





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

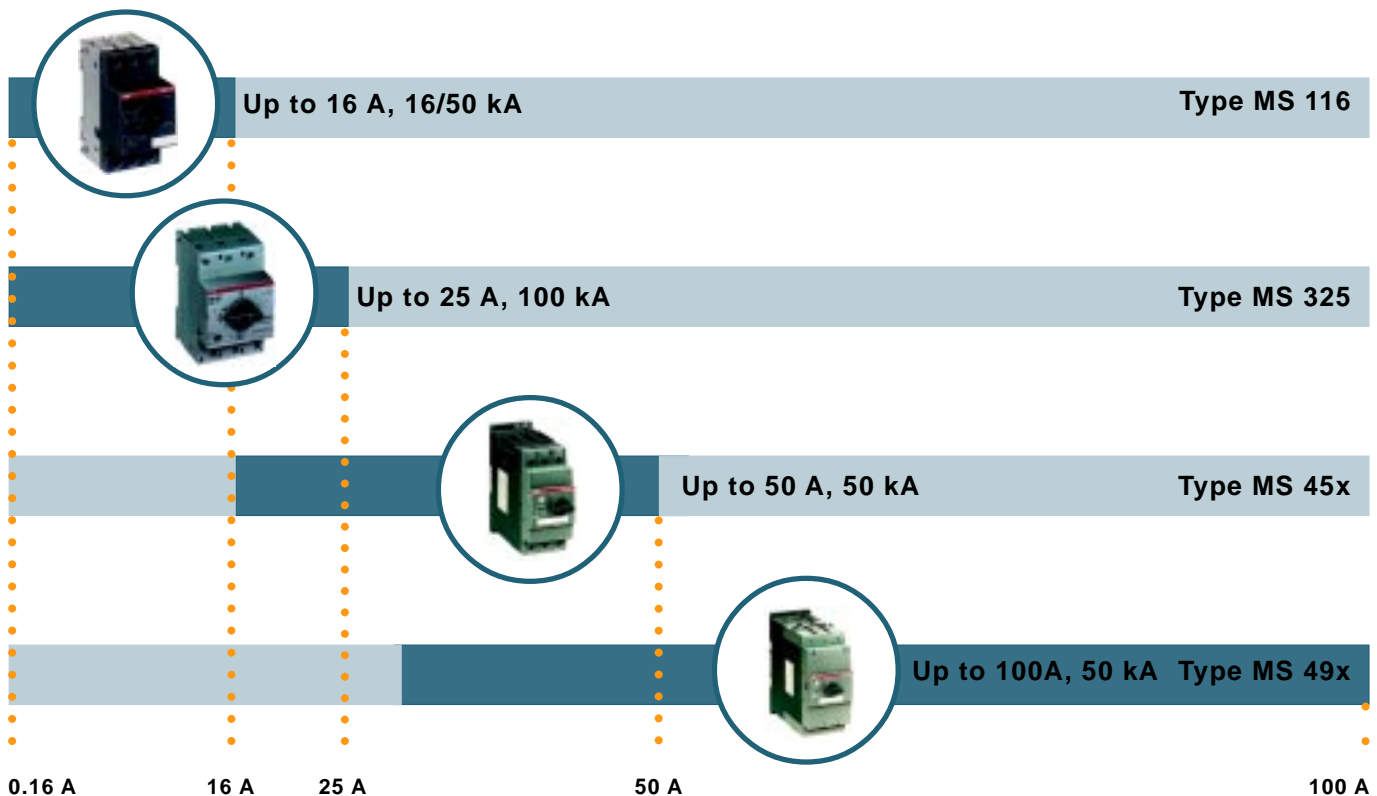
Manual motor starters provide protection against:

- 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 MS 116/325 are suitable for industrial applications as well as for domestic installations.

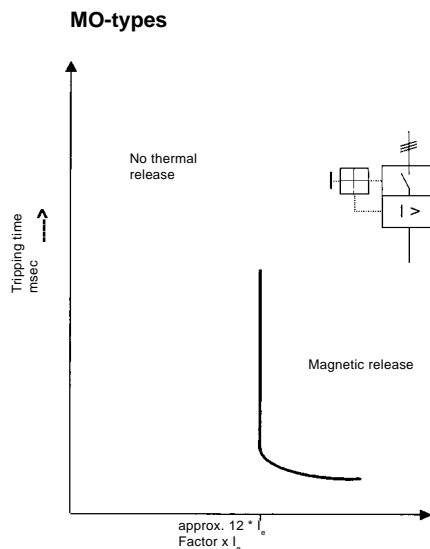
The device-types MS 116/325 can be easily coordinated with the ABB MCB-system, which is used in installations for touch-proofed enclosures and panels. MS 450 to MS 497 are your best choice for high power applications. These models are used to power up large motors up to 45 kW.

Technical Data, Overview

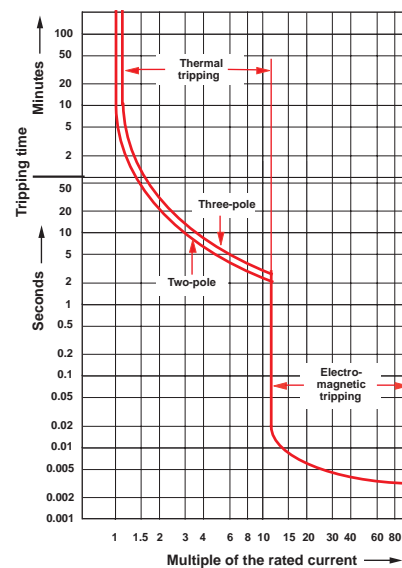
Motorstarter type	MS116	MS 325	MS 45x	MS 49x
I_e /A	16	25	50	100
I_{cs} /kA	16/30/50	50/100	25/50	25/50/100
Tripping class	10	10	10,20	10,20
Magnetic type only		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disconnect Capability, ref. IEC 60947-1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The types MS 325 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.



MSx Tripping curves



Manual Motor Starter MS 116

Accessories

Ordering details

Open design, enclosure IP 20, resistant to changeable climates. Quick fastening on mounting rails DIN EN 50 022, 35 mm without auxiliary switch.

Type	Setting range	Order code	Weight/ piece kg	Packing Unit piece
	A...A			

MS 116 with thermal and electromagnetic trips, short-circuit-proof up to 50 kA

MS 116 - 0.16	0.10 ... 0.16	1SAM 250 000 R 1001	0.268	1
MS 116 - 0.25	0.16 ... 0.25	1SAM 250 000 R 1002	0.268	1
MS 116 - 0.4	0.25 ... 0.40	1SAM 250 000 R 1003	0.268	1
MS 116 - 0.63	0.40 ... 0.63	1SAM 250 000 R 1004	0.268	1
MS 116 - 1.0	0.63 ... 1.00	1SAM 250 000 R 1005	0.268	1
MS 116 - 1.6	1.00 ... 1.60	1SAM 250 000 R 1006	0.268	1
MS 116 - 2.5	1.60 ... 2.50	1SAM 250 000 R 1007	0.268	1
MS 116 - 4	2.50 ... 4.00	1SAM 250 000 R 1008	0.268	1
MS 116 - 6.3	4.00 ... 6.30	1SAM 250 000 R 1009	0.268	1
MS 116 - 10.0	6.30 ... 10.00	1SAM 250 000 R 1010	0.268	1
MS 116 - 12.0	8.00 ... 12.00	1SAM 250 000 R 1012	0.268	1
MS 116 - 16.0	10.00 ... 16.00	1SAM 250 000 R 1011	0.268	1

Accessories

Type	Order code	Packing Unit piece
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Auxiliary switches, for front mounting ①

HKF1-11	1 NO + 1 NC	1SAM 201 901 R 1001	10
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Auxiliary switches with lead contacts, also to use with undervoltage release

HK1-20L	2 NO lead contacts	1SAM 201 902 R 1004	10
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Auxiliary switches, lateral attachment at right

HK1-11	1 NO + 1 NC	1SAM 201 902 R 1001	10
HK1-20	2 NO	1SAM 201 902 R 1002	10
HK1-02	2 NC	1SAM 201 902 R 1003	10

Shunt release, lateral mounting at the left side

AA1-24	24 V, 50/60 Hz	1SAM 201 910 R 1001	10
AA1-110	110 V, 50/60 Hz	1SAM 201 910 R 1002	10
AA1-230	200-240 V, 50/60 Hz	1SAM 201 910 R 1003	10
AA1-400	350-415 V, 50/60 Hz	1SAM 201 910 R 1004	10

Signal kontakt for general "tripped" signal, lateral attachment at right

SK1-11	1 NO + 1 NC	1SAM 201 903 R 1001	10
SK1-20	2 NO	1SAM 201 903 R 1002	10
SK1-02	2 NC	1SAM 201 903 R 1003	10

Undervoltage release, lateral attachment at left

UA1-24	24 V, 50 Hz	1SAM 201 904 R 1001	10
UA1-48	48 V, 50 Hz	1SAM 201 904 R 1002	10
UA1-60	60 V, 50 Hz	1SAM 201 904 R 1003	10
UA1-120	110 V 50 Hz/120 V 60 Hz	1SAM 201 904 R 1004	10
UA1-208	208 V, 60 Hz	1SAM 201 404 R 1008	10
UA1-230	230 V 50 Hz/240 V 60 Hz	1SAM 201 904 R 1005	10
UA1-400	400 V, 50 Hz	1SAM 201 904 R 1006	10
UA1-415	415 V 50 Hz/480 V 60 Hz	1SAM 201 904 R 1007	10

Locking device (see also MS 325, Page 9)

SA1	lock adapter	GJF1 101 903 R 0001	10
SA2	padlock + 2 keys	GJF1 101 903 R 0002	10
SA3	lock adapter + padlock + 2 keys	GJF1 101 903 R 0003	1

Direct adapter, for wiring to contactors

BEA7/116	mini contactors B6/B7	1ISBN 080 906 R 1000	1
BEA16/116	contactors A9/A12/A16	1ISBN 081 406 R 1000	1
BEA26/116	contactors A26	1ISBN 082 406 R 1000	1

① Not suitable for panel mounting



Manual Motor Starter MS 116

Accessories

Ordering details



Accessories

Type	Order code	Packing Unit/piece	Price
Phase buses for cross wiring MS 116, 63 A, 690 V			
PS1-2-0, for 2 devices without auxiliary switches	1SAM 201 906 R 1002	10	
PS1-3-0, for 3 devices without auxiliary switches	1SAM 201 906 R 1003	10	
PS1-4-0, for 4 devices without auxiliary switches	1SAM 201 906 R 1004	10	
PS1-5-0, for 5 devices without auxiliary switches	1SAM 201 906 R 1005	10	
PS1-2-1, for 2 devices with 1 auxiliary switch	1SAM 201 906 R 1012	10	
PS1-3-1, for 3 devices with 1 auxiliary switch	1SAM 201 906 R 1013	10	
PS1-4-1, for 4 devices with 1 auxiliary switch	1SAM 201 906 R 1014	10	
PS1-5-1, for 5 devices with 1 auxiliary switch	1SAM 201 906 R 1015	10	
PS1-2-2, for 2 devices with 2 auxiliary switches	1SAM 201 906 R 1022	10	
PS1-3-2, for 3 devices with 2 auxiliary switches	1SAM 201 906 R 1023	10	
PS1-4-2, for 4 devices with 2 auxiliary switches	1SAM 201 906 R 1024	10	
PS1-5-2, for 5 devices with 2 auxiliary switches	1SAM 201 906 R 1025	10	
Power infeed blocks, 63 A, 690 V, stranded 25 mm², flexible 16 mm²			
S1-M1, flat	1SAM 201 907 R 1001	10	
S1-M2, high	1SAM 201 907 R 1002	10	
Cover for phase busses			
BS1-3	1SAM 201 908 R 1001	50	
Insulating enclosure IP 65, with rotary handle, triple lockable in Off position, with N- und PE-terminal, for Manual Motor Starter			
IB 116-G, Twist knob black	1SAM 201 911 R 1000	1	
IB 116-Y, Twist knob red/yellow	1SAM 201 911 R 1001	1	
Insulating enclosure, light grey IP 55 with cover, including DIN rail for manual motor starter or line protection devices			
QES 4/3 N, for 4 modules, 72 mm	GHL 111 2304 R 0013		
QES 6/3 N, for 6 modules, 108 mm	GHL 111 2306 R 0013		
QES 10/3 N, for 10 modules, 180 mm	GHL 111 2310 R 0013		
Set of neutral and earth terminals			
SMO 4, for QES 4/3 N	GHL 430 1910 R 0004		
SMO 6, for QES 6/3 N	GHL 430 1910 R 0006		
SMO 10, for QES 10/3 N	GHL 430 1910 R 0010		
Plastic enclosure, light grey, IP40 in panel design, including DIN rail			
PCD 4 N, for 4 modules, 72 mm	GHS 270 1921 R 0004		
PCD 6 N, for 6 modules, 108 mm	GHS 270 1921 R 0006		
PCD 8 N, for 8 modules, 144 mm	GHS 270 1921 R 0008		
Switch cubicle mounting kit IP 65, with axial extension triple lockable in Off position, locked in On position			
OHB2AJM, Twist knob black	1SCA 022 384 R 6940	1	
OHY2AJM, Twist knob red/yellow	1SCA 022 384 R 7080	1	
OXS5X85, axis 85 mm	1SCA 022 347 R 3570	1	
OXS5X105, axis 105 mm	1SCA 022 347 R 3650	1	
OXS5X130, axis 130 mm	1SCA 022 353 R 4540	1	
OXS5X180, axis 180 mm	1SCA 022 353 R 4620	1	
MSMN, driver ①	1SAM 101 923 R 0001	1	
MSOX, driver spindle 32 mm ②	1SAM 101 924 R 0001	1	
Door mounting kit IP 65, Lockable in Off-position			
DMS 116-G, Twist knob black	1SAM 201 912 R 1000	1	
DMS 116-Y, Twist knob red/yellow	1SAM 201 912 R 1001	1	

① For accommodating spindle and attachment to manual motor starter

② Is screwed directly onto the manual motor starter

Manual Motor Starter MS 325

Ordering details



SST01487

MS 325



SST 02899

MS 325 with auxiliary contacts HKF-11 front mounting

Selection

Open design, enclosure IP 20, resistant to changeable climates. Quick fastening on mounting rails DIN EN 50 022, 35.

Type	Setting range	Order code	Weight/ piece kg	Packing Unit piece	Price
	A...A				

MS 325 with thermal and electromagnetic trips, short-circuit-proof up to 100 kA, resp.50 kA ① ②

MS 325 – 0.16	0.10 ... 0.16	1SAM 150 000 R 1001	0.347	1	
MS 325 – 0.25	0.16 ... 0.25	1SAM 150 000 R 1002	0.347	1	
MS 325 – 0.4	0.25 ... 0.40	1SAM 150 000 R 1003	0.347	1	
MS 325 – 0.63	0.40 ... 0.63	1SAM 150 000 R 1004	0.347	1	
MS 325 – 1	0.63 ... 1.00	1SAM 150 000 R 1005	0.347	1	
MS 325 – 1.6	1.00 ... 1.60	1SAM 150 000 R 1006	0.347	1	
MS 325 – 2.5	1.60 ... 2.50	1SAM 150 000 R 1007	0.347	1	
MS 325 – 4	2.50 ... 4.00	1SAM 150 000 R 1008	0.347	1	
MS 325 – 6.3	4.00 ... 6.30	1SAM 150 000 R 1009	0.347	1	
MS 325 – 9	6.30 ... 9.00	1SAM 150 000 R 1010	0.347	1	
MS 325 – 12.5	9.00 ... 12.50	1SAM 150 000 R 1011	0.347	1	
MS 325 – 16	12.50 ... 16.00	1SAM 150 000 R 1012	0.347	1	
MS 325 – 20	16.00 ... 20.00	1SAM 150 000 R 1013	0.347	1	
MS 325 – 25	20.00 ... 25.00	1SAM 150 000 R 1014	0.347	1	

MS 325 with thermal and electromagnetic trips, short-circuit-proof up to 100 kA, resp. 50 kA ① ② with auxiliary switch 1 NO + 1 NC front mounted

MS 325 – 0.16	0.10 ... 0.16	1SAM 150 005 R 0001	0.359	1	
MS 325 – 0.25	0.16 ... 0.25	1SAM 150 005 R 0002	0.359	1	
MS 325 – 0.4	0.25 ... 0.40	1SAM 150 005 R 0003	0.359	1	
MS 325 – 0.63	0.40 ... 0.63	1SAM 150 005 R 0004	0.359	1	
MS 325 – 1	0.63 ... 1.00	1SAM 150 005 R 0005	0.359	1	
MS 325 – 1.6	1.00 ... 1.60	1SAM 150 005 R 0006	0.359	1	
MS 325 – 2.5	1.60 ... 2.50	1SAM 150 005 R 0007	0.359	1	
MS 325 – 4	2.50 ... 4.00	1SAM 150 005 R 0008	0.359	1	
MS 325 – 6.3	4.00 ... 6.30	1SAM 150 005 R 0009	0.359	1	
MS 325 – 9	6.30 ... 9.00	1SAM 150 005 R 0010	0.359	1	
MS 325 – 12.5	9.00 ... 12.50	1SAM 150 005 R 0011	0.359	1	
MS 325 – 16	12.50 ... 16.00	1SAM 150 005 R 0012	0.359	1	
MS 325 – 20	16.00 ... 20.00	1SAM 150 005 R 0013	0.359	1	
MS 325 – 25	20.00 ... 25.00	1SAM 150 005 R 0014	0.359	1	

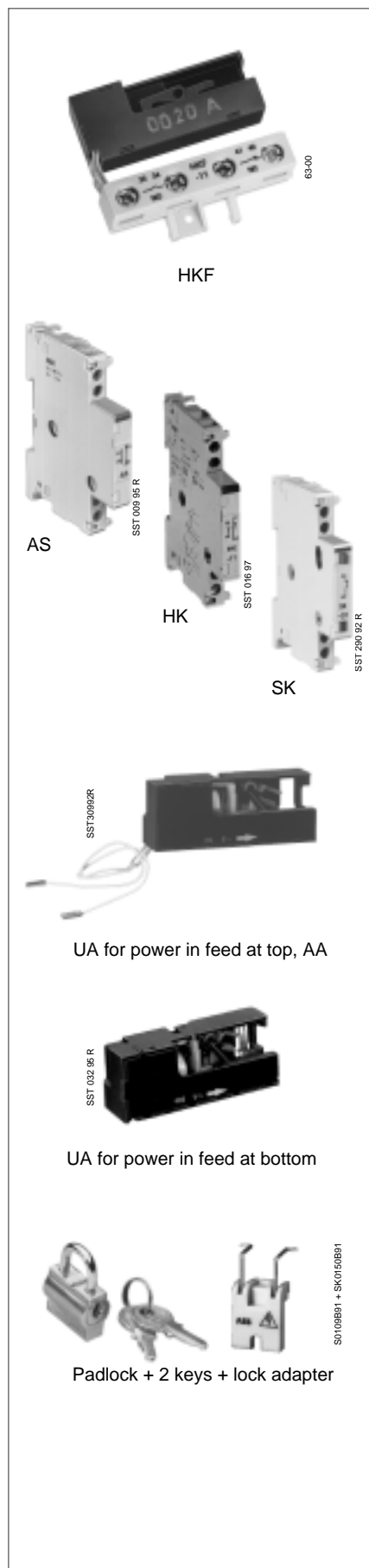
① See table on Page 21

② Not suitable for panel mounting

Manual Motor Starters MS 325

Accessories

Ordering details



Retrofittable accessories

These parts can be procured in addition to the **MS 325**; they must be installed by the user.

Type	Setting range	Order code	Weight/ piece kg	Packing Unit piece	Price
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Auxiliary switches, for front mounting ①

HKF-11	1 NO + 1 NC	1SAM 101 928 R 0001	0.020	10	
HKF-20	2 NO	1SAM 101 928 R 0002	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	10	
HK-20	2 NO ④	1SAM 101 901 R0002	0.031	10	
HK-02	2 NC	1SAM 101 901 R0003	0.031	10	

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	10	
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Undervoltage release, slide-in ⑤

UA, power infeed at bottom, ⑥ U _C 400 V~		1SAM 101 902 R 0400	0.02	10	
UAF, power infeed at top, resp. connection of external voltage	U _C 24 V~	1SAM 101 903 R 0024	0.02	10	
	48 V~	1SAM 101 903 R 0048	0.02	10	
	60 V~	1SAM 101 903 R 0060	0.02	10	
	110 V~	1SAM 101 903 R 0110	0.02	10	
	230 V~	1SAM 101 903 R 0230	0.02	10	
	400 V~	1SAM 101 903 R 0400	0.02	10	
	415 V~	1SAM 101 903 R 0415	0.02	10	
500 V~	1SAM 101 903 R 0500	0.02	10		

Open circuit shunt release, slide-in ⑦

AA	24 ... 60 V AC/DC	1SAM 101 909 R 0001	0.02	10	
AA	110... 240 V AC/DC	1SAM 101 909 R 0002	0.02	10	

Terminal support, lateral attachment at left to MS 325, HK and SK

AS, for UA, AA or as N/LS terminal	1SAM 101 905 R 0001	0.031	10	
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Locking device for MS 325

SA1, lock adapter	GJF1 101 903 R 0001	0.004	10	
SA2, padlock + 2 keys	GJF1 101 903 R 0002	0.004	10	
SA3, lock adapter + padlock + 2 keys	GJF1 101 903 R 0003	0.050	1	

Printadapter, for soldering on electronic plates

PA25, for MS 325 and 2 aux. contacts	1SAM 101 933 R 0001	0.030	1 kit	
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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 socket busbar system smissline-S (see Page 13)

⑦ Recommendation: Connection of external voltage via terminal support AS

Manual Motor Starters MS 325

Accessories

Ordering details



Accessories

Type	Order code	Weight/ piece kg	Packing unit piece	Price
Phase buses for cross wiring MS 325, 63 A, 690 V				
PS3-2-0, for 2 dev., without aux. switch	1SAM 101 937 R 0012		10	
PS3-3-0, for 3 dev., without aux. switch	1SAM 101 937 R 0013		10	
PS3-4-0, for 4 dev., without aux. switch	1SAM 101 937 R 0014		10	
PS3-5-0, for 5 dev., without aux. switch	1SAM 101 937 R 0015		10	
PS3-2-1, for 2 dev., with 1 aux. switch	1SAM 101 937 R 0022		10	
PS3-3-1, for 3 dev., with 1 aux. switch	1SAM 101 937 R 0023		10	
PS3-4-1, for 4 dev., with 1 aux. switch	1SAM 101 937 R 0024		10	
PS3-5-1, for 5 dev., with 1 aux. switch	1SAM 101 937 R 0025		10	
PS3-2-2, for 2 dev., with 2 aux. switches	1SAM 101 937 R 0032		10	
PS3-4-2, for 4 devices, with 2 aux. swit.	1SAM 101 937 R 0034		10	
Power infeed blocks, 63 A, 690 V, stranded 25 mm², flexible 16 mm²				
S3- M1, flat	1SAM 101 938 R 0001		10	
S3- M2, high	1SAM 101 938 R 0002		10	
Cover for busbars (for not used poles)				
BS3-3	1SAM 101 938 R 0003		50	
Connecting element from MS 325 to 3-pole circuit-breaker S2				
SZ-SM3, for power infeed from top or bottom	GHV 036 0504 R 0005	0.047	1	
Insulating enclosure IP 65 with rotary handle, triple lockable in Off position, with N- und PE-terminal, for Manual Motor Starter				
IB 325-G, Twist knob black	1SAM 101 940 R1000	1		
IB 325 Y, Twist knob red/yellow	1SAM 101 940 R1001	1		
Insulating enclosure, light grey IP 55 with cover, including DIN rail for manual motor starter or line protection devices				
QES 4/3 N, for 4 modules, 72 mm	GHL 111 2304 R 0013			
QES 6/3 N, for 6 modules, 108 mm	GHL 111 2306 R 0013			
QES 10/3 N, for 10 modules, 180 mm	GHL 111 2310 R 0013			
Set of neutral and earth terminals				
SMO 4, for QES 4/3 N	GHL 430 1910 R 0004			
SMO 6, for QES 6/3 N	GHL 430 1910 R 0006			
SMO 10, for QES 10/3 N	GHL 430 1910 R 0010			
Plastic enclosure, light grey, IP40 in panel design, including DIN rail				
PCD 4 N, for 4 modules, 72 mm	GHS 270 1921 R 0004			
PCD 6 N, for 6 modules, 108 mm	GHS 270 1921 R 0006			
PCD 8 N, for 8 modules, 144 mm	GHS 270 1921 R 0008			
Switch cubicle mounting kit IP 65, with axial extension triple lockable in Off position, locked in On position				
OHB2AJM, Twist knob black	1SCA 022 384 R 6940		1	
OHY2AJM, Twist knob red/yellow ③	1SCA 022 384 R 7080		1	
OXS5X 85, axis 85 mm	1SCA 022 347 R 3570		1	
OXS5X105, axis 105 mm	1SCA 022 347 R 3650		1	
OXS5X130, axis 130 mm	1SCA 022 353 R 4540		1	
OXS5X180, axis 180 mm	1SCA 022 353 R 4620		1	
MSMN, driver ①	1SAM 101 923 R 0001		1	
MSOX, driver spindle 32 mm ②	1SAM 101 924 R 0001		1	
Direct adapter MS 325 ④				
BEA7/325, direct adapter MS325 to B6/B7	1SBN 080 906 R 1001	0.021	10	
BEA16/325, direct adapter MS325 to A9/A12/A16	1SBN 081 406 R 1001	0.031	10	
BEA26/325, direct adapter MS325 to A26	1SBN 082 406 R 1001	0.031	10	
Door mounting kit IP 65, Lockable in Off-position				
DMS 325-G, grey handle	1SAM 101 941 R 1000		1	
DMS 325-Y, red/yellow handle	1SAM 101 941 R 1001		1	

① For accommodating spindle and attachment to manual motor starter

② Is screwed directly onto the manual motor starter, ③ Only suitable for MS 325, ④ See also page 33

Manual Motor Starter MS 325

Accessories

Ordering details, Technical data



RC 325 mounted at MS 325

Remote Control Unit RC 325

The Remote Control Unit RC 325 is suitable for manual motor starters type MS 325 up to 16 A.

With RC 325 and MS 325 customers will receive a complete, fully coordinated starter combination, type I and type II in only one product.

This combination doesn't need a backup fuse for a short circuit protection up to 60 kA at 16 A. The combination is fully coordinated and after a short circuit event no contacts will be welded.

Users will achieve a high availability since the combination's functionality is fully restored after a short circuit.

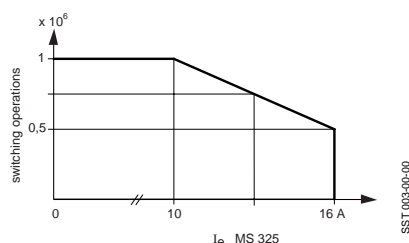
Moreover, the combination is compact and saves space and costs in operation.)

RC 325 and MS 325 together work as a manual motor starter/contactors combination. The control circuit must be connected to RC 325 which controls MS 325. To start operation, the MS 325 has to be switched to its "ON"-position. The RC 325 then controls the main contacts of the MS 325 for switching a motor or another load. In the event of a short circuit the manual motor starter will trip. For restarting MS 325 must be switched to its "ON"-position again. (RC 325 acts on 1 NO and 1 NC contact. The NO contact may operate as locking contact and the NC-contact may be used for signalling.)

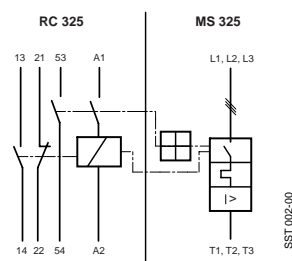
Technical data

Normes:	ICE/EN 60947-6-2, -5-1		
Approvals:	U _L , CSA		
Rated operating voltage U _e	V AC:	600	
Rated operating current I _e	A:	16	
Short circuit breaking capacity I _{cs} (at 400 V / 16 A)	kA:	60	
Rated operating voltage U _c	V AC / DC:	24, 48, 60, 110, 230	
Coil consumption	pick up	W:	90
	holding	W:	3
Relative switching duty ED	%:	100	
Rated operating temperature	°C:	- 25 ... + 50 ①	

Mechanical and electrical time life AC-3, 400 V



Wiring diagram



Contact load for RC 325

U _e / V:	AC-15 / 4	DC-13 / A:	min. load:
24	4	3	24 V, 10 mA
120	3.5	1	
230	3	0.55	
400	2	—	
500	1	—	

Ordering details

Type	Order code	Weight/ piece kg	Packing Unit piece	Price
Remote control unit for MS 325 up to 16 A, lateral attachment at left ②				
RC 325,	U _c = 230 V AC / DC	1SAM 101 926 R 0001	0.175	1
	110 V AC / DC	1SAM 101 926 R 0002	0.175	1
	60 V AC / DC	1SAM 101 926 R 0003	0.175	1
	48 V AC / DC	1SAM 101 926 R 0004	0.175	1
	24 V AC / DC	1SAM 101 926 R 0005	0.175	1

Distance piece for mounting in group

ZLS 721	GHE 610 1002 R 0024		50	
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① Please use distance piece at left by group mounting

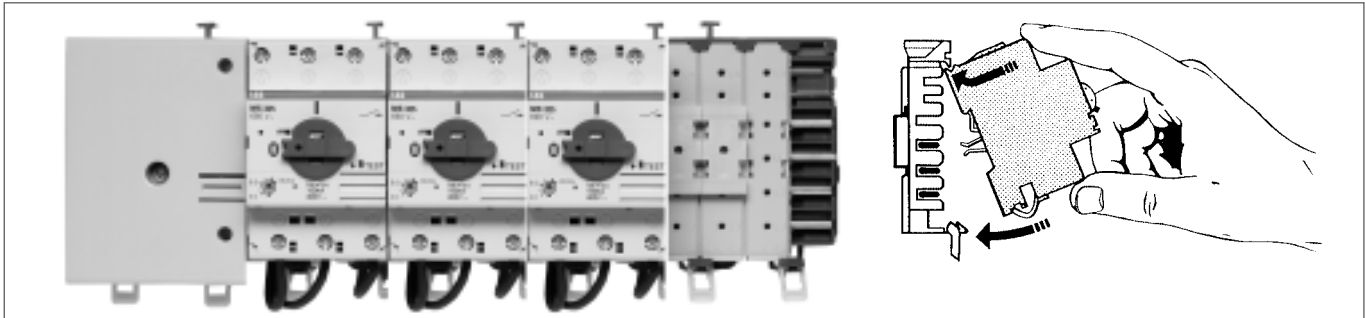
② If RC 325 is used - auxiliary devices as HKF, HK, SK, shunt-, undervoltage- release are not suitable at the same time.



RC 325

Busbar system smissline-S for MS 325

Manual Motor Starter for plug in



Smisline-S is a powerful busbar system for the quick and easy installation of manual motor starters type MS 325 up to 160 A. A user of this system not only will save time and wiring costs in electrical installations but will be rewarded with increased safety. This powerful system offers large advantages in a current range up to 160 A with a short circuit capacity of 50 kA.

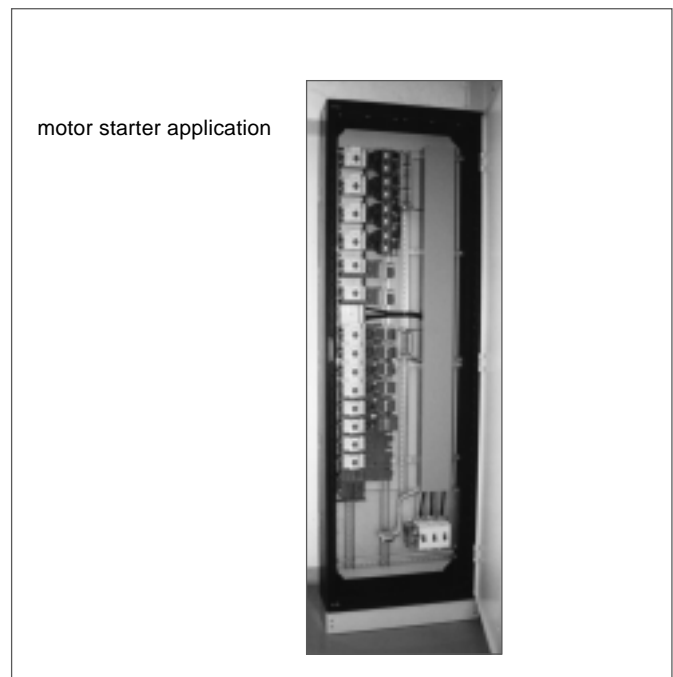
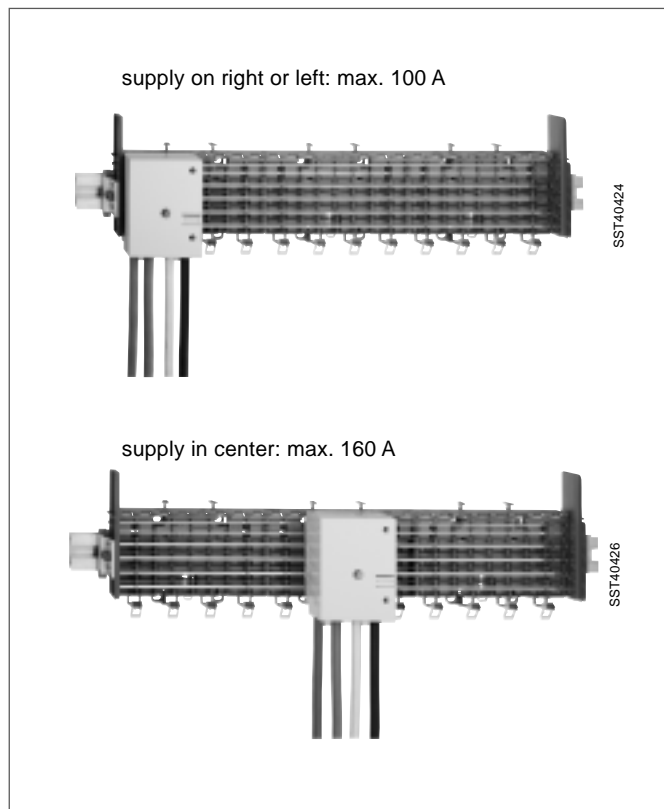
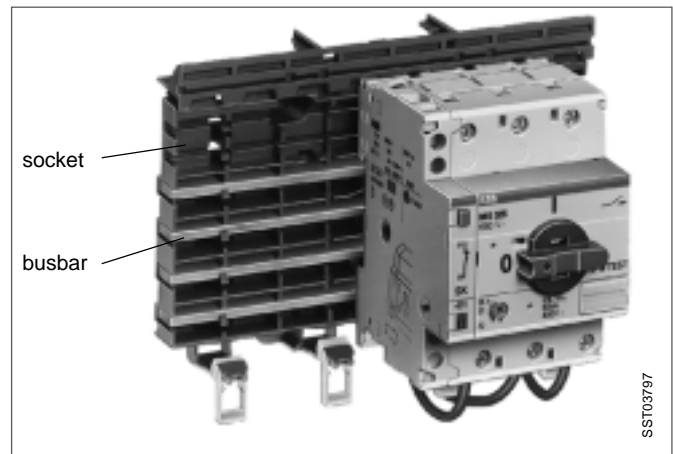
ABB offers smisline modules in various lengths that are ready-made for directly mounting the MS 325 according to a simple plug-in philosophy – an ideal solution for fast installations with high wiring safety.

Smislin-S is a proven system which has been successfully installed in numerous hospitals, as well as in office and commercial buildings, power plants, industrial installations or in production lines. Smisline-S can be installed either horizontally or vertically.

In no time at all components can be changed or replaced safely in operation – a huge advantage for a quick and efficient service. Thus the installation achieves a very high availability and safety.

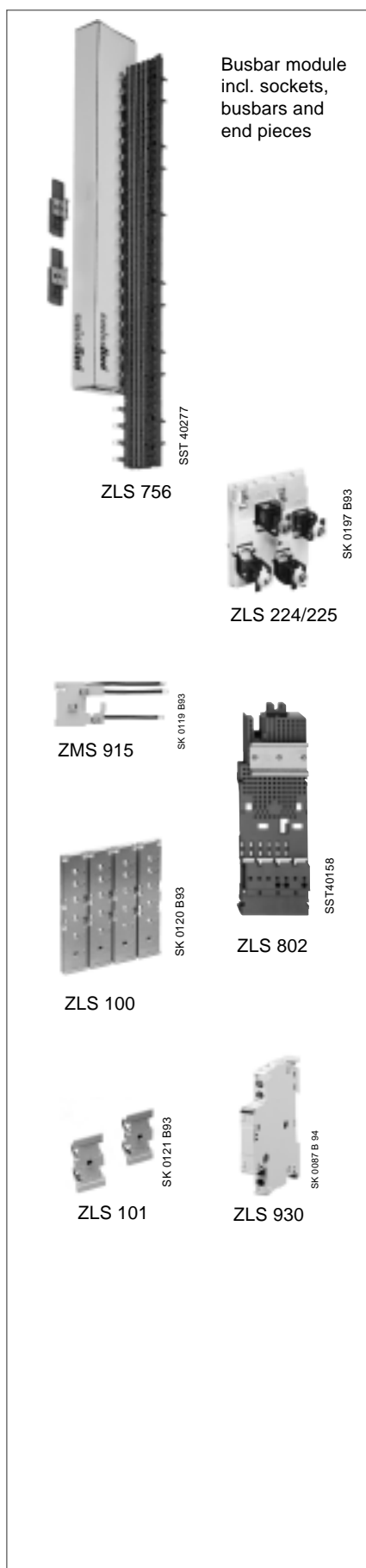
Technical Data

For DIN rail or wall-mounting	
Mounting position:	vertical, horizontal
Max. operating voltage:	690 V
Max. operating current:	
supply on left or right:	100 A
supply in center:	160 A
Short circuit capacity:	50 kA



Busbar system smissline-S for MS 325

Manual Motor Starter for plug in



Design	Type	Order code	Weight/ piece kg	Packing Unit piece	Price
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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: 432 mm 24 PLE	ZLS 750	GHE 610 1000 R 0001			
Length: 576 mm 32 PLE	ZLS 752	GHE 610 1000 R 0002			
Length: 720 mm 40 PLE	ZLS 754	GHE 610 1000 R 0003			
Length: 864 mm 48 PLE	ZLS 756	GHE 610 1000 R 0004			
Length: 1440 mm 80 PLE	ZLS 758	GHE 610 1000 R 0005			

Infeed block with cover

3L + N	4 PLE	ZLS 224	GHE 610 1001 R 0014		
3L	4 PLE	ZLS 225	GHE 610 1001 R 0015		

Adapter plate ZMS 915 for MS 325 for plug into the busbar system

adapter plate for max. 415 V, 20 A	ZMS 915	GHE 610 1002 R 0030			
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Mounting plate to create a starter combination for plug in for mounting MS 325 and a contactor etc.

max. 415 V, 20 A	ZLS 802	GHE 610 1004 R 0025			
nec. is also adapter plate	ZMS 915	GHE 610 1002 R 0030			

Busbar cover pieces for empty places, 1 piece can cover 4 PLE - 1 PLE can be break down.

ZLS 100	GHE 610 1002 R 0015			
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Dummy housing for MS 325

ZLS 930	1SAM 101 908 R 0001			
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DIN Rail adapter for cover plate for mounting

ZLS 101	GHE 610 1002 R 0020			
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Other products and accessories see smissline-catalogue

Manual Motor Starters MS 4xx

Ordering details



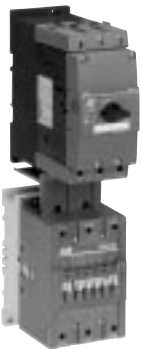
MS 45x

SST02198



MS 49x

SST01898



MS 495 with A95
connected via BEA 110/495

ST14-02



MS 495 with auxiliary switch
HKS4-02 and open-circuit shunt
release AA4 in addition to
terminal shroud KA495C

SST 09498

Selection

open design, enclosure IP 20, resistant to changeable climates. Quick fastening on mounting rails DIN EN 50 022, 35 mm without auxiliary switch

Type	Setting range	Order code	Weight / piece kg	Packing unit piece	Price
	A . . . A				

MS 450 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 50 kA ①

MS 450 – 16	11 ... 16	1SAM 450 000 R 1001	0.96	1	
MS 450 – 20	14 ... 20	1SAM 450 000 R 1002	0.96	1	
MS 450 – 25	18 ... 25	1SAM 450 000 R 1003	0.96	1	
MS 450 – 32	22 ... 32	1SAM 450 000 R 1004	0.96	1	
MS 450 – 40	28 ... 40	1SAM 450 000 R 1005	0.96	1	
MS 450 – 45	36 ... 45	1SAM 450 000 R 1006	0.96	1	
MS 450 – 50	40 ... 50	1SAM 450 000 R 1007	0.96	1	

MS 495 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 50 kA ①

MS 495 – 40	28 ... 40	1SAM 550 000 R 1005	2.1	1	
MS 495 – 50	36 ... 50	1SAM 550 000 R 1006	2.1	1	
MS 495 – 63	45 ... 63	1SAM 550 000 R 1007	2.1	1	
MS 495 – 75	57 ... 75	1SAM 550 000 R 1008	2.1	1	
MS 495 – 90	70 ... 90	1SAM 550 000 R 1009	2.1	1	
MS 495 – 100	80 ...100 ②	1SAM 550 000 R 1010	2.1	1	

MS 497 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 100 kA ①

MS 497 – 16	11 ... 16	1SAM 580 000 R 1001	2.1	1	
MS 497 – 20	14 ... 20	1SAM 580 000 R 1002	2.1	1	
MS 497 – 25	18 ... 25	1SAM 580 000 R 1003	2.1	1	
MS 497 – 32	22 ... 32	1SAM 580 000 R 1004	2.1	1	
MS 497 – 40	28 ... 40	1SAM 580 000 R 1005	2.1	1	
MS 497 – 50	36 ... 50	1SAM 580 000 R 1006	2.1	1	
MS 497 – 63	45 ... 63	1SAM 580 000 R 1007	2.1	1	
MS 497 – 75	57 ... 75	1SAM 580 000 R 1008	2.1	1	
MS 497 – 90	70 ... 90	1SAM 580 000 R 1009	2.1	1	
MS 497 – 100	80 ...100 ②	1SAM 580 000 R 1010	2.1	1	

MS 451 with thermal and electromagnetic trips, tripping class 20, for heavy start short-circuit-proof up to 50 kA ①

MS 451 – 16	11 ... 16	1SAM 470 000 R 1001	0.96	1	
MS 451 – 20	14 ... 20	1SAM 470 000 R 1002	0.96	1	
MS 451 – 25	18 ... 25	1SAM 470 000 R 1003	0.96	1	
MS 451 – 32	22 ... 32	1SAM 470 000 R 1004	0.96	1	
MS 451 – 40	28 ... 40	1SAM 470 000 R 1005	0.96	1	
MS 451 – 45	36 ... 45	1SAM 470 000 R 1006	0.96	1	
MS 451 – 50	40 ... 50	1SAM 470 000 R 1007	0.96	1	

MS 496 with thermal and electromagnetic trips, tripping class 20, for heavy start short-circuit-proof up to 100 kA ①

MS 496 – 40	28 ... 40	1SAM 570 000 R 1005	2.1	1	
MS 496 – 50	36 ... 50	1SAM 570 000 R 1006	2.1	1	
MS 496 – 63	45 ... 63	1SAM 570 000 R 1007	2.1	1	
MS 496 – 75	57 ... 75	1SAM 570 000 R 1008	2.1	1	
MS 496 – 90	70 ... 90	1SAM 570 000 R 1009	2.1	1	
MS 496 – 100	80 ...100 ②	1SAM 570 000 R 1010	2.1	1	

Direct adapter for wiring MS 450 - MS 497 to contactors

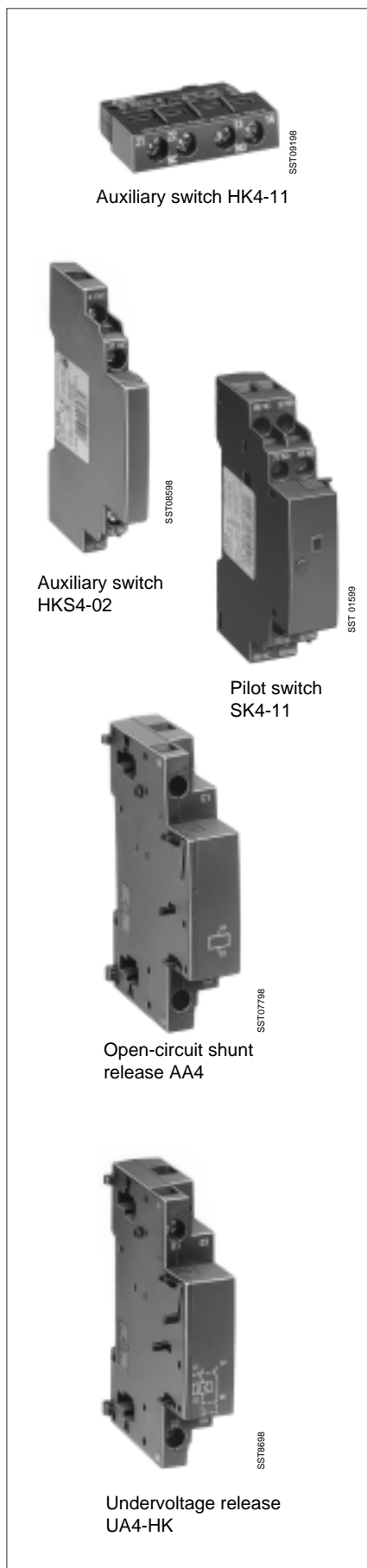
Type	Order code	Weight / piece kg	Packing unit piece	Price
BEA40/450, direct adapter MS450 to A30/A40	1SBN 083 206 R 1000	0.061	1	
BEA50/450, direct adapter MS450 to A50 plate	1SBN 083 506 R 1000	0.062	1	
BEA75/495, direct adapter MS495-497 to A50/63/75	1SBN 084 106 R 1000	0.120	1	
BEA110/495, direct adapter MS495-497 to A95/A110	1SBN 084 506 R 1000	0.124	1	

① See table on Page 22. ② Max. motor current 95 A

Manual Motor Starters MS 4xx

Accessories

Ordering details



Retrofittable accessories

These parts may be procured in addition to the MS 4xx. 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	
Pilot switch, for separate signalling of short-circuit and general tripping, lateral attachment at left, max. 1 mountable, also together with auxiliary switch ④					
SK4-11, for any signal	1 NO + 1 NC	1SAM 401 904 R 1001	0.07	1	
Undervoltage release, for lateral attachment at right					
UA4,	U _c 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 _c 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/DC	1SAM 401 907 R1001	0.11	1	
AA4,	70-190 V, 50/60 Hz/DC	1SAM 401 907 R1002	0.11	1	
AA4,	190-330 V, 50/60 Hz/DC	1SAM 401 907 R1003	0.11	1	
AA4,	330-500 V, 50/60 Hz/DC	1SAM 401 907 R1004	0.11	1	
Terminal shroud, for additional shock-hazard protection					
KA450,	for MS 45x ①	1SAM 401 908 R1001	0.01	1	
KA495,	for MS 49x ①	1SAM 501 901 R1001	0.01	1	
KA495C,	for MS 49x ②	1SAM 501 902 R1001	0.03	1	
Terminal insulation barrier,					
DX495	necessary for UL 508E, MS 49x-Starter	1SAM 401 912 R1001			
Scale cover, lead-sealable					
SA450,	for MS 45x ③	1SAM 401 909 R1001	0.007	1 set	
Disconnecter module, for producing a visible gap, lockable					
TB450,	for MS 45x	1SAM 401 910 R1001	0.30	1	
Phase busses MS 45x, 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 IP 65, with axial extension, lockable in Off position, locked in On position ⑥					
OHB2AJM,	Twist knob black	1SCA 022 384 R 6940			
OHY2AJM,	Twist knob red/yellow	1SCA 022 384 R 7080			
OXS5X 85,	axis 85 mm	1SCA 022 347 R 3570			
OXS5X105,	axis 105 mm	1SCA 022 347 R 3650			
OXS5X130,	axis 130 mm	1SCA 022 353 R 4540			
OXS5X180,	axis 180 mm	1SCA 022 353 R 4620			
MSMN,	driver ⑦	1SAM 101 923 R 0001			

- ① Is plugged onto the box terminals in each case
 ② Is plugged onto the housing after removing the box terminals, if using cable lugs or buses
 ③ Supplied only as a set as 10 scale covers
 ④ Mounting sequence: Motor protection switch, pilot switch, auxiliary switch
 ⑤ Max. ON time: 5 seconds, see also Page 20
 ⑥ See also MS325 Page 10
 ⑦ Is screwed directly onto the manual motor starter

Strategies for Motor protection with magnetic only types MO

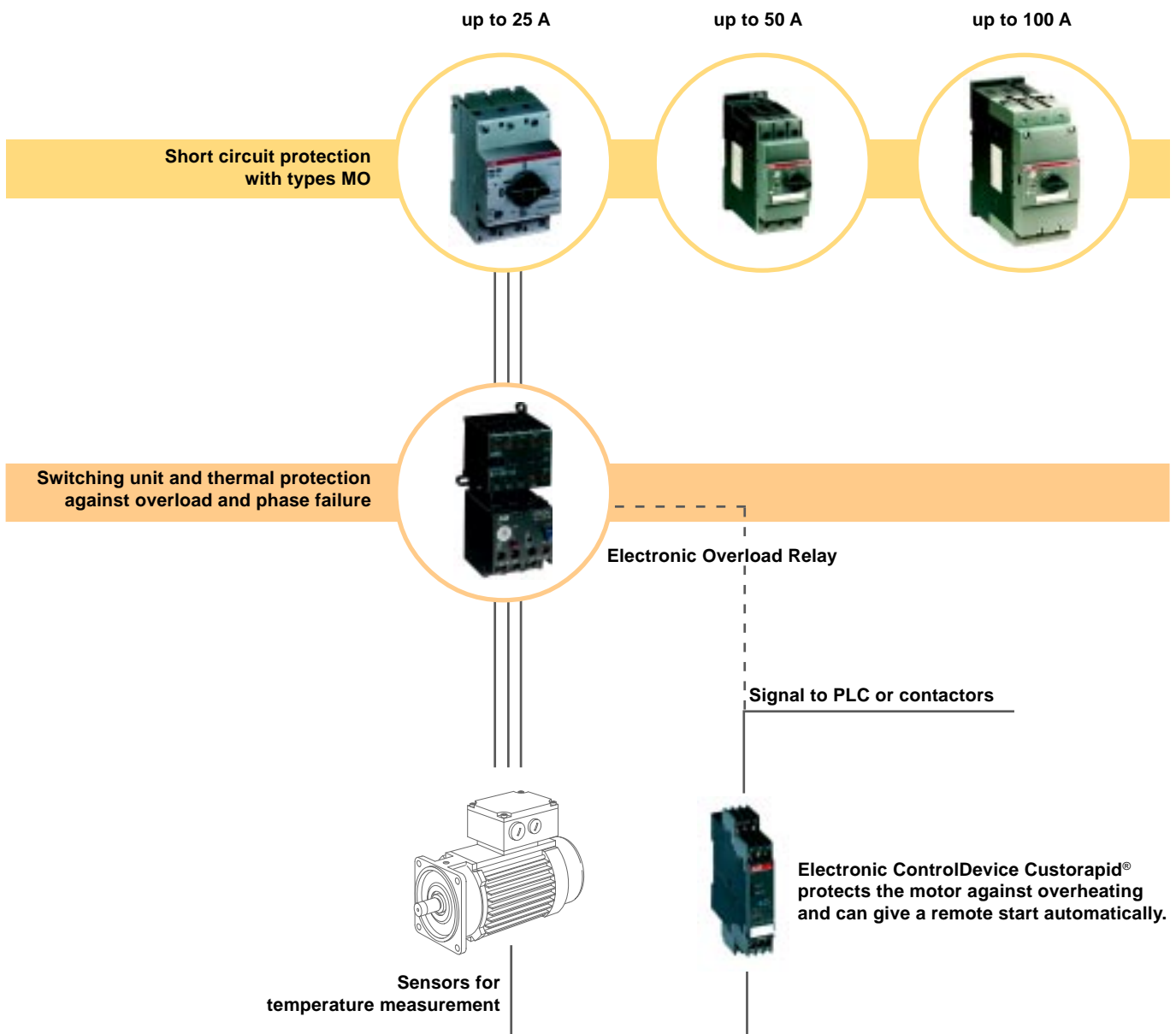
For special applications ABB's manual motor starter of the MS series are also available as versions MO 325 / MO 450 / MO 495 with magnetic tripping only, protecting exclusively against short circuits.

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 with electronic relays Custorapid®:**
High accuracy with temperature monitoring directly in the coil, highly efficient protection with several electronic possibilities.

Examples for motor protection



Magnetic only types MO 4xx - circuit breakers

Ordering details

Selection

Type	Setting range A ... A	Order code	Weight / piece kg	Packing unit piece	Price
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MO 325 magnetic only types

MO 325 – 0.4	0.25 ... 0.40	1SAM 160 000 R 1003	0.347	1	
MO 325 – 0.63	0.40 ... 0.63	1SAM 160 000 R 1004	0.347	1	
MO 325 – 1	0.63 ... 1.00	1SAM 160 000 R 1005	0.347	1	
MO 325 – 1.6	1.00 ... 1.60	1SAM 160 000 R 1006	0.347	1	
MO 325 – 2.5	1.60 ... 2.50	1SAM 160 000 R 1007	0.347	1	
MO 325 – 4	2.50 ... 4.00	1SAM 160 000 R 1008	0.347	1	
MO 325 – 6.3	4.00 ... 6.00	1SAM 160 000 R 1009	0.347	1	
MO 325 – 9	6.30 ... 9.00	1SAM 160 000 R 1010	0.347	1	
MO 325 – 12.5	9.00 ... 12.50	1SAM 160 000 R 1011	0.347	1	
MO 325 – 16	12.50 ... 16.00	1SAM 160 000 R 1012	0.347	1	
MO 325 – 20	16.00 ... 20.00	1SAM 160 000 R 1013	0.347	1	
MO 325 – 25	20.00 ... 25.00	1SAM 160 000 R 1014	0.347	1	

MO 450 with electromagnetic trips, short-circuit-capacity up to 50 kA

MO 450 – 16	11 ... 16	1SAM 460 000 R 1001		1	
MO 450 – 20	14 ... 20	1SAM 460 000 R 1002		1	
MO 450 – 25	18 ... 25	1SAM 460 000 R 1003		1	
MO 450 – 32	22 ... 32	1SAM 460 000 R 1004		1	
MO 450 – 40	28 ... 40	1SAM 460 000 R 1005		1	
MO 450 – 45	36 ... 45	1SAM 460 000 R 1006		1	
MO 450 – 50	40 ... 50	1SAM 460 000 R 1007		1	

MO 495 with electromagnetic trips, short-circuit-capacity up to 50 kA

MO 495 – 40	28 ... 40	1SAM 560 000 R 1005		1	
MO 495 – 50	36 ... 50	1SAM 560 000 R 1006		1	
MO 495 – 63	45 ... 63	1SAM 560 000 R 1007		1	
MO 495 – 75	57 ... 75	1SAM 560 000 R 1008		1	
MO 495 – 90	70 ... 90	1SAM 560 000 R 1009		1	
MO 495 – 100	80 ... 100	1SAM 560 000 R 1010		1	

MO 496 with electromagnetic trips, short-circuit-capacity up to 100 kA

MO 496 – 16	11 ... 16	1SAM 590 000 R 1001		1	
MO 496 – 20	14 ... 20	1SAM 590 000 R 1002		1	
MO 496 – 25	18 ... 25	1SAM 590 000 R 1003		1	
MO 496 – 32	22 ... 32	1SAM 590 000 R 1004		1	
MO 496 – 40	28 ... 40	1SAM 590 000 R 1005		1	
MO 496 – 50	36 ... 50	1SAM 590 000 R 1006		1	
MO 496 – 63	45 ... 63	1SAM 590 000 R 1007		1	
MO 496 – 75	57 ... 75	1SAM 590 000 R 1008		1	
MO 496 – 90	70 ... 90	1SAM 590 000 R 1009		1	
MO 496 – 100	80 ... 100	1SAM 590 000 R 1010		1	

The tripping curves show the tripping time dependent on the factor of the selected motor current. The values have a tolerances of approx. +/- 20%.

Standard manual motor starters have thermal protection against overload, a magnetic protection against short circuit and a protection against phase failure.

Types MOxx protect only against short circuit. The thermal release and phase failure are not in function.

Applications are:

Short circuit protection against resistance loads

Short circuit protection using TOL for thermal protection

Only short circuit protection for loads where a tripping curve 12 ... 14 x In is required



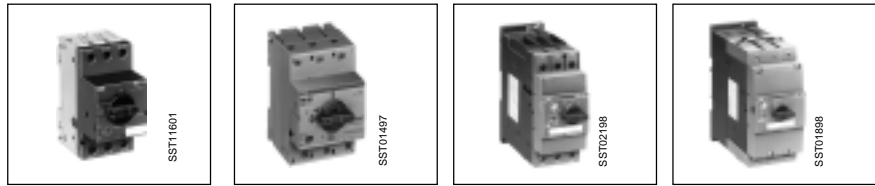
SST02186



SST01898

Manual Motor Starters Type Series MS

Technical data



Manual motor starter	Type	MS 116	MS 325	MS 450/451	MS 495/496/497
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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
Disconnecter characteristics (to IEC/EN 60947-1)		yes	yes	yes	yes
Mechanical service life in operations		100.000	100.000	50.000	
Permissible ambient temperature					
- open °C		- 20... + 55/70 ①	- 25 ... + 55 ①	- 20 ... + 60/70 ①	
- encapsulated (in protective housing) °C		on request	- 25 ... + 40	- 20 ... + 35	
- 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 sinusoidal shock (IEC 68-2-27)		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 35 mm	2 x M5 35 mm,
Quick fastening on top-hat rail	to EN 50022	35 mm	35 mm	(15 mm high)	
	to EN 50023	-	-	-	75 mm
Electrical connection of the main conductors (main circuits)					
Type		Screw terminal	Box terminal	Box terminal + bus	Box terminal
Screw		Pozidrive size 2	Pozidrive size 2	Pozidrive size 2 4 mm	Internal hexagon
Single-core 1 x mm ²		1 ... 4	1 ... 10	0.75 ... 35	2.5 ... 70
2 x mm ²		1 ... 4 ③	1 ... 4	0.75 ... 25	2.5 ... 50
Stranded 1 x mm ²		1 ... 4	1 ... 10	0.75 ... 35	2.5 ... 70
2 x mm ²		1 ... 4	-	0.75 ... 25	2.5 ... 50
Flexible 1 x mm ²		0.75 ... 2.5	1 ... 6	0.75 ... 25	2.5 ... 50
2 x mm ²		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 mm ²		1 ... 2.5	0.5 ... 2.5	0.5 ... 2.5	
2 x mm ²		1 ... 2.5 ⑤	0.5 ... 2.5	0.5 ... 2.5	
Flexible 1 x mm ²		0.75 ... 2.5	0.5 ... 2.5	0.5 ... 1.5	
2 x mm ²		0.75 ... 2.5	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 Starters Type Series MS

Technical data

Manual motor starter	Type	MS 116	MS 325	MS 450/451	MS 495/496/497
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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 21 / 22.

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		5 mA at 17 VDC	5 10	5 mA at 17 VDC
Minimum load at:	24 V DC mA 12 V DC mA	5 mA at 17 VDC -	5 10	5 mA at 17 VDC -
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 Starters Type Series MS

Technical data

Manual motor starter	Type	MS 116	MS 325	MS 450/451	MS 495/496/497
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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 consumption	% ED	100	–	100 at voltages 50/60 Hz to Power on request	
	Pick-up VA	9.0	110-240V: 13-61 ⑤	on request	
	Hold VA	3.0	–	on request	

Internal resistance values

Setting ranges		Resistance per phase in Ω resp. MS4.. in mΩ					
from	A to	MS 116	MS 325	MS 450	MS 451	MS 495/MS 497	MS 496
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	–	0,00 35	–	–	–	–
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

Manual Motor Starters Type Series MS

Technical data

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

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$ ①																	
		at 230 V AC			at 400 V AC			at 440 V AC			at 500 V AC			at 690 V AC					
from	to	I_{cu}	I_{cs}	gL, gG	I_{cu}	I_{cs}	gL, gG	I_{cu}	I_{cs}	gL, gG	I_{cu}	I_{cs}	gL, gG	I_{cu}	I_{cs}	gL, gG			
A	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A			
Setting ranges	0.1 ... 0.16	Short-circuit proof up to $I_{cc} = 50$ kA									Short-circuit proof up to $I_{cc} = 30$ kA								
	1.0 ... 1.6																		
	1.6 ... 2.5										10	10	25	10	10	25	5	5	25
	2.5 ... 4.0										6	6	25	6	6	25	2	2	25
	4.0 ... 6.3										6	6	63	6	6	63	2	2	40
	6.3 ... 10.0										6	6	63	6	6	63	2	2	50
	8.0 ... 12.0	25	25	80	25	25	80	6	6	63	6	6	63	2	2	50			
10.0 ... 16.0	16	16	80	16	16	80	4	4	63	4	4	63	2	2	63				

Short-circuit protection MS 325, setting ranges, short-circuit strength and max. back-up fuses

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$ ①									
		at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC	
from	to	I_{cs}	gL, aM	I_{cs}	gL, aM	I_{cs}	gL, aM	I_{cs}	gL, aM	I_{cs}	gL, aM
A	A	kA	A	kA	A	kA	A	kA	A	kA	A
Setting ranges	0.1 ... 0.16	Short-circuit proof									
	1.0 ... 1.6	No back-up fuse required up to $I_{cc} = 100$ kA									
	1.6 ... 2.5										
	2.5 ... 4.0										
	4.0 ... 6.3										
	6.3 ... 9.0										
	9.0 ... 12.5										
	12.5 ... 16.0										
16.0 ... 20.0											
20.0 ... 25.0											
				75	80	45	80	27	80	4.5	50
				60	100	40	100	25	100	4	50
				55	100	35	100	22	100	3.5	50
				50	125	30	125	20	125	3	50
								60	35 / 40	10	40
								40	50	7	40
								30	80	5	50

Short-circuit protection MS 325, setting ranges, short-circuit strength and max. back-up fuses

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$ ①									
		at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC	
from	to	I_{cs}	gL, aM	I_{cs}	gL, aM	I_{cs}	gL, aM	I_{cs}	gL, aM	I_{cs}	gL, aM
A	A	kA	A	kA	A	kA	A	kA	A	kA	A
Setting ranges	0.1 ... 0.16	Short-circuit proof									
	1.0 ... 1.6	No back-up fuse required up to $I_{cc} = 50$ kA									
	1.6 ... 2.5										
	2.5 ... 4.0										
	4.0 ... 6.3										
	6.3 ... 9.0										
	9.0 ... 12.5										
	12.5 ... 16.0										
	16.0 ... 20.0										
	20.0 ... 25.0										
										40	25
										10	40
										7	40
										5	50
										4.5	50
										4	50
										3.5	50
										3	50
										60	35 / 40
										40	50
										30	80
										27	80
										25	100
										22	100
										20	125

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 MS 325 and MS 116!

Manual Motor Starters Type Series MS

Technical data

Short-circuit protection MS 450 / MS 451, setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cc}$ 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 MS 495, setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cc}$ 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 MS 496, setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cc}$ 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 MS 497, setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cc}$ 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.

Manual Motor Starters Type Series MS

Technical data

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		Motor protecting switch type	Setting range A ... A	Contactor Type	Maximum current permitted for the combination A
	I _e /A				
0.06	0.22	MS 325-0.25	0.16 ... 0.25	A9	0.25
0.09	0.33	MS 325-0.4	0.25 ... 0.4	A9	0.4
0.12	0.42	MS 325-0.63	0.40 ... 0.63	A9	0.63
0.18	0.72	MS 325-1	0.63 ... 1	A9	1
0.25	0.83	MS 325-1	0.63 ... 1	A9	1
0.37	1.2	MS 325-1.6	1 ... 1.6	A9	1.6
0.55	1.5	MS 325-1.6	1 ... 1.6	A9	1.6
0.75	2	MS 325-2.5	1.6 ... 2.5	A9	2.5
1.1	2.6	MS 325-4	2.5 ... 4	A9	4
1.5	3.5	MS 325-4	2.5 ... 4	A12	4
2.2	5	MS 325-6.3	4 ... 6.3	A12	6.3
3	6.6	MS 325-9	6.3 ... 9	A26	9
4	8.5	MS 325-9	6.3 ... 9	A26	9
5.5	11.5	MS 325-12.5	9 ... 12.5	A26	12.5
7.5	15.5	MS 325-16	12.5 ... 16	A26	16
		MS 450-20	14 ... 20	A26	16
9	18.3	MS 325-20	16 ... 20	A26	20
11	22	MS 3265-25	20 ... 25	A30	25
		MS 450-25	18 ... 25	A30	25
15	30	MS 450-32	22 ... 32	A30	30
18.5	37	MS 450-40	28 ... 40	A40	40
22	44	MS 450-50	40 ... 50	A50	50
30	60	MS 495-63	45 ... 63	A63	63
37	72	MS 495-75	57 ... 75	A95	75
45	85	MS 495-90	70 ... 90	A95	90
55	98	MS 495-100	80 ... 100	A110	100

Further coordination tables on request

Forward current integrals (I² 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 mm ²				
	4	2.5	1.5	1.0	0.75
MS 325					
0,16 to 6					
10					
20					
25					

Manual Motor Starters Type Series MS

Technical data

Times to trip

Selection table for suitability of the motor protection switches for motors of enclosure $\text{Ex}e$

Time to trip of the motor protection switches as a function of a multiple of the setting current (tolerance $\pm 20\%$ 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
A	times the setting current, 3-pole, starting from cold state.					
A	s	s	s	s	s	s

Manual motor starter, Type MS 325



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.	
MS 325	3.53 - 1357/94	National Institute for Standards and Technology
MS 450, MS 495, MS 497	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	PTB, KEMA	GL Germany	LRS Great Britain	BV France	DNV Norway
MS 116	M	M		m	m		
MS 325	M	M	M	M	M	M	M
MS 450	M	M	M	M			M
MS 495	M	M	M	M			M
MS 497	M	M	M	m			m

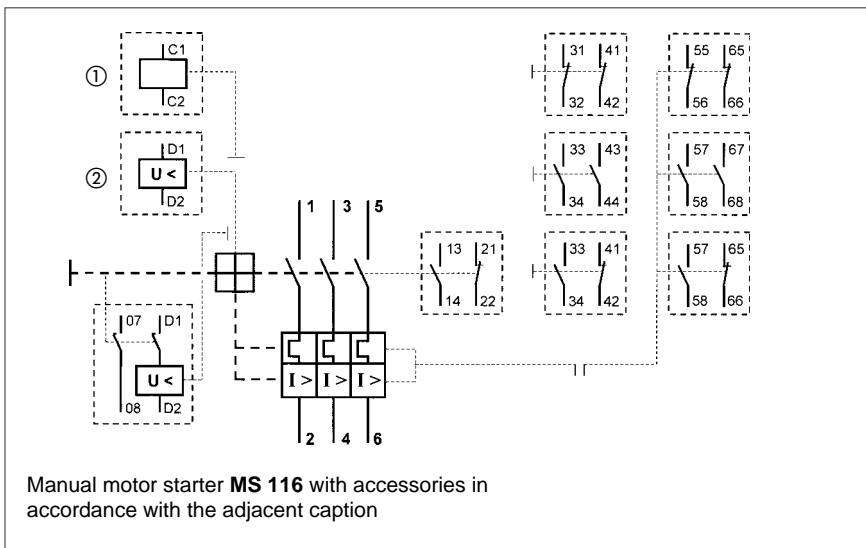
Explanation of symbols

M Normal version approved: Rating plates bear the test mark if mandatory.

m Submitted for approval, delivery time on request.

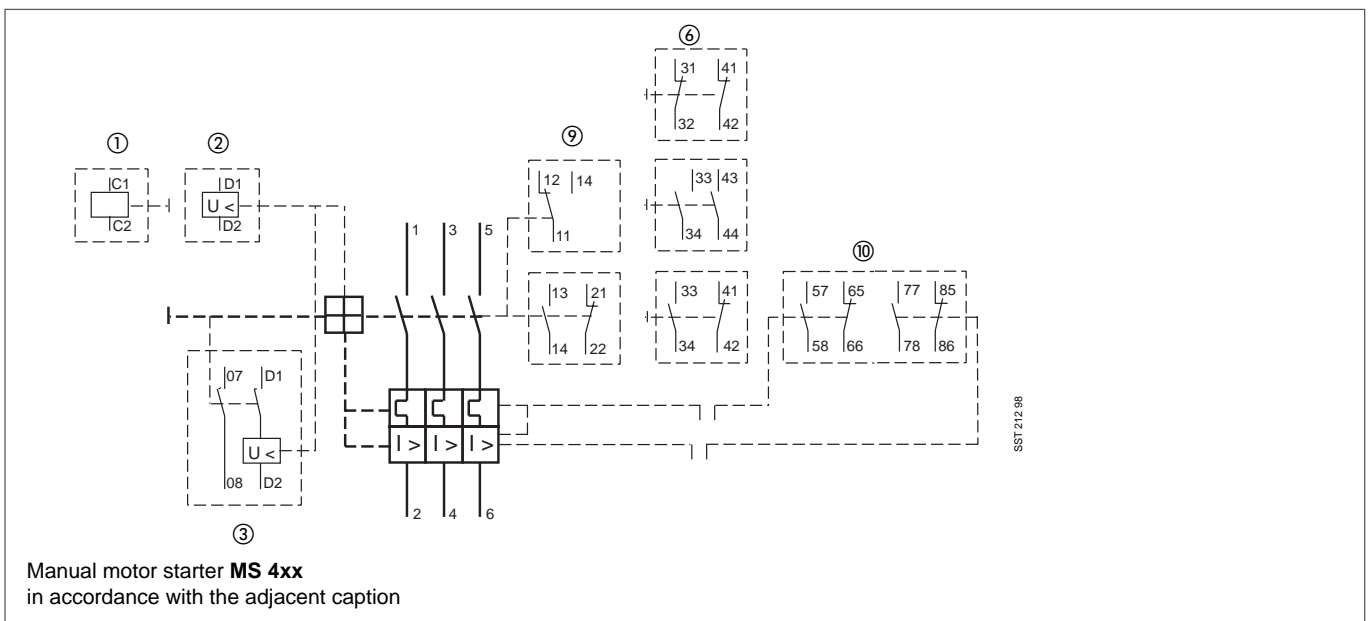
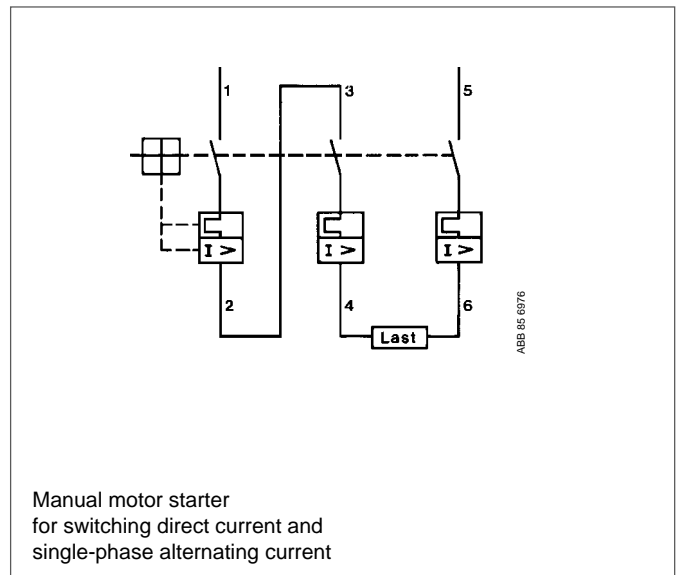
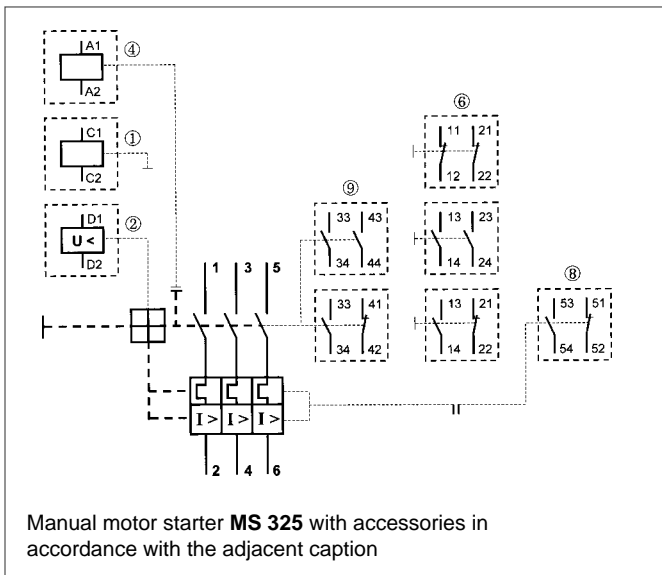
Manual Motor Starters Type Series MS

Wiring diagrams



Caption

- ① Open-circuit shunt release
- ② Undervoltage release
- ③ Undervoltage release with leading auxiliary switch 2 SV
- ④ Indexing mechanism, only MS 325
- ⑤ Auxiliary switch blocks for lateral attachment
- ⑥ Tripped alarm switch block (signalling contact)
- ⑦ Auxiliary switches which can be plugged on at the front
- ⑧ Alarm switch for short-circuits and general tripping



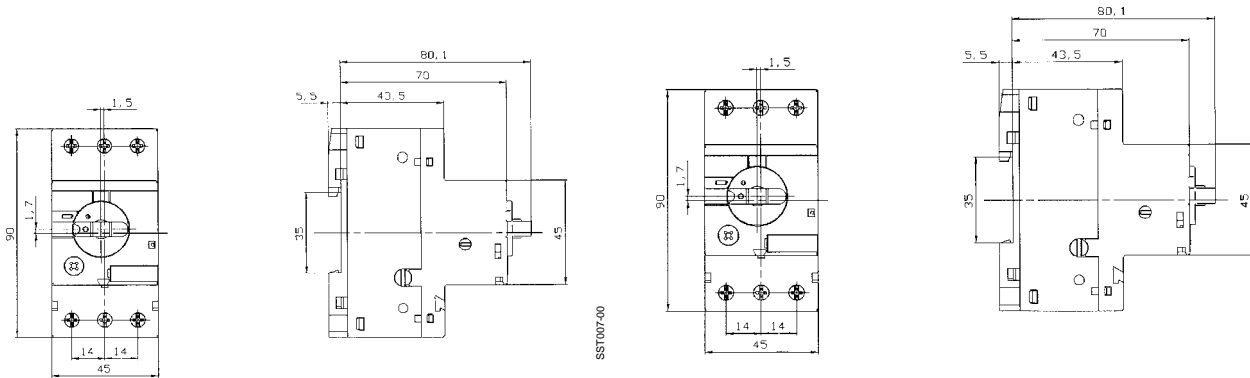
Manual Motor Starter MS 116

Accessories

Dimension diagrams

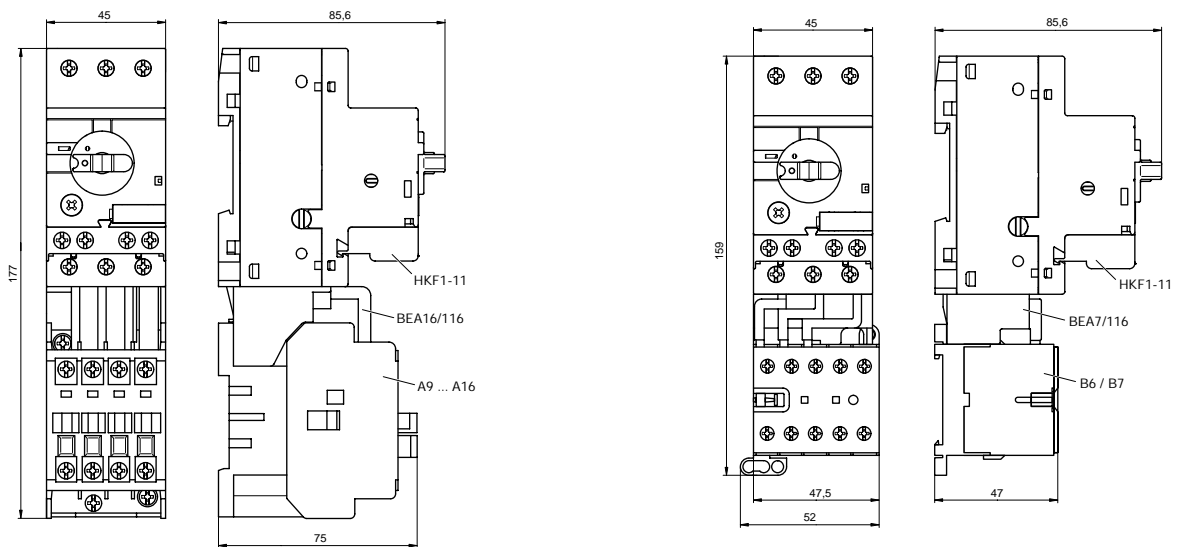
Manual motor starter **MS 116**

MS 116 with aux. contact HKF 1 for front mounting

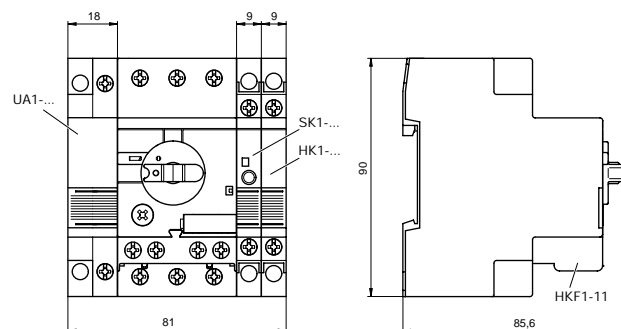


Manual motor starter **MS 116** mounted with contactor **A9...A16**

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



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

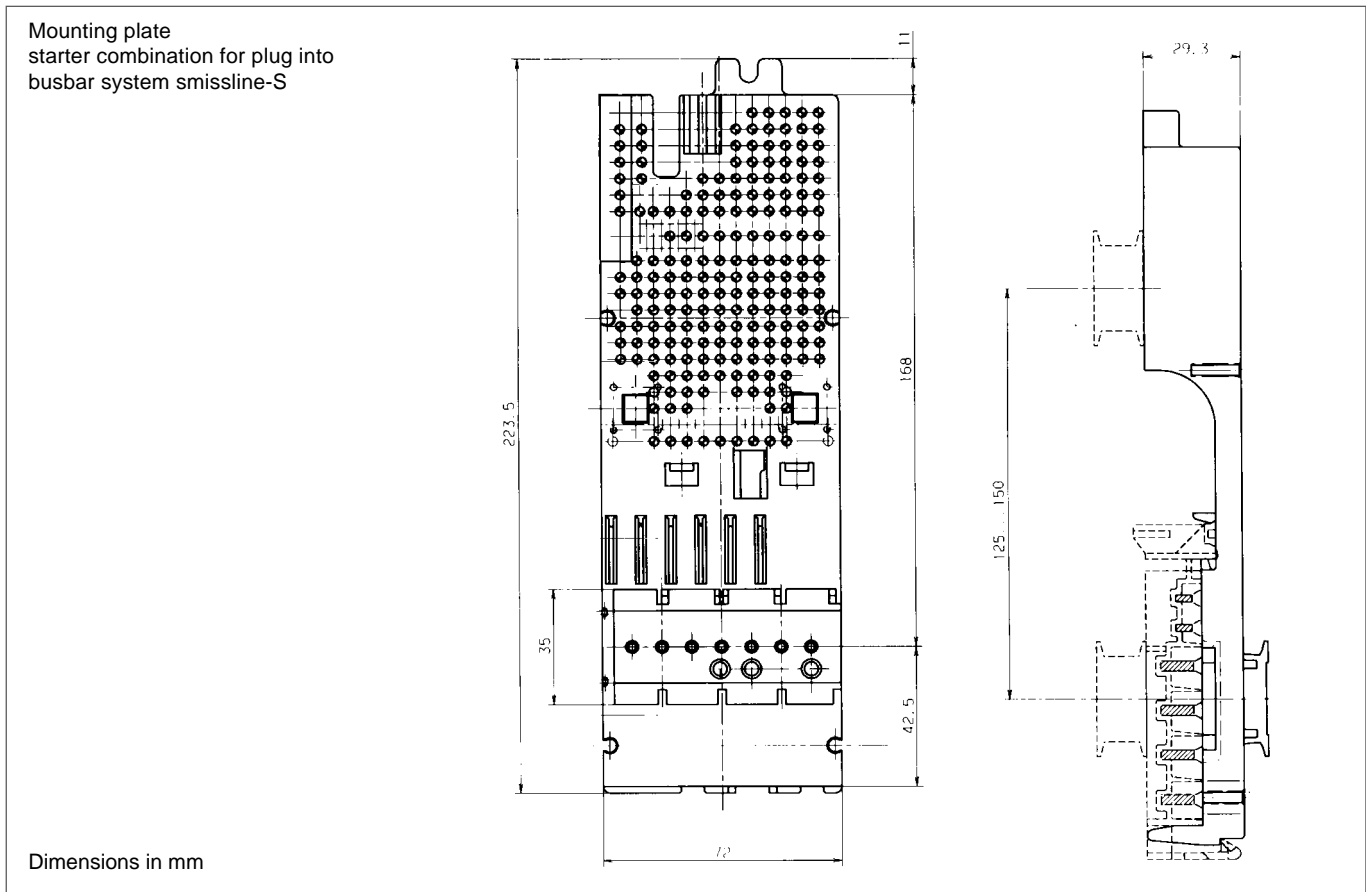
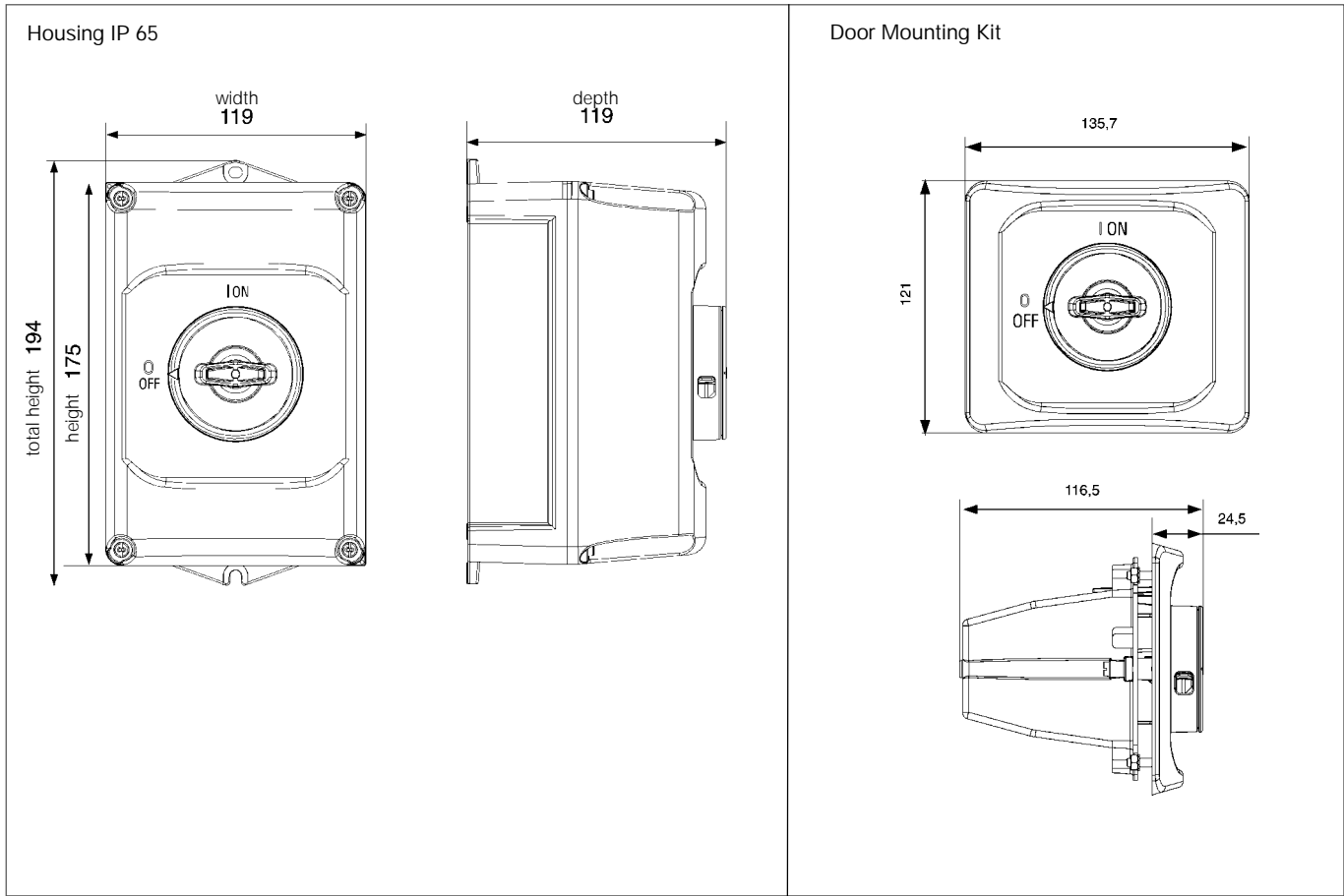


Dimension in mm

Manual Motor Starters MS 325

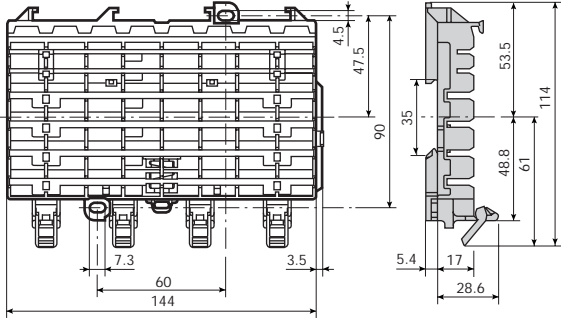
Accessories

Dimension diagrams



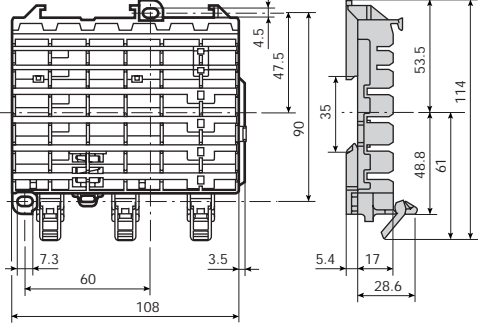
Busbar system smissline-S

Socket ZLS 808 8 PLE



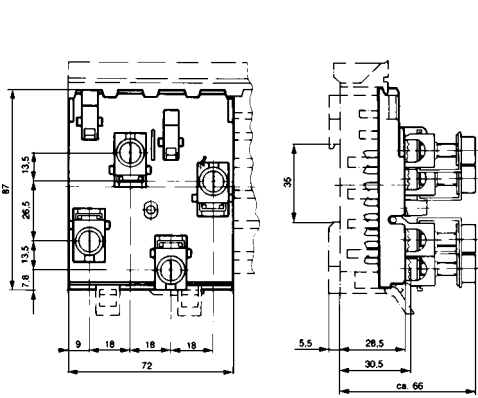
Z20117.eps

Socket ZLS 806 6 PLE

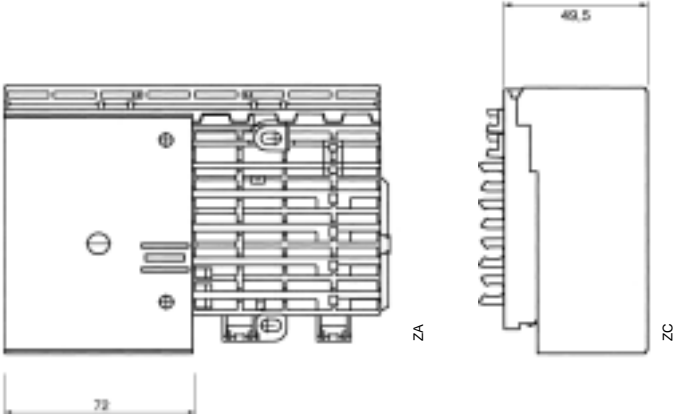


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Power infeed block ZLS 224 4 PLE



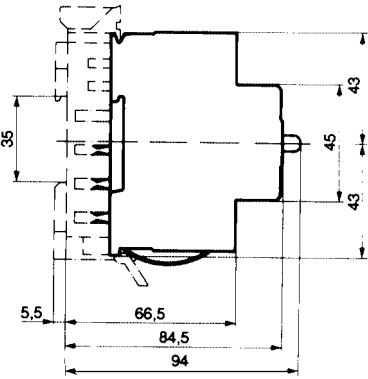
SK 0263 Z 93



ZA

ZC

Motor protection switch MS 325 3 PLE



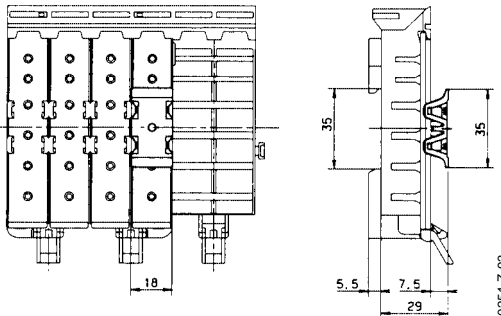
SK 0259 Z 93

Auxiliary switch block HK with empty housing ZLS 930 1 PLE



SK 0260 Z 93

Busbar cover ZLS 100 with adapter ZLS 101



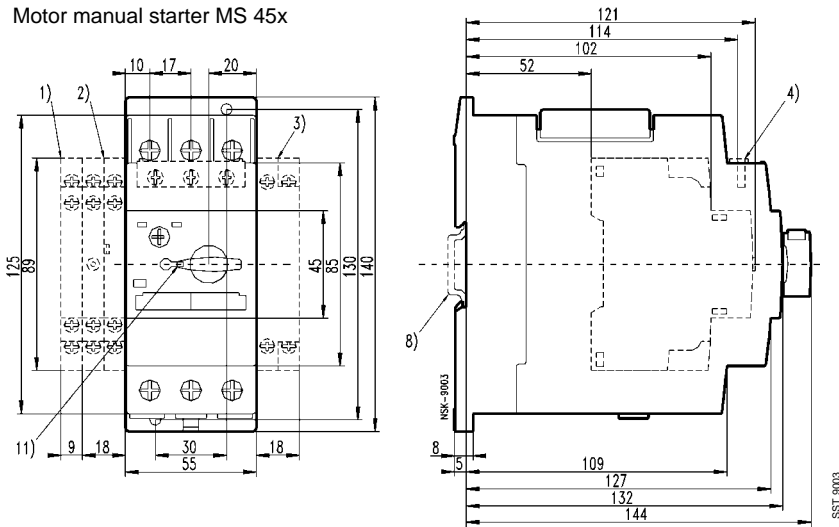
SK 0251 Z 93

Dimensions in mm

Manual Motor Starters MS 45x / MS 49x

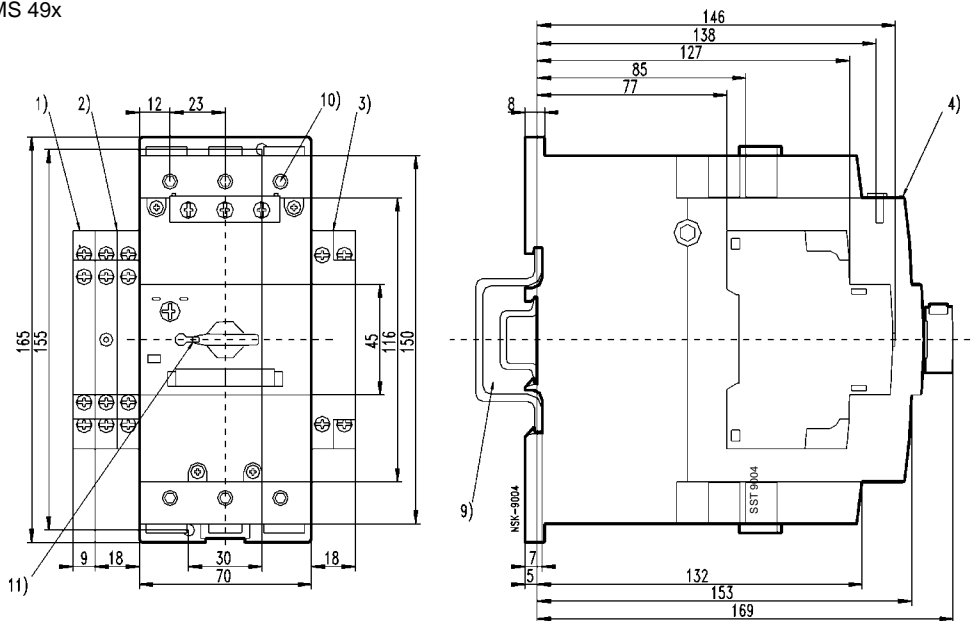
Dimension diagrams

Motor manual starter MS 45x

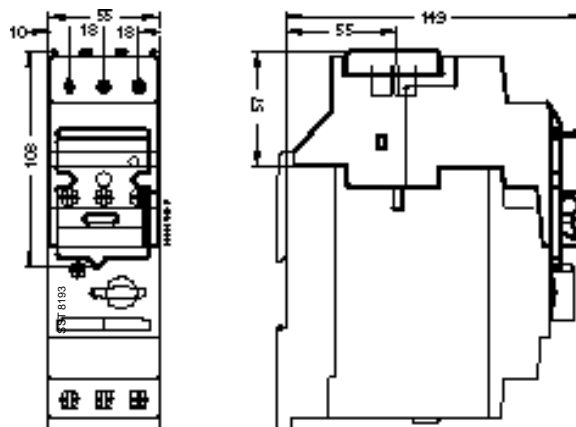


- Auxiliary switch block HKS4
- Pilot switch SK4
- Open-circuit shunt release/undervoltage release AA4, UA4, UA4-HK
- Auxiliary switch HK4
- (Top-hat rail 35 mm to DIN EN 50022
- Top-hat rail 35 mm, 15 mm high to DIN EN 50022 or Top-hat rail 75 mm to DIN EN 50023
-) Switch knob lockable in zero position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

Motor manual starter MS 49x



MS 45x with disconnecter module TB 450



Notes



Manual Motor Starter MS 325

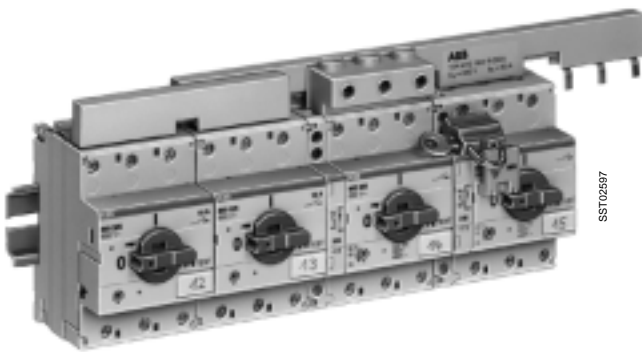
Combinations with Accessories



MS 325
with undervoltage release UAF



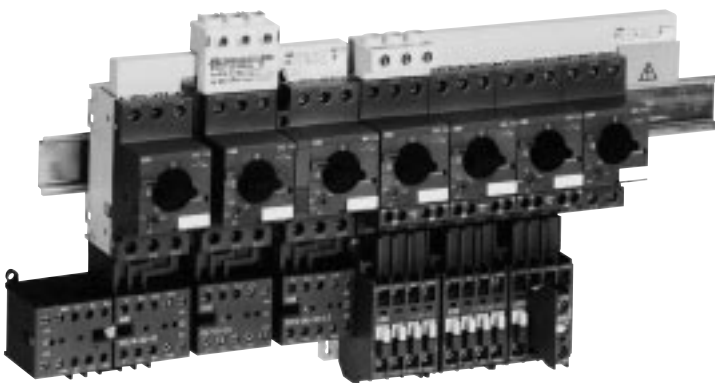
Insulating
enclosure IP 65



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



QES 6/3 N



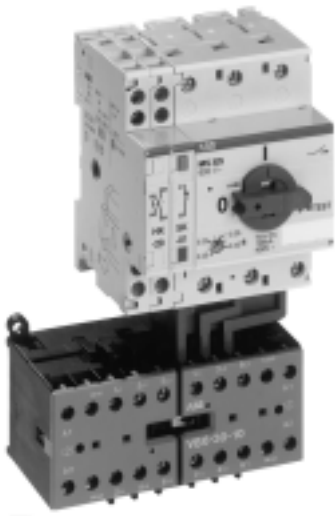
MS 116 cross wired via phase busses and power infeed blocks



MS 325 with RC 325 in PCD 6 N

Manual Motor Starter MS 325

Combinations with Accessories



SST02401

MS 325 + HK + SK with compact reversing contactor VB 6



SST03201

MS 325 + HKF with contactor A 16

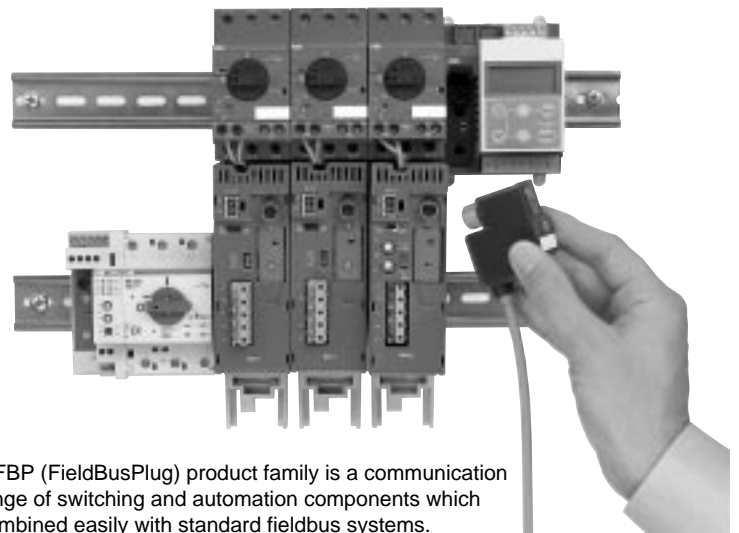


SST10698

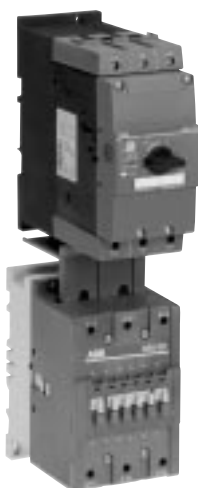
MS 325 with contactor A 26 on busbar adapter SA 11



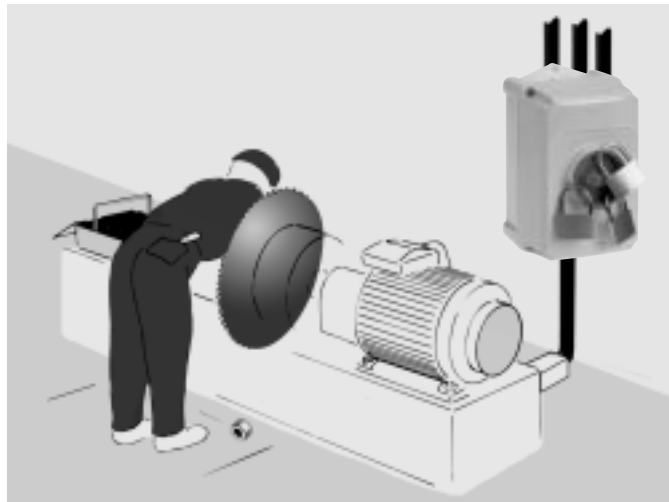
Insulating enclosure IP 65 with locks



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.



MS 495 with A95 connected via BEA 110/495



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

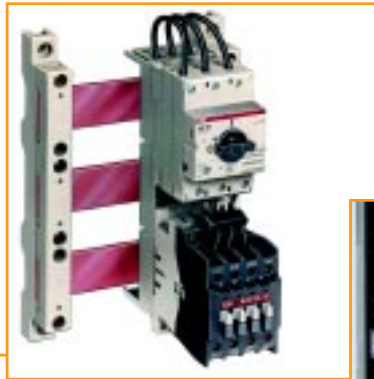
Various Motor Starter combinations

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 MS 116, MS 325, MS 450 and MS 495 these ABB components form coordinated starter combinations for a large variety of applications.

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



Starter solution for plug-in

Compact motor starter

Manual Motor Starter MS 325 and switching Unit RC 325

RC 325 and MS 325 - this smart motor starter combination is quite an innovative solution for protecting and switching remotely, all in one single device, automatically coordinated up to 100 kA.

It can be plugged into the manual motor starter MS 325 laterally. As an innovative and extremely compact motor starter combination it provides the design engineer with a powerful yet easy to use modular device for switching, protecting and remote controlling of a motor.



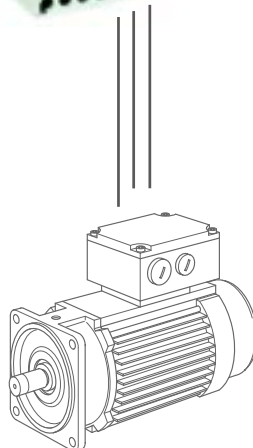
Customer Benefits

- Remote control for MS 325
- Compact starter according to IEC 60947-4-1
- No need for additional coordination, thanks to mechanical interlock

Technical data for the compact motor starter

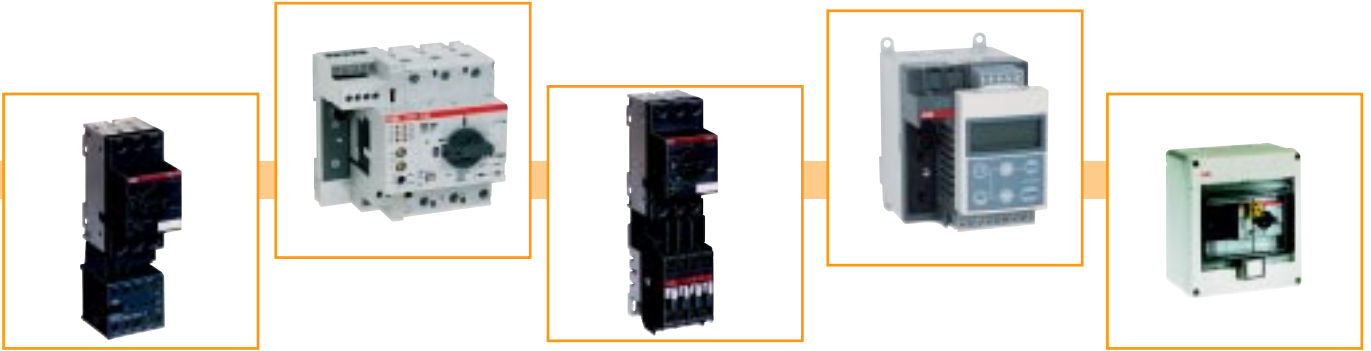
Operating current: up to 16 A
Short circuit range: up to 100 kA
Switching capacity: up to 1.000.000 operations

Several control circuits RC 325 are available in a wide voltage range



Various Motor Starter combinations

- cost efficient
- reliable
- space-saving



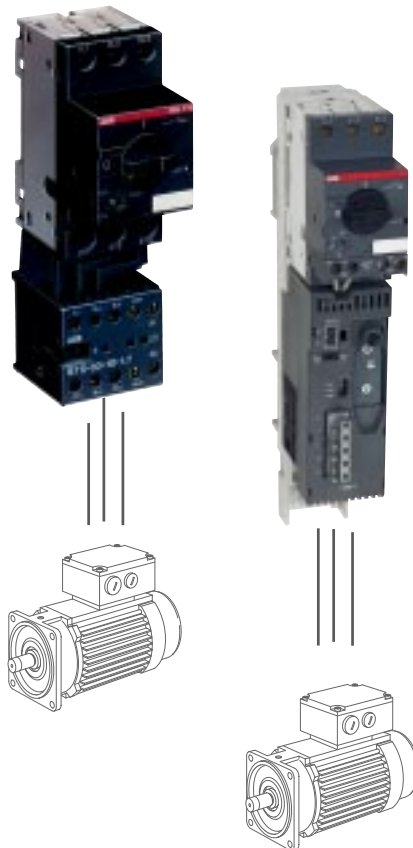
DOL Starters

A unit MS 116/325 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

ABB - a partner of choice

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

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

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

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