

Item description	Rating	Catalog number	List price	
Undervoltage release	110–120V, 50–60Hz	MS495-UA4-120	\$ 100	
	208V, 60Hz	MS495-UA4-208		
	230–240V, 50–60Hz	MS495-UA4-240		
	400V, 50Hz	MS495-UA4-400		
	480V, 60Hz	MS495-UA4-480		
Undervoltage release with early make contacts 2 N.O.	230V, 50Hz	MS495-UA4-HK-230	120	
	400V, 50Hz	MS495-UA4-HK-400		
	480V, 60Hz	MS495-UA4-HK-480		
Shunt trip	Voltage continuous 50 – 60Hz	20 – 24	MS495-AA4-24 MS495-AA4-110 MS495-AA4-240 MS495-AA4-415	100
		30 – 110		
	Voltage 5 sec. max. 50 – 60Hz, DC	20 – 70V		
		70 – 190V		
	210 – 240	190 – 330V		
	350 – 415	330 – 500V		

### Power feed terminal block — for MS45X

Item description	Catalog number	List price
For feeding power to multiple MS45Xs when using busbar Accepts 10 - 1/0 AWG, 108A	MS450-S4-M1	\$ 50

### Busbars – for MS45X

Item description	Catalog number	List price
Without side mounted auxiliary devices	MS450-PS4-2-0	\$ 40
	MS450-PS4-3-0	50
	MS450-PS4-4-0	60
With one side mounted auxiliary device	MS450-PS4-2-2	50
	MS450-PS4-3-2	60
	MS450-PS4-4-2	70

### Close coupling adapters

Item description	Catalog number	List price
MS45X + A30, A40	BEA40/450	\$ 40
MS45X + A50	BEA50/450	50
MS49X + A50, A63, A75	BEA75/495	80
MS49X + A95, A110	BEA110/495	120

### Terminal shrouds

Item description	Catalog number	List price
for MS45x	MS450-KA450 ①	\$ 16
for MX49x	MS495-KA495 ①	20
for MS49x	MS495-KA495C ②	24

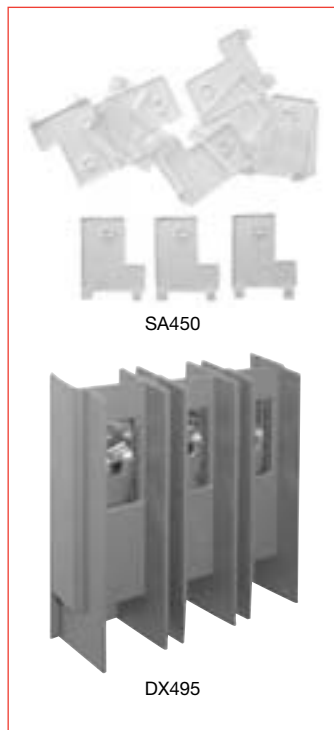
① Plug onto box terminals in each case.

② Plug onto housing after removing box terminals, if using cable lugs or buses.

## Accessories

### Type MS450 – MS496

## Technical Data



#### FLA adjustment cover

Item description	Catalog number	List price
for MS45x	MS450-SA450 ①	\$ 20

#### MS49x Type E Terminal — Required for UL 508 Type E Applications

Item description	Catalog number	List price
for MS49x	MS495-DX495	\$ 45

#### Signalling contact — indication of short-circuit trip (required for UL508 Type E applications)

Item description	Catalog number	List price
Short circuit trip 1 N.O. + 1 N.C.	MS495-SK4-11	\$ 60

### Technical Data

Device type		MS116	MS325	MS450	MS451	MS495	MS496
Standards, approvals		UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE
Rated operating current	A	16	25	50	50	100	100
Current range	A	0.10 - 16	0.10 - 25	11 - 50	11 - 50	28 - 100	28 - 100
Number of poles		3	3	3	3	3	3
Frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60
Tripping class	A	10	10	10	20	10	20
Max. kAIC & 600V	kAIC	30	50	50	50	50	100
Mechanical life	Operations	100,000	100,000	50,000	50,000	50,000	50,000
Wire range	AWG	12-18	14-8	2x18-3; 1x18-2	2x18-3; 1x18-2	2x10-1/0; 1x10-2/0	2x10-1/0; 1x10-2/0
Terminal torque	in. lbs	14	14	27 - 40	27 - 40	35 - 53	35 - 53
Terminal tool options		flat screwdriver PZ2	flat screwdriver PZ2	flat screwdriver PZ2	flat screwdriver PZ2	hex allen 4mm	hex allen 4mm
Permissible altitude without derating	m	3000	3000	2000	2000	2000	2000
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
CSA/UL Listed for group installation			Yes	Yes	Yes	Yes	Yes Yes
Self-protected Type E manual combination starter		Yes	Apply for	Yes	Yes	Yes	Yes
Accessories							
Terminal shroud		No	Yes	Yes	Yes	Yes	Yes
Auxiliary contacts		Yes	Yes	Yes	Yes	Yes	Yes
Shunt trip		Yes	Yes	Yes	Yes	Yes	Yes
Trip signal contacts		Yes	Yes	Yes	Yes	Yes	Yes
UV release		Yes	Yes	Yes	Yes	Yes	Yes
Busbar		Yes	Yes	Yes	Yes	No	No
Through door handle		Yes	Yes	No	No	No	No

① Supplied only as a set of 10 scale covers.

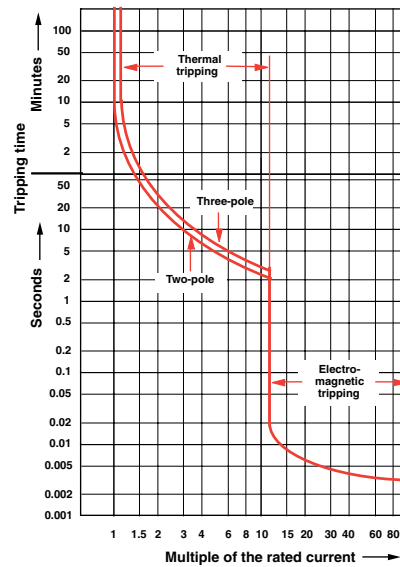
# Technical data

## Type MS116, MS325, MS45x, MS49x

Manual motor starter type	MS116	MS325	MS450/451	MS495/496
<b>Auxiliary circuits</b>				
Load rating of the auxiliary circuits				
Minimum load at: 24 VDC mA	5	5	5 mA at 17 VDC	
12 VDC mA	10	10	—	
Rated operating at AC 15 to 24 VAC A	6	2.5	—	
current $I_e$ 230 VAC A	4	2	3 / 0.5 / 6	
400 VAC A	3	1	1.5 / — / 3	
Rated operating at DC 13 to 24 VDC A	2	2.5	— / — / —	
current $I_e$ 60 VDC A	2	2.5	— / 0.15 / —	
110 VDC A	0.5	0.6	0.22 / — / 0.5	
220 VDC A	0.25	0.25	0.1 / — / 0.25	
440 VDC A	0.1	—	— / — 0.1	
Short circuit protection back up fuse				
gL A	10	10	gL / gG 10 A	
aM A	6	6	—	
<b>Release</b>				
Device for phase failure protection	With	With	With	
Electromagnetic trips				
Response value set ex-works	9.6 – 14.4 x $I_n$	7.5 – 12 $I_n$ ① 9 – 14 $I_n$ ② 10 – 15 $I_n$ ③ 12.5 – 17.5 $I_n$ ④	10.4 $I_n$ – 15.6 $I_n$	
Undervoltage release				
Pick-up value % of $U_c$	≥ 85	≥ 85	≥ 85	
Drop-out value % of $U_c$	35 – 75	35 – 75	35 – 70	
Power consumption - Pick-up VA	9.0	0.9	20.2	
Power consumption - Hold VA	3.0	0.9	7.2	
Shunt release				
Pick-up value % of $U_c$	≥ 70	≥ 85	≥ 70	
Relative duty consumption % ED	—	—	100 at voltages 50 / 60 Hz to Power	
Pick-up VA	9.0	110 - 240V: 13 - 61 ⑤	Consult factory	
Hold VA	3.0	—	Consult factory	

Manual motor protectors must be set to the rated motor demand. Higher current is needed at motor start-up. During the start-up period the manual motor starter will let the current go through and will not trip, following the pertaining international standards and curves for motor start and hold operation.

MSx Tripping curves



① Current ranges 0.16 to 0.63A  
 ② Current ranges 1 to 2.5A  
 ③ Current ranges 4 to 6.3A  
 ④ Current ranges 9 to 25A  
 ⑤ 24 - 60V : 14.4 - 90vA

# Technical data

## Type MS116, MS325

### Short circuit ratings

#### Short circuit ratings – MS116

Range	Short Circuit		Maximum Fuse size A
	480VAC	600VAC	
0.1 - 0.16	18	5	15
0.16 - 0.25	18	5	15
0.25 - 0.40	18	5	15
0.40 - 0.63	18	5	15
0.63 - 1.0	18	5	15
1.0 - 1.6	18	5	15
1.6 - 2.5	18	5	15
2.5 - 4.0	18	5	15
4.0 - 6.3	18	5	25
6.3 - 10.0	18	5	35
8.0 - 12	18	5	50
10.0 - 16	18	5	60

#### Short circuit ratings – MS325

Range	Short Circuit	Maximum Fuse size A
	600VAC kA	
0.1 - 0.16	5	15
0.16 - 0.25	5	15
0.25 - 0.40	5	15
0.40 - 0.63	5	15
0.63 - 1.0	5	15
1.0 - 1.6	5	15
1.6 - 2.5	5	15
2.5 - 4.0	5	15
4.0 - 6.3	5	25
6.3 - 9.0	5	35
9.0 - 12.5	5	50
12.5 - 16	5	60
16 - 20	5	80
20 - 25	5	100

#### Group installation short circuit ratings, MS325

MS325 Current range	5 kA		30 kA		50 kA		85kA
	Fuse A	MCCB	Fuse A	MCCB	Fuse A	MCCB	Fuse A
<b>480V</b> ①							
0.1 - 0.16	1600	S7H1200	1600	S7H1200	1600	S7H1200	1600
0.25 - 0.40	1600	S7H1200	1600	S7H1200	1600	S7H1200	1600
0.40 - 0.63	1600	S7H1200	1600	S7H1200	1600	S7H1200	1600
0.63 - 1.0	1600	S7H1200	1600	S7H1200	1600	S7H1200	1600
1.0 - 1.6	1600	S7H1200	1600	S7H1200	1600	S7H1200	1600
1.6 - 2.5	1600	S7H1200	1600	S7H1200	1600	S7H1200	1600
2.5 - 4.0	1600	S7H1200	1600	S7H1200	1600	S7H1200	1600
4.0 - 6.3	1600	S7H1200	1600	S7H1200	600	S7H1200	—
6.3 - 9.0	1600	S7H1200	1600	S7H1200	600	S7H1200	—
9.0 - 12.5	1600	S7H1200	1600	S7H1200	400	S4H250	—
12.5 - 16	1600	S7H1200	1600	S7H1200	400	S4H250	—
16 - 20	1600	S7H1200	1600	S7H1200	400	S4H250	—
20 - 25	1600	S7H1200	1600	S7H1200	400	S4H250	—
<b>600V</b> ②							
0.1 - 0.16	1200	S7H1200	1200	S7H1200	1200	S7H1200	—
0.25 - 0.40	1200	S7H1200	1200	S7H1200	1200	S7H1200	—
0.40 - 0.63	1200	S7H1200	1200	S7H1200	1200	S7H1200	—
0.63 - 1.0	1200	S7H1200	1200	S7H1200	1200	S7H1200	—
1.0 - 1.6	1200	S7H1200	1200	S7H1200	1200	S7H1200	—
1.6 - 2.5	1200	S7H1200	1200	S7H1200	1200	S7H1200	—
2.5 - 4.0	1200	S7H1200	1200	S7H1200	1200	S7H1200	—
4.0 - 6.3	1200	S7H1200	1200	S7H1200	1200	S7H1200	—
6.3 - 9.0	1200	S7H1200	1200	S7H1200	250	S4H250	—
9.0 - 12.5	1200	S7H1200	1200	S7H1200	—	—	—
12.5 - 16	1200	S7H1200	1200	S7H1200	—	—	—
16 - 20	1200	S7H1200	250	S4H250	—	—	—
20 - 25	1200	S7H1200	250	S4H250	—	—	—

① Fuse: Rated 1600A, Listed Class L. All others, listed RK5. Both time delay fuses.

② Fuse: Rated 1600A, Listed Class L. All others, listed K5. Both time delay fuses.

# Technical data

## Short circuit protection

### Type MS116, MS325

#### Short-circuit protection MS 116 – Setting ranges, short-circuit strength and max. back-up fuses

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$																	
from	to	at 230 V AC			at 400 V AC			at 440 V AC			at 500 V AC			at 690 V AC					
		$I_{cu}$ kA	$I_{cs}$ kA	gL, gG A	$I_{cu}$ kA	$I_{cs}$ kA	gL, gG A	$I_{cu}$ kA	$I_{cs}$ kA	gL, gG A	$I_{cu}$ kA	$I_{cs}$ kA	gL, gG A	$I_{cu}$ kA	$I_{cs}$ kA	gL, gG A			
Setting ranges	0.1 ... 0.16	Short-circuit proof up to $I_{cc} = 50$ kA									Short-circuit proof up to $I_{cc} = 30$ kA								
	to																		
	1.0 ... 1.6																		
	1.6 ... 2.5										10	10	25	10	10	25	5	5	25
	2.5 ... 4.0										6	6	25	6	6	25	2	2	25
	4.0 ... 6.3										6	6	63	6	6	63	2	2	40
	6.3 ... 10.0										6	6	63	6	6	63	2	2	50
8.0 ... 12.0	25	25	80	25	25	80	6	6	63	6	6	63	2	2	50				
10.0 ... 16.0	16	16	80	16	16	80	4	4	63	4	4	63	2	2	63				

#### Short-circuit protection MS325 – Setting ranges, short-circuit strength and max. back-up fuses

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$									
from	to	at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC	
		$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A
		Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)									
Setting ranges	0.1 ... 0.16	Short-circuit proof									
	to	No back-up fuse required up to $I_{cc} = 100$ kA									
	1.0 ... 1.6										
	1.6 ... 2.5										
	2.5 ... 4.0										
	4.0 ... 6.3										
	6.3 ... 9.0										
	9.0 ... 12.5			75	80	45	80	27	80	4.5	50
12.5 ... 16.0			60	100	40	100	25	100	4	50	
16.0 ... 20.0			55	100	35	100	22	100	3.5	50	
20.0 ... 25.0			50	125	30	125	20	125	3	50	

#### Short-circuit protection MS325 – Setting ranges, short-circuit strength and max. back-up fuses

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$									
from	to	at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC	
		$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A
		Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)									
Setting ranges	0.1 ... 0.16	Short-circuit proof									
	to	No back-up fuse required up to $I_{cc} = 50$ kA									
	1.0 ... 1.6										
	1.6 ... 2.5										
	2.5 ... 4.0										
	4.0 ... 6.3										
	6.3 ... 9.0										
	9.0 ... 12.5			45	80	27	80	4.5	50		
12.5 ... 16.0			40	100	25	100	4	50			
16.0 ... 20.0			35	100	22	100	3.5	50			
20.0 ... 25.0			30	125	20	125	3	50			

$I_{cs}$  = Rated service short-circuit breaking capacity,  $I_{cu}$  = Rated ultimate short-circuit capacity,  $I_{cc}$  = Prospective short-circuit current at installation location.  
 $I_{cs} = I_{cu}$  in the case of MS 325 and MS 116!



# Technical data

## Short circuit protection

### Type MS450/451, MS495/496

#### Short-circuit protection MS450 / MS451 – Setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cs}$														
	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A
11 ... 16	Short-circuit-proof No back-up fuse required up to $I_{cc} = 100kA$			25	50	100	25	50	100	6	12	63	3	5	63
14 ... 20				25	50	125	25	50	100	6	12	80	3	5	63
18 ... 25				25	50	125	15	30	100	6	12	80	3	5	63
22 ... 32				25	50	125	15	30	125	5	10	100	2	4	63
28 ... 40				25	50	160	15	30	125	5	10	100	2	4	63
36 ... 45				25	50	160	15	30	125	5	10	100	2	4	63
36 ... 50				25	50	160	15	30	125	5	10	100	2	4	80

#### Short-circuit protection MS495 – Setting ranges, short-circuit strength and max. back-up fuses

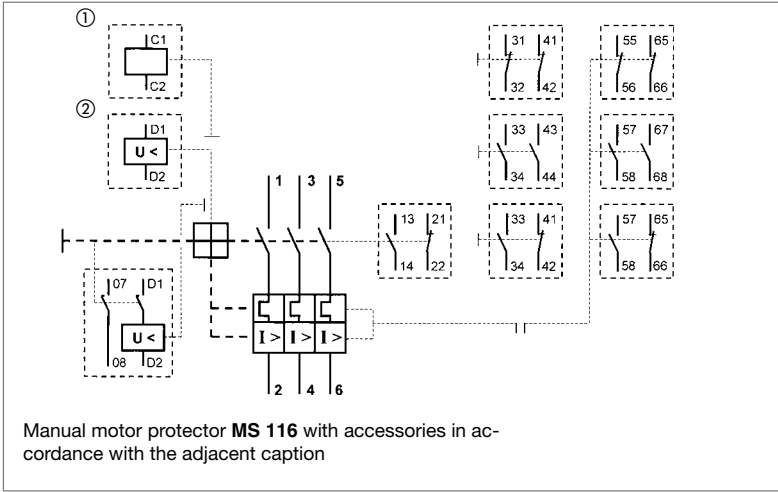
Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cs}$														
	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A
28 ... 40	Short-circuit-proof No back-up fuse required up to $I_{cc} = 100kA$			25	50	125	20	40	125	6	12	100	6	3	63
36 ... 50				25	50	125	20	40	125	6	12	100	6	3	80
45 ... 63				25	50	160	20	40	160	6	12	100	6	3	80
57 ... 75				25	50	160	20	40	160	4	8	125	5	3	100
70 ... 90				25	50	160	20	40	160	4	8	125	5	3	125
80 ... 100				25	50	160	20	40	160	4	8	125	5	3	125

#### Short-circuit protection MS496 – Setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cs}$														
	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A	$I_{cs}$ in kA	$I_{cu}$ in kA	gL,gG in A
28 ... 40	Short-circuit-proof No back-up fuse required up to $I_{cc} = 100kA$			25	50	160	9	18	160	6	12	80	6	12	80
36 ... 50				25	50	160	7.5	15	160	5	10	100	5	10	100
45 ... 63				25	50	200	7.5	15	160	4	7.5	100	4	7.5	100
57 ... 75				25	50	200	5	10	160	3	6	125	3	6	125
70 ... 90				25	50	200	5	10	160	3	6	160	3	6	160
80 ... 100				25	50	200	5	10	160	3	6	160	3	6	160

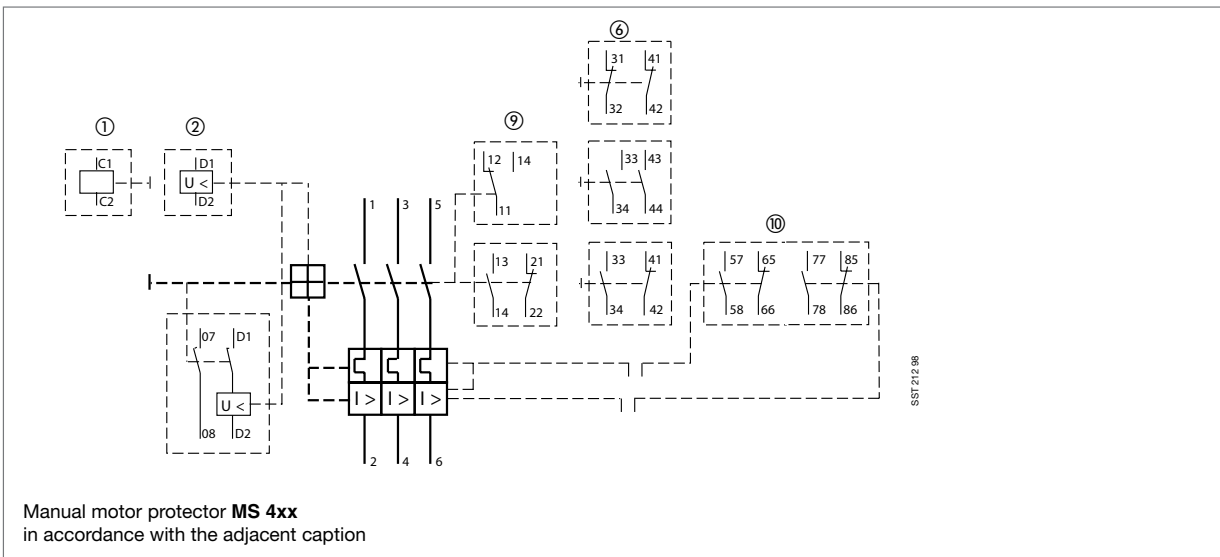
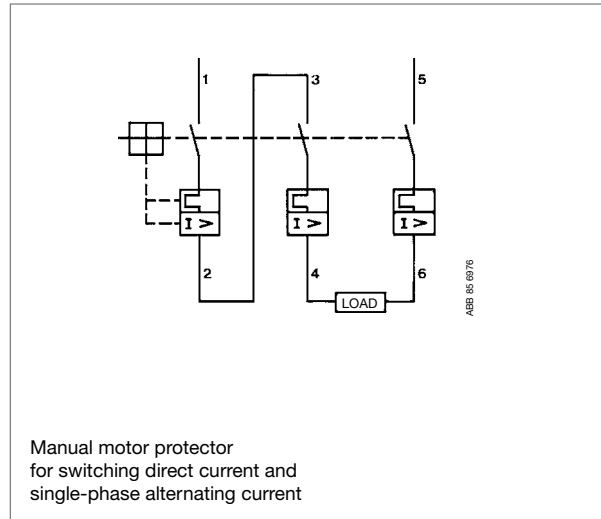
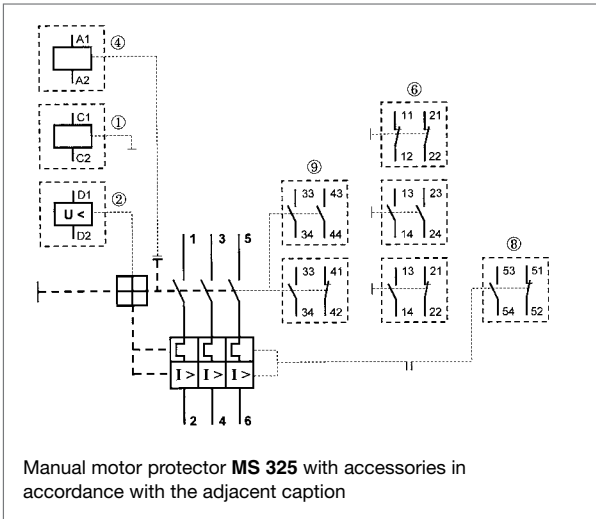
# Manual Motor Protectors Type Series MS

## Wiring diagrams



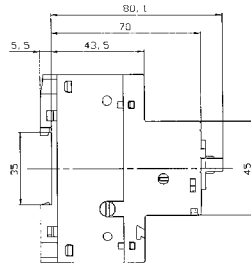
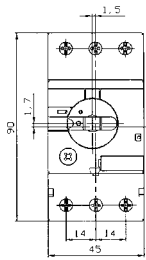
**Caption**

- ① Open-circuit shunt release
- ② Undervoltage release
- ③ Undervoltage release with leading auxiliary switch 2 SV
- ④ Indexing mechanism, only MS 325
- ⑥ Auxiliary switch blocks for lateral attachment
- ⑧ Tripped alarm switch block (signalling contact)
- ⑨ Auxiliary switches which can be plugged on at the front
- ⑩ Alarm switch for short-circuits and general tripping

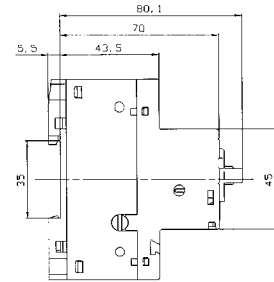
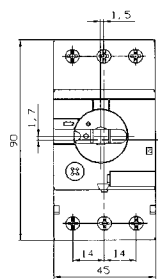


# Approximate dimensions MS116

Manual motor protector **MS 116**

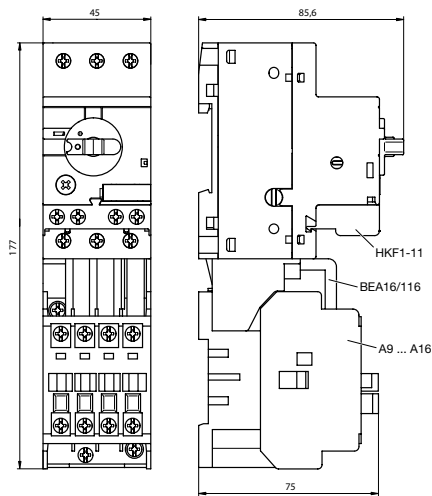


SES7007-00

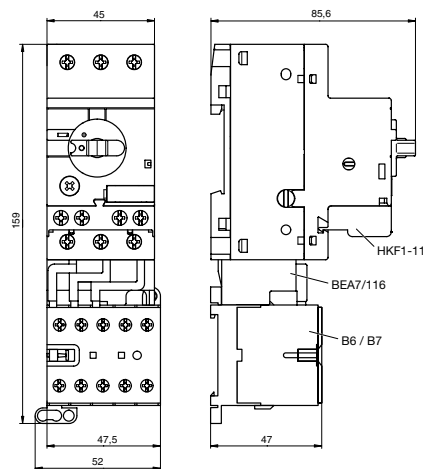


SES7006-00

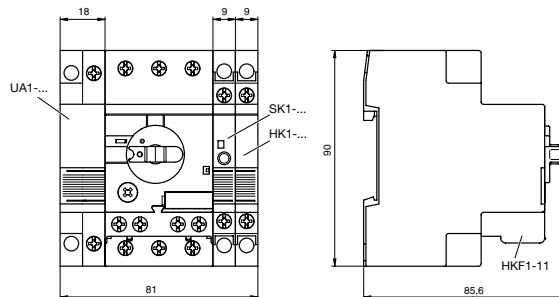
Manual motor protector **MS 116** mounted with contactor **A9...A16**



Manual motor protector **MS 116** mounted with mini contactor **B6/7**



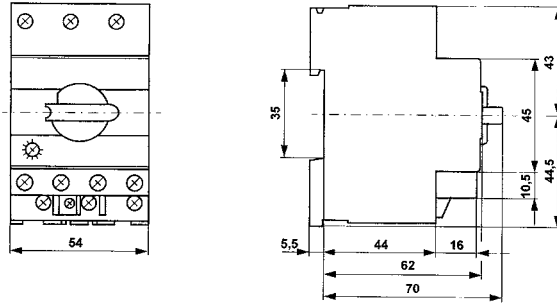
Manual motor protector **MS 116** mounted with **UA1.../SK1.../HK1.../HKF1-11**



Dimension in mm

## Approximate dimensions MS325

Manual motor protector **MS 325** with aux. contact HKF for front mounting



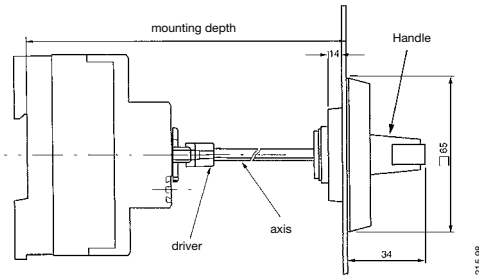
SST 008-00

Signal contact SK  
Auxiliary switch HK



SST 106 962 M

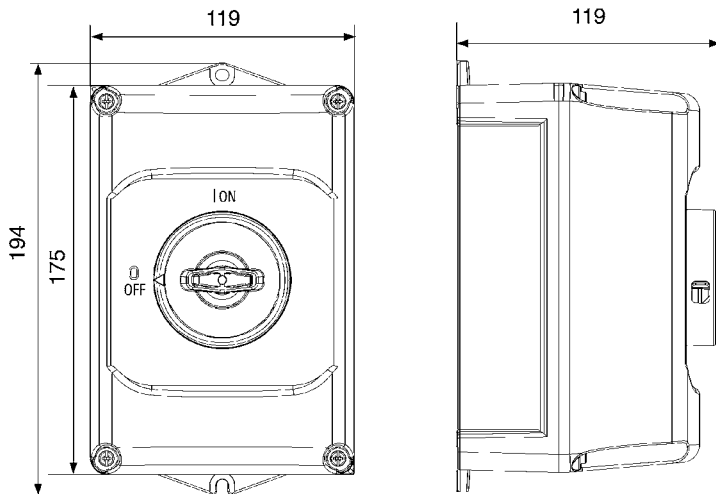
Switch cubicle mounting kit



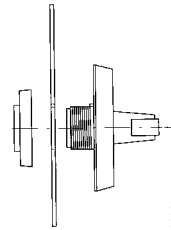
SST 215 96

Mounting depth mm	90	137	157	182	232
Axial length mm	32	85	105	130	180

**Molded plastic enclosures** for MS116, MS325  
IB325-G, IB325-Y, IB116-G and IB116-Y  
Housing IP 65

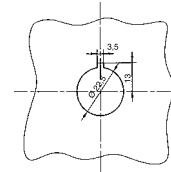


Outer twist knobs



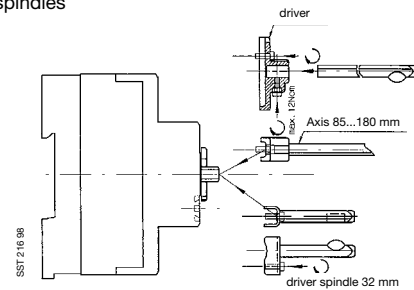
SST 214 96

Drilling plan



SST 213 96

Driver and spindles



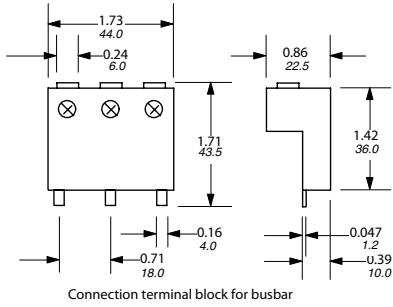
SST 216 96

Dimension in mm

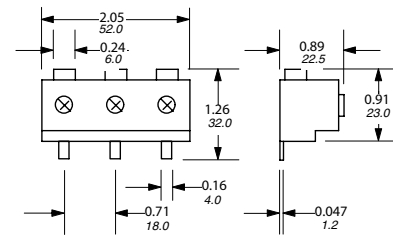
# Approximate dimensions Accessories for MS325

00.00 → Inches  
00.00 → [Millimeters]

## Power feed terminal blocks for MS325

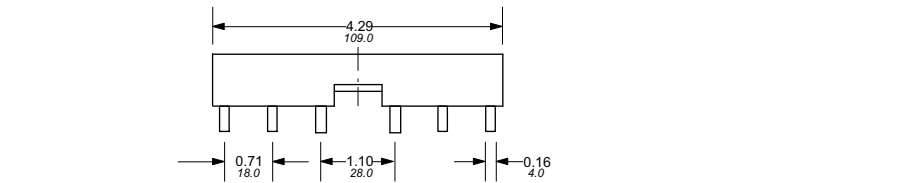


Connection terminal block for busbar

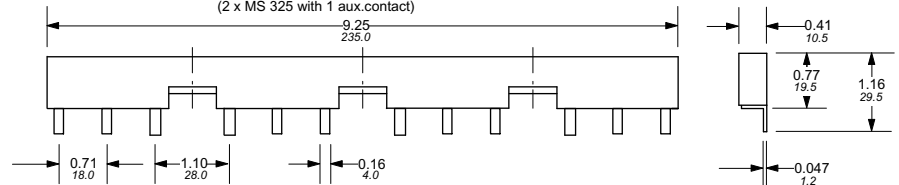


Connection terminal block for 4 AWG / 25 mm wires

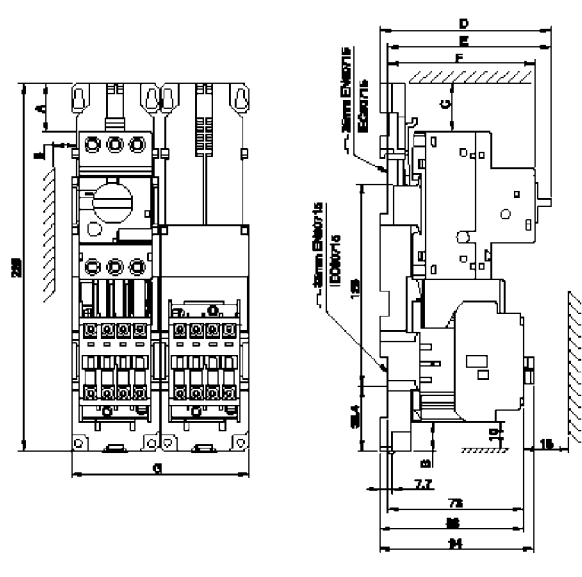
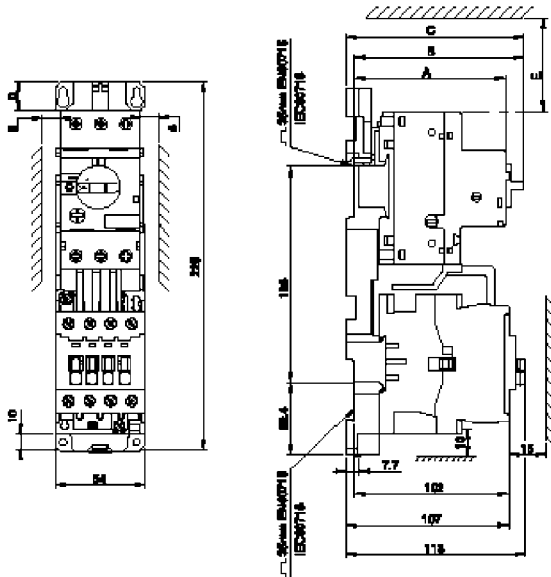
## Busbar connectors for MS325



Busbar Connector  
(2 x MS 325 with 1 aux. contact)



Busbar Connector  
(4 x MS 325 with 1 aux. contact)



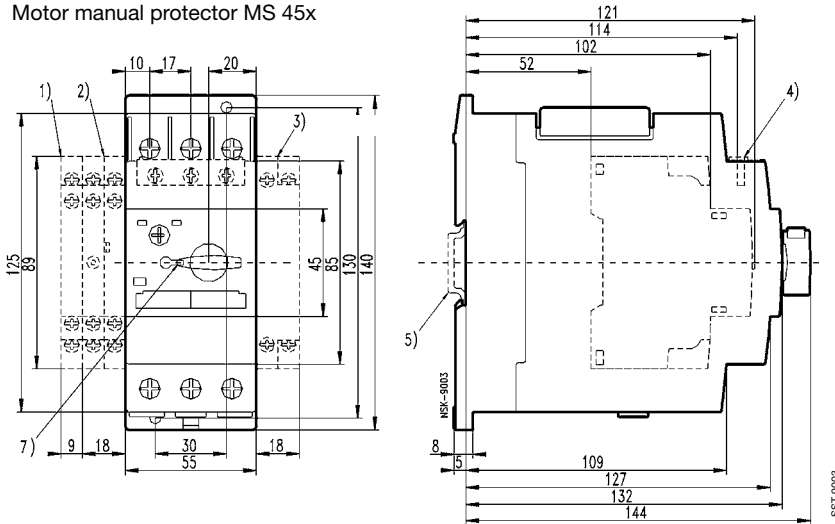
	A	B	C	D	E
MS116+A26+PM26-13	91	101	106	20	40
MS325+A26+PM26-13	83	91	96	16	25

	A	B	C	D	E	F	G
MS325+A 16+PM26-23	26	19	25	96	91	83	108
MS116+A 16+PM26-23	29.5	19	40	106	101	91	108
MS325+A26+PM26-23	16	10	25	96	91	83	123
MS116+A26+PM26-23	20	10	40	106	101	91	123

# Approximate dimensions MS450 & MS490

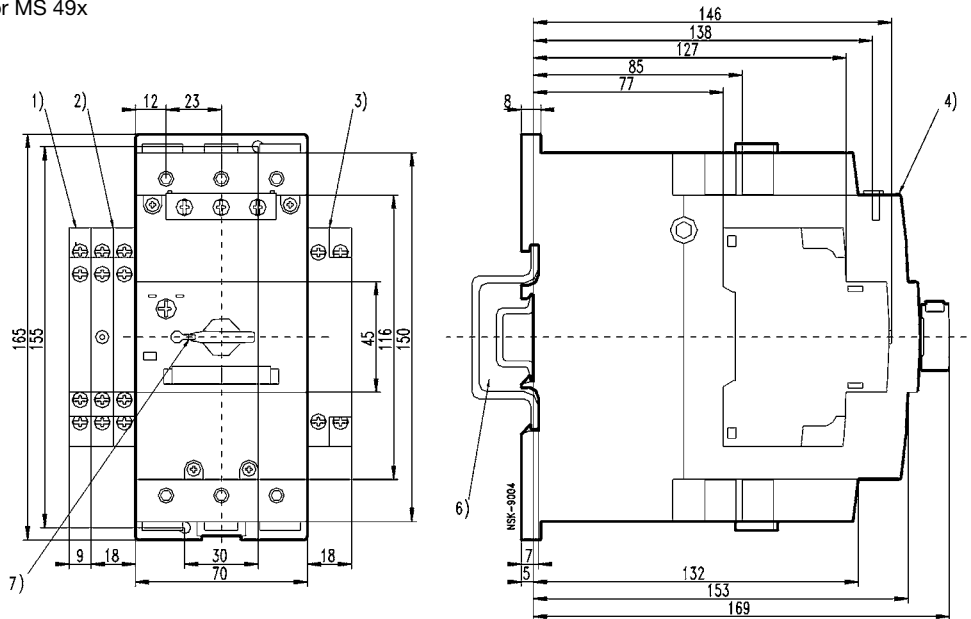
← 00.00 → [Millimeters]

Motor manual protector MS 45x



- 1) Auxiliary switch block HKS4
- 2) Pilot switch SK4
- 3) Open-circuit shunt release/undervoltage release AA4, UA4, UA4-HK
- 4) Auxiliary switch HK4
- 5) Top-hat rail 35 mm to DIN EN 50022
- 6) Top-hat rail 35 mm, 15 mm high to DIN EN 50022 or Top-hat rail 75 mm to DIN EN 50023
- 7) Switch knob lockable in zero position with bracket diameter 5 mm

Motor manual protector MS 49x

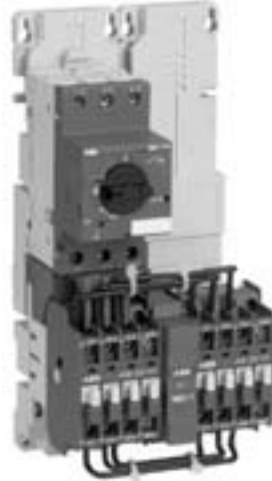


# Manual Motor Protectors Combinations with Accessories

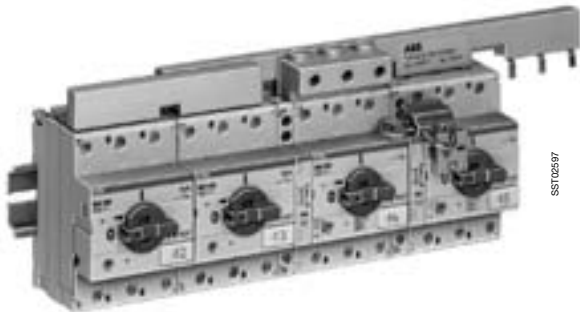
Manual  
motor protectors



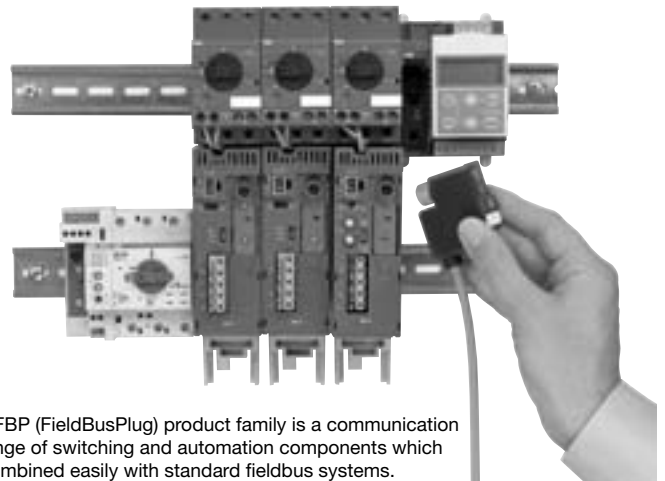
PM26-13 + MS325 + BEA + A26



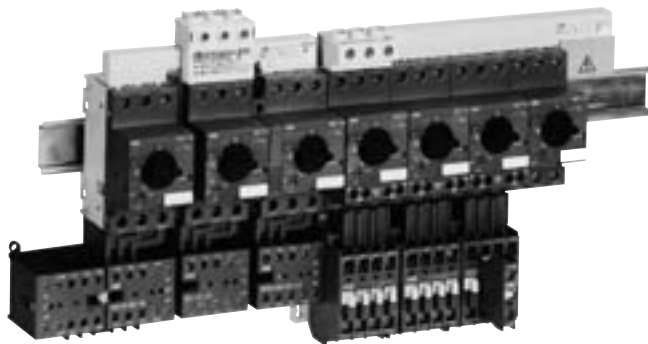
PM26-23 + MS116 + 2 x A9 + VE5



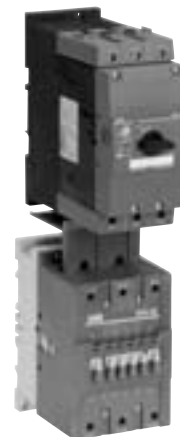
MS 325 with auxiliary switch HK  
cross-wired with phase buses and power infeed block



The new FBP (FieldBusPlug) product family is a communication device range of switching and automation components which can be combined easily with standard fieldbus systems.



MS 116 cross wired via phase busses and power infeed blocks










MS 495 with A95  
connected via BEA 110/495

# ABB - a partner of choice

ABB strives to be your partner in all questions of motor protection. Besides the manual motor protectors and motor starter combinations presented in this brochure, the ABB product range consists of various other components to increase the performance of your drives.

ABB offers various industrial relays that further enhance the performance and the safety of your motor applications. Why don't you talk to your local representative on how ABB's low voltage products can be used in your application.

Device type	Approvals			Ships' classification societies			
Test mark							
Abbreviation Validity	CSA Canada	USA	PTB Germany	GL Germany	LRS Great Britain	BV France	DNV Norway
MS 116	●	●		●	●		
MS 325	●	●	●	●	●	●	●
MS 45x	●	●					
MS 49x	●	●					



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