Technical Catalogue

Manual Motor Starters
MS116, MS325, MS4xx

ABB

Manual Motor Starters
Type Series M up to 45 kW (400 V AC)

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Manual Motor Starters and Motor Starter Combinations

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

Thus, ABB‘s manual motor starter 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:

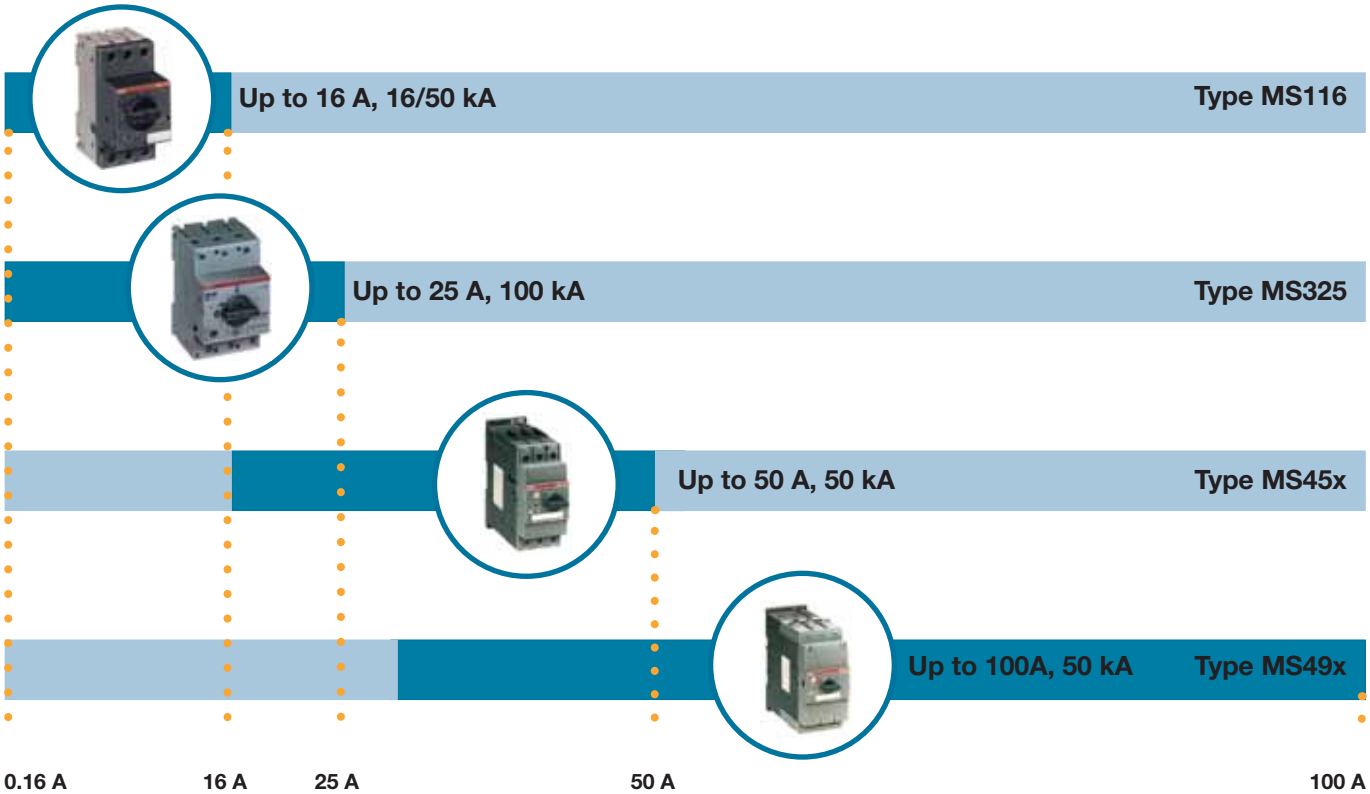
- General engineering and plants
- Industries
- Conveyor systems
- Chemical industries including process engineering
- Pharmaceutical industries
- Automation of buildings, e. g. in air-conditionings
- Environmental plants
- Power stations
- Fresh water and sewage plants
- Machine tools

Manual motor starters 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 protection solution.

Switching capabilities of ABB‘s manual motor starters



Manual Motor Starters from ABB

ABB offers a wide range of a manual motor starters providing highly efficient motor protection up to 100 A.
The arc breaking capacity of the devices can reach up to 100 kA depending of the motor starter type used, without the necessity for any special upstream protection.

Thanks to its design MS116/325 are suitable for industrial applicatons as well as for domestic installations.

The device-types MS116/325 can be easily coordinated with the ABB MCB-system, which is used in installations for touch-proved enclosures and panels.
MS450 to MS497 are your best choice for high power applications. These models are used to power up large motors up to 45 kW.

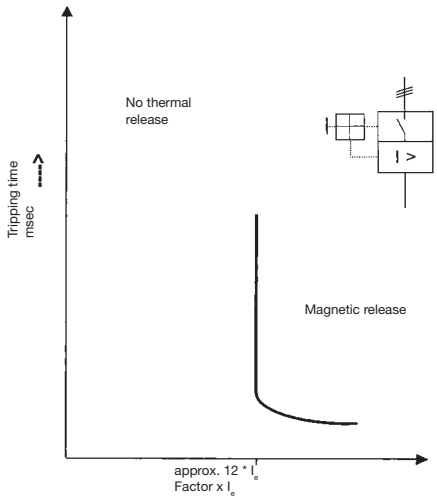
Technical Data, Overview_

Motorstarter type	MS116	MS325	MS45x	MS49x
I_e/A	16	25	50	100
I_{CS}/kA	16/30/50	50/100	25/50	25/50/100
Tripping class	10	10	10,20	10,20
Magnetic type only		●	●	●
Disconnect Capability, ref. IEC 60947-1	●	●	●	●
UL 508 type E		●	●	●

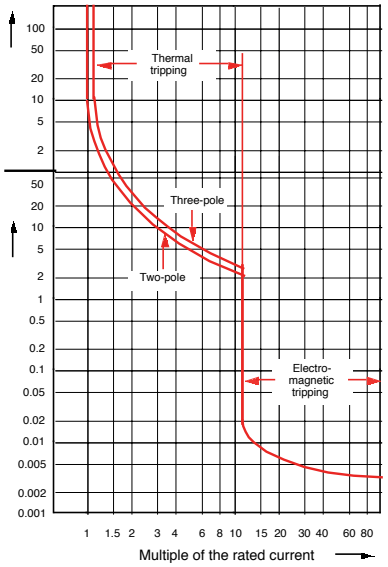
The types MS325 have the lowest “energy let through”-values on the market in case of short circuits.
This way cables and the wiring are also protected optimally, providing for even higher safety.

Manual motor starters 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.

MO-types



MSx Tripping curves



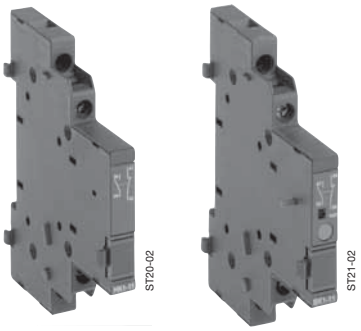
Manual Motor Starter MS116

Accessories

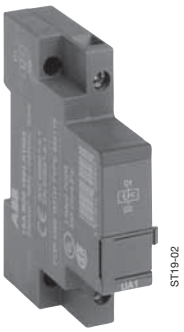
Ordering details

MS116

HKF1-11



HK1 SK1



UA1

Padlock + 2 keys + lock adapter

Direct adapter

Type	Setting range A...A	Order code	Weight/ piece kg	Packing Unit piece
MS116 with thermal and electromagnetic trips, short-circuit-proof up to 50 kA				
MS116 - 0.16	0.10 ... 0.16	**1SAM 250 000 R1001**	0.268	1
MS116 - 0.25	0.16 ... 0.25	**1SAM 250 000 R1002**	0.268	1
MS116 - 0.4	0.25 ... 0.40	**1SAM 250 000 R1003**	0.268	1
MS116 - 0.63	0.40 ... 0.63	**1SAM 250 000 R1004**	0.268	1
MS116 - 1.0	0.63 ... 1.00	**1SAM 250 000 R1005**	0.268	1
MS116 - 1.6	1.00 ... 1.60	**1SAM 250 000 R1006**	0.268	1
MS116 - 2.5	1.60 ... 2.50	**1SAM 250 000 R1007**	0.268	1
MS116 - 4	2.50 ... 4.00	**1SAM 250 000 R1008**	0.268	1
MS116 - 6.3	4.00 ... 6.30	**1SAM 250 000 R1009**	0.268	1
MS116 - 10.0	6.30 ... 10.00	**1SAM 250 000 R1010**	0.268	1
MS116 - 12.0	8.00 ... 12.00	**1SAM 250 000 R1012**	0.268	1
MS116 - 16.0	10.00 ... 16.00	**1SAM 250 000 R1011**	0.268	1

Accessories

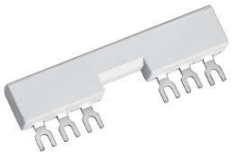
Type		Order code		Packing Unit piece
Auxillary switches, for front mounting ①				
HKF1-11	1 NO + 1 NC	**1SAM 201 901 R1001**		10
Auxillary switches with lead contacts, also to use with undervoltage release				
HK1-20L	2 NO lead contacts	**1SAM 201 902 R1004**		2
Auxiliary switches, lateral attechment at right				
HK1-11	1 NO + 1 NC	**1SAM 201 902 R1001**		2
HK1-20	2 NO	**1SAM 201 902 R1002**		2
HK1-02	2 NC	**1SAM 201 902 R1003**		2
Shunt release, lateral mounting at the left side				
AA1-24	24 V, 50/60 Hz	**1SAM 201 910 R1001**		1
AA1-110	110 V, 50/60 Hz	**1SAM 201 910 R1002**		1
AA1-230	200-240 V, 50/60 Hz	**1SAM 201 910 R1003**		1
AA1-400	350-415 V, 50/60 Hz	**1SAM 201 910 R1004**		1
Signal switch for general "tripped" signal, lateral attachment at right				
SK1-11	1 NO + 1 NC	**1SAM 201 903 R1001**		2
SK1-20	2 NO	**1SAM 201 903 R1002**		2
SK1-02	2 NC	**1SAM 201 903 R1003**		2
Undervoltage release, lateral attachment at left				
UA1-24	24 V, 50 Hz	**1SAM 201 904 R1001**		1
UA1-48	48 V, 50 Hz	**1SAM 201 904 R1002**		1
UA1-60	60 V, 50 Hz	**1SAM 201 904 R1003**		1
UA1-120	110 V 50 Hz/120 V 60 Hz	**1SAM 201 904 R1004**		1
UA1-208	208 V, 60 Hz	**1SAM 201 404 R1008**		1
UA1-230	230 V 50 Hz/240 V 60 Hz	**1SAM 201 904 R1005**		1
UA1-400	400 V, 50 Hz	**1SAM 201 904 R1006**		1
UA1-415	415 V 50 Hz/480 V 60 Hz	**1SAM 201 904 R1007**		1
Locking device (see also MS325, Page 9)				
SA1	lock adapter	**GJF1 101 903 R0001**		1
SA2	padlock + 2 keys	**GJF1 101 903 R0002**		1
SA3	lock adapter + padlock + 2 keys	**GJF1 101 903 R0003**		1
FC116	fixing clip for screw mounting	**1SAM 201 909 R1001**		
Direct adapter, for wiring to contactors				
BEA7/116	mini contactors B6/B7	**1SBN 080 906 R1000**		1
BEA16/116	contactors A9/A12/A16	**1SBN 081 406 R1000**		1
BEA26/116	contactors A26	**1SBN 082 406 R1000**		1

① Not suitable for panel mounting

Manual Motor Starter MS116

Accessories

Ordering details



Phase buses PS1-2-1

Phase buses PS1-4-1

Power infeed block S1-M1

Power infeed block S1-M2

Insulating enclosure IP55

Insulating enclosure IP65

Plastic enclosure IP40

Accessories

Type	Order cod		Packing Unit/piece	Price
Phase buses for cross wiring MS116, 63 A, 690 V				
PS1-2-0, for 2 devices without auxiliary switches	**1SAM 201 906 R1002**		10	
PS1-3-0, for 3 devices without auxiliary switches	**1SAM 201 906 R1003**		10	
PS1-4-0, for 4 devices without auxiliary switches	**1SAM 201 906 R1004**		10	
PS1-5-0, for 5 devices without auxiliary switches	**1SAM 201 906 R1005**		10	
PS1-2-1, for 2 devices with 1 auxiliary switch	**1SAM 201 906 R1012**		10	
PS1-3-1, for 3 devices with 1 auxiliary switch	**1SAM 201 906 R1013**		10	
PS1-4-1, for 4 devices with 1 auxiliary switch	**1SAM 201 906 R1014**		10	
PS1-5-1, for 5 devices with 1 auxiliary switch	**1SAM 201 906 R1015**		10	
PS1-2-2, for 2 devices with 2 auxiliary switches	**1SAM 201 906 R1022**		10	
PS1-3-2, for 3 devices with 2 auxiliary switches	**1SAM 201 906 R1023**		10	
PS1-4-2, for 4 devices with 2 auxiliary switches	**1SAM 201 906 R1024**		10	
PS1-5-2, for 5 devices with 2 auxiliary switches	**1SAM 201 906 R1025**		10	
Power infeed blocks, 63 A, 690 V, stranded 25 mm², flexible 16 mm²				
S1-M1, flat	**1SAM 201 907 R1001**		10	
S1-M2, high	**1SAM 201 907 R1002**		10	
Cover for phase busses				
BS1-3	**1SAM 201 908 R1001**		50	
Insulating enclosure IP65, with rotary handle, triple lockable in Off position, with N- und PE-terminal, for Manual Motor Starter				
IB116-G, Twist knob black	**1SAM 201 911 R1000**		1	
IB116-Y, Twist knob red/yellow	**1SAM 201 911 R1001**		1	
Insulating enclosure, light grey IP55 with cover, including DIN rail for manual motor starter or line protection devices				
QES4/3N, for 4 modules, 72 mm	**GHL 111 2304 R0013**			
QES6/3N, for 6 modules, 108 mm	**GHL 111 2306 R0013**			
QES10/3N, for 10 modules, 180 mm	**GHL 111 2310 R0013**			
Set of neutral and earth terminals				
SMO4, for QES 4/3 N	**GHL 430 1910 R0004**			
SMO6, for QES 6/3 N	**GHL 430 1910 R0006**			
SMO10, for QES 10/3 N	**GHL 430 1910 R0010**			
Plastic enclosure, light grey, IP40 in panel design, including DIN rail				
PCD4N, for 4 modules, 72 mm	**GHS 270 1921 R0004**			
PCD6N, for 6 modules, 108 mm	**GHS 270 1921 R0006**			
PCD8N, for 8 modules, 144 mm	**GHS 270 1921 R0008**			
Switch cubicle mounting kit IP65, with axial extension triple lockable in Off position, locked in On position				
OHB2AJM, Twist knob black	**1SCA 022 384 R6940**		1	
OHY2AJM, Twist knob red/yellow	**1SCA 022 384 R7080**		1	
OXS5X85, axis 85 mm	**1SCA 022 347 R3570**		1	
OXS5X105, axis 105 mm	**1SCA 022 347 R3650**		1	
OXS5X130, axis 130 mm	**1SCA 022 353 R4540**		1	
OXS5X180, axis 180 mm	**1SCA 022 353 R4620**		1	
MSMN, driver ①	**1SAM 101 923 R0001**		1	
MSOX, driver spindle 32 mm ②	**1SAM 101 924 R0001**		1	
Door mounting kit IP65, Lockable in Off-position				
DMS116-G, Twist knob black	**1SAM 201 912 R1000**		1	
DMS116-Y, Twist knob red/yellow	**1SAM 201 912 R1001**		1	

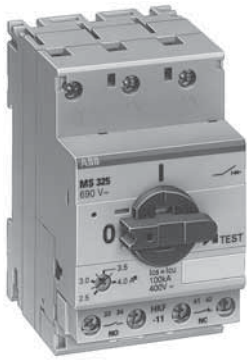
① For accommodating spindle and attachment to manual motor starter
② Is srewed directly onto the manual motor starter

Manual Motor Starter MS325

Ordering details

SST01497

MS325



SST 02899

MS325 with
auxiliary contacts HKF-11
front mounting

2CDC 241 008 F004

2CDC 241 004 F004

Type	Setting range A...A	Order code	Weight/ piece kg	Packing Unit piece	Price
MS325 with thermal and electromagnetic trips, short-circuit-proof up to 100 kA					
MS325 – 0.16	0.10 ... 0.16	**1SAM 150 000 R1001**	0.347	1	
MS325 – 0.25	0.16 ... 0.25	**1SAM 150 000 R1002**	0.347	1	
MS325 – 0.4	0.25 ... 0.40	**1SAM 150 000 R1003**	0.347	1	
MS325 – 0.63	0.40 ... 0.63	**1SAM 150 000 R1004**	0.347	1	
MS325 – 1	0.63 ... 1.00	**1SAM 150 000 R1005**	0.347	1	
MS325 – 1.6	1.00 ... 1.60	**1SAM 150 000 R1006**	0.347	1	
MS325 – 2.5	1.60 ... 2.50	**1SAM 150 000 R1007**	0.347	1	
MS325 – 4	2.50 ... 4.00	**1SAM 150 000 R1008**	0.347	1	
MS325 – 6.3	4.00 ... 6.30	**1SAM 150 000 R1009**	0.347	1	
MS325 – 9	6.30 ... 9.00	**1SAM 150 000 R1010**	0.347	1	
MS325 – 12.5	9.00 ... 12.50	**1SAM 150 000 R1011**	0.347	1	
MS325 – 16	12.50 ... 16.00	**1SAM 150 000 R1012**	0.347	1	
MS325 – 20	16.00 ... 20.00	**1SAM 150 000 R1013**	0.347	1	
MS325 – 25	20.00 ... 25.00	**1SAM 150 000 R1014**	0.347	1	
MS325 with thermal and electromagnetic trips, short-circuit-proof up to 100 kA, with auxiliary switch 1 NO + 1 NC front mounted					
MS325 – 0.16	0.10 ... 0.16	**1SAM 150 005 R0001**	0.359	1	
MS325 – 0.25	0.16 ... 0.25	**1SAM 150 005 R0002**	0.359	1	
MS325 – 0.4	0.25 ... 0.40	**1SAM 150 005 R0003**	0.359	1	
MS325 – 0.63	0.40 ... 0.63	**1SAM 150 005 R0004**	0.359	1	
MS325 – 1	0.63 ... 1.00	**1SAM 150 005 R0005**	0.359	1	
MS325 – 1.6	1.00 ... 1.60	**1SAM 150 005 R0006**	0.359	1	
MS325 – 2.5	1.60 ... 2.50	**1SAM 150 005 R0007**	0.359	1	
MS325 – 4	2.50 ... 4.00	**1SAM 150 005 R0008**	0.359	1	
MS325 – 6.3	4.00 ... 6.30	**1SAM 150 005 R0009**	0.359	1	
MS325 – 9	6.30 ... 9.00	**1SAM 150 005 R0010**	0.359	1	
MS325 – 12.5	9.00 ... 12.50	**1SAM 150 005 R0011**	0.359	1	
MS325 – 16	12.50 ... 16.00	**1SAM 150 005 R0012**	0.359	1	
MS325 – 20	16.00 ... 20.00	**1SAM 150 005 R0013**	0.359	1	
MS325 – 25	20.00 ... 25.00	**1SAM 150 005 R0014**	0.359	1	
UL 508 Type E Accessories					
S3-M3	High insulation infeed block	**1SAM 101 938 R0004**	0.030	1	
Signal switch for short circuit tripping, lateral attachment at right					
CK-11	1 NO + 1 NC	**1SAM 101 943 R0001**	0.030	2	

Manual Motor Starters MS325

Accessories

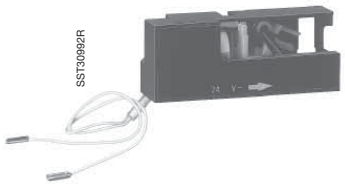
Ordering details

HKF

AS

HK

SK



UA for power in feed at top, AA

UA for power in feed at bottom

Padlock + 2 keys + lock adapter

Retrofittable accessories

These parts can be procured in addition to the **MS325**; they must be installed by the user.

Type	Setting range	Order code	Weight/ piece kg	Packing Unit piece	Price
Auxiliary switches, for front mounting ①					
HKF-11	1 NO + 1 NC	**1SAM 101 928 R0001**	0.020	10	
HKF-20	2 NO	**1SAM 101 928 R0002**	0.020	10	
Auxiliary switches, lateral attachment at left, max. 2 pieces attachable ② ③					
HK-11	1 NO + 1 NC	**1SAM 101 901 R0001**	0.031	2	
HK-20	2 NO ④	**1SAM 101 901 R0002**	0.031	2	
HK-02	2 NC	**1SAM 101 901R0003**	0.031	2	
Signal contact for general "tripped" signal, lateral attachment at the left max. 1 piece attachable					
SK-11	1 NO + 1 NC	**1SAM 101 904 R0003**	0.031	2	
Undervoltage release, slide-in ⑤					
UA, power infeed at **bottom**, ⑥ U_c 400 V~		**1SAM 101 902 R0400**	0.0210		
UAF, power infeed at top, resp. connection U_c of external voltage	24 V~	**1SAM 101 903 R0024**	0.0210		
	48 V~	**1SAM 101 903 R0048**	0.0210		
	60 V~	**1SAM 101 903 R0060**	0.0210		
	110 V~	**1SAM 101 903 R0110**	0.0210		
	230 V~	**1SAM 101 903 R0230**	0.0210		
	400 V~	**1SAM 101 903 R0400**	0.0210		
	415 V~	**1SAM 101 903 R0415**	0.0210		
	500 V~	**1SAM 101 903 R0500**	0.0210		
Open circuit shunt release, slide-in ⑦					
AA	24 ... 60 V AC/DC	**1SAM 101 909 R0001**	0.02	10	
AA	110... 240 V AC/DC	**1SAM 101 909 R0002**	0.02	10	
Terminal support, lateral attachment at left to MS325, HK and SK					
AS, for UA, AA or as N/LS terminal		**1SAM 101 905 R0001**	0.031	10	
Locking device for MS325					
SA1, lock adapter		**GJF1 101 903 R0001**	0.004	10	
SA2, padlock + 2 keys		**GJF1 101 903 R0002**	0.004	10	
SA3, lock adapter + padlock + 2 keys		**GJF1 101 903 R0003**	0.050	1	
Printadapter, for soldering on electronic plates					
PA25, for MS325 and 2 aux. contacts		**1SAM 101 933 R0001**	0.030	1 kit	

① Not simultaneously with UA/UA and AA, not suitable for distributor installation

② Max. 1 piece in conjunction with SK. SK must be mounted on first position

③ Pre-mating normally open contacts

④ Can be used together with UAF (power infeed at top) for safety circuit with Emergency Stop button (further information available on request)

⑤ Other voltages, in particular DC, on request

⑥ In particular if used with socke busbar system smissline-S (see Page 19)

⑦ Recommendation: Connection of external voltage via terminal support AS

Manual Motor Starters MS325

Accessories

Ordering details

Phase buses PS3-2-1

Phase buses PS3-4-1

Power infeed block S3-M1

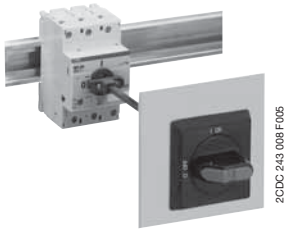
Power infeed block S3-M2

Insulating enclosure IP65

Insulating enclosure IP55

Accessories

Type	Order code	Weight/ piece kg	Packing unit piece	Price
Phase buses for cross wiring MS325, 63 A, 690 V				
PS3-2-0, for 2 dev., without aux. switch	**1SAM 101 937 R0012**		10	
PS3-3-0, for 3 dev., without aux. switch	**1SAM 101 937 R0013**		10	
PS3-4-0, for 4 dev., without aux. switch	**1SAM 101 937 R0014**		10	
PS3-5-0, for 5 dev., without aux. switch	**1SAM 101 937 R0015**		10	
PS3-2-1, for 2 dev., with 1 aux. switch	**1SAM 101 937 R0022**		10	
PS3-3-1, for 3 dev., with 1 aux. switch	**1SAM 101 937 R0023**		10	
PS3-4-1, for 4 dev., with 1 aux. switch	**1SAM 101 937 R0024**		10	
PS3-5-1, for 5 dev., with 1 aux. switch	**1SAM 101 937 R0025**		10	
PS3-2-2, for 2 dev., with 2 aux. switches	**1SAM 101 937 R0032**		10	
PS3-4-2, for 4 devices, with 2 aux. swit.	**1SAM 101 937 R0034**		10	
Power infeed blocks, 63 A, 690 V, stranded 25 mm², flexible 16 mm²				
S3– M1, flat	**1SAM 101 938 R0001**		10	
S3– M2, high	**1SAM 101 938 R0002**		10	
Cover for busbars (for not used poles)				
BS3-3	**1SAM 101 938 R0003**		50	
Insulating enclosure IP65 with rotary handle, triple lockable in Off position, with N- und PE-terminal, for Manual Motor Starter				
IB325-G, Twist knob black	**1SAM 101 940 R1000**	1		
IB325 Y, Twist knob red/yellow	**1SAM 101 940 R1001**	1		
Insulating enclosure, light grey IP55 with cover, including DIN rail for manual motor starter or line protection devices				
QES4/3N, for 4 modules, 72 mm	**GHL 111 2304 R0013**		**1**	
QES6/3N, for 6 modules, 108 mm	**GHL 111 2306 R0013**		**1**	
QES10/3N, for 10 modules, 180 mm	**GHL 111 2310 R0013**		**1**	
Set of neutral and earth terminals				
SMO4, for QES 4/3 N	**GHL 430 1910 R0004**		**1**	
SMO6, for QES 6/3 N	**GHL 430 1910 R0006**		**1**	
SMO10, for QES 10/3 N	**GHL 430 1910 R0010**		**1**	
Plastic enclosure, light grey, IP40 in panel design, including DIN rail				
PCD4N, for 4 modules, 72 mm	**GHS 270 1921 R0004**		**1**	
PCD6N, for 6 modules, 108 mm	**GHS 270 1921 R0006**		**1**	
PCD8N, for 8 modules, 144 mm	**GHS 270 1921 R0008**		**1**	



Switch cubicle mounting kit

Door mounting kit

Accessories

Type	Order code	Weight/ piece kg	Packing unit piece	Price
Switch cubicle mounting kit IP65, with axial extension triple lockable in Off position, locked in On position				
OHB2AJM, Twist knob black	**1SCA 022 384 R6940**		1	
OHY2AJM,Twist knob red/yellow ③	**1SCA 022 384 R7080**		1	
OXS5X 85, axis 85 mm	**1SCA 022 347 R3570**		1	
OXS5X105, axis 105 mm	**1SCA 022 347 R3650**		1	
OXS5X130, axis 130 mm	**1SCA 022 353 R4540**		1	
OXS5X180, axis 180 mm	**1SCA 022 353 R4620**		1	
MSMN, driver ①	**1SAM 101 923 R0001**		1	
MSOX, driver spindle 32 mm ②	**1SAM 101 924 R0001**		1	
Direct adapter MS325 ④				
BEA7/325, direct adapter MS325 to B6/B7	**1SBN 080 906 R1001**	0.021	10	
BEA16/325, direct adapter MS325 to A9/A12/A16	**1SBN 081 406 R1001**	0.031	10	
BEA26/325, direct adapter MS325 to A26	**1SBN 082 406 R1001**	0.031	10	
Door mounting kit IP65, Lockable in Off-position				
DMS325-G, grey handle	**1SAM 101 941 R1000**		1	
DMS325-Y, red/yellow handle	**1SAM 101 941 R1001**		1	

① For accommodating spindle and attachment to manual motor starter
② Is screwed directly onto the manual motor starter
③ Only suitable for MS325
④ See also page 34

Manual Motor Starters MS4xx

Ordering details

MS45x

MS49x

MS495 with A95
connected via BEA 110/495

MS495 with auxiliary switch HKS4-02 and open-circuit shunt release AA4 in addition to terminal shroud KA495C

Type	Setting range A . . . A	Order code	Weight / piece kg	Packing unit piece	Price
MS450 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 50 kA ①					
MS450 – 16	11 ... 16	**1SAM 450 000 R1001**	0.96	1	
MS450 – 20	14 ... 20	**1SAM 450 000 R1002**	0.96	1	
MS450 – 25	18 ... 25	**1SAM 450 000 R1003**	0.96	1	
MS450 – 32	22 ... 32	**1SAM 450 000 R1004**	0.96	1	
MS450 – 40	28 ... 40	**1SAM 450 000 R1005**	0.96	1	
MS450 – 45	36 ... 45	**1SAM 450 000 R1006**	0.96	1	
MS450 – 50	40 ... 50	**1SAM 450 000 R1007**	0.96	1	
MS495 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 50 kA ①					
MS495 – 40	28 ... 40	**1SAM 550 000 R1005**	2.1	1	
MS495 – 50	36 ... 50	**1SAM 550 000 R1006**	2.1	1	
MS495 – 63	45 ... 63	**1SAM 550 000 R1007**	2.1	1	
MS495 – 75	57 ... 75	**1SAM 550 000 R1008**	2.1	1	
MS495 – 90	70 ... 90	**1SAM 550 000 R1009**	2.1	1	
MS495 – 100	80 ...100 ②	**1SAM 550 000 R1010**	2.1	1	
MS497 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 100 kA ①					
MS497 – 16	11 ... 16	**1SAM 580 000 R1001**	2.1	1	
MS497 – 20	14 ... 20	**1SAM 580 000 R1002**	2.1	1	
MS497 – 25	18 ... 25	**1SAM 580 000 R1003**	2.1	1	
MS497 – 32	22 ... 32	**1SAM 580 000 R1004**	2.1	1	
MS497 – 40	28 ... 40	**1SAM 580 000 R1005**	2.1	1	
MS497 – 50	36 ... 50	**1SAM 580 000 R1006**	2.1	1	
MS497 – 63	45 ... 63	**1SAM 580 000 R1007**	2.1	1	
MS497 – 75	57 ... 75	**1SAM 580 000 R1008**	2.1	1	
MS497 – 90	70 ... 90	**1SAM 580 000 R1009**	2.1	1	
MS497 – 100	80 ...100 ②	**1SAM 580 000 R1010**	2.1	1	
MS451 with thermal and electromagnetic trips, tripping class 20, for heavy start short-circuit-proof up to 50 kA ①					
MS451 – 16	11 ... 16	**1SAM 470 000 R1001**	0.96	1	
MS451 – 20	14 ... 20	**1SAM 470 000 R1002**	0.96	1	
MS451 – 25	18 ... 25	**1SAM 470 000 R1003**	0.96	1	
MS451 – 32	22 ... 32	**1SAM 470 000 R1004**	0.96	1	
MS451 – 40	28 ... 40	**1SAM 470 000 R1005**	0.96	1	
MS451 – 45	36 ... 45	**1SAM 470 000 R1006**	0.96	1	
MS451 – 50	40 ... 50	**1SAM 470 000 R1007**	0.96	1	
MS496 with thermal and electromagnetic trips, tripping class 20, for heavy start short-circuit-proof up to 100 kA ①					
MS496 – 40	28 ... 40	**1SAM 570 000 R1005**	2.1	1	
MS496 – 50	36 ... 50	**1SAM 570 000 R1006**	2.1	1	
MS496 – 63	45 ... 63	**1SAM 570 000 R1007**	2.1	1	
MS496 – 75	57 ... 75	**1SAM 570 000 R1008**	2.1	1	
MS496 – 90	70 ... 90	**1SAM 570 000 R1009**	2.1	1	
MS496 – 100	80 ...100 ②	**1SAM 570 000 R1010**	2.1	1	

Direct adapter for wiring MS450 - MS497 to contactors

Type	Order code	Weight / piece kg	Packing unit piece	Price
BEA40/450, direct adapter MS450 to A30/A40	**1SBN 083 206 R1000**	0.061	1	
BEA50/450, direct adapter MS450 to A50 plate	**1SBN 083 506 R1000**	0.062	1	
BEA75/495, direct adapter MS495-497 to A50/63/75	**1SBN 084 106 R1000**	0.120	1	
BEA110/495, direct adapter MS495-497 to A95/A110	**1SBN 084 506 R1000**	0.124	1	

① See table on Page 24, ② Max. motor current 95 A

Manual Motor Starters MS4xx

Accessories

Ordering details

Auxiliary switch HK4-11

Auxiliary switch
HKS4-02

Pilot switch
SK4-22

Open-circuit shunt
release AA4

Undervoltage release
UA4-HK

Retrofittable accessories

These parts may be procured in addition to the MS4xx.
They must be mounted by the user.

Type		Order code	Weight/ piece kg	Packing unit piece	Price
Auxiliary switches, for front mounting					
HK4-11,	1 NO + 1NC	**1SAM 401 901 R1001**	0.02	10	
HK4-W,	1 Changeover	**1SAM 401 901 R1002**	0.02	10	
Auxiliary switches, for lateral attachment at left, max. 1 mountable					
HKS4-11,	1 NO + 1 NC	**1SAM 401 902 R1001**	0.03	2	
HKS4-20,	2 NO	**1SAM 401 902 R1002**	0.03	2	
HKS4-02,	2 NC	**1SAM 401 902 R1003**	0.03	2	
Signal switch for separate signalling acc. UL508 type E, lateral attachment at left 1NO + 1NC for short circuit signalling, 1NO + 1NC for general tripping					
SK4-11	2x: 1NO + 1NC	**1SAM 401 904 R 1001**	0.07	1	
Undervoltage release, for lateral attachment at right					
UA4,	24 V 50 Hz	**1SAM 401 905 R1004**	0.12	1	
UA4,	110 V 50 Hz	**1SAM 401 905 R1001**	0.12	1	
UA4,	230 V 50 Hz / 240 V 60 H	**1SAM 401 905 R1002**	0.12	1	
UA4,	400 V 50 Hz	**1SAM 401 905 R1003**	0.12	1	
Undervoltage release with pre-mating auxiliary switch 2 NO, for lateral attachment at right					
UA4-HK,	U 230 V 50 Hz / 240 V 60 Hz	**1SAM 401 906 R1001**	0.13	1	
UA4-HK,	400 V 50 Hz	**1SAM 401 906 R1002**	0.13	1	
Shunt release, lateral mounting at the left side ⑤					
AA4,	20-70 V, 50/60 Hz	**1SAM 401 907 R1001**	0.11	1	
AA4,	70-190 V, 50/60 Hz	**1SAM 401 907 R1002**	0.11	1	
AA4,	190-330 V, 50/60 Hz	**1SAM 401 907 R1003**	0.11	1	
AA4,	330-500 V, 50/60 Hz	**1SAM 401 907 R1004**	0.11	1	
Terminal shroud, for additional shock-hazard protection					
KA450,	for MS45x ①	**1SAM 401 908 R1001**	0.01	1	
KA495,	for MS49x ①	**1SAM 501 901 R1001**	0.01	1	
KA495C,	for MS49x ②	**1SAM 501 902 R1001**	0.03	1	
Terminal insulation barrier,					
DX495 necessary for UL 508E, MS49x-Starter		**1SAM 401 912 R1001**			
Scale cover, lead-sealable					
SA450,	for MS45x ③	**1SAM 401 909 R1001**	0.007	1 set	
Disconnector module, for producing a visible gap, lockable					
TB450,	for MS45x	**1SAM 401 910 R1001**	0.30	1	
Phase busses MS45x, 108 A, 690 V					
PS4-2 without HK, for 2 devices		**1SAM 401 911 R1001**			
PS4-3 without HK, for 3 devices		**1SAM 401 911 R1002**			
PS4-4 without HK, for 4 devices		**1SAM 401 911 R1003**			
PS4-2 with HK, for 2 devices		**1SAM 401 911 R1004**			
PS4-3 with HK, for 3 devices		**1SAM 401 911 R1005**			
PS4-4 with HK, for 4 devices		**1SAM 401 911 R1006**			
Infeed block, 108 A, 690 V, Stranded 50 mm², finely stranded 35 mm²					
S4-M1, flat		**1SAM 401 911 R1007**	10		
Cover for phase bus poles					
BS4-3		**1SAM 401 911 R1008**			
Switch cubicle mounting kit IP65, with axial extension, lockable in Off position, locked in On position ⑥					
OHB2AJM, Twist knob black		**1SCA 022 384 R6940**			
OHY2AJM, Twist knob red/yellow		**1SCA 022 384 R7080**			
OXS5X 85, axis 85 mm		**1SCA 022 347 R3570**			
OXS5X105, axis 105 mm		**1SCA 022 347 R3650**			
OXS5X130, axis 130 mm		**1SCA 022 353 R4540**			
OXS5X180, axis 180 mm		**1SCA 022 353 R4620**			
MSMN, driver ⑦		**1SAM 101 923 R0001**			

① Is plugged onto the box terminals in each case ④ Mounting sequence: Motor protection switch, pilot switch, auxiliary switch
② Is plugged onto the housing after removing the box terminals, if using cable lugs or buses ⑤ Max. ON time: 5 seconds, see also Page 22
③ Supplied only as a set as 10 scale covers ⑥ See also MS325 Page 10
⑦ Is screwed directly onto the manual motor starter

Strategies for motor protection with magnetic only types MO

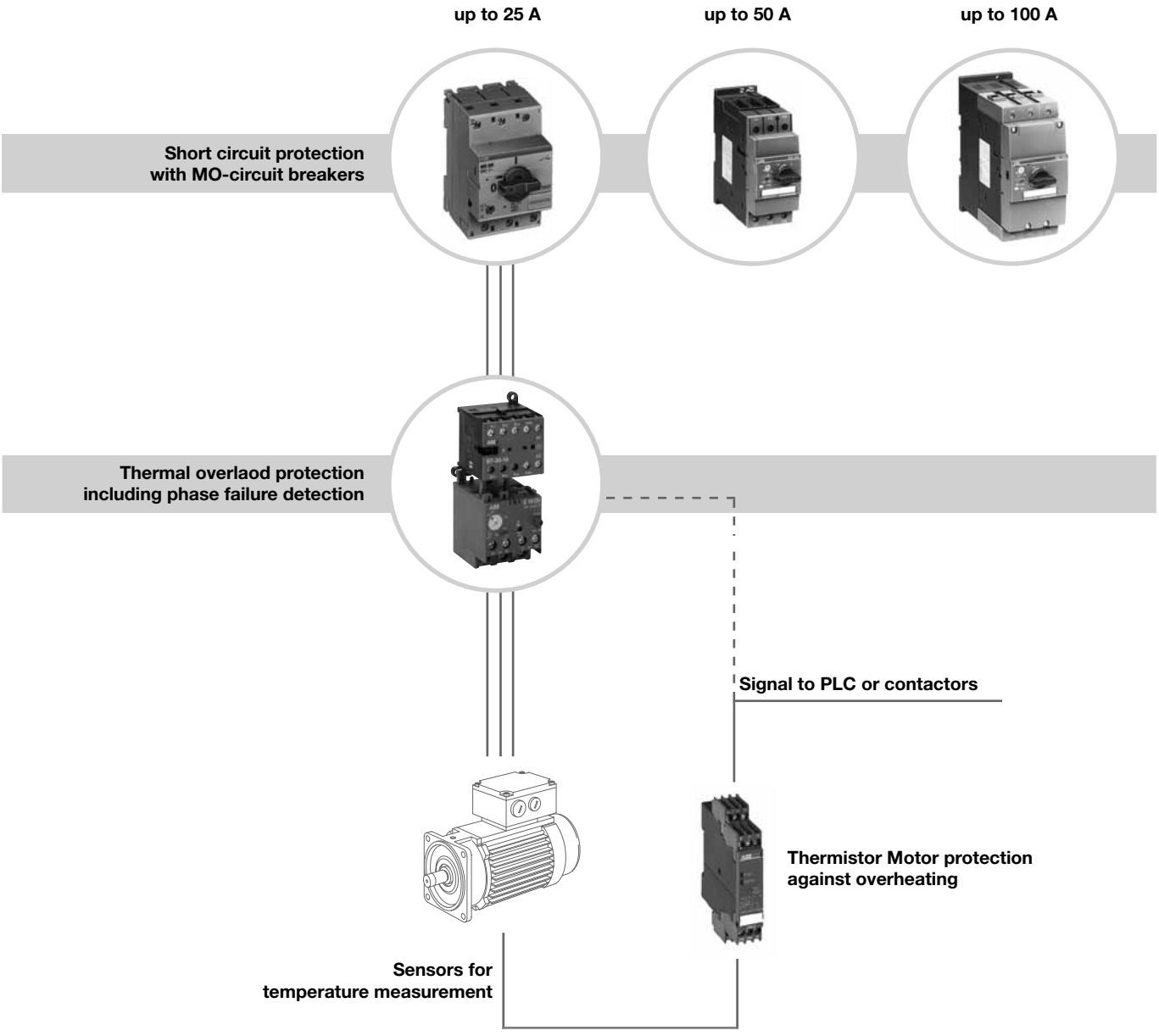
For special applications ABB's manual motor starter of the MS series are also available as versions MO325 / MO450 / MO495 with magnetic tripping only, protecting exclusively against short circuits.

However, combined with intelligent ABB-components, the starter series MO open up further interesting alternatives for the use of motor starters, especially when short circuit protection and thermal protection have to be realized independent from one another.

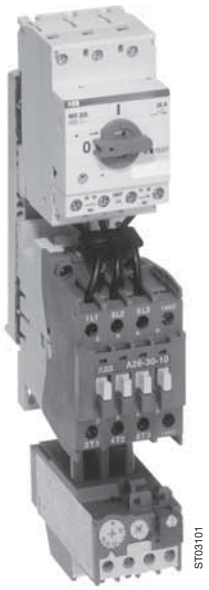
Therefore three different strategies of motor protection with manual motor starters MO from ABB are feasible:

1. **With thermal overload relays:**
   cost efficient protection against overload and phase failure
2. **With electronic overload relays:**
   For high accuracy and efficient stock planing, less types for the complete range, high flexibility.
3. **Thermistor motor protection:**
   High accuracy with temperature monitoring directly in the coil, highly efficient protection with several electronic posibilities.

Examples for motor protection

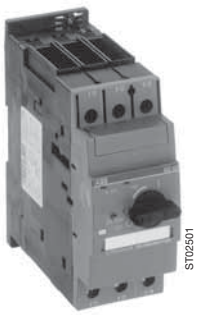


Magnetic only types
MOxxx
Ordering details, Technical data



MO325 + A26 + TA25DU

MO325



MO450

MO495/495

Devices with only electromagnetic tripping for short circuit protection
The MO-types are used as MCB, mainly in combinations with other coordinated products for branch protection.

Type	rated current	Short circuit trip range	**Order code**	Weight / piece kg	Packing unit piece
MO325, short-circuit – capacity up to 100kA and 50 kA					
MO325-0.4	**0,4**	**3 - 4.8**	**1SAM 160 000 R1003**	**0.347**	**1**
MO325-0.63	**0,63**	**4.8 - 7.6**	**1SAM 160 000 R1004**	**0.347**	**1**
MO325-1	**1**	**9 - 14**	**1SAM 160 000 R1005**	**0.347**	**1**
MO325-1.6	**1,6**	**13 - 19**	**1SAM 160 000 R1006**	**0.347**	**1**
MO325-2.5	**2,5**	**22 - 32,5**	**1SAM 160 000 R1007**	**0.347**	**1**
MO325-4	**4**	**32 - 48**	**1SAM 160 000 R1008**	**0.347**	**1**
MO325-6.3	**6,3**	**53 - 82**	**1SAM 160 000 R1009**	**0.347**	**1**
MO325-9	**9**	**112 - 155**	**1SAM 160 000 R1010**	**0.347**	**1**
MO325-12.5	**12,5**	**155 - 215**	**1SAM 160 000 R1011**	**0.347**	**1**
MO325-16	**16**	**200 - 280**	**1SAM 160 000 R1012**	**0.347**	**1**
MO325-20	**20**	**250 - 350**	**1SAM 160 000 R1013**	**0.347**	**1**
MO325-25	**25**	**312 - 435**	**1SAM 160 000 R1014**	**0.347**	**1**
MO496, short-circuit – capacity up to 50 kA					
MO496-16	**16**	**166 - 250**	**1SAM 590 000 R1001**	**2.100**	**1**
MO496-20	**20**	**208 - 312**	**1SAM 590 000 R1002**	**2.100**	**1**
MO496-25	**25**	**260 - 390**	**1SAM 590 000 R1003**	**2.100**	**1**
MO496-32	**32**	**333 - 499**	**1SAM 590 000 R1004**	**2.100**	**1**
MO496-40	**40**	**416 - 624**	**1SAM 590 000 R1005**	**2.100**	**1**
MO496-50	**50**	**520 - 780**	**1SAM 590 000 R1006**	**2.100**	**1**
MO496-63	**63**	**655 - 983**	**1SAM 590 000 R1007**	**2.100**	**1**
MO496-75	**75**	**780 - 1170**	**1SAM 590 000 R1008**	**2.100**	**1**
MO496-90	**90**	**936 - 1404**	**1SAM 590 000 R1009**	**2.100**	**1**
MO496-95	**100**	**988 - 1482**	**1SAM 590 000 R1010**	**2.100**	**1**
MO450, short-circuit – capacity up to 25 kA					
MO450-16	**16**	**166 - 250**	**1SAM 460 000 R1001**	**0.960**	**1**
MO450-20	**20**	**208 - 312**	**1SAM 460 000 R1002**	**0.960**	**1**
MO450-25	**25**	**260 - 390**	**1SAM 460 000 R1003**	**0.960**	**1**
MO450-32	**32**	**333 - 499**	**1SAM 460 000 R1004**	**0.960**	**1**
MO450-40	**40**	**416 - 624**	**1SAM 460 000 R1005**	**0.960**	**1**
MO450-45	**45**	**468 - 702**	**1SAM 460 000 R1006**	**0.960**	**1**
MO450-50	**50**	**520 - 780**	**1SAM 460 000 R1007**	**0.960**	**1**
MO495, short-circuit – capacity up to 25 kA					
MO495-40	**40**	**416 - 624**	**1SAM 560 000 R1005**	**2.100**	**1**
MO495-50	**50**	**520 - 780**	**1SAM 560 000 R1006**	**2.100**	**1**
MO495-63	**63**	**655 - 983**	**1SAM 560 000 R1007**	**2.100**	**1**
MO495-75	**75**	**780 - 1170**	**1SAM 560 000 R1008**	**2.100**	**1**
MO495-90	**90**	**936 - 1404**	**1SAM 560 000 R1009**	**2.100**	**1**
MO495-95	**100**	**988 - 1482**	**1SAM 560 000 R1010**	**2.100**	**1**

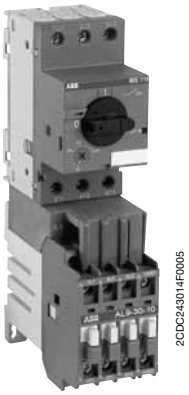
Starter Combinations with Manual Motor Starters MSxxx

Overview

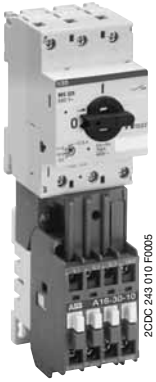
Manual Motor Starter	MS116 up to 16 A		MS225, MS325, MO325 up to 25 A		
Direct adapter	BEA7/116	BEA16/116	BEA7/325	BEA16/325	BEA26/325
Contactor, AC controlled	B6 B7	A9 A12 A16	B6 B7	A9 A12 A16	A26 A30 A40
Direct adapter	BEA7/116	BEA16/116AL	BEA7/325	BEA16/325AL	BEA26/325AL
Contactor, DC controlled	BC6 BC7	AL9 AL12 AL16	BC6 BC7	AL9 AL12 AL16	AL26 AL30 AL40
Further accessories					
Aux.-contact 1NO/1NC for front mounting	HKF1-11		HKF-11		
Phase busses for MSS	PS1-2-1 for 2 starters PS1-3-1 for 3 starters PS1-4-1 for 4 starters PS1-5-1 for 5 starters	PS1-2-0 for 2 starters PS1-3-0 for 3 starters PS1-4-0 for 4 starters PS1-5-0 for 5 starters	PS3-2-0 for 2 starters PS3-3-0 for 3 starters PS3-4-0 for 4 starters PS3-5-0 for 5 starters PS3-6-0 for 6 starters		

Examples for Starter Combinations

MS116 with B7

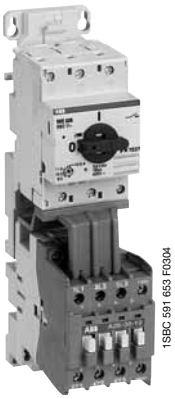


MS116 with AL16



MS325 with A16

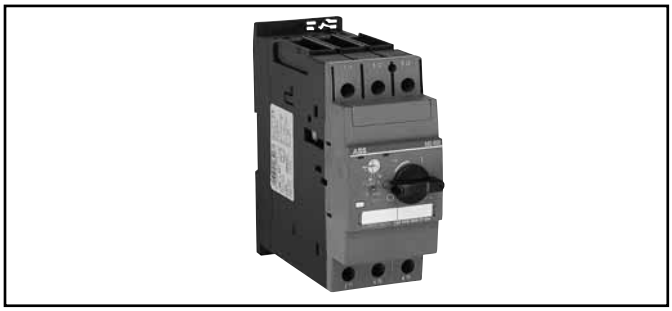
MS325 with A26

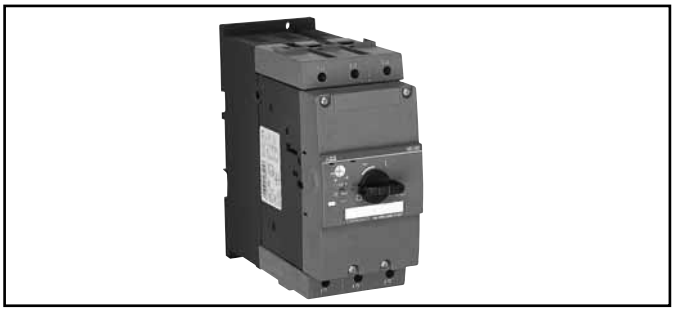


MS325 with A26 at PM26-13

Starter Combinations with Manual Motor Starters MSxxx

Overview





MS45x, MO450 up to 50 A			MS49x, MO49x up to 100 A				
BEA40/450		BEA50/450	BEA75/495			BEA16/325	
A30	A40	A50	A50	A63	A75	A95	A110
-		BEA50/450	BEA75/495			BEA110/495	
AL30	AL40	AE50 AF50	AE50 AF50	AE63 AF63	AE75 AF75	AE95 AF95	AE110 AF110

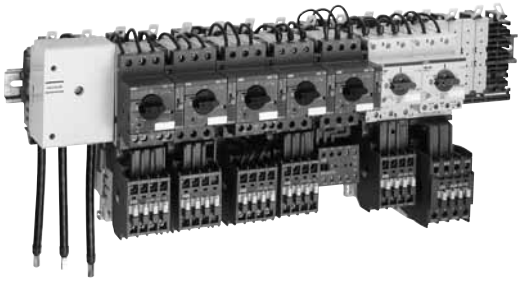
HK4-11		H4F-11
PS4-2-0 for 2 starters PS4-3-0 for 3 starters PS4-4-0 for 4 starters	PS4-2-1 for 2 starters PS4-3-1 for 3 starters PS4-4-1 for 4 starters	

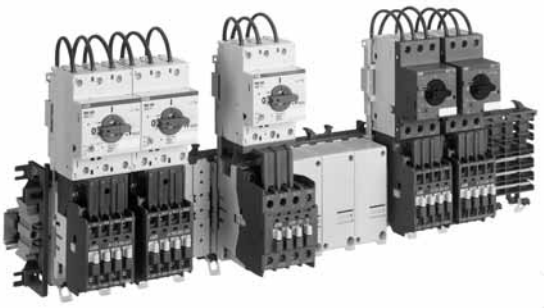
MS450 with A40

MS495 with A110

Busbar system smissline-S

For power distribution up to 200 A





Smissline-S is a powerful busbar system with quick and easy installation of protection devices as manual motor starters, starter combinations and MCB. This powerful system offers a lot of advantages for industries regarding time savings. cost reduction, flexibility, availability, safety and transparent installation.

Customers benefits are in a flexible and easy project planning. Room & power reserves can be used if project and technical expansion is necessary. Additional devices can be plugged in easily in this plug & play starter concept. To form a system there are only few parts needed: Busbar kit, feeder block & starter combination.

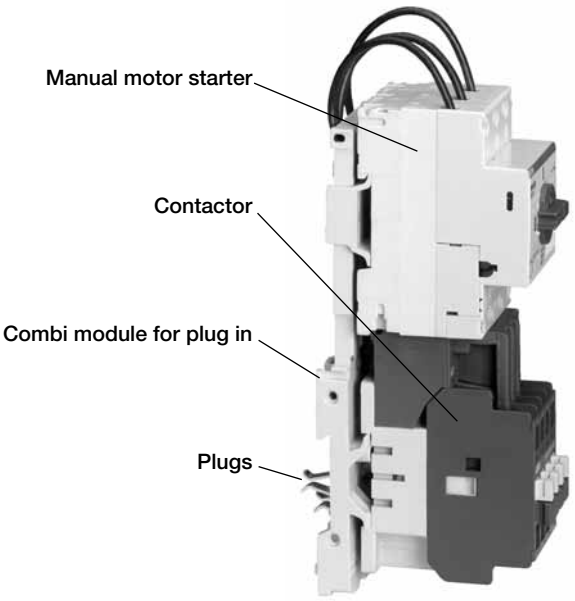
Time and cost savings
- Quick installation
- Less cables / cable channels
- Reduce changing costs
- Quick trouble shooting
- Maintenance under power

Flexibility and availability
- Free of phase allocation
- Mounting in any position
- Quick replacement of devices
- Less stops in production
- Room reserves for backup

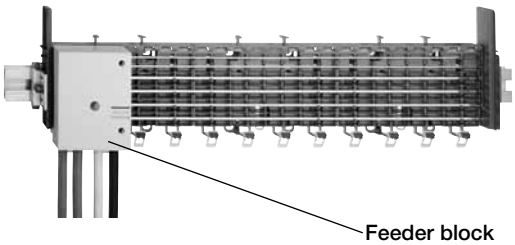
Safety and transparency
- Less clamping points
- Less fireload
- High power reserve
- Clear installation
- Touch proved

Technical Data

For DIN rail or wall-mounting	
Mounting position:	vertical, horizontal
Max. operating voltage:	690 V
Max. operating current: supply on left or right: supply in center:	 100 A 200 A
Short circuit capacity:	50 kA

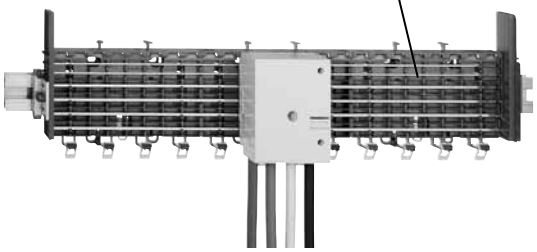


supply on right or left: max. 100 A



Busbar kit including busbars

supply in center: max. 200 A



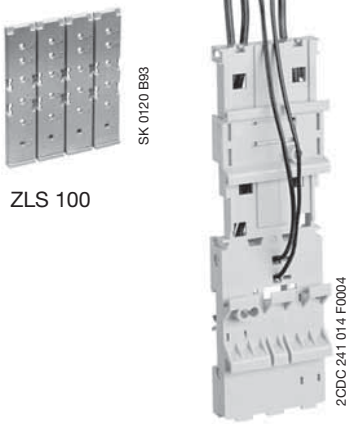
Busbar system smissline-S for MS325

Manual Motor Starter for plug in

Busbar module incl. sockets, busbars and end pieces

ZLS 756

ZLS 224/225 without cover



ZLS 100

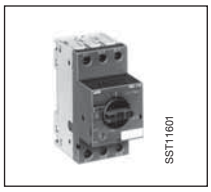
ZLS 101

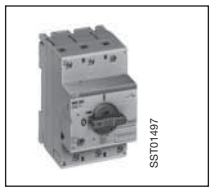
Design	Type	Order code	Weight/ piece kg	Packing Unit piece	Price
Busbar System as a complete module in a package for plug and play including plastic sockets, busbars for 3 phases L1, L2, L3 and end pieces fixed modules, ready for DIN rail mounting					
Length: 393 mm 22 PLE	**ZLS 760**	**2CCF 016 420 R0001**			
429 mm 24 PLE	**ZLS 750**	**2CCF 015 346 R0002**			
537 mm 30 PLE	**ZLS 762**	**2CCF 016 422 R0003**			
573 mm 32 PLE	**ZLS 752**	**2CCF 015 348 R0004**			
685 mm 38 PLE	**ZLS 764**	**2CCF 016 424 R0005**			
717 mm 40 PLE	**ZLS 754**	**2CCF 015 350 R0002**			
861 mm 48 PLE	**ZLS 756**	**2CCF 015 352 R0003**			
1150 mm 64 PLE	**ZLS 766**	**2CCF 016 426 R0004**			
1438 mm 80 PLE	**ZLS 758**	**2CCF 015 354 R0005**			
Infeed block 160A with cover					
3-phase block 4 PLE	**ZLS225**	**2CCF 015 197 R0014**			
Infeed Elements 200A with cover					
Infeed Element Phase 1		**2CCV 672 501 R0001**			
Infeed Element Phase 2		**2CCV 672 502 R0001**			
Infeed Element Phase 3		**2CCV 672 503 R0001**			
Busbar cover pieces for empty places					
Busbar cover pieces for empty places **1 piece can cover 4 PLE - 1 PLE can be break down**	**ZLS 100**	**2CCF 002 762 R0001**			
Combi modules wire top feed up to 32A					
L1, L2, L3 top feed	**ZLS 8403LWT-S**	**2CCA 180 451 R0001**			
L1, L2, L3, N top feed	**ZLS 8403LNWT-S**	**2CCA 180 452 R0001**			
Combi modules wire bottom feed up to 32A					
L1, L2, L3 bottom feed	**ZLS 8403LWB-S**	**2CCA 180 465 R0001**			
L1, L2, L3, N bottom feed		**ZLS 8403LNWB-S**	**2CCA 180 462 R0001**		
Adapter plate ZMS915 for MS325 for plug in to the busbar system					
adapter plate for max. 415V, 20A	**ZMS915**	**GHE 610 1002 R0030**			

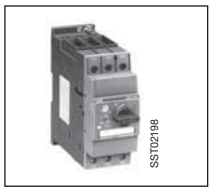
Single Adapter Plates up to 63 A to mount standard control gear and DIN Rail products see smissline-S catalog.

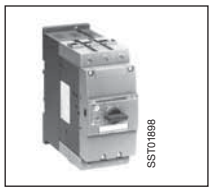
Manual Motor Starters Type Series MS

Technical data









Manual motor starter	**Type**	**MS116**	**MS325; MO325**	**MS450/451; MO450**	**MS495/496/497; MO495/496**

General technical data

Standards: **The devices comply with the major international, European and national regulations IEC 60../EN 60..**		**947-1 947-2 947-4-1 947-5-1**	**947-1 947-2 947-4-1 947-5-1**	**947-1 947-2 947-4-1 947-5-1**	**947-1 947-2 947-4-1 947-5-1**
Disconnector characteristics (to IEC/EN 60947-1)		**yes**	**yes**	**yes**	**yes**
Mechanical service life in **operations**		**100.000**	**100.000**	**50.000**	
Permissible ambient temperature					
- Operating temperature	**°C**	**– 20... + 55/70 ①**	**– 25 ... + 55/70 ①**	**– 20 ... + 60/70 ①**	
- Storage temperature	**°C**	**– 50 ... + 80**	**– 50 ... + 80**	**– 50 ... + 80**	
Temperature compensation		**with**			
Mounting position		**any**			
Permissible altitude	**m**	**3000**	**3000**	**2000**	
Permissible resistance to vibrations ② (IEC 68-2-6)		**10-150 Hz Amplitude 5 g**	**10-150 Hz Amplitude 5 g**	**on request**	**on request**
Permissible resistance to shocks (IEC 68-2-27)	**sinusoidal shock**	**25 g (11 ms)**	**15 g (11 ms)**	**on request**	**on request**
Mounting (mounting hardware not included in scope of delivery)					
Screw fixing		**see accessories**	**see accessories**	**2 x M5**	**2 x M5**
Quick fastening on top-hat rail	**to EN 50022**	**35 mm**	**35 mm**	**35 mm (15 mm high)**	**35 mm,**
	to EN 50023	**–**	**–**	**–**	**75 mm**
Electrical connection of the main conductors (main circuits)					
Type		**Screw terminal**	**Box terminal + bus**	**Box terminal**	**Box terminal**
Screw		**Pozidrive size 2**	**Pozidrive size 2 4 mm**	**Pozidrive size 2**	**Internal hexagon**
	Single-core 1 x mm²	**1 ... 4**	**1 ... 10**	**0.75 ... 35**	**2.5 ... 70**
	2 x mm²	**1 ... 4**	**1 ... 4**	**0.75 ... 25**	**2.5 ... 50**
	Stranded 1 x mm²	**1 ... 4**	**1 ... 10**	**0.75 ... 35**	**2.5 ... 70**
	2 x mm²	**1 ... 4 ③**	**–**	**0.75 ... 25**	**2.5 ... 50**
	Flexible 1 x mm²	**0.75 ... 2.5**	**1 ... 6**	**0.75 ... 25**	**2.5 ... 50**
	2 x mm²	**0.75 ... 2.5**	**–**	**0.75 ... 16**	**2.5 ... 35**
of the auxiliary conductors (auxiliary circuits)					
Type		**Screw terminal**	**Screw terminal ④**	**Screw terminal**	
Screw		**Pozidrive size 2**	**Pozidrive size 1**	**Pozidrive size 2**	
	Single-core 1 x mm²	**1 ... 2.5**	**0.5 ... 2.5**	**0.5 ... 2.5**	
	2 x mm²	**1 ... 2.5**	**0.5 ... 2.5**	**0.5 ... 2.5**	
	Flexible 1 x mm²	**0.75 ... 2.5**	**0.5 ... 2.5**	**0.5 ... 1.5**	
	2 x mm²	**0.75 ... 2.5 ⑤**	**0.5 ... 2.5**	**0.5 ... 1.5**	

① Operating conditions up to 70° C on request

② G-values refer to the mounting position subject to the highest shock sensitivity

③ Also applies to auxiliary switches HKF1 and undervoltage release UA1

④ For auxiliary switch HKF.. Pozidrive 2

⑤ Applies to auxiliary switches HK1 and SK1

Manual motor starter	Type	MS116	MS325; MO325	MS450/451; MO450	MS495/496/497; MO495/496
General electrical data					
Rated insulation voltage U_i					
to EN 60947	**V AC**	**690**	**690**	**690**	**690**
to CSA / U_L / NEMA	**V AC**	**600**	**600**	**600**	**600**
Rated operating voltage U_e **up to**	**V**	**690 AC/440 DC**	**690 AC/440 DC**	**690 AC/440 DC**	**690 AC/440 DC**
Rated impulse strength U_{imp}	**kV**	**6**	**6**	**6**	**6**
Rated continuous thermal current I_{th}	**A**	**16**	**25**	**50**	**100**
Rated frequency ①	**Hz**	**50/60**			
Rated current ranges I_e **(number of ranges)**	**A**	**0.1 ... 16 (11)**	**0.1 ... 25 (14)**	**11 ... 50 (7)**	**28 ... 100 (6)**
Rated service short-circuit breaking capacity I_{cs} and max. permissible back-up fuses see pages 23 / 24.					
DC rated operating voltage					
in the case of series connection of 3 main circuits					
(see wiring diagram, Page 25) **DC 1, 60 V A**		**on request**	**25**	**50**	**100**
DC 3, 60 V A		**on request**	**25**	**50**	**100**
DC 5, 60 V A		**on request**	**25**	**50**	**100**
Short circuit capacity for DC-rating		on request			
Auxiliary circuits					
Load rating of the auxiliary circuits					
Minimum load at:	**24 V DC mA**	**5 mA at 17 VDC**	**5**	**5 mA at 17 VDC**
	12 V DC mA	**–**	**10**	**–**
Auxiliary contact for front mounting	**AC15**	**24V, 3.0 A 230V, 1.5 A**	**24V, 4.0 A 120V, 3.0 A 230V, 2.0 A**	**24V, 4.0 A 230V, 3.0 A**
	DC13	**24V, 1.0 A 60V, 0.7 A 110 V, 0.3 A 220 V, 0.1 A**	**24V, 2.0 A 60V, 2.5 A 110 V, 0.6 A 220 V, 0.25 A**	**24V, 1.0 A 48V, 0.3 A 60 V, 0.15 A**
Auxiliary and signal contact	**AC15**	**24V, 6.0 A 230V, 4.0 A 400 V, 3.0 A**	**24V, 4.0 A 120V, 3.0 A 230V, 2.0 A**	**24V, 6.0 A 230V, 4.0 A 400 V, 3.0 A**
	DC13	**24V, 2.0 A 110 V, 0.5 A 220 V, 0.25 A**	**24V, 2.0 A 60V, 2.5 A 110 V, 0.6 A 220 V, 0.25 A**	**24V, 1.0 A 110 V, 0.5 A 220 V, 0.25 A**

① Correction factors for other frequencies on request

Manual motor starter	Type	MS116	MS325; MO325	MS450/451; MO450	MS495/496/497; MO495/496

Release

Device for phase failure protection		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**	
Hold	**VA**	**3.0**	**0.9**	**7.2**	
Open-circuit shunt release					
Pick-up value	**% of U_c**	**≥ 70**	**≥ 85**	**≥ 70**	
Relative duty	**% ED**	**100**	**–**	**100 at voltages 50/60 Hz to**	
Power consumption Pick-up	**VA**	**9.0**	**110-240V: 13-61 ⑤**	**on request**	
Hold	**VA**	**3.0**	**–**	**on request**	

Internal resistance values

Setting ranges A from		to	Resistance per phase in Ω resp. MS4.. in mΩ MS116	MS325	MS450	MS451	MS495/MS497	MS496
0.1	...	**0.16**	66	71.1	–	–	–	–
0.16	...	**0.25**	25.5	27.1	–	–	–	–
0.25	...	**0.4**	10.38	12.3	–	–	–	–
0.4	...	**0.63**	4.36	5.17	–	–	–	–
0.63	...	**1.0**	1.602	2.09	–	–	–	–
1.0	...	**1.6**	0.645	0.805	–	–	–	–
1.6	...	**2.5**	0.2795	0.34	–	–	–	–
2.5	...	**4.0**	0.1035	0.141	–	–	–	–
4.0	...	**6.3**	0.0433	0.051	–	–	–	–
6.3	...	**9.0**	–	0.0224	–	–	–	–
6.3	...	**10.0**	0.0217	–	–	–	–	–
8,0	...	**12,0**	0.0148	–	–	–	–	–
9.0	...	**12.5**	–	0.0122	–	–	–	–
10.0	...	**16.0**	0.0088	–	–	–	–	–
11.0	...	**16.0**	–	–	13.3	13.8	17.3	–
12.5	...	**16.0**	–	0.0081	–	–	–	–
14.0	...	**20.0**	–	–	8.74	8.74	11.3	–
16.0	...	**20.0**	–	0.0048	–	–	–	–
18.0	...	**25.0**	–	–	5.43	5.83	7.11	–
20.0	...	**25.0**	–	0.0035	–	–	–	–
22.0	...	**32.0**	–	–	3.60	4.10	4.75	–
28.0	...	**40.0**	–	–	2.56	2.90	3.28	3.28
36.0	...	**45.0**	–	–	1.80	2.20	–	–
36.5	...	**50.0**	–	–	–	–	2.24	2.52
40.0	...	**50.0**	–	–	1.46	1.82	–	–
45.0	...	**63.0**	–	–	–	–	1.40	1.40
57.0	...	**75.0**	–	–	–	–	0.95	1.00
70.0	...	**90.0**	–	–	–	–	0.60	0.63
80.0	...	**100.0**	–	–	–	–	0.54	0.57

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

Short-circuit protection MS116, setting ranges, short-circuit strength and max. back-up fuses

Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$ ①

	from		to	at 230 V AC			at 400 V AC			at 440 V AC			at 500 V AC			at 690 VAC		
				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 to 1.0	...	**0.16 1.6**	**Short-circuit proof** up to I_{cc} = 50 kA									**Short-circuit proof** up to I_{cc} = 30 kA					
	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 / MO325, setting ranges, short-circuit strength and max. back-up fuses

Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$ ①

	from		to	at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 VAC	
				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, l.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)									
Setting ranges	0.1 to 1.0	...	**0.16 1.6**	**Short-circuit proof** **No back-up fuse required up to I_{cc} = 100 kA**									
	1.6	...	**2.5**									**40**	**25**
	2.5	...	**4.0**							**60**	**35 / 40**	**10**	**40**
	4.0	...	**6.3**					**70**	**50**	**40**	**50**	**7**	**40**
	6.3	...	**9.0**					**50**	**80**	**30**	**80**	**5**	**50**
	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 / MO325, setting ranges, short-circuit strength and max. back-up fuses

Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$ ①

	from		to	at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 VAC	
				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, l.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)									
Setting ranges	0.1 to 1.0	...	**0.16 1.6**	**Short-circuit proof** **No back-up fuse required up to I_{cc} = 50 kA**									
	1.6	...	**2.5**									**40**	**25**
	2.5	...	**4.0**							**60**	**35 / 40**	**10**	**40**
	4.0	...	**6.3**							**40**	**50**	**7**	**40**
	6.3	...	**9.0**							**30**	**80**	**5**	**50**
	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**

① 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 MS325 and MS116!

Manual Motor Starters Type Series MS

Technical data

Short-circuit protection MS450 / MS451 / MO450, setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cu}$ ①															
	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 / MO495, setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cu}$ ①															
	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 / MO496, setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cu}$ ①															
	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	
36 ... 50							25	50	160	7.5	15	160	5	10	100	
45 ... 63							25	50	200	7.5	15	160	4	7.5	100	
57 ... 75							25	50	200	5	10	160	3	6	125	
70 ... 90							25	50	200	5	10	160	3	6	160	
80 ... 100							25	50	200	5	10	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 $I_{cu} > I_{cu}$ ①															
	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	
14 ... 20							25	50	100	15	30	80	7	15	63	
18 ... 25							25	50	100	15	30	80	7	15	63	
22 ... 32							25	50	125	11	22	100	7	15	63	
28 ... 40							25	50	160	9	18	160	6	12	80	
36 ... 50							25	50	160	7.5	15	160	5	10	100	
45 ... 63							25	50	200	7.5	15	160	4	7.5	100	
57 ... 75							25	50	200	5	10	160	3	6	125	
70 ... 90							25	50	200	5	10	160	3	6	160	
80 .. 100							25	50	200	5	10	160	3	6	160	

① 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.

Coordination acc. IEC / EN 60947-4-1

The following table lists the combinations of motor protection switches and contactors according to assignment type 2 in compliance with IEC / EN 60947-4-1

Assignment type 2, 400 V - 50 Hz, 50 kA, normal start

Motor output AC-3 and design current three phase cage motor 1500 rp/min. 380/400 V P_e/kW	I_e/A	**Motor protecting switch type**	**Setting range** A ... A	**Contactor Type**	**Maximum current permitted for the combination** A
0.06	0.22	**MS325-0.25**	0.16 ... 0.25	A9	0.25
0.09	0.33	**MS325-0.4**	0.25 ... 0.4	A9	0.4
0.12	0.42	**MS325-0.63**	0.40 ... 0.63	A9	0.63
0.18	0.72	**MS325-1**	0.63 ... 1	A9	1
0.25	0.83	**MS325-1**	0.63 ... 1	A9	1
0.37	1.2	**MS325-1.6**	1 ... 1,6	A9	1.6
0.55	1.5	**MS325-1.6**	1 ... 1.6	A9	1.6
0.75	2	**MS325-2.5**	1.6 ... 2.5	A9	2.5
1.1	2.6	**MS325-4**	2.5 ... 4	A9	4
1.5	3.5	**MS325-4**	2.5 ... 4	A12	4
2.2	5	**MS325-6.3**	4 ... 6.3	A12	6.3
3	6.6	**MS325-9**	6.3 ... 9	A26	9
4	8.5	**MS325-9**	6.3 ... 9	A26	9
5.5	11.5	**MS325-12.5**	9 ... 12.5	A26	12.5
7.5	15.5	**MS325-16** **MS450-20**	12.5 ... 16 14 ... 20	A26 A26	16 16
9	18.3	**MS325-20**	16 ... 20	A26	20
11	22	**MS3265-25** **MS450-25**	20 ... 25 18 ... 25	A30 A30	25 25
15	30	**MS450-32**	22 ... 32	A30	30
18.5	37	**MS450-40**	28 ... 40	A40	40
22	44	**MS450-50**	40 ... 50	A50	50
30	60	**MS495-63**	45 ... 63	A63	63
37	72	**MS495-75**	57 ... 75	A95	75
45	85	**MS495-90**	70 ... 90	A95	90
55	98	**MS495-100**	80 ... 100	A110	100

Further coordination tables on request

Forward current integrals (I^2t curves) on request

Peak forward current curves on request

Reliable line protection

Protection of PVC-insulated lines
against thermal overload in the event of short circuit:

In compliance with VDE 0100 section 430 and 523, cables and lines must be protected against overheating and short circuit.

The table opposite indicates which conductor cross-section are safely protected by motor protection switches in the event of short circuit.

Manual motor starter type	min. protected conductor cross section at 380 / 415 V AC, Cu mm²				
MS325	4	2.5	1.5	1.0	0.75
0,16 to 6					
10					
20					
25					

Times to trip

Selection table for suitability of the motor protection switches for motors of enclosure Ex e

Time to trip of the motor protection switches as a function of a multiple of the setting current (tolerance ± 20 % of the time to trip).
PTB approvals, see below.

Setting range of the manual motor starter		Time to trip of the motor protection switches at					
		3	**4**	**5**	**6**	**7.2**	**8**
		times the setting current, 3-pole, starting from cold state.					
A	**A**	s	s	s	s	s	s
Manual motor starter, Type MS325							
0.1 ...	**0.16**	15	9	6.5	4.8	3.7	3.2
0.16 ...	**0.25**	16	10	6.8	5.2	4	3.6
0.25 ...	**0.4**	16	9.7	6.5	5	3.8	3.3
0.4 ...	**0.63**	17	10.2	7.3	5.7	4.4	3.9
0.63 ...	**1.0**	17.5	10.2	7.2	5.5	4.2	3.8
1.0 ...	**1.6**	17	10	7.1	5.6	4.4	4
1.6 ...	**2.5**	18	10.3	7.5	5.9	4.7	4.2
2.5 ...	**4.0**	18.4	11.5	8.1	6.4	5	4.6
4.0 ...	**6.3**	19	12	8.5	6.7	5.3	4.9
6.3 ...	**9.0**	18.2	11.5	7.9	6	4.5	3.8
9.0 ...	**12.5**	19	11.5	8	6	4.6	4
12.5 ...	**16**	19.5	11.5	7.5	5.4	4	3.3
16 ...	**20**	20	11.5	7.8	5.7	4,2	3.5
20 ...	**25**	20	10.4	7	5	3.7	3.2

Ident-numbers of manual motor starters for motors with EEx e-Protection:

Type	Ident-No.	
MS325	3.53 - 1357/94	National Institute for Standards and Technology
MS450, MS495, MS497	Ex - 99.Y.74976	KEMA

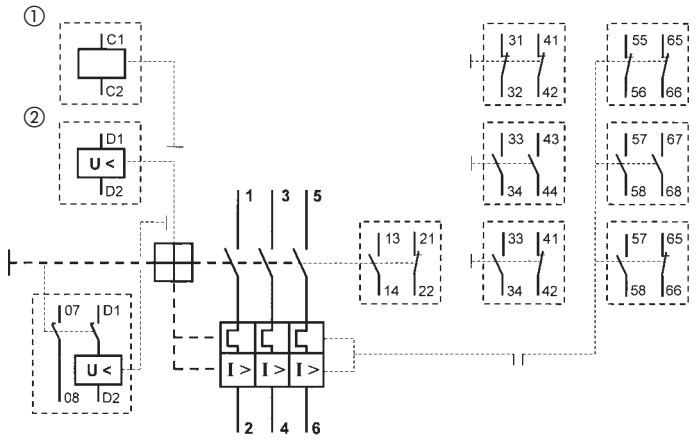
Approvals and certificates

Device-Type	Approvals, certificates			Ship's classification societies			
Test mark			EEx e				
Abbreviation Validity	CSA Canada	USA	ATEX	GL Germany	LRS Great Britain	BV France	DNV Norway
MS116	■	■		■	■	■	
MS325	■	■	■	■	■	■	■
MS450	■	■	■	■	■	■	
MS495	■	■	■	■	■	■	
MS497	■	■	■	■	■	■	

Other approvals CCC/CB/GOST etc. on request

Manual Motor Starters Type Series MS

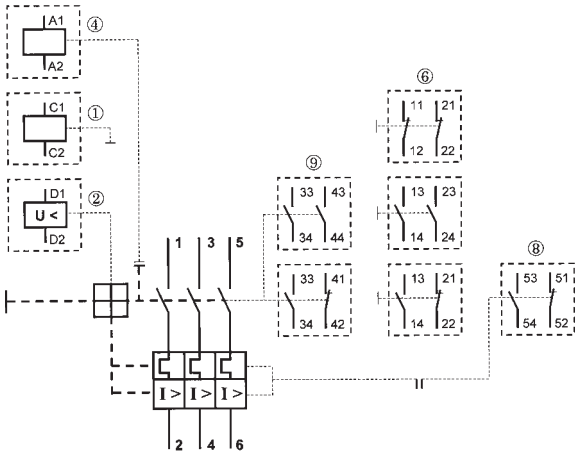
Wiring diagrams



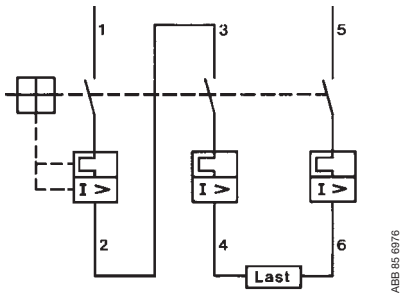
Manual motor starter **MS116** with accessories in accordance with the adjacent caption

Caption

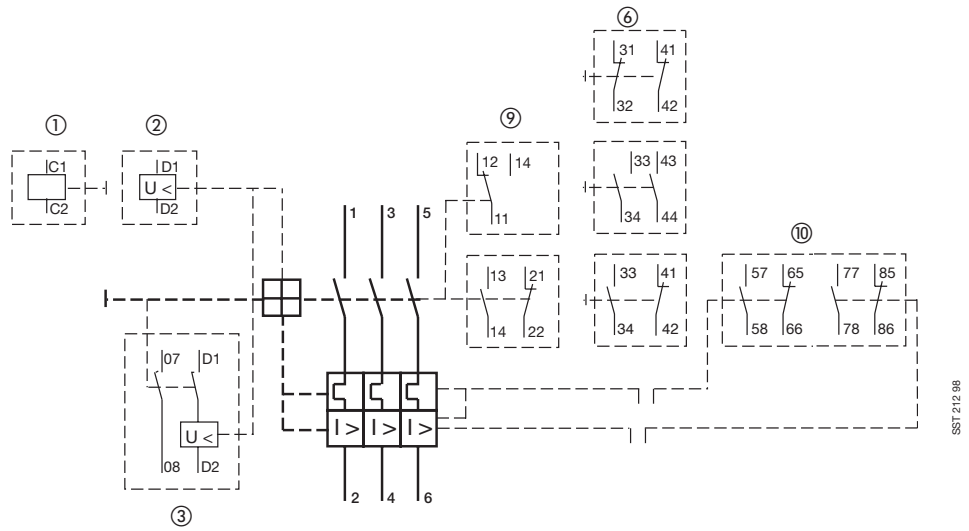
① Open-circuit shunt release
② Undervoltage release
③ Undervoltage release with leading auxiliary switch 2 SV
④ Indexing mechanism, only MS325
⑥ Auxiliary switch blocks for lateral attachment
⑧ Tripped alarm switch block (signalling contact)
⑨ Auxiliary switches which can be plugged on at the front
⑩ Alarm switch for short-circuits and general tripping



Manual motor starter **MS325** with accessories in accordance with the adjacent caption



Manual motor starter
for switching direct current and single-phase alternating current



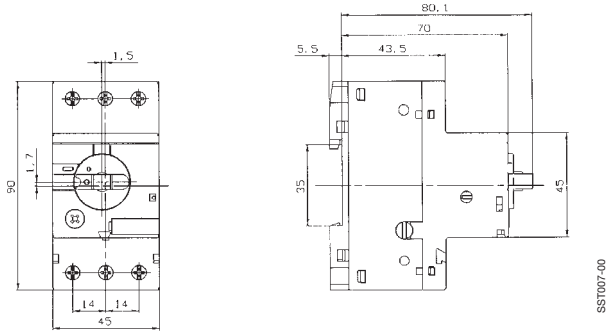
Manual motor starter **MS4xx**
in accordance with the adjacent caption

Manual Motor Starter MS116

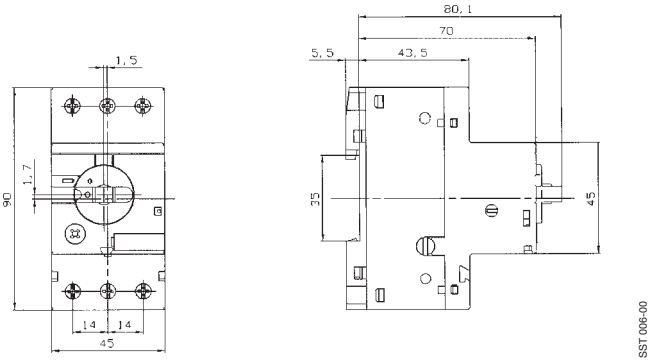
Accessories

Dimension diagrams

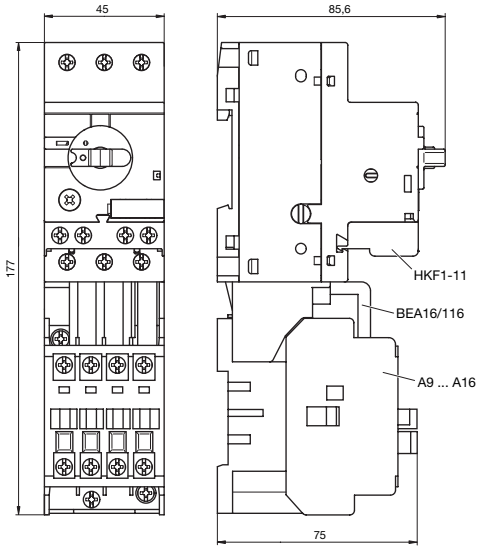
Manual motor starter **MS116**



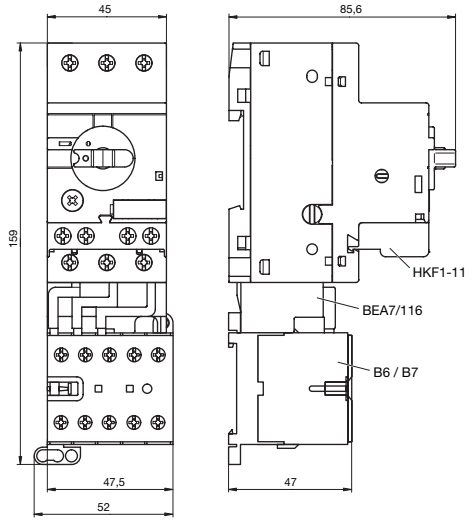
MS116 with aux. contact HKF 1 for front mounting



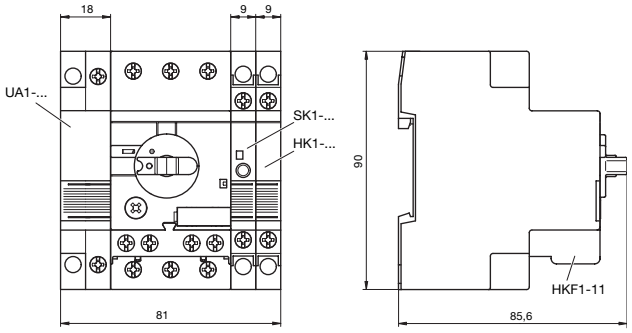
Manual motor starter **MS116** mounted with contactor **A9...A16**



Manual motor starter **MS116** mounted with mini contactor **B6/7**



Manual motor starter **MS116** mounted with UA1.../SK1.../HK1.../HKF1-11



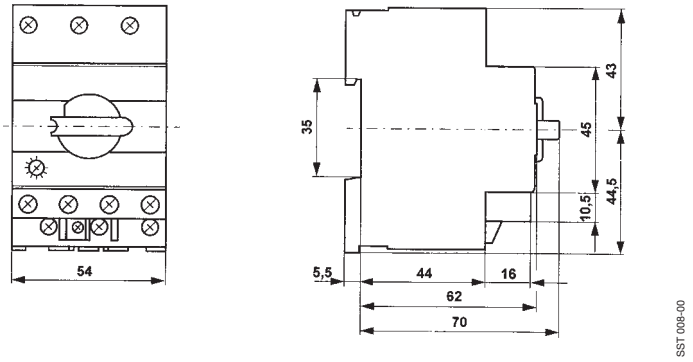
Dimension in mm

Manual Motor Starters MS325

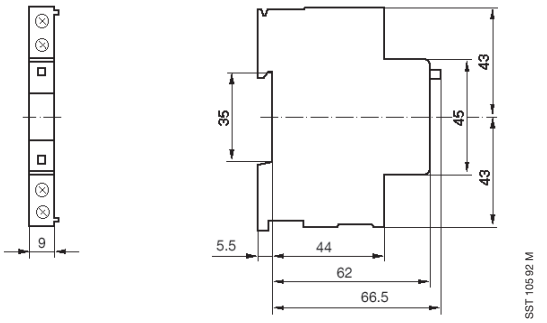
Accessories

Dimension diagrams

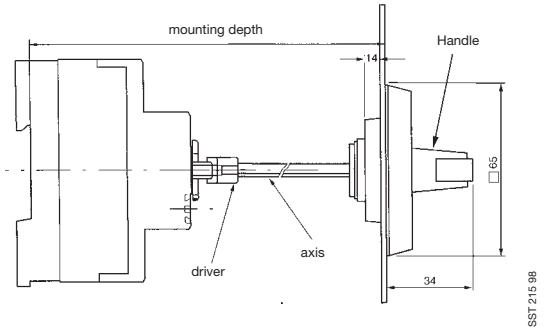
Manual motor starter **MS325** with aux. contact HKF for front mounting



Signal contact SK
Auxiliary switch HK

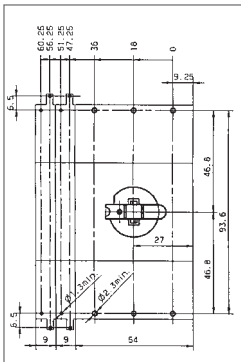


Switch cubicle mounting kit

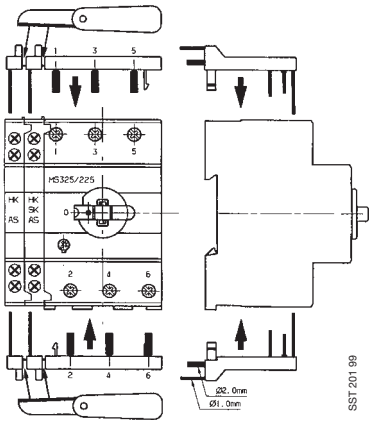


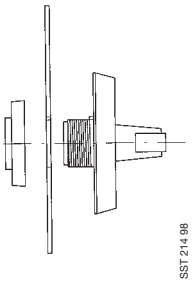
Mounting depth mm	90	137	157	182	232
Axial length mm	32	85	105	130	180

Drilling plan

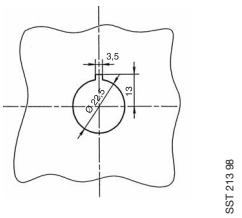


Printadapter PA25



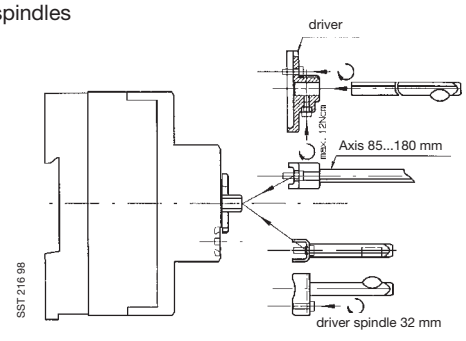


Outer twist knobs



Drilling plan

Driver and spindles



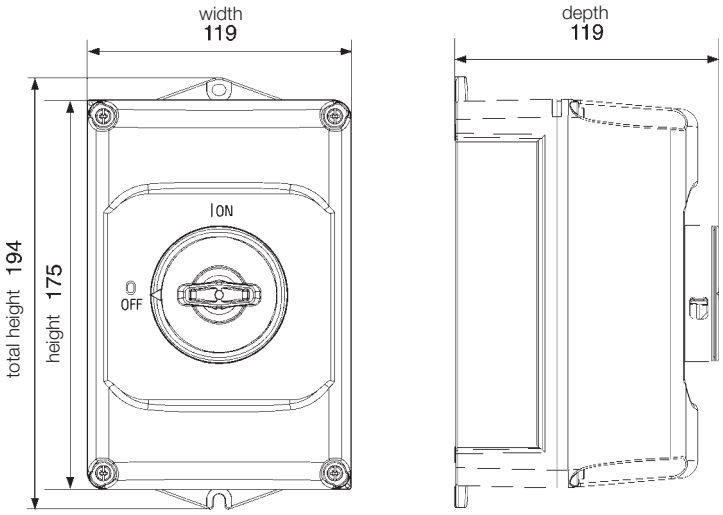
Dimension in mm

Manual Motor Starters MS325

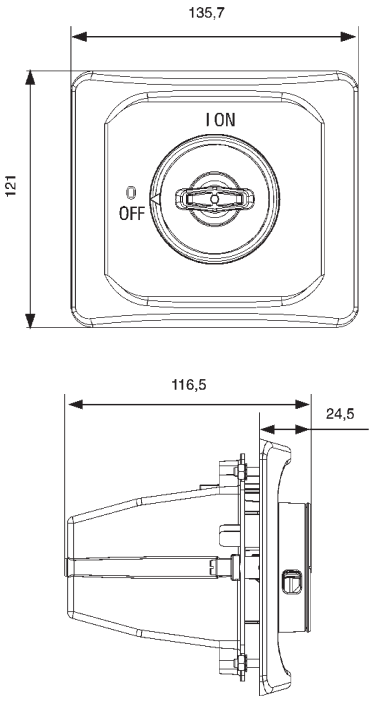
Accessories

Dimension diagrams

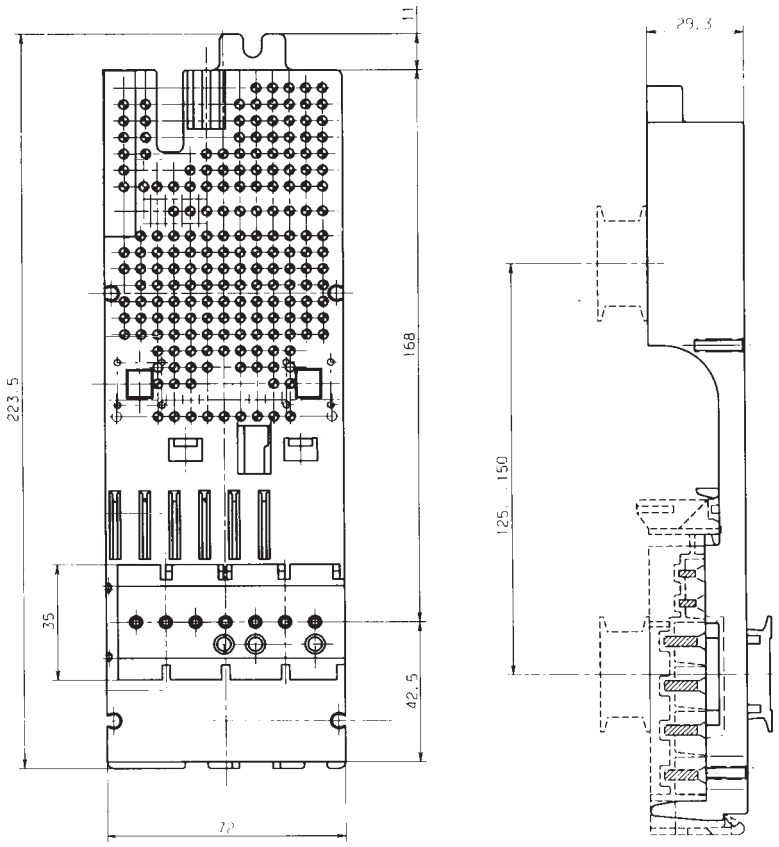
Housing IP65



Door Mounting Kit



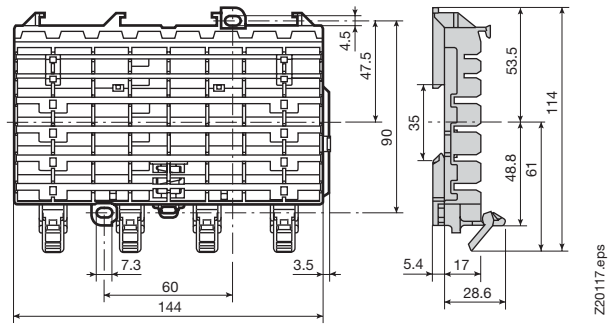
Mounting plate
starter combination for plug into busbar system smissline-S



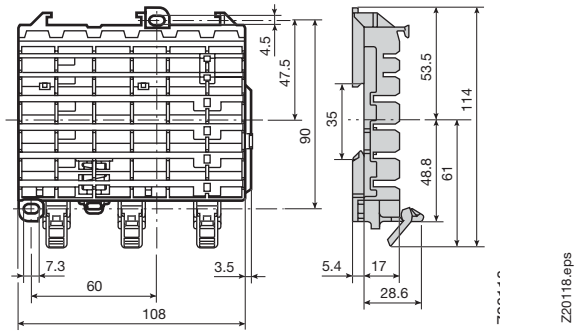
Dimensions in mm

Busbar system smissline-S

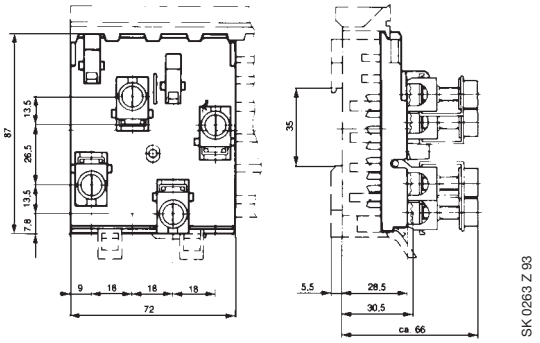
Socket ZLS 808 8 PLE

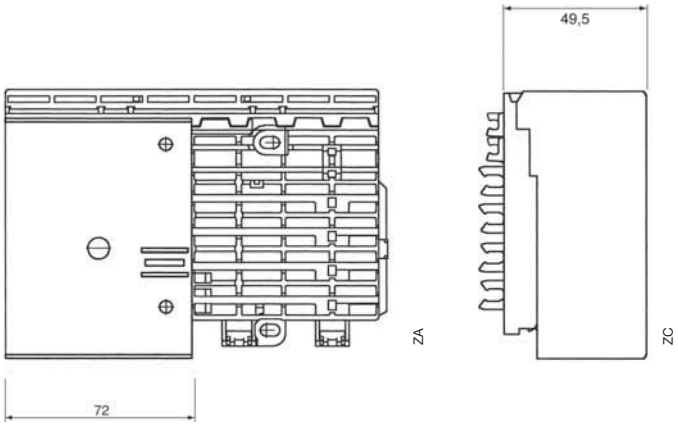


Socket ZLS 806 6 PLE

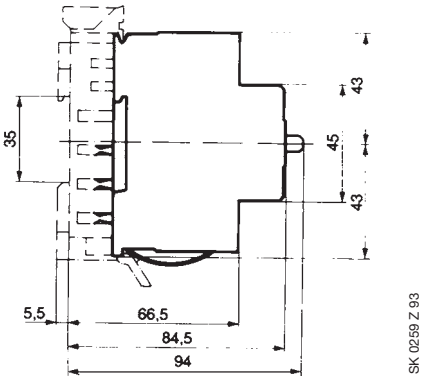


Power infeed block ZLS 224 4 PLE

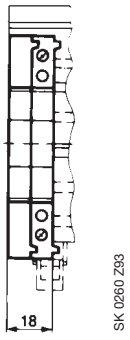




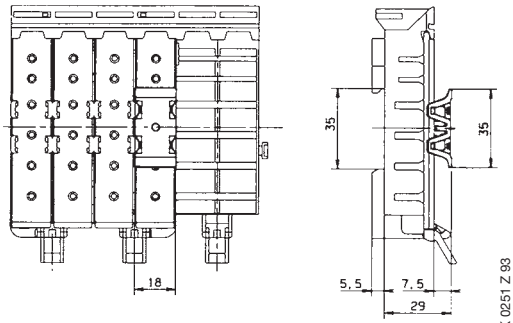
Motor protection switch MS325 3 PLE



Auxiliary switch block HK with empty housing ZLS 930 1 PLE



Busbar cover ZLS 100 with adapter ZLS 101

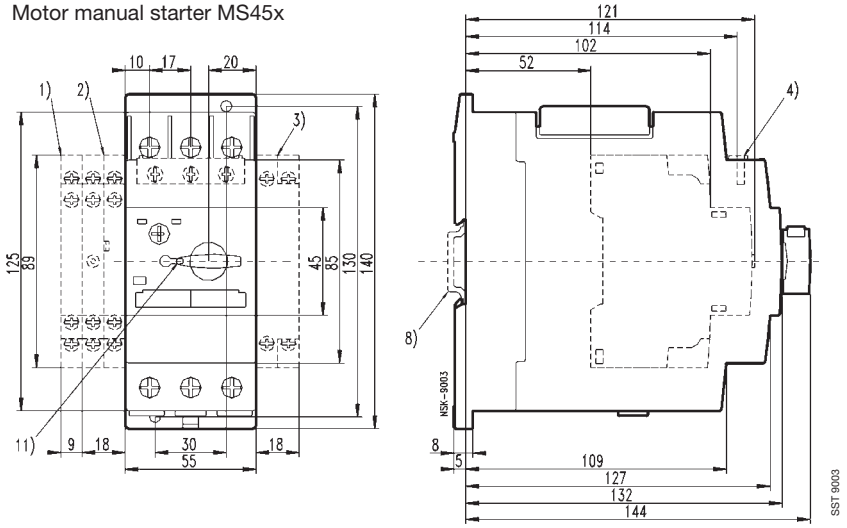


Dimensions in mm

Manual Motor Starters MS45x / MS49x

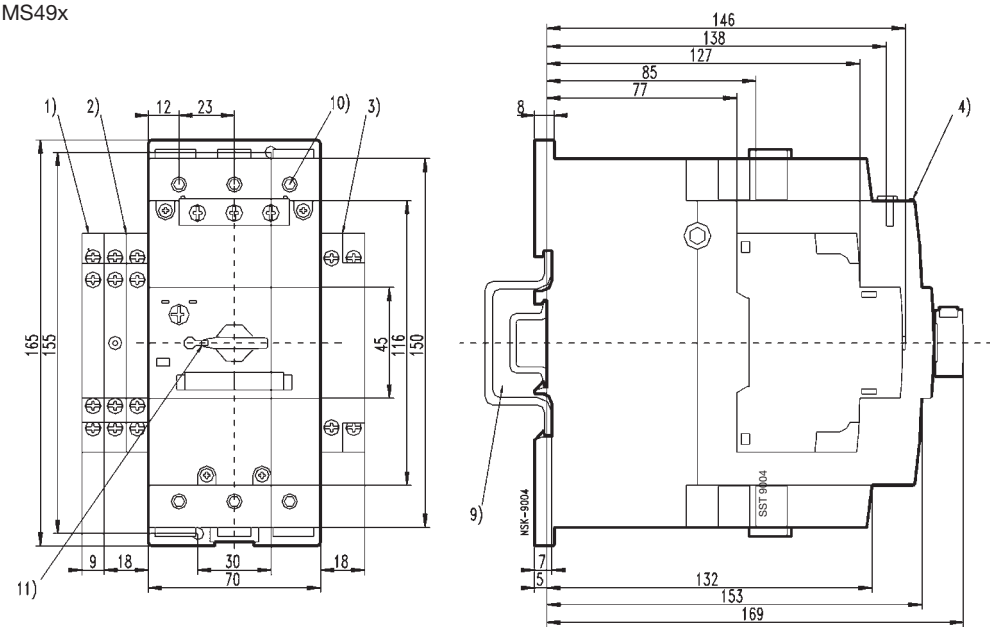
Dimension diagrams

Motor manual starter MS45x

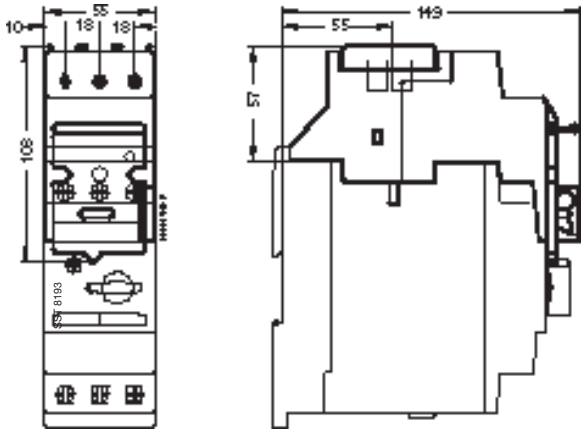


- ❷ Auxiliary switch block HKS4
- ◗ Pilot swich SK4
- ➥ Open-circuit shunt release/undervoltage release AA4, UA4, UA4-HK
- ❸ Auxiliary switch HK4
  Top-hat rail 35 mm to DIN EN 50022
- ⇨ Top-hat rail 35 mm, 15 mm high to DIN EN 50022
  or Top-hat rail 75 mm to DIN EN 50023
  Switch knob lockable in zero position with bracket diameter 5 mm

Motor manual starter MS49x

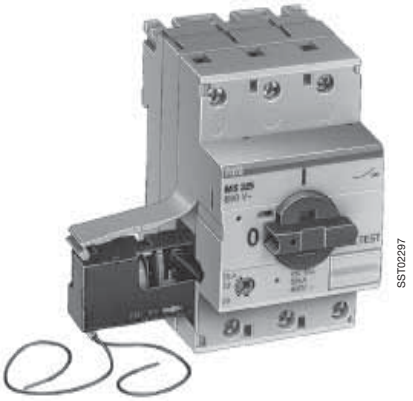


MS45x with disconnector module TB450



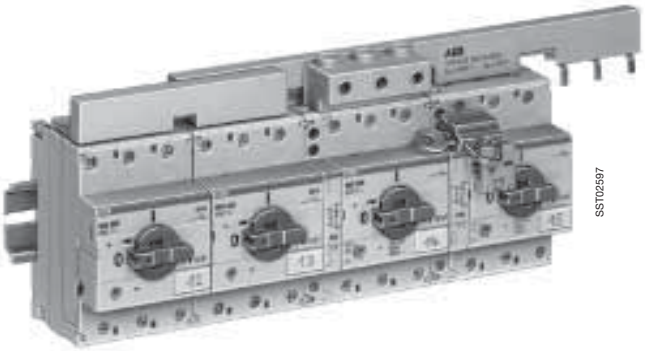
Manual Motor Starter MS325

Combinations with Accessories



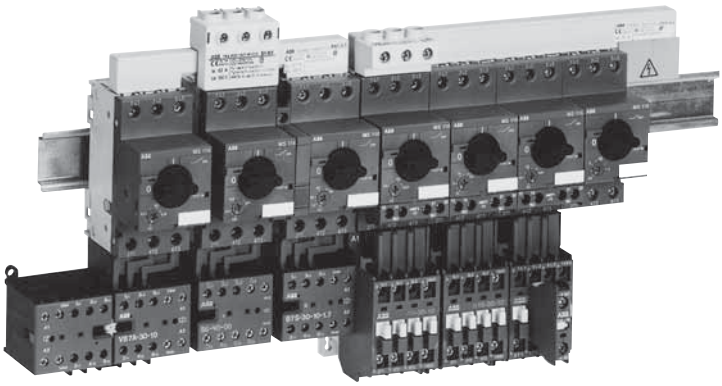
MS325
with undervoltage release UAF

Insulating
enclosure IP65



MS325 with auxiliary switch HK
cross-wired with phase buses and power infeed block

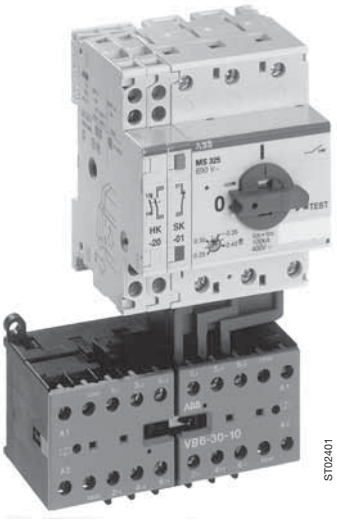
QES6/3N



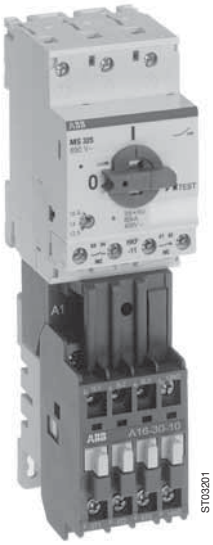
MS116 cross wired via phase busses and power infeed blocks

Manual Motor Starter MS325

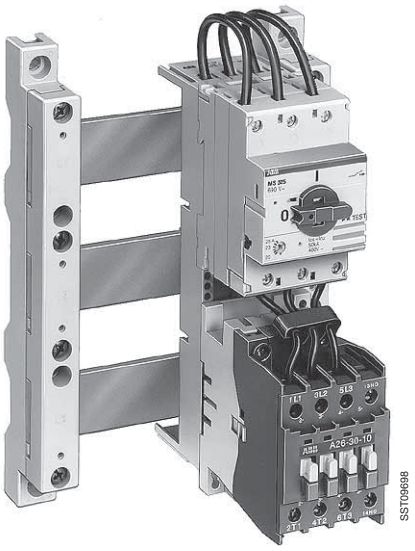
Combinations with Accessories



MS325 + HK + SK with
compact reversing contactor VB6

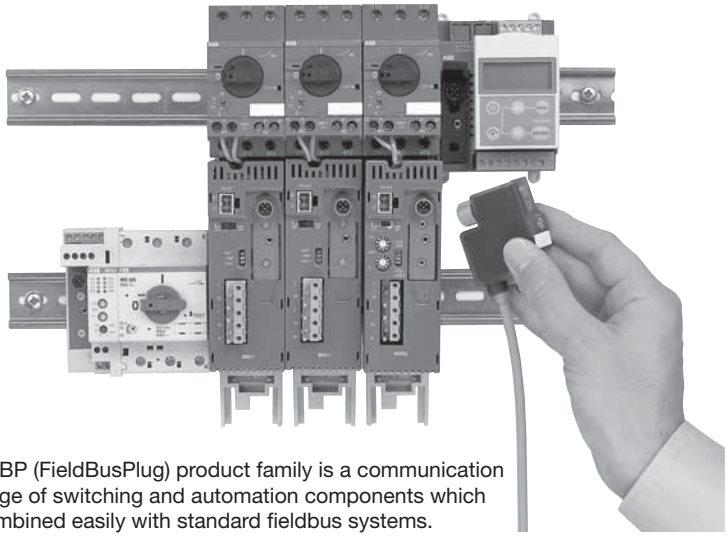


MS325 + HKF with contactor A16

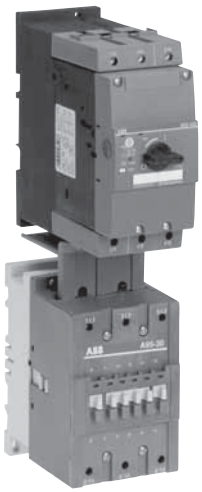


MS325 with contactor A26
on busbar adapter SA11

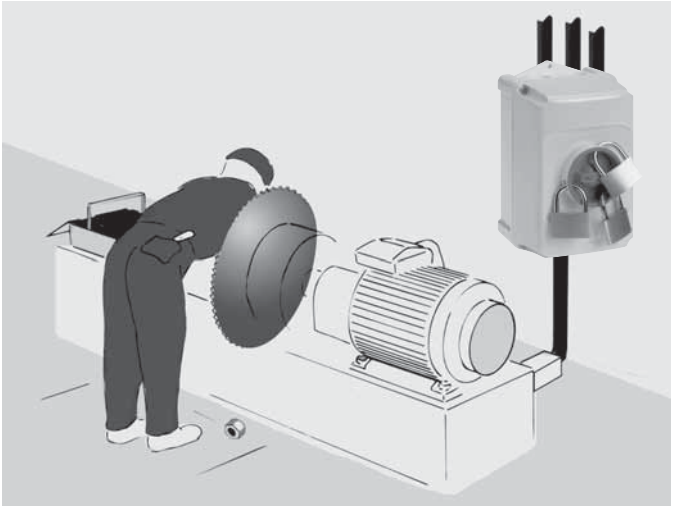
Insulating enclosure
IP65 with locks



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.



MS495 with A95
connected via BEA 110/495

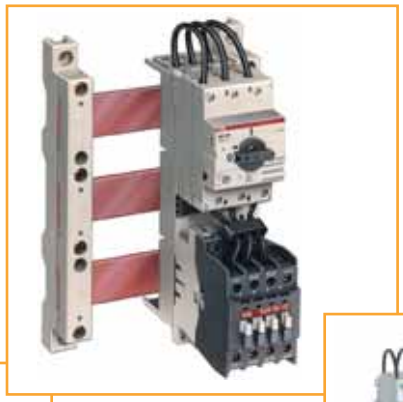


Manual Motor Starter Application: Switching on/off, Disconnection and locking for service, Motorprotection

Various Motor Starter combinations

The manual motor starters from ABB are designed to be easily coordinated with various other components from ABB to build a motor starter combination.

These combinations include for example the A-Series contactors from ABB, as well as other contactors like an operating mechanism or mini-contactors Series “B”.



Together with the manual motor starters MS116, MS325, MS450 and MS495 these ABB components form coordinated starter combinations for a large variety of applications.

Such a modular philosophy brings endusers an emproved service and faster reactions in operating systems.

Starter solution for plug-in

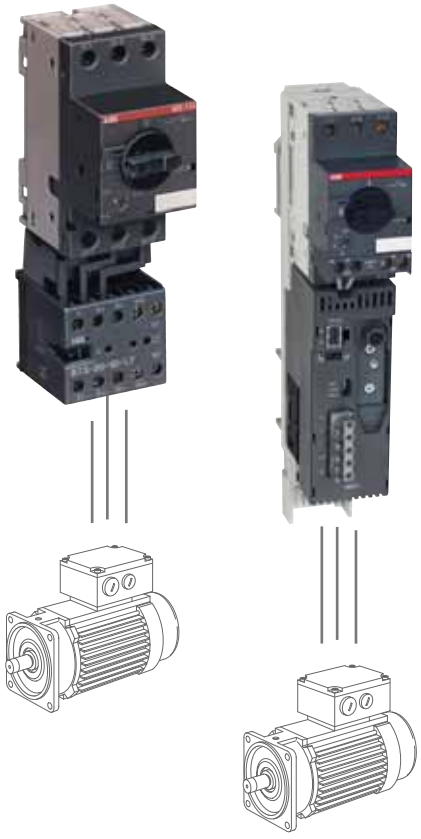
DOL Starters

A unit MS116/325 can be clipped, forming an automatically connected motor starter combination.

Fast front connection, compact dimensions and a robust design are only the most obvious advantages of ABB’s motor starters.

Seperate gear concept

Individual devices for single wiring. Manual motor starter and contactor can be wired according to customer demands.



Modular concept

Motor starter Combinations without or with field bus connection.

Customer benefits:

- fully coordinated modular assembly
- easy planning
- no wiring necessary
- compact - space saving
- easy to change
- better and quicker service
- FBP connection to field busses

Manual Motor Starters
MS116, MS325, MS4xx

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