

# Manual motor Protectors



## Manual motor protectors

Type MS116

Type MS325

Type MS45X

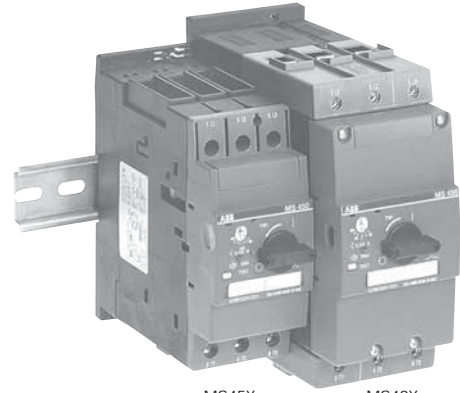
Type MS49X



MS116



MS325



MS45X

MS49X

### Description

#### Type MS116

- Suitable for use with 3-phase motors up to 10 HP @ 480V
- UL Listed and CSA certified for Group Motor Installations
- 12 Setting ranges from 0.1 to 16 amps.
- Up to 30kA or 50kA with no back up fuse required
- 35mm DIN rail snap-on mounting
- Wide range of accessories

#### Type MS325

- Suitable for use with 3-phase motors up to 15 HP @ 480V
- UL Listed and CSA certified for Group Motor Installations
- 12 Setting ranges from 0.1 to 25 amps.
- Up to 50kA or 100kA with no back up fuse required
- 35mm DIN rail snap-on mounting
- Wide range of accessories

#### Type MS45x

- Suitable for use with 3-phase motors up to 40 HP @ 480V
- UL Listed and CSA certified for Group Motor Installations
- 14 Setting ranges from 11 to 50 amps
- Up to 100kA with no back up fuse required
- 35mm DIN rail snap-on mounting
- Wide range of accessories

#### Type MS49x

- Suitable for use with 3-phase motors up to 75 HP @ 480V
- UL Listed and CSA certified for Group Motor Installations
- 22 Setting ranges from 11 to 100 amps
- Up to 100kA with no back up fuse required
- 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 50kAIC, 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. Article 430.53(C) of the *NEC*<sup>®</sup> specifies the requirements for group motor installations; all ABB MMPs meet these requirements.

## General information

### Selection

Group installation is an approach to building multi-motor control systems in accordance with Section 430-53 of the National 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 UL listing with the selected BCPD and the available short circuit current at the application location.

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### 1. Fused disconnect

Calculate maximum fuse size according to NEC 430-53 (c).  $I_{max}$  (fuse size) = 175% x FLC (full load current for largest motor) + the sum of FLC (full load current for largest motor) + the sum of FLC values for other motors on that branch using NEC Table 430-150 on the right. Select fuse from NEC Table 240-6 below. Where  $I_{max}$  falls between two fuse ampere ratings NEC 430-53 (c) permits going 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 the next page, identify the system application voltage and interrupting capacity for the type of fuse selected in step 1 above.

NEC 240-6 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 NEC 240-6 = 50A
  - Minimum disconnect size = 115% x Total FLA
  - NEC 430-150 table = 115% x (14 + 11 + 7.6 + 4.8 + 1) = 44.16
- Disconnect for 50A fuses is ok.

### NEC Table 430-150 full load current, 3ph AC motor

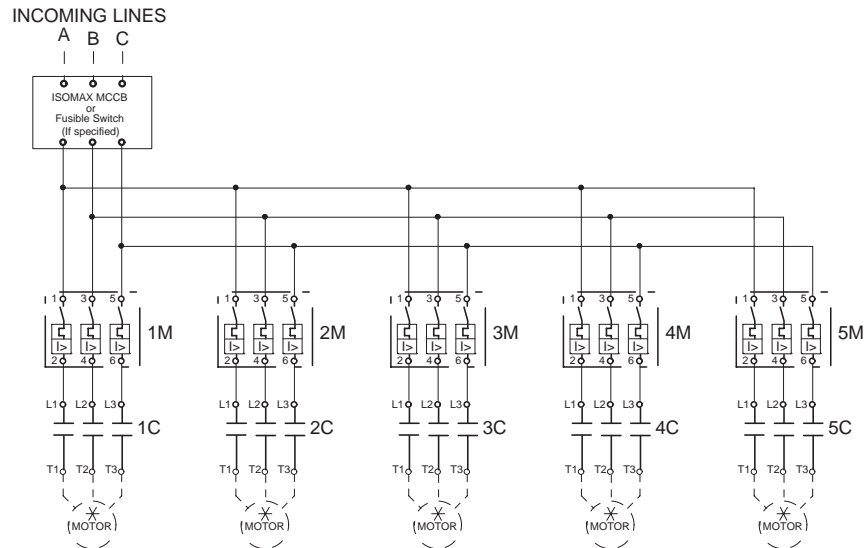
Horsepower	Induction type squirrel cage & wound rotor ①		
	230V amps	460V amps	575V amps
1/2	2	1	.8
3/4	2.8	1.4	1.1
1	3.6	1.8	1.4
1.5	5.2	2.6	2.1
2	6.8	3.4	2.7
3	9.6	4.8	3.9
5	15.2	7.6	6.1
7.5	22	11	9
10	28	14	11
15	42	21	17
20	54	27	22
25	68	34	27

Note: Refer to NEC 310-1 and NEC 430-53(d) 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

Motor rating at 460V		MS325	Contactor
Horsepower	FLA, AC3		
1/2	1.0	MS325-1.0	A9C
3	4.8	MS325-6.3	A9C
5	7.6	MS325-9.0	A9C
7.5	11	MS325-12.5	A12C
10	14	MS325-16	A16C



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



MS116

## Manual motor protectors

Thermal setting range (Amps)	Single-phase horsepower ratings ①		3-phase horsepower ratings			Catalog number	List price
	120V	240V	240V	480V	600V		
<b>MS116</b>							
0.10 – 0.16	—	—	—	—	—	MS116-0.16	<b>\$ 129</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	<b>148.50</b>
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	<b>172.50</b>
8.0 – 12	1/2	2	3	7.5	10	MS116-12	
10.0 – 16	1	2	5	10	10	MS116-16	

UL File # E137861

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

## Type MS116 Accessories

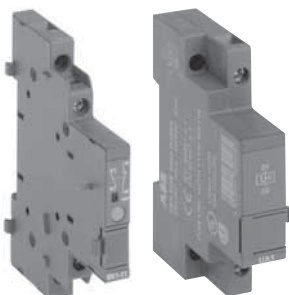
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HK1-11



HKF1-11



SK1-11

UA1-120



OTPA116



12644

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

Contact configuration	Catalog number	List price
1 NO & 1 NC	HK1-11	<b>\$ 33</b>
2 NO	HK1-20	
2 NC	HK1-02	

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

Contact configuration	Catalog number	List price
1 NO & 1 NC	HKF1-11	<b>\$ 33</b>

### Bell alarm contact blocks for Type MS116

Contact configuration	Catalog number	List price
1 NO & 1 NC	SK1-11	<b>\$ 33</b>
2 NO	SK1-20	
2 NC	SK1-02	

### Undervoltage trip for Type MS116

Voltage (VAC)	Catalog number	List price
24	UA1-24	<b>\$ 82.50</b>
48	UA1-48	
60	UA1-60	
120	UA1-120	
230	UA1-230	
400	UA1-400	
415	UA1-415	

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

Voltage (VAC)	Catalog number	List price
24	UA1-HK-24	<b>\$ 97.50</b>
48	UA1-HK-48	
60	UA1-HK-60	
120	UA1-HK-120	
230	UA1-HK-230	
400	UA1-HK-400	
415	UA1-HK-415	

### Locking device for Type MS116

Description	Catalog number	List price
Adaptor for padlock Type SA1	MS325-SA1	<b>\$ 15.00</b>
Complete padlock locking kit (adaptor, padlock & 3 keys)	MS325-SA3	<b>37.50</b>

### Molded plastic enclosures for Type MS116

Item description	Protection level	Catalog number	List price
Gray enclosure with black handle	IP64	OTPA116L2P1	<b>\$ 75</b>
Yellow enclosure with red handle	IP64	OTPA116A2P1	<b>75</b>
Gray enclosure with clear cover, 4 module	IP55	12644	<b>84</b>
Gray enclosure with clear cover, 6 module	IP55	12646	<b>98</b>
Gray enclosure with black handle	IP65	IB116-G	<b>75</b>
Yellow enclosure with red handle	IP65	IB116-Y	<b>75</b>

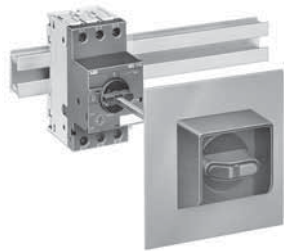
### Plastic adaptors for enclosures for Type MS116

Description	Catalog number	List price
PG16 to 1/2NPT	PG16-1/2NPT	<b>\$ 10</b>

### Shunt trip for Type MS116

Voltage (VAC)	Catalog number	List price
24V	AA1-24	<b>\$ 75</b>
110V	AA1-110	
200 – 240V	AA1-230	
350 – 415V	AA1-400	

# Type MS116 Accessories



OHB2AJ



S1-M1

S1-M2



PS1-2-1



## Door mounting hardware for for Type MS116 ①

Description	Catalog number	List price
Shaft coupler	MSMN	\$ 15
NEMA 1, 3R, 12 Black selector handle	OHB2AJ	30
NEMA 1, 3R, 12 Red, yellow selector handle	OHY2AJ	30
4.1" length shaft	OXS5X105	4
7.1" length shaft	OXS5X180	6

## Power feed terminal blocks for Type MS116

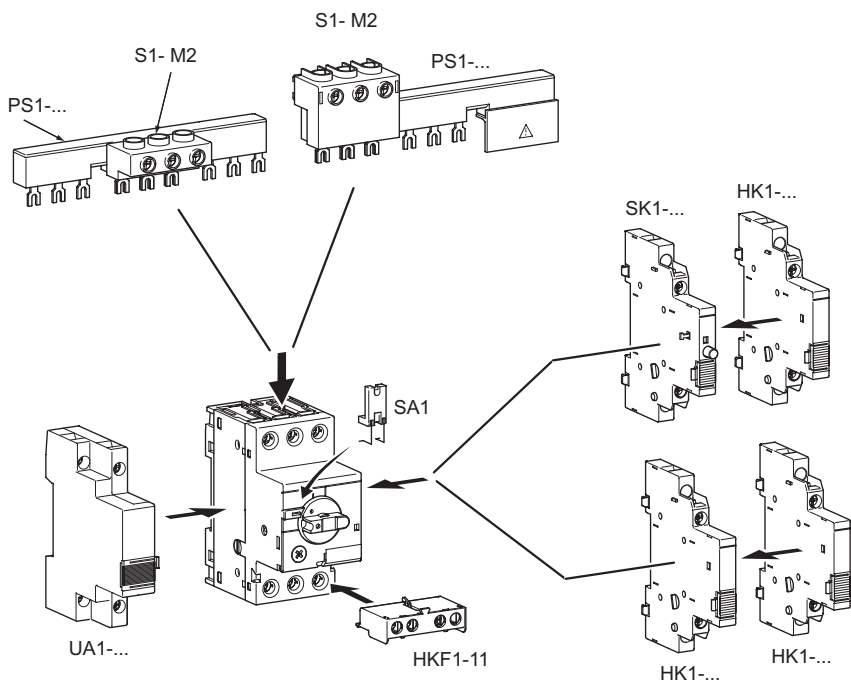
Description	Catalog number	List price
for 4 AWG wire	S1-M1	\$ 24
for busbar	S1-M2	

## Busbars for Type MS116

Description	Catalog number	List price
for 2 devices without auxiliary contacts	PS1-2-0	\$ 24
for 3 devices without auxiliary contacts	PS1-3-0	30
for 4 devices without auxiliary contacts	PS1-4-0	36
for 5 devices without auxiliary contacts	PS1-5-0	42
for 2 devices with 1 auxiliary contact	PS1-2-1	24
for 3 devices with 1 auxiliary contact	PS1-3-1	30
for 4 devices with 1 auxiliary contact	PS1-4-1	36
for 5 devices with 1 auxiliary contact	PS1-5-1	42
for 2 devices with 2 auxiliary contacts	PS1-2-2	24
for 3 devices with 2 auxiliary contacts	PS1-3-2	30
for 4 devices with 2 auxiliary contacts	PS1-4-2	36
for 5 devices with 2 auxiliary contacts	PS1-5-2	42

## Busbar for direct mounting of contactors

Description	Catalog number	List price
B6/B7	BEA7/116	\$ 12.00
A9/A12/A16	BEA16/116	13.50
A26	BEA26/116	15.00
AL9 - AL16	BEA16/116AL	14.50



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

# Type MS116

## Technical data

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Softstarter type		MS116
Standards, approvals		UL, CSA, CE
Rated operating current	A	16
Current range	A	0.16 – 16
Number of poles		3
Frequency	Hz	50 / 60
Tripping class	A	10
Max. kAIC & 600V	kAIC	30
Mechanical life	Operations	100,000
Wire range	AWG	12 – 18
Terminal torque	in. lbs.	14
Terminal tool options		Flat screwdriver PZ2
Permissible attitude without derating	m	3000
Degree of protection		IP20
UL Listed for group installation		Yes
Self-protected Type E manual combination starter		No
<b>Accessories</b>		
Terminal shroud		No
Auxiliary contacts		Yes
Shunt trip		No
Trip signal contacts		Yes
UV release		Yes
Busbar		Yes
Through the door handle		Yes
Minimum enclosure size		H x W x D
<b>Loads for accessories</b>		
Auxiliary contact for front mounting, HKF	AC15	24 V, 3.0 A 230 V, 1.5 A
Auxiliary contact for front mounting, HKF	DC13	24 V, 1.0 A 48 / 60V, 0.7 A 110 V, 0.27 A
Auxiliary and signal contact, HK + SK	AC15	24 V, 6 A 230 V, 4 A 400 V, 3 A
Auxiliary and signal contact, HK + SK	DC13	24 V, 2 A 110 V, 0.5 A 220 V, 0.25 A 440 V, 0.1 A
<b>Electromagnet trips</b>		
Response value set ex-works		9.6 – 14.4 x I <sub>n</sub>
<b>Undervoltage release</b>		
Pick-up value	% of U <sub>C</sub>	85
Drop-out value	% of U <sub>C</sub>	35 – 75
<b>Power consumption</b>		
Pick-up VA		Consult factory
Hold VA		Consult factory

### 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<sub>cc</sub> > I<sub>cs</sub>

from A	to A	at 230 V AC			at 400 V AC			at 440 V AC			at 500 V AC			at 690 V AC		
		I <sub>cu</sub> kA	I <sub>cs</sub> kA	gL, gG A	I <sub>cu</sub> kA	I <sub>cs</sub> kA	gL, gG A	I <sub>cu</sub> kA	I <sub>cs</sub> kA	gL, gG A	I <sub>cu</sub> kA	I <sub>cs</sub> kA	gL, gG A	I <sub>cu</sub> kA	I <sub>cs</sub> kA	gL, gG A
0.1	... 0.16	Short-circuit proof up to I <sub>cc</sub> = 50 kA						Short-circuit proof up to I <sub>cc</sub> = 30 kA								
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

# Type MS116

## Technical data

### General purpose

MS116 range	Maximum current (600 VAC Max.)
0.1 – 0.16	0.16
0.16 – 0.25	0.25
0.25 – 0.40	0.40
0.04 – 0.63	0.63
0.63 – 1.0	1.0
1.0 – 1.6	1.6
1.6 – 2.5	2.5
2.5 – 4.0	4.0
4 – 6.3	6.3
6.3 – 10	10
8 – 12	12
10 – 16	16

### Short circuit ratings

18,000 RMS symmetrical 480 VAC  
5,000 RMS symmetrical 600 VAC

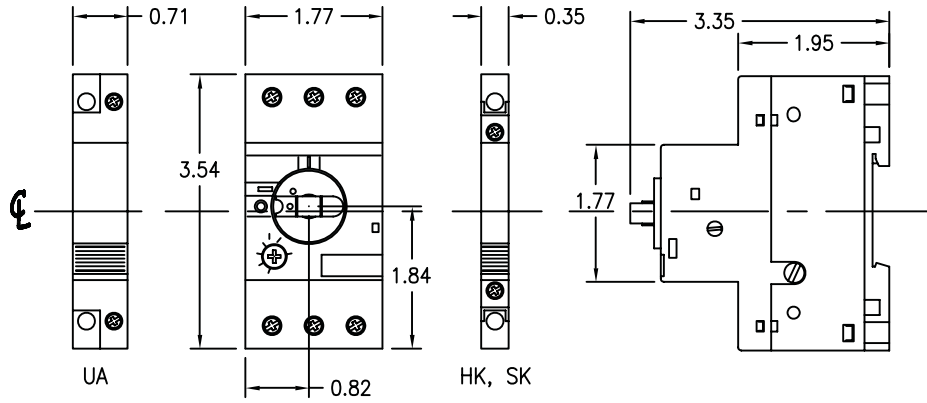
### Maximum ratings

MS116 Range	Horsepower, HP, Breaking-All-Lines				
	Single phase 50/60 Hz		Three phase 50/60 Hz		
	120 VAC	240 VAC	240 VAC	480 VAC	600 VAC
0.1 – 0.16	—	—	—	—	—
0.16 – 0.25	—	—	—	—	—
0.25 – 0.40	—	—	—	—	—
0.40 – 0.63	—	—	—	—	—
0.63 – 1.0	—	—	—	1/2	1/2
1.0 – 1.6	—	1/10	—	3/4	3/4
1.6 – 2.5	—	1/6	1/2	1	1 1/2
2.5 – 4.0	1/8	1/3	1	2	3
4.0 – 6.3	1/4	1/2	1 1/2	3	5
6.3 – 10	1/2	1 1/2	3	5	7 1/2
8 – 12	1/2	2	3	7 1/2	10
10 – 16	1	2	5	10	10

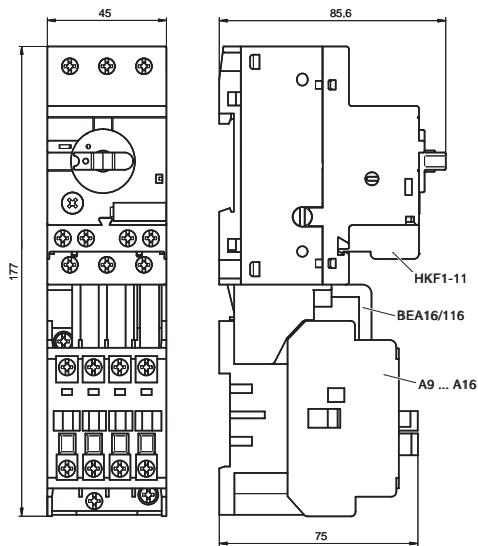
# Type MS116

## Approximate dimensions

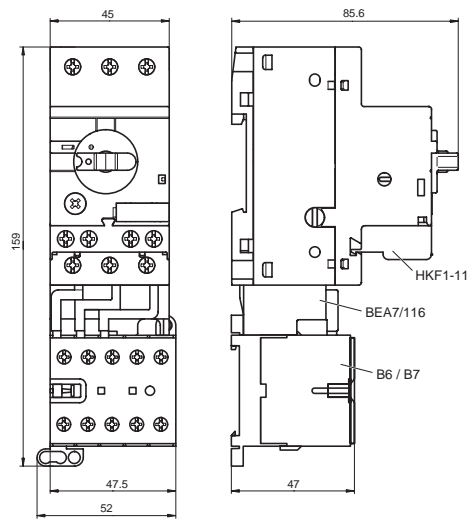
### MS116



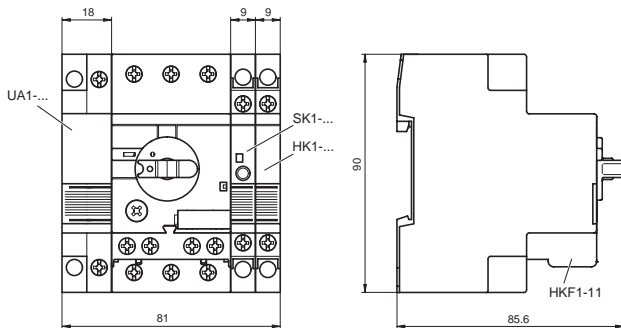
### MS116 — mounted with A9 - A16 contactor



### MS116 — mounted with B6/B7 minicontactor



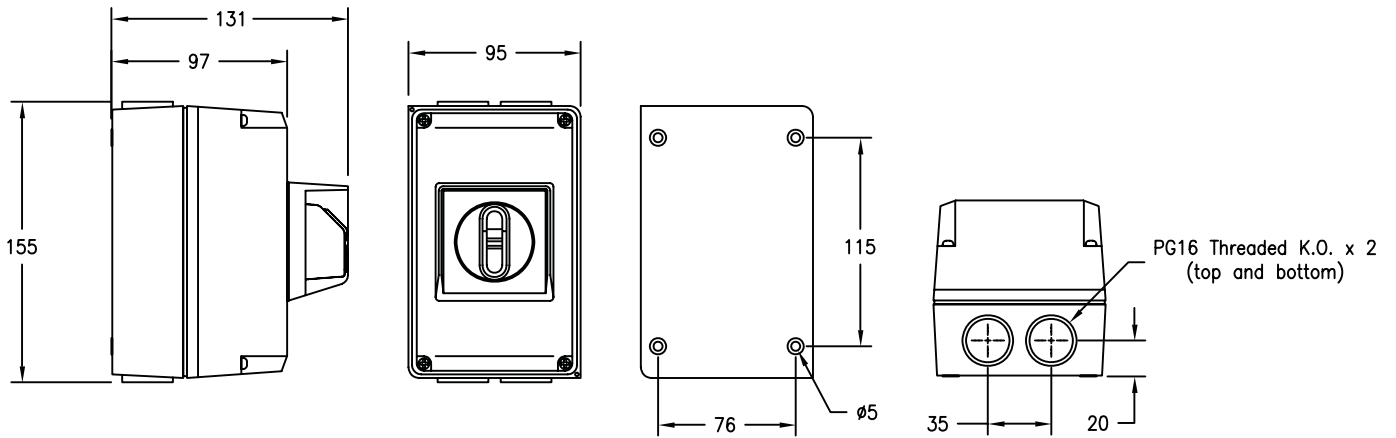
### MS116 — mounted with UA1..., SK1..., HK1..., HKF1-11



# Type MS116

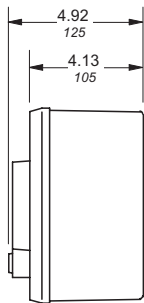
## Approximate dimensions

Molded plastic enclosures for MS116  
OTPA116L2P1 and OTPA116A2P1

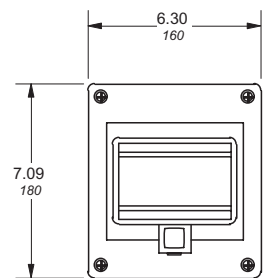
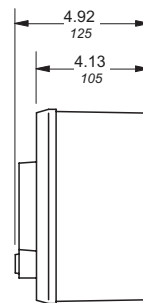
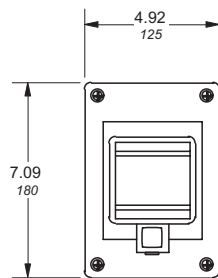


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12644



12646



## Type MS325

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MS325-1.0

### Manual motor protectors — Type MS325

Thermal setting range (Amps)	Single-phase horsepower ratings ①		3-phase horsepower ratings			Catalog number	List price
	120V	240V	240V	480V	600V		
0.10 – 0.16	—	—	—	—	—	MS325-0.16 MS325-0.25 MS325-0.40 MS325-0.63	\$ 144
0.16 – 0.25	—	—	—	—	—		
0.25 – 0.40	—	—	—	—	—		
0.40 – 0.63	—	—	—	—	—		
0.63 – 1.0	—	—	—	1/2	1/2	MS325-1.0 MS325-1.6 MS325-2.5 MS325-4.0 MS325-6.3	165
1.0 – 1.6	—	1/10	—	3/4	3/4		
1.6 – 2.5	—	1/6	1/2	1	1.5		
2.5 – 4.0	1/8	1/3	1	2	3		
4.0 – 6.3	1/4	1/2	1.5	3	5		
6.3 – 9.0	1/3	1	2.5	5	7.5	MS325-9.0 MS325-12.5 MS325-16	192
9.0 – 12.5	1/2	2	3	7.5	10		
12.5 – 16	1	2.5	5	10	10		
16 – 20	1.5	3	5	10	15	MS325-20	211.50
20 – 25	2	3	7.5	15	20	MS325-25	223.50

MS325 UL File #E137861

Accessories UL File #E90353

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

# Type MS325 UL 508E

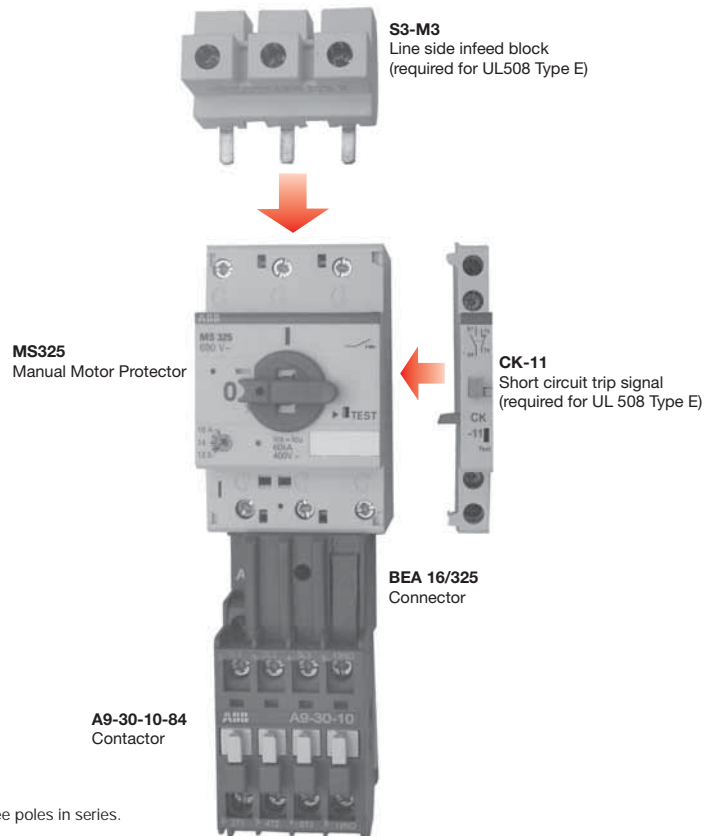


MS325-1.0

## Manual motor protectors — Type MS325

Thermal setting range (Amps)	Single-phase horsepower ratings ①		3-phase horsepower ratings			Catalog number ②	List price
	120V	240V	240V	480V	600V		
0.10 – 0.16	—	—	—	—	—	MS325-0.16E MS325-0.25E MS325-0.40E MS325-0.63E	\$ 223
0.16 – 0.25	—	—	—	—	—		
0.25 – 0.40	—	—	—	—	—		
0.40 – 0.63	—	—	—	—	—		
0.63 – 1.0	—	—	—	1/2	1/2	MS325-1.0E MS325-1.6E MS325-2.5E MS325-4.0E MS325-6.3E	244
1.0 – 1.6	—	1/10	—	3/4	3/4		
1.6 – 2.5	—	1/6	1/2	1	1.5		
2.5 – 4.0	1/8	1/3	1	2	3		
4.0 – 6.3	1/4	1/2	1.5	3	5		
6.3 – 9.0	1/3	1	2.5	5	7.5		
9.0 – 12.5	1/2	2	3	7.5	10	MS325-9.0E MS325-12.5E MS325-16E	271
12.5 – 16	1	2.5	5	10	10		
16 – 20	1.5	3	5	10	15		
20 – 25	2	3	7.5	15	20	MS325-20E	290
						MS325-25E	302

MS325 UL File #E137861  
Accessories UL File #E90353  
Class 10 overload  
Short circuit rating of 18kA



① Single phase motor ratings are based upon wiring all three poles in series.  
② Part includes MMP, barrier and trip signal.

## Type MS325 Accessories

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MS325-HK11



MS325-HKF11



MS325-UA24



MS325-AS



MS325-SA1



MS325-SA3

### 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>\$ 33</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>\$ 33</b>

### Bell alarm contact blocks for Type MS325

Item description	Catalog number	List price
1 NO 1 NC	MS325-SK10 MS325-SK01	<b>\$ 33</b>

### Shunt trips for Type MS325

Item description	Catalog number	List price
110 – 240 VAC/VDC, 60 Hz 24 – 60 VAC/DC, 60 Hz	MS325-ST110 MS325-ST24	<b>\$ 82.50</b>

### Undervoltage trip for Type MS325

Item description	Catalog number	List price
24V 48V 60V 110V 230V 400V 415V 480V	MS325-UA24 MS325-UA48 MS325-UA60 MS325-UA110 MS325-UA230 MS325-UA400 MS325-UA415 MS325-UA480	<b>\$ 82.50</b>

### Remote control unit

Item description	Catalog number	List price
Electrically operated remote control unit for MS325. For use up to MS325-16 and below. Not for use with MS325-20 & MS325-25. Provided with 1 NO & 1 NC auxiliary contacts and 1NO trip signal contacts	24V AC/DC 48V AC/DC 60V AC/DC 110V AC/DC 230V AC/DC RC325-24V RC325-48V RC325-60V RC325-110V RC325-230V	<b>\$ 165</b>

NOTE: May not be used with HFK, SK, ST or UV accessories

### Supporting terminal for Type MS325

Item description	Catalog number	List price
for UA or as N/LS clamp	MS325-AS	<b>\$ 15</b>

### Padlocking devices for Type MS325

Item description	Catalog number	List price
Adapter for padlock type SA1	MS325-SA1	<b>\$ 15.00</b>
Complete padlock kit (includes adaptor, padlock & 3 keys)	MS325-SA3	<b>37.50</b>

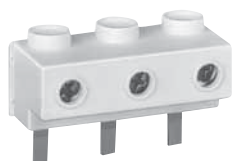
# Type MS325 Accessories



Switch cubicle mounting kit



MS325-BB1



MS325-SM1



PS3-2-0



PS3-4-0



MS325 coupled to mini-contactor

## Molded plastic enclosures for Type MS325

Item description	Protection level	Catalog number	List price
Light gray enclosure with black handle	IP64	OTPA325B2P1	\$ 75
Light gray enclosure with red/yellow handle	IP64	OTPA325A2P1	75
Gray enclosure w/clear lid, 4 module	IP55	12644	84
Gray enclosure w/clear lid, 6 module	IP55	12646	98
Gray enclosure with black handle	IP65	IB325-G	75
Yellow enclosure with red handle	IP65	IB325-Y	75

NOTE: Use Discount schedule MA for IP64 & IP65 enclosures; use Discount schedule CB8 for IP55 enclosures.

## Plastic adaptors for enclosures for Type MS325

Item description	Catalog number	List price
PG16 TO 1/2 NPT	PG16-1/2 NPT	\$ 10

## Selector handles for through-the-door operation for Type MS325 ①

Item description	Catalog number	List price
Shaft coupler	MSMN	\$ 15
NEMA 1, 3R, 12 black selector handle	OHB2AJ	30
NEMA 1, 3R, 12 red/yellow selector handle	OHY2AJ	30
4.1" length shaft	OXS5X105	4
7.1" length shaft	OXS5X180	6

NOTE: Use Discount schedule MA for shaft coupler; use Discount schedule H6 for handles and shafts.

## Power feed terminal blocks for Type MS325

Item description	Catalog number	List price
Standard, accepts 4 AWG wire	MS325-SM1	\$ 24
Low profile, accepts 4 AWG wire	MS325-BB1	25.50

## Busbars for Type MS325 ②

Item description	Catalog number	List price
for 2 devices; without auxiliary switch	PS3-2-0	\$ 24
for 3 devices; without auxiliary switch	PS3-3-0	30
for 4 devices; without auxiliary switch	PS3-4-0	33
for 5 devices; without auxiliary switch	PS3-5-0	39
for 2 devices; with 1 auxiliary switch	PS3-2-1	30
for 3 devices; with 1 auxiliary switch	PS3-3-1	34.50
for 4 devices; with 1 auxiliary switch	PS3-4-1	37.50
for 5 devices; with 1 auxiliary switch	PS3-5-1	42
for 2 devices; with 2 auxiliary switches	PS3-2-2	30
for 4 devices; with 2 auxiliary switches	PS3-4-2	37.50

Busbars can be daisy chained to connect additional MS325s.

## Close coupling adapters

Device	Catalog number	List price
MS325 + B6/B7 contactor	BEA7/325	\$ 12.00
MS325 + VB6/VB7 reversing contactor	MS325-VB7	
MS325 + A9, A12, A16 contactor	BEA16/325	13.50
MS325 + A26 contactor	BEA26/325	15.00
AL9 - AL16	BEA16/325AL	14.50
AL26	BEA26/325AL	16.00

## UL 508 Type E Accessories – Required

Device	Catalog number	List price
Line side infeed block	S3-M3	\$ 30
Short circuit trip signal	CK-11	49

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

## Type MS450 – MS497

5



MS450



MS497

### Manual motor starters

FLA adjustment range	Horsepower ratings						Weight (lbs)	Availability code	Catalog number	List price
	Single-phase <sup>①</sup>		Three-phase							
	115V	230V	200V – 208V	230V	460V	575V				
<b>MS450</b>										
11 – 16	1	3	5	5	10	15	2.12	A	MS450-16	\$ 450
14 – 20	1.5	3	5	7.5	15	20	2.12	A	MS450-20	450
18 – 25	2	5	7.5	10	20	25	2.12	A	MS450-25	450
22 – 32	3	5	10	10	25	30	2.12	A	MS450-32	450
28 – 40	3	7.5	15	15	30	40	2.12	A	MS450-40	510
36 – 45	5	7.5	15	15	30	40	2.12	A	MS450-45	510
40 – 50	5	10	15	20	40	50	2.12	A	MS450-50	510
<b>MS495</b>										
28 – 40	3	7.5	15	15	30	40	4.63	A	MS495-40	562.50
36 – 50	5	10	15	20	40	50	4.63	A	MS495-50	562.50
45 – 63	5	15	20	25	50	60	4.63	A	MS495-63	562.50
57 – 75	7.5	15	25	25	60	75	4.63	A	MS495-75	600
70 – 90	10	20	30	30	75	100	4.63	A	MS495-90	615
80 – 100	10	25	40	40	75	100	4.63	A	MS495-100	690
<b>MS497</b>										
11 – 16	1	3	5	5	10	15	2.12	B	MS497-16	450
14 – 20	1.5	3	5	7.5	15	20	2.12	B	MS497-20	450
18 – 25	2	5	7.5	10	20	25	2.12	B	MS497-25	450
22 – 32	3	5	10	10	25	30	2.12	B	MS497-32	450
28 – 40	3	7.5	15	15	30	40	4.63	B	MS497-40	562.50
36 – 50	5	10	15	20	40	50	4.63	B	MS497-50	562.50
45 – 63	5	—	20	25	50	60	4.63	B	MS497-63	562.50
57 – 75	7.5	—	25	25	60	75	4.63	B	MS497-75	600
70 – 90	10	—	30	30	75	100	4.63	B	MS497-90	615
80 – 100	10	—	30	40	75	100	4.63	B	MS497-100	690
<b>MS451</b>										
11 – 16	1	3	5	5	10	15	2.12	B	MS451-16	450
14 – 20	1.5	3	5	7.5	15	20	2.12	B	MS451-20	450
18 – 25	2	5	7.5	10	20	25	2.12	B	MS451-25	450
22 – 32	3	5	10	10	25	30	2.12	B	MS451-32	450
28 – 40	3	7.5	15	15	30	40	2.12	B	MS451-40	510
36 – 45	5	7.5	15	15	30	40	2.12	B	MS451-45	510
40 – 50	5	10	15	20	40	50	2.12	B	MS451-50	510
<b>MS496</b>										
28 – 40	3	7.5	15	15	30	40	4.63	B	MS496-40	562.50
36 – 50	5	10	15	20	40	50	4.63	B	MS496-50	562.50
45 – 63	5	15	20	25	50	60	4.63	B	MS496-63	562.50
57 – 75	7.5	15	25	25	60	75	4.63	B	MS496-75	600
70 – 90	10	20	30	30	75	100	4.63	B	MS496-90	615
80 – 100 <sup>②</sup>	10	25	40	40	75	100	4.63	B	MS496-100	690

**Availability code**

- A – Standard item, stock to two weeks lead time
- B – Stock to four weeks lead time
- C – 4 to 6 weeks lead time

UL File # E167205

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

# Type MS450 – MS497 for UL 508 Type E Applications



MS450-16E



MS497-16E

## Manual motor starters

FLA adjustment range	Horsepower ratings						Weight (lbs)	Availability code	Catalog ③ number	List price		
	Single-phase①		Three-phase									
	115V	230V	200V – 208V	230V	460V	575V						
<b>MS450</b>	11 – 16	1	3	5	5	10	15	2.12	A	MS450-16E	\$ 525	
	14 – 20	1.5	3	5	7.5	15	20	2.12	A	MS450-20E	525	
	18 – 25	2	5	7.5	10	20	25	2.12	A	MS450-25E	525	
	22 – 32	3	5	10	10	25	30	2.12	A	MS450-32E	525	
	28 – 40	3	7.5	15	15	30	40	2.12	A	MS450-40E	585	
	36 – 45	5	7.5	15	15	30	40	2.12	A	MS450-45E	585	
	40 – 50	5	10	15	20	40	50	2.12	A	MS450-50E	585	
	<b>MS495</b>	28 – 40	3	7.5	15	15	30	40	4.63	A	MS495-40E	622.50
		36 – 50	5	10	15	20	40	50	4.63	A	MS495-50E	622.50
		45 – 63	5	15	20	25	50	60	4.63	A	MS495-63E	622.50
57 – 75		7.5	15	25	25	60	75	4.63	A	MS495-75E	720	
70 – 90		10	20	30	30	75	100	4.63	A	MS495-90E	735	
80 – 100		10	25	40	40	75	100	4.63	A	MS495-100E	810	
<b>MS497</b>	11 – 16	1	3	5	5	10	15	2.12	B	MS497-16E	570	
	14 – 20	1.5	3	5	7.5	15	20	2.12	B	MS497-20E	570	
	18 – 25	2	5	7.5	10	20	25	2.12	B	MS497-25E	570	
	22 – 32	3	5	10	10	25	30	2.12	B	MS497-32E	570	
	28 – 40	3	7.5	15	15	30	40	4.63	B	MS497-40E	622.50	
	36 – 50	5	10	15	20	40	50	4.63	B	MS497-50E	622.50	
	45 – 63	5	—	20	25	50	60	4.63	B	MS497-63E	622.50	
	57 – 75	7.5	—	25	25	60	75	4.63	B	MS497-75E	720	
	70 – 90	10	—	30	30	75	100	4.63	B	MS497-90E	735	
	80 – 100	10	—	30	40	75	100	4.63	B	MS497-100E	810	
<b>MS451</b>	11 – 16	1	3	5	5	10	15	2.12	B	MS451-16E	525	
	14 – 20	1.5	3	5	7.5	15	20	2.12	B	MS451-20E	525	
	18 – 25	2	5	7.5	10	20	25	2.12	B	MS451-25E	525	
	22 – 32	3	5	10	10	25	30	2.12	B	MS451-32E	525	
	28 – 40	3	7.5	15	15	30	40	2.12	B	MS451-40E	585	
	36 – 45	5	7.5	15	15	30	40	2.12	B	MS451-45E	585	
	40 – 50	5	10	15	20	40	50	2.12	B	MS451-50E	585	
	<b>MS496</b>	28 – 40	3	7.5	15	15	30	40	4.63	B	MS496-40E	622.50
		36 – 50	5	10	15	20	40	50	4.63	B	MS496-50E	622.50
		45 – 63	5	15	20	25	50	60	4.63	B	MS496-63E	622.50
57 – 75		7.5	15	25	25	60	75	4.63	B	MS496-75E	720	
70 – 90		10	20	30	30	75	100	4.63	B	MS496-90E	735	
80 – 100②		10	25	40	40	75	100	4.63	B	MS496-100E	810	

### Availability code

- A – Standard item, stock to two weeks lead time
- B – Stock to four weeks lead time
- C – 4 to 6 weeks lead time

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.

## Type MS450 – MS497 Accessories

5



HK4-11



HKS4-02



UA4-HK-220



AA4-24

### Auxiliary contacts — top mount

Item description	Weight (lbs)	Packaged in quantity of	Availability code	Catalog number	List price
1 N.O. + 1 N.C. 1 changeover	.044 .044	10 10	A B	HK4-11 HK-W	<b>\$ 36</b>

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

Item description	Weight (lbs)	Packaged in quantity of	Availability code	Catalog number	List price
1 N.O. + 1 N.C.	.066	2	A	HKS4-11	<b>\$ 36</b>
2 N.O.	.066	2	B	HKS4-20	
2 N.C.	.066	2	B	HKS4-02	

### Auxiliary release

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

Item description	Rating	Weight (lbs)	Pkg. qty.	Avail. code	Catalog number	List price	
Undervoltage release	110–120V, 50–60Hz	.264	1	A	UA4-120	<b>\$ 93</b>	
	208V, 60Hz	.264	1	A	UA4-208		
	230–240V, 50–60Hz	.264	1	A	UA4-240		
	400V, 50Hz	.264	1	B	UA4-400		
	480V, 60Hz	.264	1	A	UA4-480		
Undervoltage release with early make contacts 2 N.O.	230V, 50Hz	.286	1	B	UA4-HK-230	<b>117</b>	
	400V, 50Hz	.286	1	B	UA4-HK-400		
	480V, 60Hz	.286	1	A	UA4-HK-480		
Shunt trip	Voltage continuous 50 – 60Hz					<b>93</b>	
	20 – 24	20 – 70V	.242	1	B		AA4-24
	30 – 110	70 – 190V	.242	1	A		AA4-110
	210 – 240	190 – 330V	.242	1	B		AA4-240
	350 – 415	330 – 500V	.242	1	B		AA4-415

### Power feed terminal blocks — for MS45X

Item description	Catalog number	List price
For feeding power to multiple MS45Xs when using busbar Accepts 10 - 1/0 AWG, 108A	S4-M1	<b>\$ 81</b>

### Busbars – for MS45X

Item description	Catalog number	List price
Without side mounted auxiliary devices	PS4-2-0	<b>\$ 51</b>
	PS4-3-0	<b>60</b>
	PS4-4-0	<b>76.50</b>
With one side mounted auxiliary device	PS4-2-2	<b>58.50</b>
	PS4-3-2	<b>60</b>
	PS4-4-2	<b>84</b>

### Close coupling adapters

Item description	Catalog number	List price
MS45X + A30, A40	BEA40/450	<b>\$ 54</b>
MS45X + A50	BEA50/450	<b>63</b>
MS49X + A50, A63, A75	BEA75/495	<b>120</b>
MS495 + A95, A110	BEA110/495	<b>180</b>

① Mounting sequence: motor protection switch, pilot switch, auxiliary switch.

# Type MS450 – MS497 Accessories



KA450



SA450



DX495



SK4-11

### Terminal shrouds

Item description	Weight (lbs)	Packaged in quantity of	Availability code	Catalog number	List price
for MS45x	.022	1	A	KA450 ①	\$ 15
for MX49x	.022	1	A	KA495 ①	18
for MS49x	.066	1	A	KA495C ②	21

### FLA adjustment cover

Item description	Weight (lbs)	Packaged in quantity of	Availability code	Catalog number	List price
for MS45x	.015	10	A	SA450 ③	\$ 30

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

Item description	Weight (lbs)	Packaged in quantity of	Availability code	Catalog number	List price
for MS49x	.550	1	B	DX495	\$ 45

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

Item description	Weight (lbs)	Packaged in quantity of	Availability code	Catalog number	List price
Short circuit trip 1 N.O. + 1 N.C.	.154	1	A	SK4-11	\$ 60

### Selector handles — for thru the door operation for Types MS450 & MS451<sup>④</sup>

Item description	Catalog number	List price
Shaft coupler	MSMN	\$ 15
NEMA 1, 3R, 12 black selector handle	OHB2AJ	30
NEMA 1, 3R, 12 red/yellow selector handle	OHY2AJ	30
4.1" length shaft	OXS5X105	4
7.1" length shaft	OXS5X180	6

① Plug onto box terminals in each case.  
 ② Plug onto housing after removing box terminals, if using cable lugs or buses.  
 ③ Supplied only as a set of 10 scale covers.  
 ④ Must have shaft coupler, handle and shaft for through-the-door operation.

## Technical data

### Type MS325

### Short circuit ratings

#### Short circuit ratings – MS325

Range	Short Circuit rating kA, 600VAC	Maximum Fuse size A
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 Current range	5 kA		30 kA		50 kA		85kA
	Fuse A	MCCB	Fuse A	MCCB	Fuse A	MCCB	Fuse A
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	—

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 MS325

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

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$																																																																																																																					
		at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC																																																																																																													
from	to	$I_{cs}$ 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																																																																																																												
A	A	Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)																																																																																																																					
Setting ranges	0.1 ... 0.16 to 1.0 ... 1.6	<p>Short-circuit proof</p> <p>No back-up fuse required up to <math>I_{cc} = 100</math> kA</p> <table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td>60</td><td>35 / 40</td><td>40</td><td>25</td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td>70</td><td>50</td><td>40</td><td>50</td><td>7</td><td>40</td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td>50</td><td>80</td><td>30</td><td>80</td><td>5</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td>45</td><td>80</td><td>27</td><td>80</td><td>4.5</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td>75</td><td>80</td><td>40</td><td>100</td><td>25</td><td>100</td><td>4</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td>60</td><td>100</td><td>35</td><td>100</td><td>22</td><td>100</td><td>3.5</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td>55</td><td>100</td><td>30</td><td>125</td><td>20</td><td>125</td><td>3</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td>50</td><td>125</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>																												60	35 / 40	40	25							70	50	40	50	7	40							50	80	30	80	5	50							45	80	27	80	4.5	50					75	80	40	100	25	100	4	50					60	100	35	100	22	100	3.5	50					55	100	30	125	20	125	3	50					50	125								
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	20.0 ... 25.0																																																																																																																						

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

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$																																																																																																									
		at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC																																																																																																	
from	to	$I_{cs}$ 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																																																																																																
A	A	Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)																																																																																																									
Setting ranges	0.1 ... 0.16 to 1.0 ... 1.6	<p>Short-circuit proof</p> <p>No back-up fuse required up to <math>I_{cc} = 50</math> kA</p> <table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td>60</td><td>35 / 40</td><td>10</td><td>40</td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td>40</td><td>50</td><td>7</td><td>40</td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td>30</td><td>80</td><td>5</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td>45</td><td>80</td><td>27</td><td>80</td><td>4.5</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td>40</td><td>100</td><td>25</td><td>100</td><td>25</td><td>100</td><td>4</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td>35</td><td>100</td><td>22</td><td>100</td><td>22</td><td>100</td><td>3.5</td><td>50</td><td></td><td></td> </tr> <tr> <td></td><td></td><td>30</td><td>125</td><td>20</td><td>125</td><td>20</td><td>125</td><td>3</td><td>50</td><td></td><td></td> </tr> </table>																												60	35 / 40	10	40									40	50	7	40									30	80	5	50							45	80	27	80	4.5	50					40	100	25	100	25	100	4	50					35	100	22	100	22	100	3.5	50					30	125	20	125	20	125	3	50		
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$I_{cs}$  = 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

### Type MS325, MS45x, MS49x

Device type		MS325	MS450	MS451	MS495	MS496	MS497
Standards, approvals		UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE	UL, CSA, CE
Rated operating current	A	25	50	50	100	100	100
Current range	A	0.10 - 25	11 - 50	11 - 50	40 - 100	28 - 100	11 - 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	20	10	20	10
Max. kAIC & 600V	kAIC	50	50	50	50	100	100
Mechanical life	Operations	100,000	50,000	50,000	50,000	50,000	50,000
Wire range	AWG	14-8	2x18-3x18-2	2x18-3x18.2	2x10-1/0; 1x10-2/0	2x10-1/0; 1x10-2/0	2x10-1/0; 1x10-2/0
Terminal torque	in. lbs	14	27 - 40	27 - 40	35 - 53	35 - 53	35 - 53
Terminal tool options		flat screwdriver PZ2	flat screwdriver PZ2	flat screwdriver PZ2	hex allen 4mm	hex allen 4mm	hex allen 4mm
Permissible altitude without derating	m	3000	2000	2000	2000	2000	2000
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20
UL Listed for group installation		Yes	Yes	Yes	Yes	Yes	Yes
Self-protected Type E manual combination starter		No	Yes	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	No	No	No
Through door handle		Yes	Yes	Yes	No	No	No

# Technical data

## Type MS325, MS45x, MS49x

Manual motor starter type	MS325	MS450/451	MS495/496/497
<b>Auxiliary circuits</b>			
Load rating of the auxiliary circuits			
Minimum load at:			5 mA at 17 VDC
24 VDC mA	5		—
12 VDC mA	10		—
Rated operating at AC 15 to 24 VAC A	2.5		—
current $I_e$			3 / 0.5 / 6
230 VAC A	2		1.5 / — / 3
400 VAC A	1		①②
Rated operating at DC 13 to 24 VDC A	2.5		— / — / —
current $I_e$			— / 0.15 / —
60 VDC A	2.5		0.22 / — / 0.5
110 VDC A	0.6		0.1 / — / 0.25
220 VDC A	0.25		— / — 0.1
440 VDC A	—		—
Short circuit protection			
back up fuse			
gL A	10		gL / gG 10 A
aM A	6		—
<b>Release</b>			
Device for phase failure protection	With		With
Electromagnetic trips			
Response value set ex-works	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
Drop-out value	% of $U_c$	35 – 75	35 – 70
Power consumption - Pick-up	VA	0.9	20.2
Power consumption - Hold	VA	0.9	7.2
Open circuit shunt release			
Pick-up value	% of $U_c$	≥ 85	≥ 70
Relative duty consumption	% ED	—	100 at voltages 50 / 60 Hz to Power
Pick-up	VA	110 - 240V: 13 - 61 ③	Consult factory
Hold	VA	—	Consult factory

① Correction factors for other frequencies on request.

② On front side 1 chageover contact / on front side 1 NO + 1 NC / at side, 1 NO + 1 NC, 2 NO, 2 NC

③ 24 - 60V: 14.4 - 90vA

# Technical data

## Short circuit protection

### Type MS450/451, MS495,6,7

#### 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

#### Short-circuit protection MS497 — 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	15	30	80	7	15	63	7	15	63
14 ... 20				25	50	100	15	30	80	7	15	63	7	15	63
18 ... 25				25	50	100	15	30	80	7	15	63	7	15	63
22 ... 32				25	50	125	11	22	100	7	15	63	7	15	63
28 ... 40				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

$I_{cs}$  = Rated service short-circuit breaking capacity,  $I_{cu}$  = Rated ultimate short-circuit breaking capacity  $I_{cc}$  = pProspective short-circuit current at installation location.

# Technical data

## IEC coordination tables

### Coordination tables

The tables below show the MS 325 manual motor starter and DLA starter combinations according to the type of coordination and motor current.

Motor power AC-3 and rated current three-phase cage motor, 1500 rpm		MS 325 manual motor starter		DLA starter type (120V coil shown)	WLA starter type (120V coil shown)	Copper cable	Max. authorized current for combination
380 V 400 V kW	A	Type	Setting range			Minimum cross- section mm <sup>2</sup>	A
<b>Coordination type I, 400 V – 50 Hz, 50 kA, normal starting</b>							
0.37	1.2	MS 325 – 1.6	1.0 – 1.6	DLA9-30-84	WLA9-30-84	1.5	1.6
0.55	1.5	MS 325 – 1.6	1.0 – 1.6	DLA9-30-84	WLA9-30-84	1.5	1.6
0.75	2	MS 325 – 2.5	1.6 – 2.5	DLA9-30-84	WLA9-30-84	1.5	2.5
1.1	2.6	MS 325 – 4	2.5 – 4.0	DLA9-30-84	WLA9-30-84	1.5	4
1.5	3.5	MS 325 – 4	2.5 – 4.0	DLA9-30-84	WLA9-30-84	1.5	4
2.2	5	MS 325 – 6.3	4.0 – 6.3	DLA9-30-84	WLA9-30-84	1.5	6.3
3	6.6	MS 325 – 9	6.3 – 9.0	DLA9-30-84	WLA9-30-84	1.5	9
4	8.5	MS 325 – 9	6.3 – 9.0	DLA9-30-84	WLA9-30-84	1.5	9
5.5	11.5	MS 325 – 12.5	9.0 – 12.5	DLA12-30-84	WLA12-30-84	1.5	12
7.5	15.2	MS 325 – 16	12.5 – 16.0	DLA16-30-84	WLA16-30-84	2.5	16
11	22	MS 325 – 25	16.0 – 25.0	DLA26-30-84	WLA26-30-84	2.5	25

\* Ambient temperature ≤ 30 °C

<b>Coordination type II, 400 V – 50 Hz, 25 kA, normal starting</b>							
0.37	1.2	MS 325 – 1.6	1.0 – 1.6	DLA9-30-84	WLA9-30-84	1.5	1.6
0.55	1.5	MS 325 – 1.6	1.0 – 1.6	DLA9-30-84	WLA9-30-84	1.5	1.6
0.75	2	MS 325 – 2.5	1.6 – 2.5	DLA9-30-84	WLA9-30-84	1.5	2.5
1.1	2.6	MS 325 – 4	2.5 – 4.0	DLA12-30-84	WLA12-30-84	1.5	4
1.5	3.5	MS 325 – 4	2.5 – 4.0	DLA26-30-84	WLA26-30-84	1.5	4
2.2	5	MS 325 – 6.3	4.0 – 6.3	DLA26-30-84	WLA26-30-84	1.5	6.3
3	6.6	MS 325 – 9	6.3 – 9.0	DLA26-30-84	WLA26-30-84	1.5	9
4	8.5	MS 325 – 9	6.3 – 9.0	DLA26-30-84	WLA26-30-84	1.5	9
5.5	11.5	MS 325 – 12.5	9.0 – 12.5	DLA26-30-84	WLA26-30-84	1.5	12.5
7.5	15.2	MS 325 – 16	12.5 – 16.0	DLA26-30-84	WLA26-30-84	2.5	16
11	22	MS 325 – 25	16.0 – 25.0	DLA26-30-84	WLA26-30-84	2.5	25

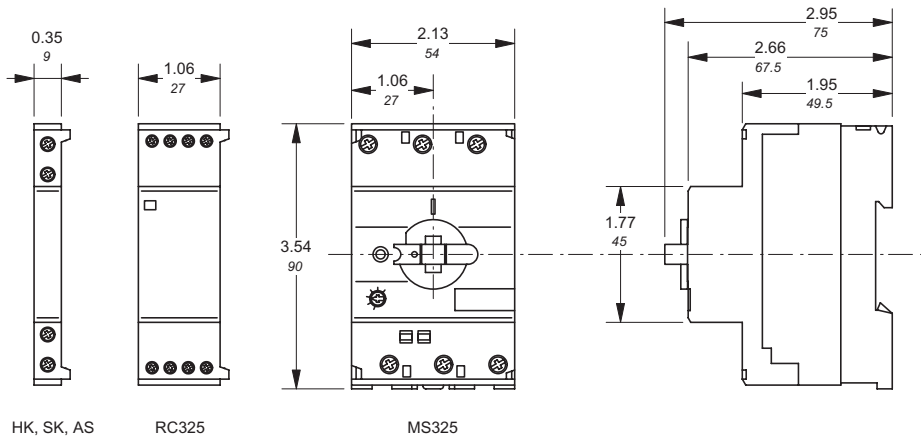
\* Ambient temperature ≤ 30 °C

# Approximate dimensions MS325

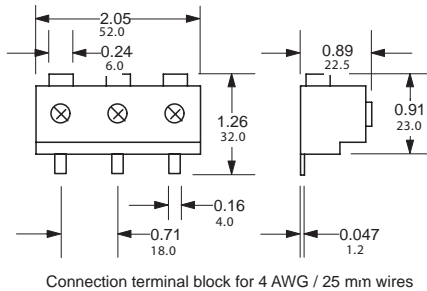
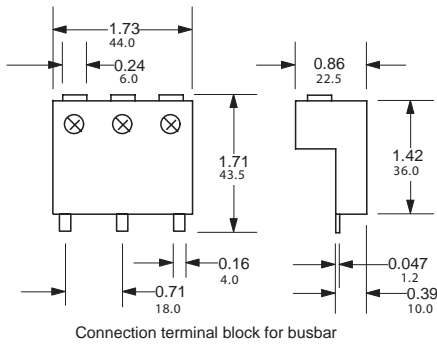
00.00 Inches  
00.00 [Millimeters]

## MS325

5



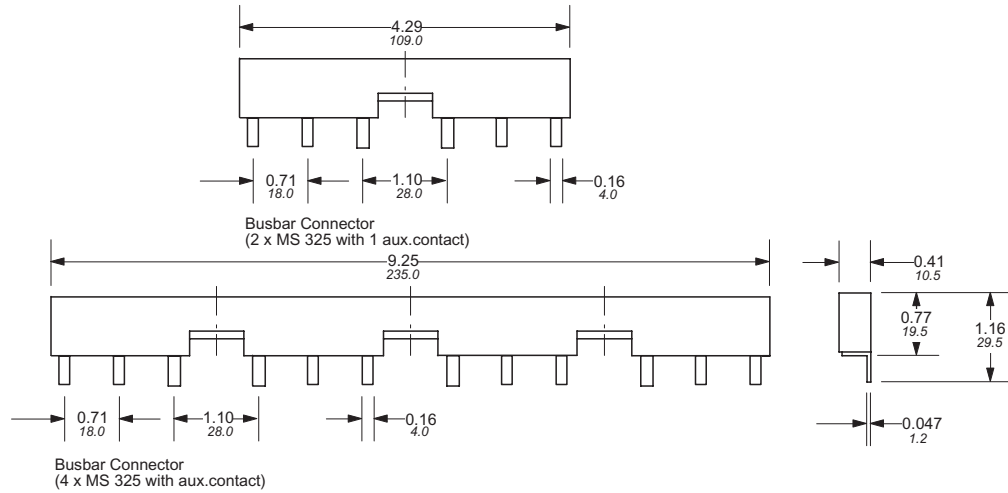
## Power feed terminal blocks for MS325



## Approximate dimensions Accessories for MS325

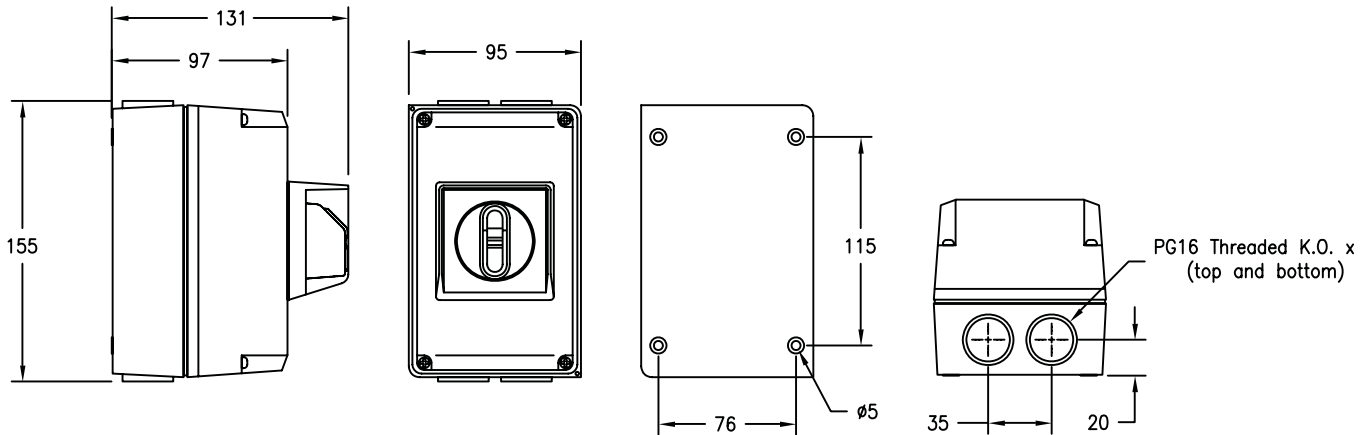
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00.00 [Millimeters]

### Busbar connectors for MS325

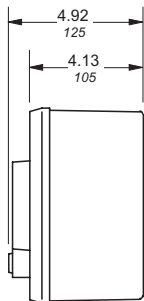


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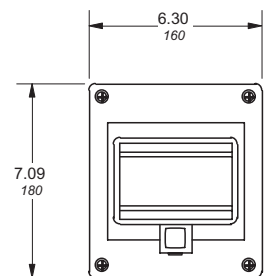
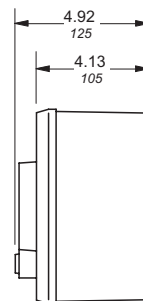
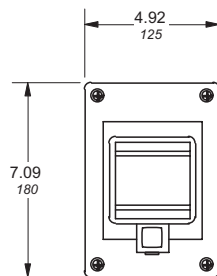
### Molded plastic enclosures for MS325 OTPA325B2P1 and OTPA325A2P1



### 12644



### 12646



# Approximate dimensions

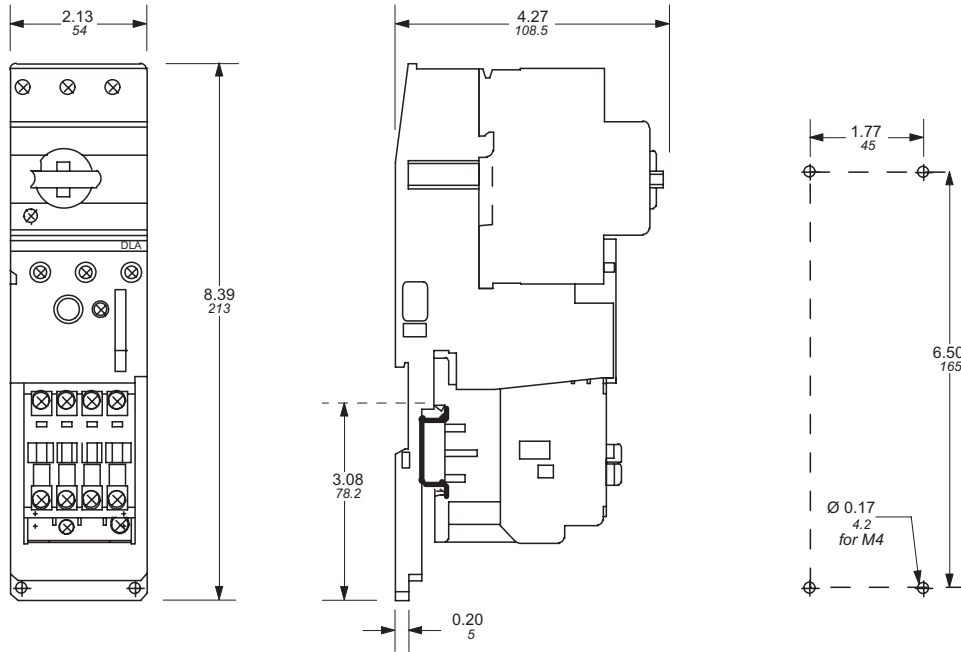
## Accessories for MS325

### DLA9 – DLA26

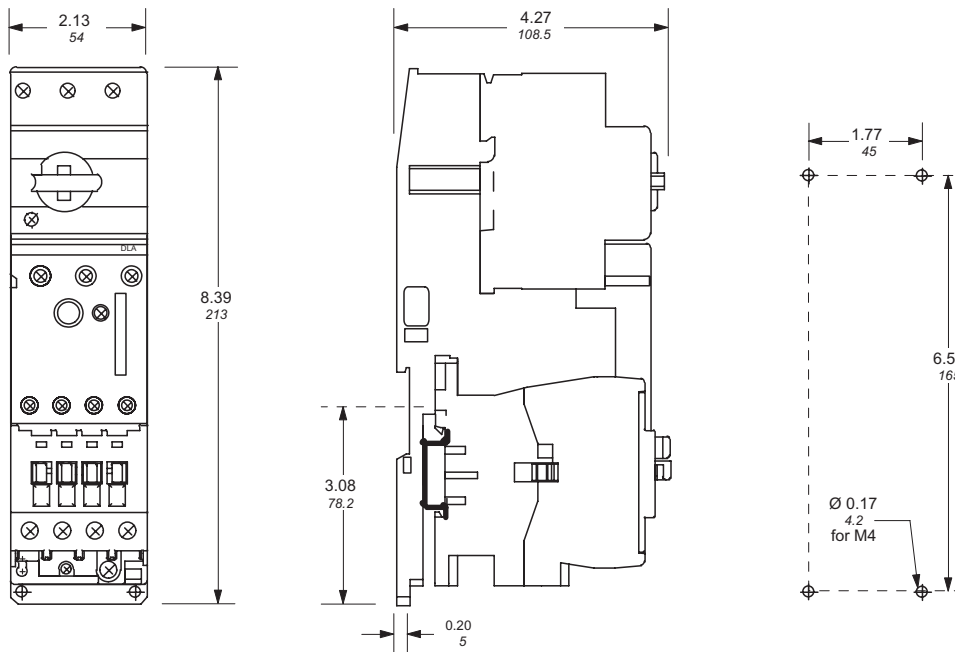
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#### DLA9 – DLA16

5



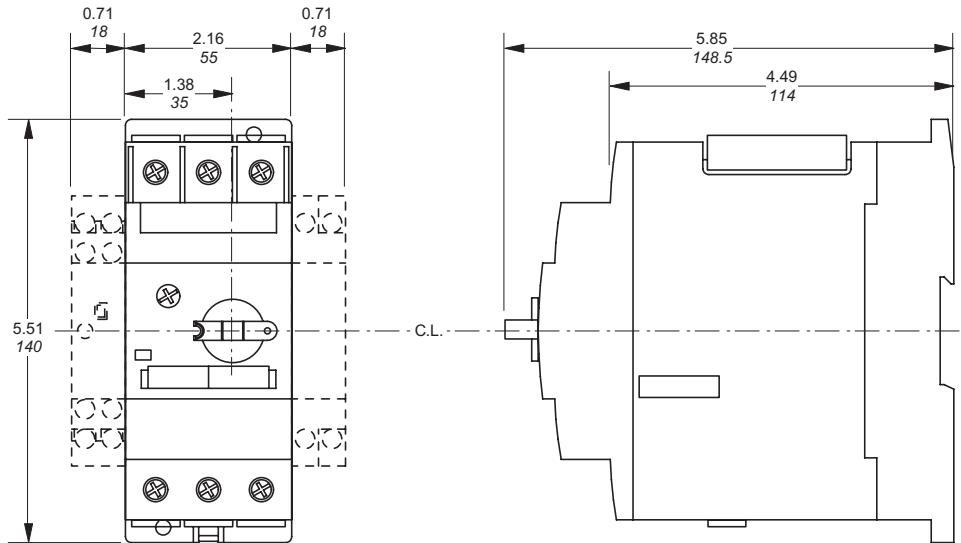
#### DLA26



# Approximate dimensions MS450 & MS490

00.00    Inches  
00.00    [Millimeters]

## MS450



5

## MS490

