

Manual Motor Starters

MS 116, MS 325, MS 4xx





Manual motor starters

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

Contents

Manual Motor Starter MS 116	
0-16 A, 10/30 kA	6
Manual Motor Starter MS 325	
0-25 A, 50 kA	8
Remote control unit RC 325	
for starter combination, 0-16 A, 50 kA	11
Busbar System smissline-S for plug in	
until 160 A, 50 kA	12
Manual Motor Starters MS 45x	
11-50 A, 25/50 kA	14
Manual Motor Starters MS 49x	
11-50 A, 25/50 kA	14
MO-magnetic only applications	
until 100 A, 25/50 kA	17
Technical data, dimensions, Short circuit switching tables	18
Examples, applications	32

Manual Motor Starters and Motor Starter Combinations

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

The ABB manual motor starter know-how increases the reliability and availability of the plant thanks to the extremely quick short circuit cut-off in cases that could cause motor damage.

Therefore, ABB motor starter combinations provide for reliable, cost-efficient solutions 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 aircondition
- Environmental plants
- Power stations
- Fresh water and sewage plants
- Machine tools

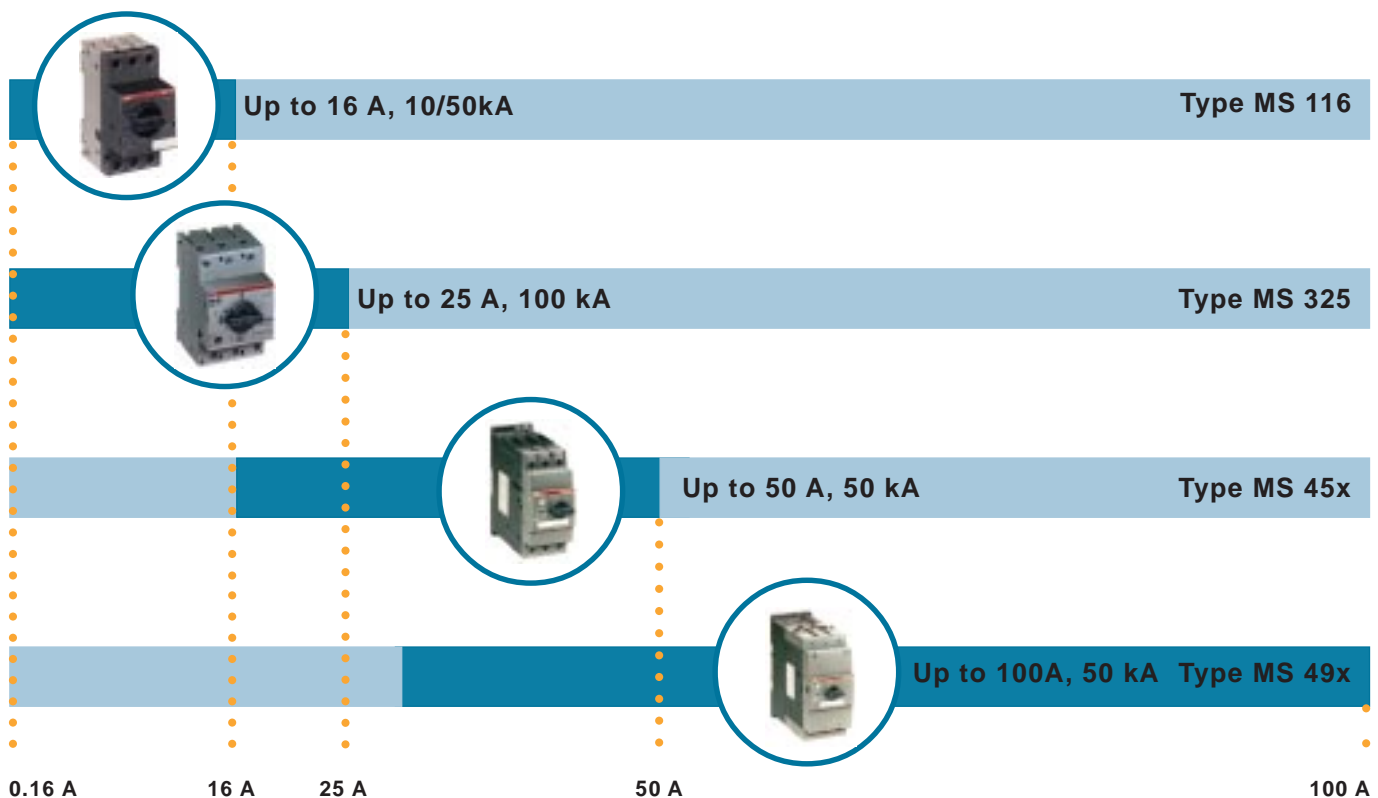
Manual motor starters provide for protection:

- Overload
- Short circuit
- Phase failure
- Undervoltage
- Overheating

Fuseless protection saves cost and space and provides for quick reaction under short circuit condition, switching the motor off within 3 ms. Easy to handle, most effective solution.



Switching capability of the manual motor starter



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.

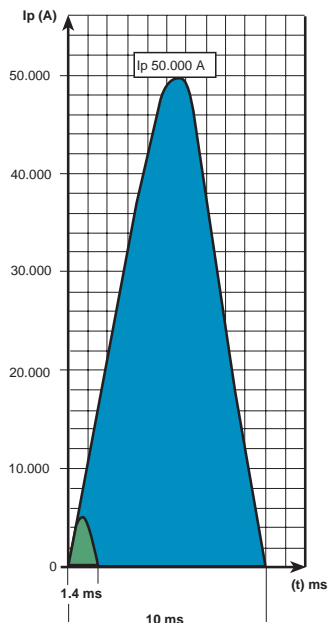
The device-types MS 116/325 can be easily coordinated with the ABB-Stotz MCB-system, which is used in installations for touch-proved enclosures and panels. MS 450 to MS 497 are your best choice for high power applications. These models are used to power up large motors up to 45 kW.

Technical Data, Overview

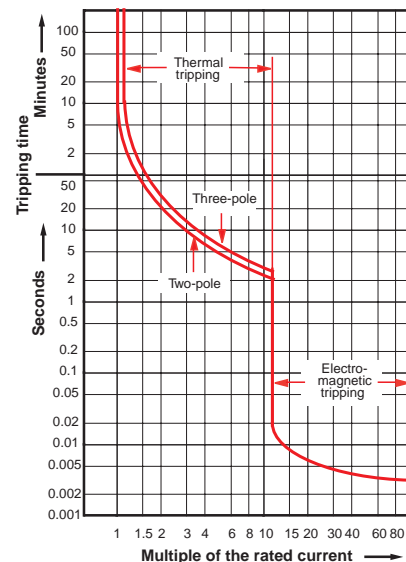
Motorstarter type	MS116	MS 325	MS 45x	MS 49x
I_g /A	16	25	50	100
I_{CS} /kA	10/50	50/100	25/50	25/50
Tripping class	10 A	10 A	10,20	10,20
Magnetic type only		●	●	●
Disconnect Capability, ref. IEC 60947-1	●	●	●	●

The types MS 325 have the lowest "energy let through"-values on the market in case of short circuits. This protects also optimally the cables and wirings and provides for high 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



MS 116

MS 116 with mini contactor B7

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 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 - 16.0	10.00 ... 16.00	1SAM 250 000 R 1011	0.268	1	

Accessories

Type		Order code		Packing Unit piece	Price

Auxiliary switches, for front-panel installation ①

HKF1-11	1 NO + 1 NC	1SAM 201 901 R 1001		10	
---------	-------------	---------------------	--	----	--

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	

Signal contact 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 AC	1SAM 201 904 R 1001		10	
UA1-48	48 V AC	1SAM 201 904 R 1002		10	
UA1-60	60 V AC	1SAM 201 904 R 1003		10	
UA1-120	120 V AC	1SAM 201 904 R 1004		10	
UA1-230	230 V AC	1SAM 201 904 R 1005		10	
UA1-400	400 V AC	1SAM 201 904 R 1006		10	
UA1-415	415 V AC	1SAM 201 904 R 1007		10	

Undervoltage release with pre-mating auxiliary switch 2S, lateral attachment at left

UA1-HK-24	24 V AC	1SAM 201 905 R 1001		10	
UA1-HK-48	48 V AC	1SAM 201 905 R 1002		10	
UA1-HK-60	60 V AC	1SAM 201 905 R 1003		10	
UA1-HK-120	120 V AC	1SAM 201 905 R 1004		10	
UA1-HK-230	230 V AC	1SAM 201 905 R 1005		10	
UA1-HK-400	400 V AC	1SAM 201 905 R 1006		10	
UA1-HK-415	415 V AC	1SAM 201 905 R 1007		10	

Locking device (see also MS 225 / MS 325, Page 9)

SA1	lock adapter	GJF1 101 903 R 0001		10	
SA3	locking device assy.	GJF1 101 903 R 0003		1	

Direct adapter, for mounting of contactors

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

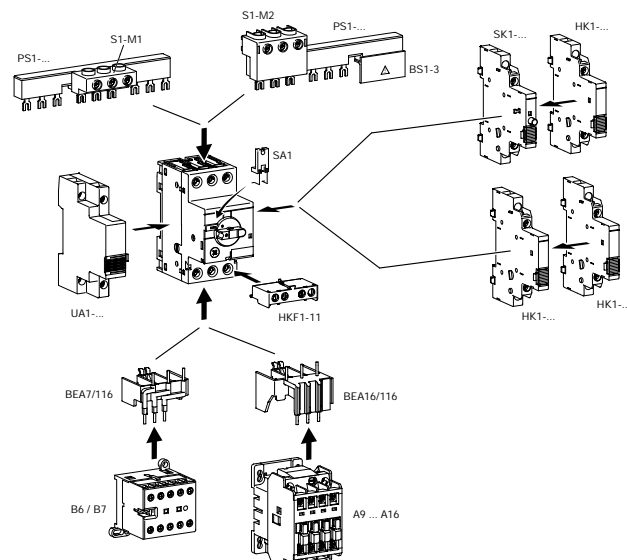
Insulating material housing light grey IP 65, triple lockable in Off position, with N- and PE-terminal, for Manual Motor Starter with 2 HK1, SK1 or UA1

OTPA 116 L2 P1, Twist knob black	1SCA 022 594 R 4270	1	
OTPA 116 A2 P1, Twist knob red/yellow	1SCA 022 594 R 4010	1	

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	
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	

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

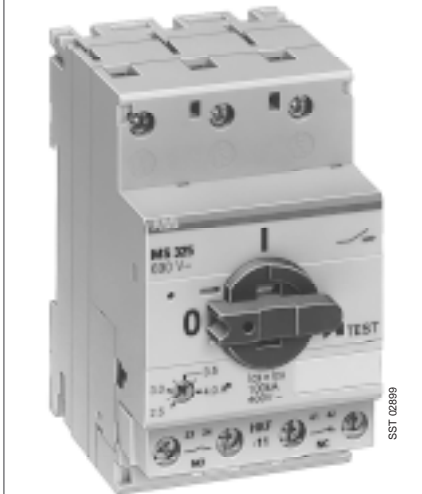


Manual Motor Starter MS 325

Ordering details



MS 325



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 ③ 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	

MO 325 magnetic only types ③

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	

MS 225 with thermal and electromagnetic trips, short-circuit-proof up to 100 kA, resp.50 kA on request

① See table on Page 21

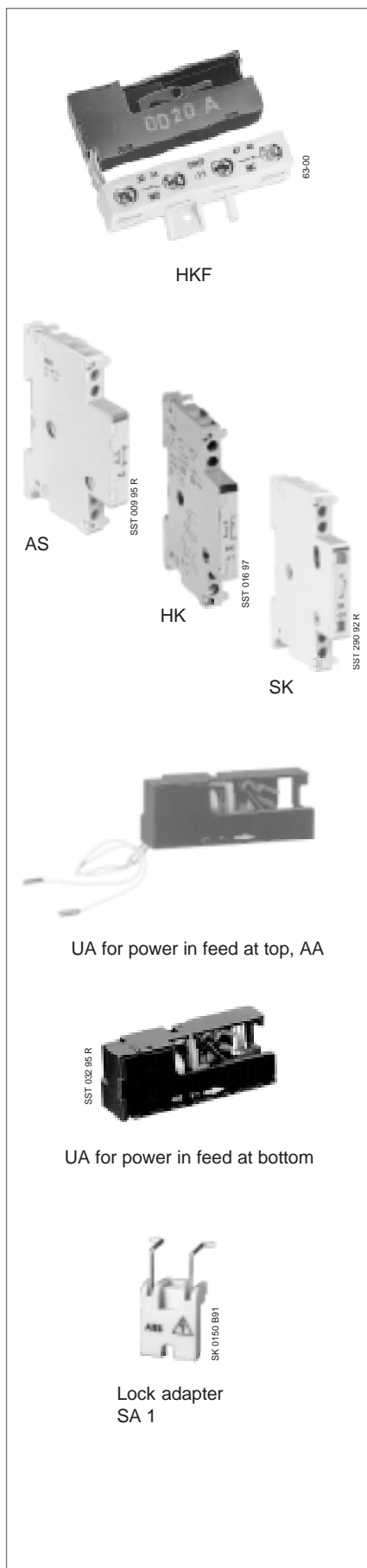
② Not suitable for panel mounting

③ See also Page 17

Manual Motor Starters MS 325 / MS 225

Accessories

Ordering details



Retrofittable accessories

These parts can be procured in addition to the **MS 325** resp. **MS 225**; 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 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	
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~ 48 V~ 60 V~ 110 V~ 230 V~ 400 V~ 415 V~ 500 V~	1SAM 101 903 R 0024 1SAM 101 903 R 0048 1SAM 101 903 R 0060 1SAM 101 903 R 0110 1SAM 101 903 R 0230 1SAM 101 903 R 0400 1SAM 101 903 R 0415 1SAM 101 903 R 0500	0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02	10 10 10 10 10 10 10 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 resp. MS 225, HK and SK					
AS, for UA, AA or as N/LS terminal		1SAM 101 905 R 0001	0.031	10	
Locking device for MS 325 resp. MS 225					
SA1, lock adapter		GJF1 101 903 R 0001	0.004	10	
SA3, locking device assy. (Adapter SA1 + padlock + 3 keys)		GJF1 101 903 R 0003	0.050	10	
Printadapter, for soldering on electronic plates					
PA25, for MS 325 and 2 aux. contacts		1SAM 101 933 R 0001	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

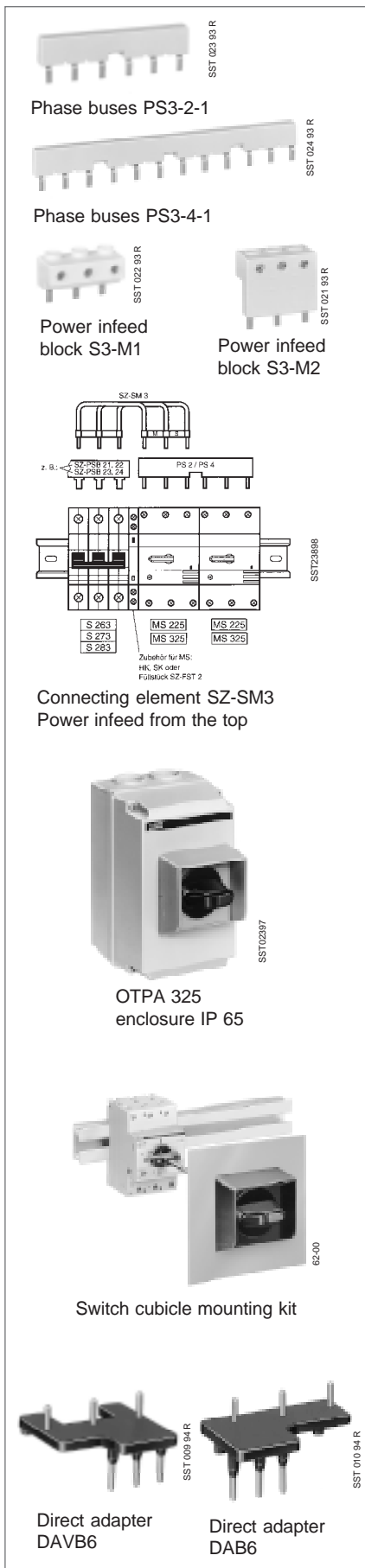
⑥ In particular if used with socket busbar system smissline-S (see Page 13)

⑦ Recommendation: Connection of external voltage via terminal support AS

Manual Motor Starters MS 325 / MS 225

Accessories

Ordering details



Accessories

Type	Order code	Weight/ piece kg	Packing unit piece	Price
------	------------	------------------------	--------------------------	-------

Phase buses for cross wiring MS325/MS225, 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 MS325 / MS225 to 3-pole circuit-breaker S2

SZ-SM3, for power infeed from top or bottom	GHV 036 0504 R 0005	0.047	1	
---	---------------------	-------	---	--

Insulating material housing light grey IP 65, triple lockable in Off position, with N- und PE-terminal, for manual motor starter with 2 HK, SK or AS

OTPA 325 B2 P1, Twist knob black	1SCA 022 576 R 5340		1	
OTPA 325 A2 P1, Twist knob red/yellow ③	1SCA 022 576 R 5180		1	

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 MS325 / MS225 ④

DAB6, for direct connection to B6/B7	1SAM 101 910 R 0001	0.010	1	
DAVB6, for direct connection to VB6/VB7	1SAM 101 911 R 0001	0.010	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 325/225

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

Remote Control Unit RC 325 RC 325 is a remote control unit for manual motor starters type MS 325 until 16 A.

With RC 325 and MS 325 the customer will get a complete, full coordinated starter combination, type I and type II in 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 full coordinated and after a short circuit no contacts will be welded.

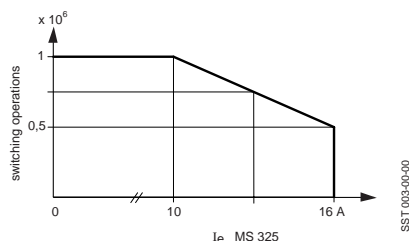
The customer will get the best availability and a complete function after a short circuit. (The combination is very small and save space and costs in operation.)

The RC 325 and MS 325 works as a manual motor starter and a contactor. The control circuit must be connected to RC 325 which control MS 325. To start the operation the MS 325 is first to put in "ON"-position. Then the RC 325 control the main contacts of MS 325 which can switch a motor or another load. By a short circuit the manual motor starter will trip. For restart the MS 325 must be put in "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.)

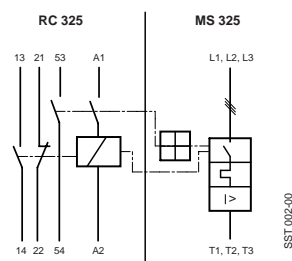
Technical data

Normes:	ICE/EN 60947-6-2, -5-1		
Approvals:	UL, 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



Control voltage 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				
BS3-3	1SAM 101 938 R 0003		50	

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



Smissline-S is a powerful busbar system until 160 A, where manual motor starters type MS 325 can be installed very quick and easy. Customers can save time and wiring costs in electrical installations and get an higher safety. This powerfull system offer big advantages depending of the modular system philosophie current range up to 160 A by having a short circuit capacity of 50 kA.

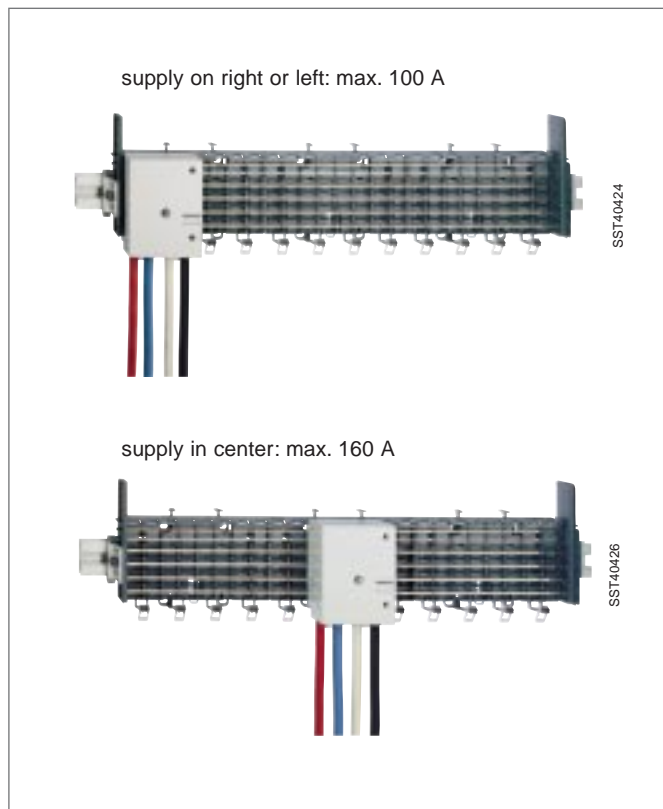
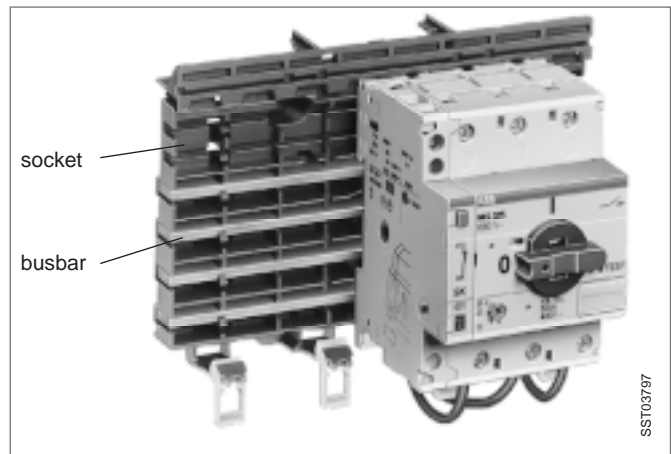
A customers benefit is that ABB offer modules in various lengths, ready made for mounting the MS 325 directly with plug in philosophie - a good solution for a fast installation and a safety wiring.

ABB got many excelent experiences with this system by using in hospitals, in official and commercial buildings, power plants, industries, production lines, wherever customer want have a good and safety soluton for wiring. Smissline-S can be used horizontal and vertically.

In operation people can change or replace components in a short time and in a safety way - a big advantage for a quick and efficient service. The installation get a very high availability and safety.

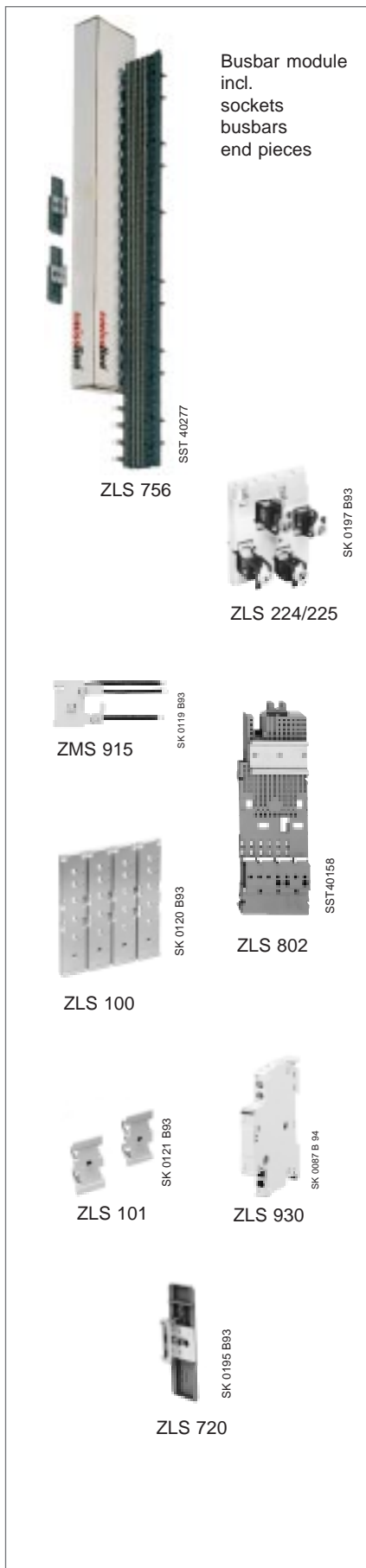
Technical Data

For mounting on DIN rail or wall	
Mounting position:	vertically, horizontal
Max. operating voltage:	690 V
Max. operating current:	
by suply on left or right:	100 A
by 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
--------	------	------------	------------------------	--------------------------	-------

Busbar System as 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			
------------------------------------	---------	---------------------	--	--	--

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			
---------	---------------------	--	--	--

Dummy housing for MS 325

ZLS 930	1SAM 101 908 R 0001			
---------	---------------------	--	--	--

DIN Rail adapter for cover plate for mounting

ZLS 101	GHE 610 1002 R 0020			
---------	---------------------	--	--	--

Alternative we offer single components for create a busbar system

sockets for busbars

6 PLE	ZLS 806	GHE 610 1004 R 0001			
8 PLE	ZLS 808	GHE 610 1004 R 0002			

Busbars, material copper, max. 160 A

Length: 396 mm 24 PLE	ZLS 201-E22	GHE 610 1001 R 1134			
Length: 540 mm 32 PLE	ZLS 201-E30	GHE 610 1001 R 1133			
Length: 684 mm 40 PLE	ZLS 201-E38	GHE 610 1001 R 1132			
Length: 864 mm 48 PLE	ZLS 201-E48	GHE 610 1001 R 0131			
Length: 1152 mm 64 PLE	ZLS 201-E64	GHE 610 1001 R 0135			
Length: 1440 mm 80 PLE	ZLS 201-E380	GHE 610 1001 R 0129			

End piece for the sockets to prevent accidental contact at the end

ZLS 720	GHE 610 1002 R 0013			
---------	---------------------	--	--	--

Adapter for DIN rail components, max. 32 A, short circuit capacity: 6 kA The adapters L1, L2, L3 can be mount to a 3-pole adapter

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			

Other accessories and components for Smissline-S on request

Manual Motor Starters MS 4xx

Ordering details



MS 45x

SST02198



MS 49x

SST01898



MS 450 with auxiliary switch
HK4-11, locked

SST09298



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

SST09498

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	

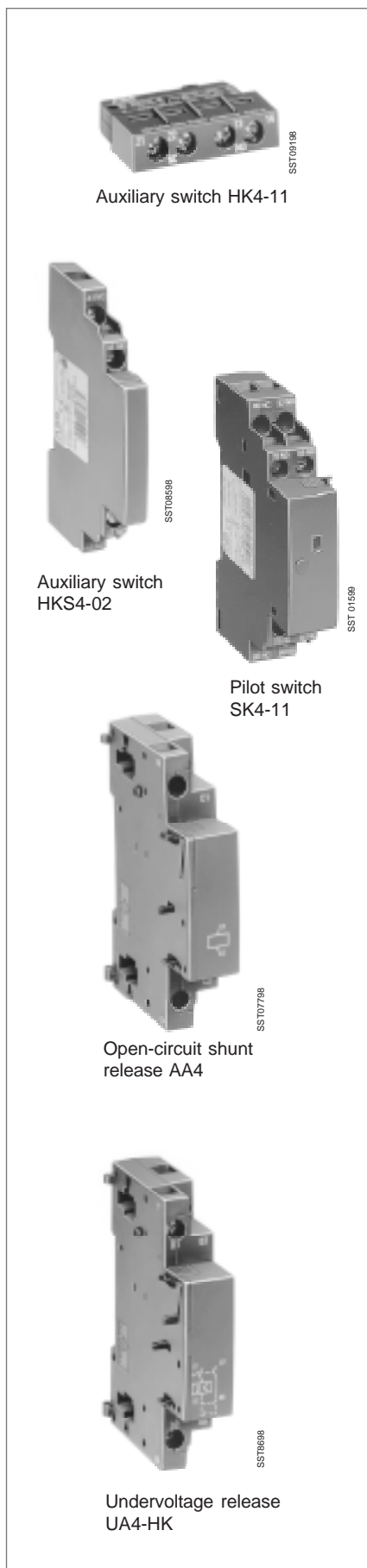
① See table on Page 22

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 panel installation				
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	
Open circuit shunt release, for lateral attachment at right 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, 190-130 V, 50/60 Hz/DC	1SAM 401 907 R1003	0.11	1	
AA4, 230-500 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	
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	10		
PS4-3 without HK, for 3 devices	1SAM 401 911 R1002	10		
PS4-4 without HK, for 4 devices	1SAM 401 911 R1003	10		
PS4-2 with HK, for 2 devices	1SAM 401 911 R1004	10		
PS4-3 with HK, for 3 devices	1SAM 401 911 R1005	10		
PS4-4 with HK, for 4 devices	1SAM 401 911 R1006	10		
Infed 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	1		
OHY2AJM, Twist knob red/yellow	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 ⑦	1SAM 101 923 R 0001	1		

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

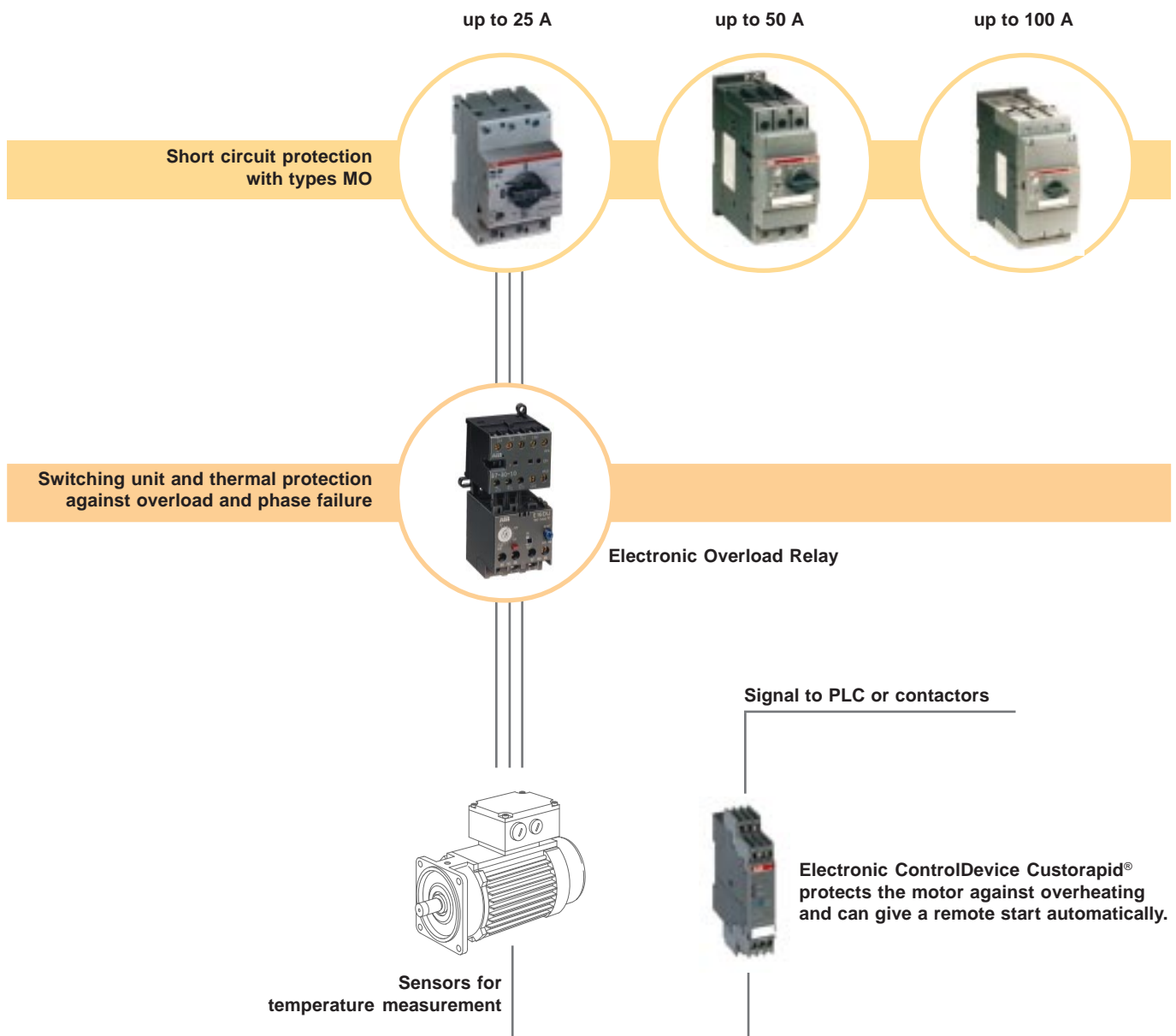
For special applications ABB's manual motor starter of the MS series are also available as versions MO 325 / MO 450 / MO 495 with magnetic tripping only, protecting exclusively against short circuits.

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

Ordering details



SST102198



SST101898

MO 325 see page 8

Selection

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

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 dependend 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.

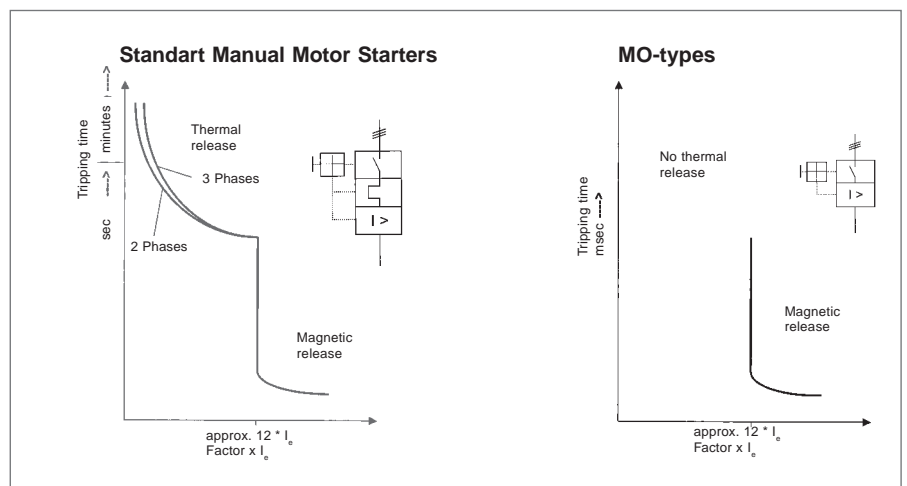
Types MOxx protect only against short circuit. The thermal release and phase failure are not in function.

Applications are:

Short circuit protection against resistance loads

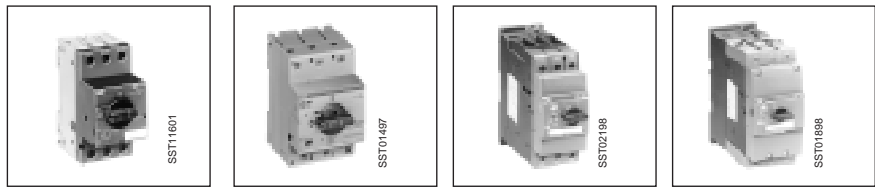
Short circuit protection with using TOL for thermal protection

Only short circuit protection for loads where are tripping curve $12 \dots 14 \times I_n$ is required



Manual Motor Starters Type Series MS

Technical data



Manual motor starter	Type	MS 116	MS 225 / MS 325	MS 450/451	MS 495/496/497
----------------------	------	--------	-----------------	------------	----------------

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	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	100.000	50.000	50.000
Permissible ambient temperature					
- open °C	– 20... + 55/70 ①	– 25 ... + 55 ①	– 25 ... + 55 ①	– 20 ... + 60/70 ①	– 20 ... + 60/70 ①
- encapsulated (in protective housing) °C	on request	– 25 ... + 40	– 25 ... + 40	– 20 ... + 35	– 20 ... + 35
- Storage temperature °C	– 50 ... + 80	– 50 ... + 80	– 50 ... + 80	– 50 ... + 80	– 50 ... + 80
Temperature compensation		with			
Mounting position	as illustrated ⑥	any			
Permissible altitude m	3000	3000	3000	2000	2000
Permissible resistance to vibrations ② (IEC 68-2-6)	10-150 Hz Amplitude 5 g	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)	15 g (11 ms)	on request	on request
Mounting (mounting hardware not included in scope of delivery)					
Screw fixing	see accessories	see accessories	see accessories	2 x M5 35 mm	2 x M5 35 mm,
Quick fastening to EN 50022	35 mm	35 mm	35 mm	(15 mm high)	75 mm
on top-hat rail to EN 50023	–	–	–	–	–
Electrical connection of the main conductors (main circuits)					
Type	Screw terminal	Box terminal	Box terminal	Box terminal + bus	Box terminal
Screw	Pozidrive size 2	Pozidrive size 2	Pozidrive size 2	Pozidrive size 2 4 mm	Internal hexagon
Single-core 1 x mm ²	1 ... 4	1 ... 10	1 ... 10	0.75 ... 35	2.5 ... 70
2 x mm ²	1 ... 4 ③	1 ... 4	1 ... 4	0.75 ... 25	2.5 ... 50
Stranded 1 x mm ²	1 ... 4	1 ... 10	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	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 ④	Screw terminal ④	Screw terminal
Screw	Pozidrive size 2	Pozidrive size 1	Pozidrive size 1	Pozidrive size 1	Pozidrive size 2
Single-core 1 x mm ²	1 ... 2.5 ⑤	0.5 ... 2.5	0.5 ... 2.5	0.5 ... 2.5	0.5 ... 2.5
2 x mm ²	1 ... 2.5	0.5 ... 2.5	0.5 ... 2.5	0.5 ... 2.5	0.5 ... 2.5
Flexible 1 x mm ²	0.75 ... 2.5	0.5 ... 2.5	0.5 ... 2.5	0.5 ... 2.5	0.5 ... 1.5
2 x mm ²	0.75 ... 2.5	0.5 ... 2.5	0.5 ... 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

⑥ other mounting positions on request

Manual Motor Starters Type Series MS

Technical data

Manual motor starter	Type	MS 116	MS 225/325	MS 450/451	MS 495/496/497
----------------------	------	--------	------------	------------	----------------

General electrical data

Rated insulation voltage U_i to EN 60947 to CSA / U_L / NEMA	V AC V AC	690 600	690 600	690 600	690 600
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 operating current I_e / AC 3 max.					
Rated frequency ①	Hz	50/60			
Rated current ranges I_e (number of ranges)	A		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					
Minimum load at:	24 V DC mA 12 V DC mA	5 mA at 17 VDC -	5 10	5 mA at 17 VDC -	
Rated operating current I_e at AC 15 to	24 V AC A 230 V AC A 400 V AC A	6 4 3	2.5 2 1	- 3 / 0.5 / 6 1.5 / - / 3 ① ② - / - / -	
at DC 13 to	24 V DC A 60 V DC A 110 V DC A 220 V DC A 440 V DC A	2 - 0.5 0.25 0.1	2.5 2.5 0.6 0.25 -	- / 0.15 / - 0.22 / - / 0.5 0.1 / - / 0.25 - / - / 0.1	
Short-circuit protection back-up fuse	gL A aM A	on request	10 6	gL / gG 10 A -	

① Correction factors for other frequencies on request

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

③ Other data on request

Manual Motor Starters Type Series MS

Technical data

Manual motor starter	Type	MS 116	MS 225/325	MS 450/451	MS 495/496/497
----------------------	------	--------	------------	------------	----------------

Release

Device for phase failure protection		with		with	
Electromagnetic trips Response value set ex-works		9.6 ... 14.4 x I _n	7.5 ... 12 I _n ① 9 ... 14 I _n ② 10 ... 15 I _n ③ 12.5 ... 17.5 I _n ④	10.4 I _n ... 15.6 I _n	
Undervoltage release					
Pick-up value	% of U _c	≥ 85	≥ 85	≥ 85	
Drop-out value	% of U _c	35 ... 75	35 ... 75	35 ... 70	
Power consumption	Pick-up VA	on request	0.9	20.2	
	Hold VA	on request	0.9	7.2	
Open-circuit shunt release					
Pick-up value	% of U _c	–	≥ 85	≥ 70	
Relative duty	% ED	–	–	100 at voltages 50/60 Hz to Power	
consumption	Pick-up VA	–	110-240V: 13-61 ⑤	on request	
	Hold VA	–	–	on request	

Internal resistance values

Setting ranges		Resistance per phase in Ω resp. MS4.. in mΩ					
from	A to	MS 116	MS 225/MS 325	MS 450	MS 451	MS 495/MS 497	MS 496
0.1	... 0.16	on request	71.1	–	–	–	–
0.16	... 0.25	on request	27.1	–	–	–	–
0.25	... 0.4	on request	12.3	–	–	–	–
0.4	... 0.63	on request	5.17	–	–	–	–
0.63	... 1.0	on request	2.09	–	–	–	–
1.0	... 1.6	on request	0.805	–	–	–	–
1.6	... 2.5	on request	0.34	–	–	–	–
2.5	... 4.0	on request	0.141	–	–	–	–
4.0	... 6.3	on request	0.051	–	–	–	–
6.3	... 9.0	–	0.0224	–	–	–	–
6.3	... 10.0	on request	–	–	–	–	–
9.0	... 12.5	–	0.0122	–	–	–	–
10.0	... 16.0	on request	–	–	–	–	–
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											
from	to	at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC			
		I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A		
A		Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)											
Setting ranges	0.1 ... 0.16	Short-circuit capacity until 50 kA no backup fuse required		Short-circuit capacity until 50 kA no backup fuse required		on request		on request		Short-circuit capacity until 30 kA no backup fuse required			
	0.16 ... 0.25											5	32
	0.25 ... 0.4											2	40
	0.4 ... 0.63									2	63		
	0.63 ... 1.0									2	63		
	1.0 ... 1.6									2	63		
	1.6 ... 2.5									2	63		
2.5 ... 4.0	2	63											
4.0 ... 6.3													
6.3 ... 10.0			12,5	63									
10.0 ... 16.0			10	80									

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																	
from	to	at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC									
		I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A								
A		Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)																	
Setting ranges	0.1 ... 0.16	Short-circuit proof No back-up fuse required up to $I_{cc} = 100$ kA																	
	1.0 ... 1.6																		
	1.6 ... 2.5											40	25						
	2.5 ... 4.0											10	40						
	4.0 ... 6.3											70	50	60	35 / 40	7	40		
	6.3 ... 9.0											50	80	40	50	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 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															
from	to	at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 V AC							
		I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A	I_{cs} kA	gL, aM A						
A		Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)															
Setting ranges	0.1 ... 0.16	Short-circuit proof No back-up fuse required up to $I_{cc} = 50$ kA															
	1.0 ... 1.6																
	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 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	5	10	100
45 ... 63				25	50	200	7,5	15	160	4	7,5	100	4	7,5	100
57 ... 75				25	50	200	5	10	160	3	6	125	3	6	125
70 ... 90				25	50	200	5	10	160	3	6	160	3	6	160
80 ... 100				25	50	200	5	10	160	3	6	160	3	6	160

Short-circuit protection 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 $I_{cc} = p$ Prospective 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.

Motor protection switch type	mind. 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 bis 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 Ex

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 times the setting current, 3-pole, starting from cold state.					
		3	4	5	6	7.2	8
A	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

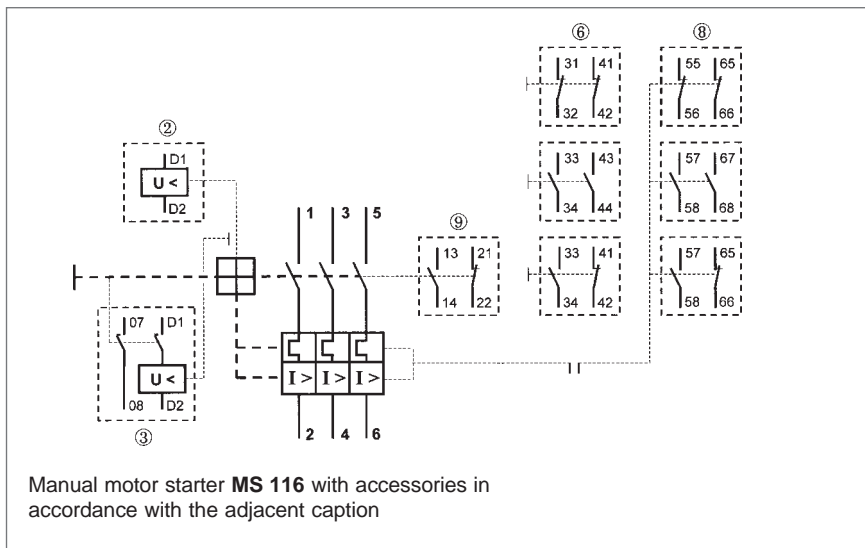
Device-Type	Approvals, certificates			Ship's classification societies			
Test mark			EEx e				
Abbreviation	CSA	USA	PTB, KEMA	GL	LRS	BV	DNV
Validity	Canada			Germany	Great Britain	France	Norway
MS 116	■	■		□	□		
MS 225	■	■					
MS 325	■	■	■	■	■	■	■
MS 450	■	■	■	■			■
MS 495	■	■	■	■			■
MS 497	■	■	■	□			□

Explanation of symbols

- Normal version approved: Rating plates bear the test mark if mandatory.
- Submitted for approval, delivery time on request.

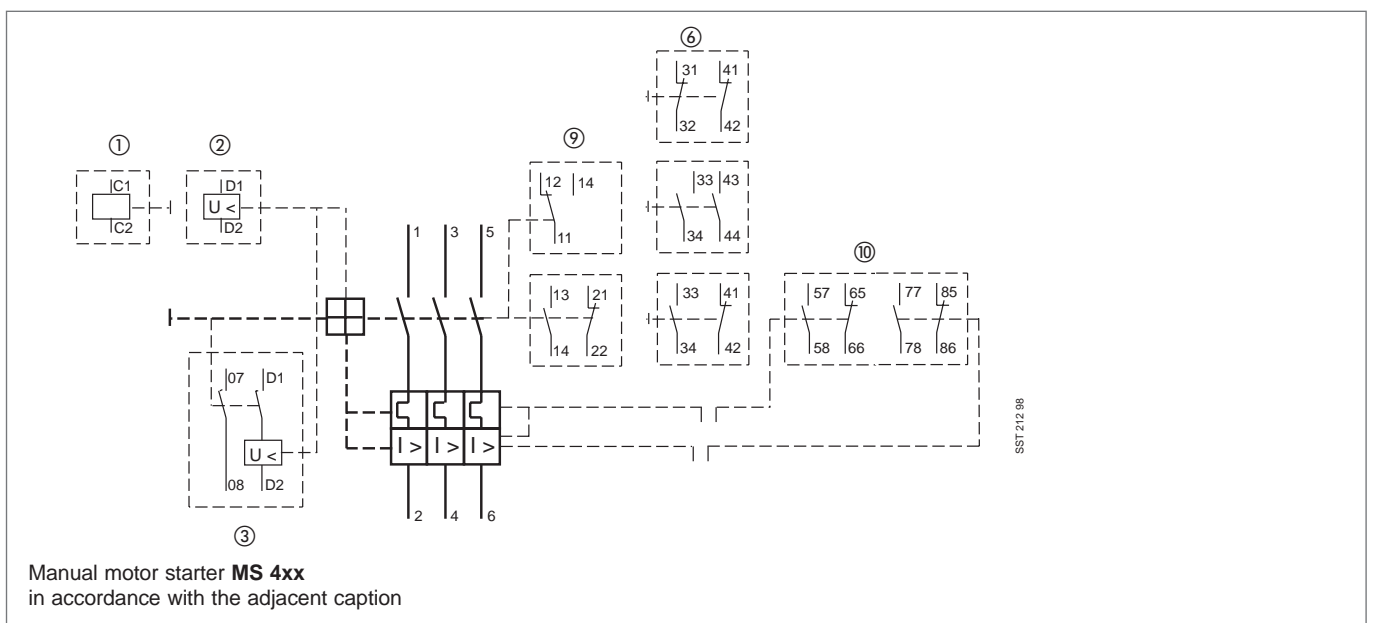
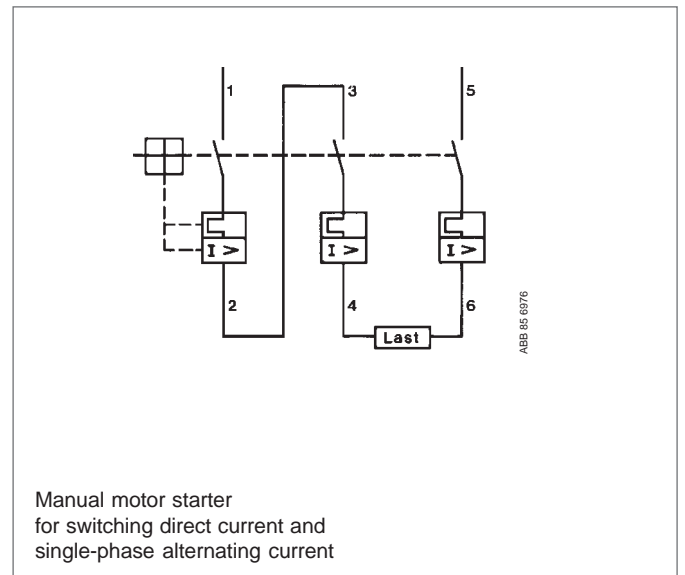
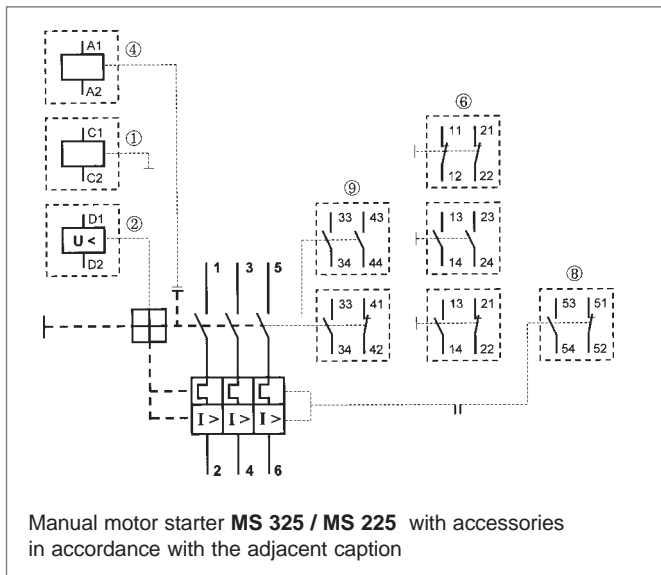
Manual Motor Starters Type Series MS

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
- ⑥ Detail wiring diagram, see page 4/8
- 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



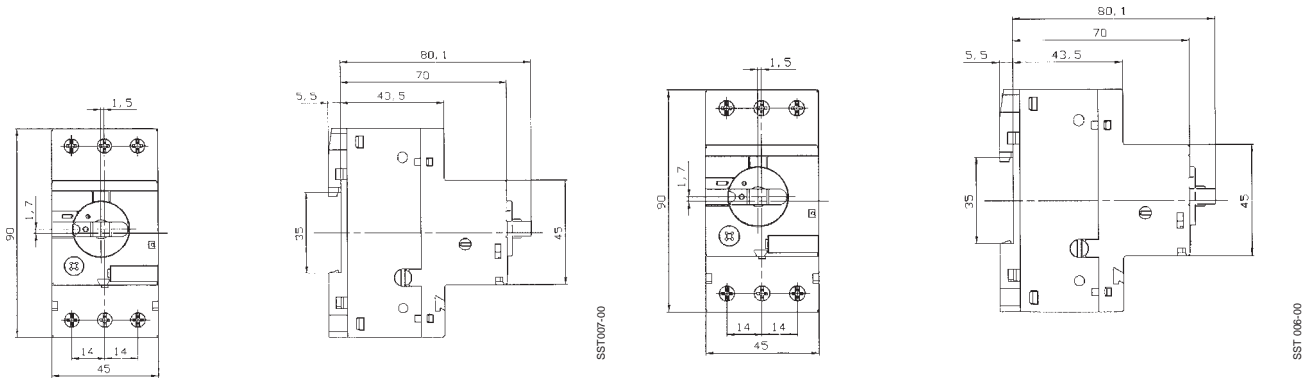
Manual Motor Starter MS 116

Accessories

Dimension diagrams

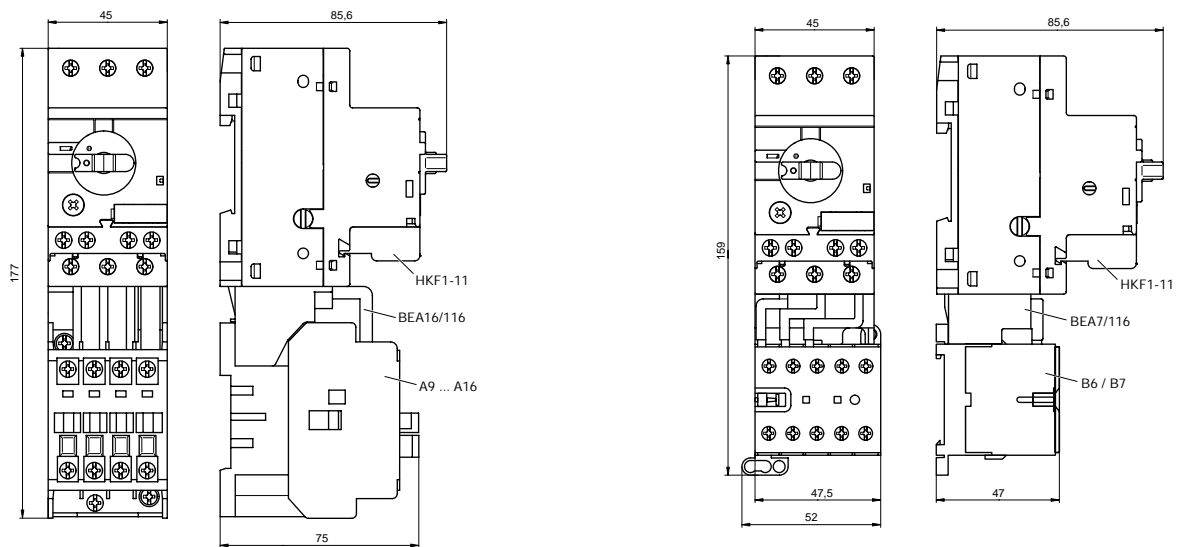
Manual motor starter **MS 116**

MS 116 with aux. contact HKF 1 for front mounting

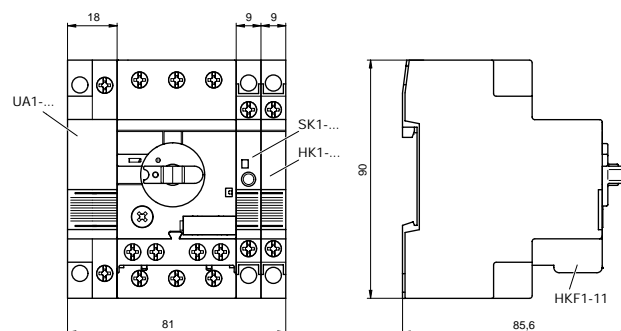


Manual motor starter **MS 116** mounted with contactor **A9...A16**

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



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



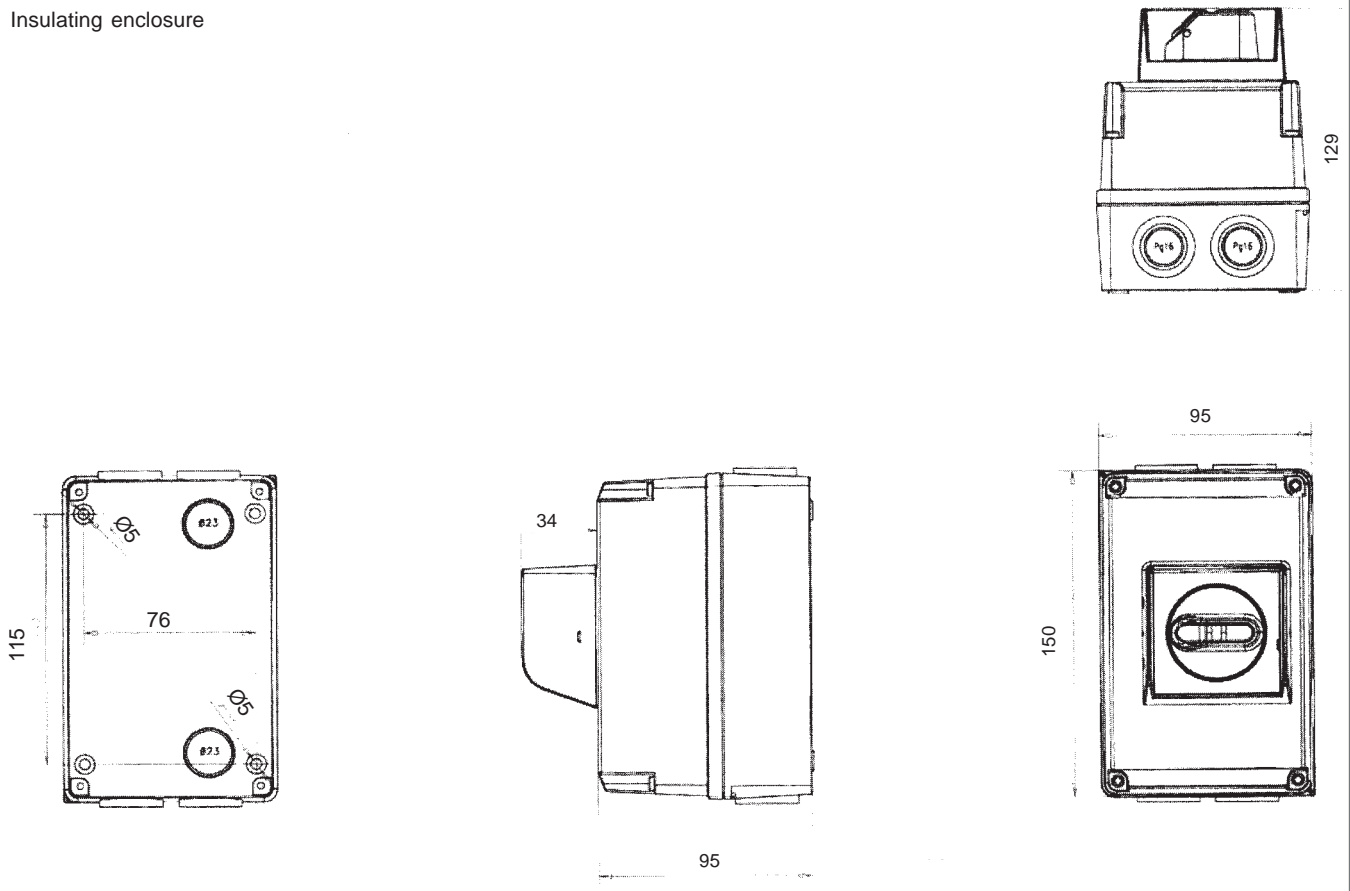
Dimension in mm

Manual Motor Starters MS 325 / MS 225

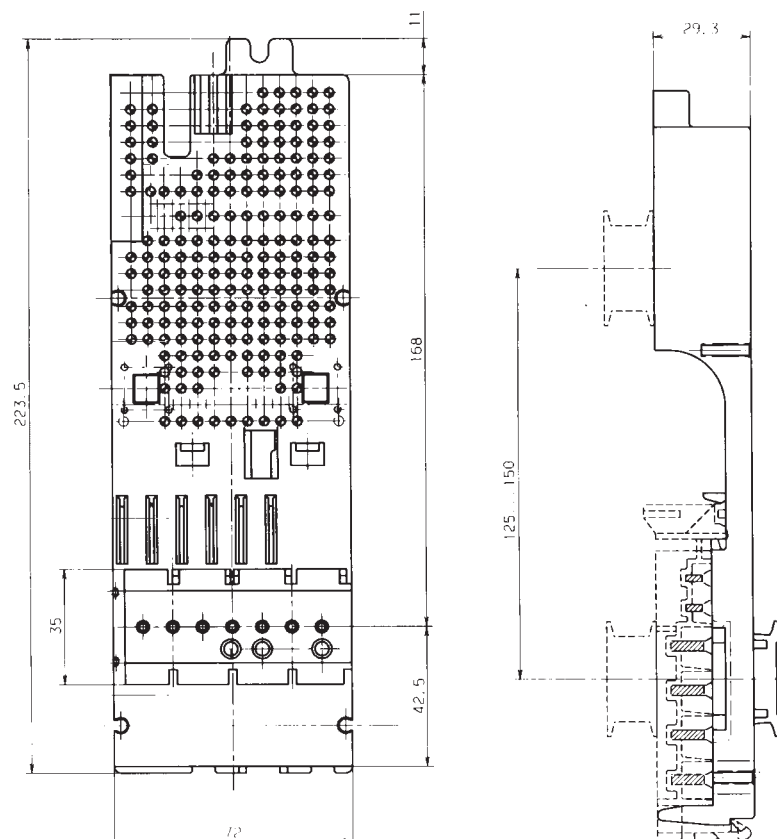
Accessories

Dimension diagrams

Insulating enclosure



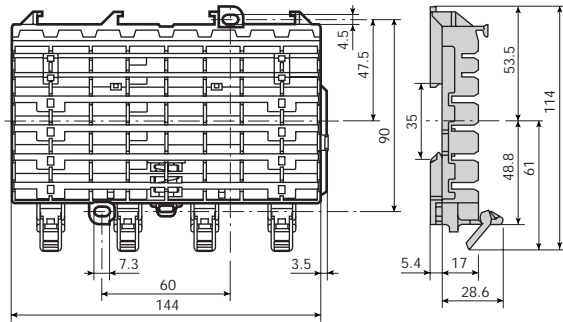
Mounting plate
starter combination for plug into
busbar system smissline-S



Dimensions in mm

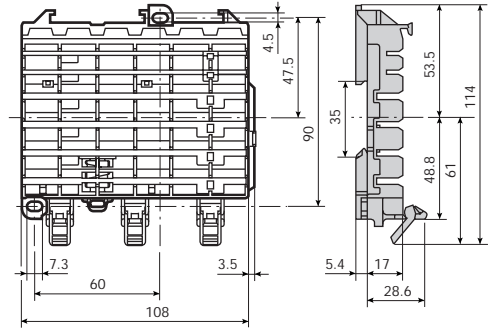
Busbar system smissline-S

Socket ZLS 808 8 PLE



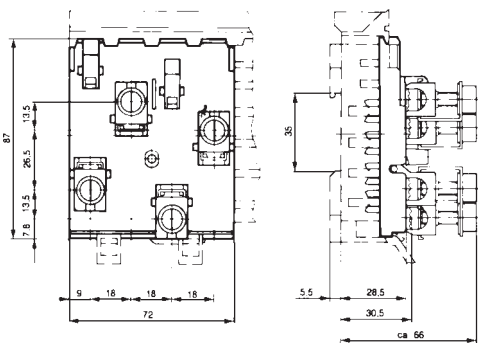
Z20117.eps

Socket ZLS 806 6 PLE

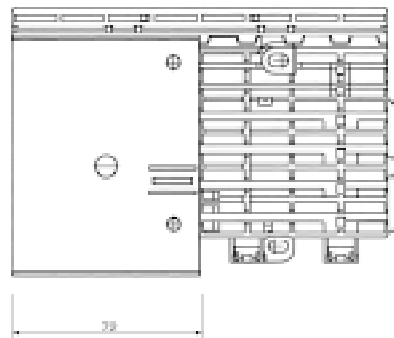


Z20118.eps

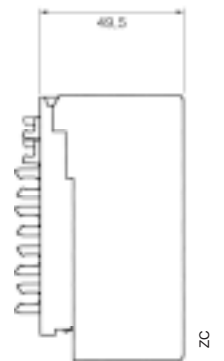
Power infeed block ZLS 224 4 PLE



SK 0263 Z 93

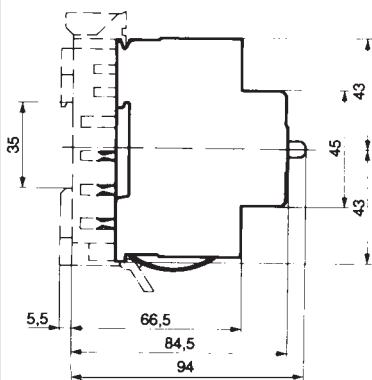


ZA



ZC

Motor protection switch MS 325 3 PLE



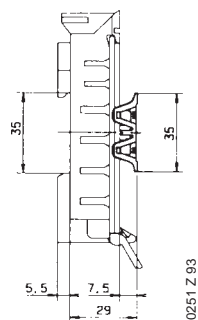
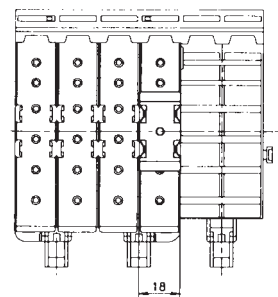
SK 0259 Z 93

Auxiliary switch block HK with empty housing ZLS 930 1 PLE



SK 0260 Z 93

Busbar cover ZLS 100 with adapter ZLS 101



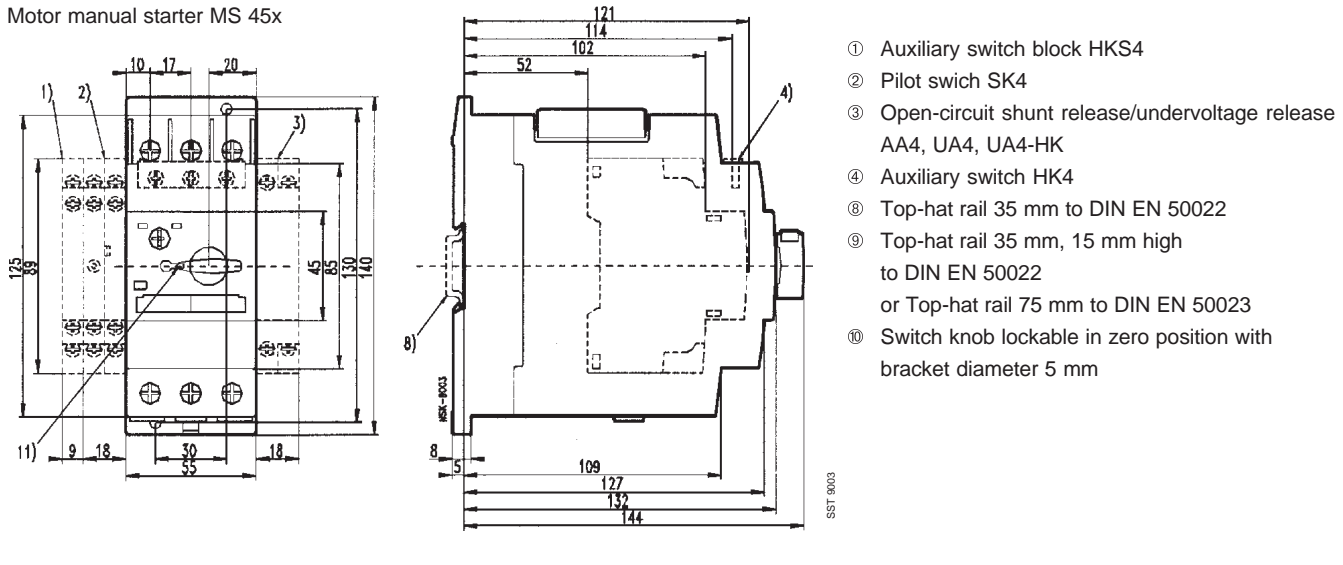
SK 0251 Z 93

Dimensions in mm

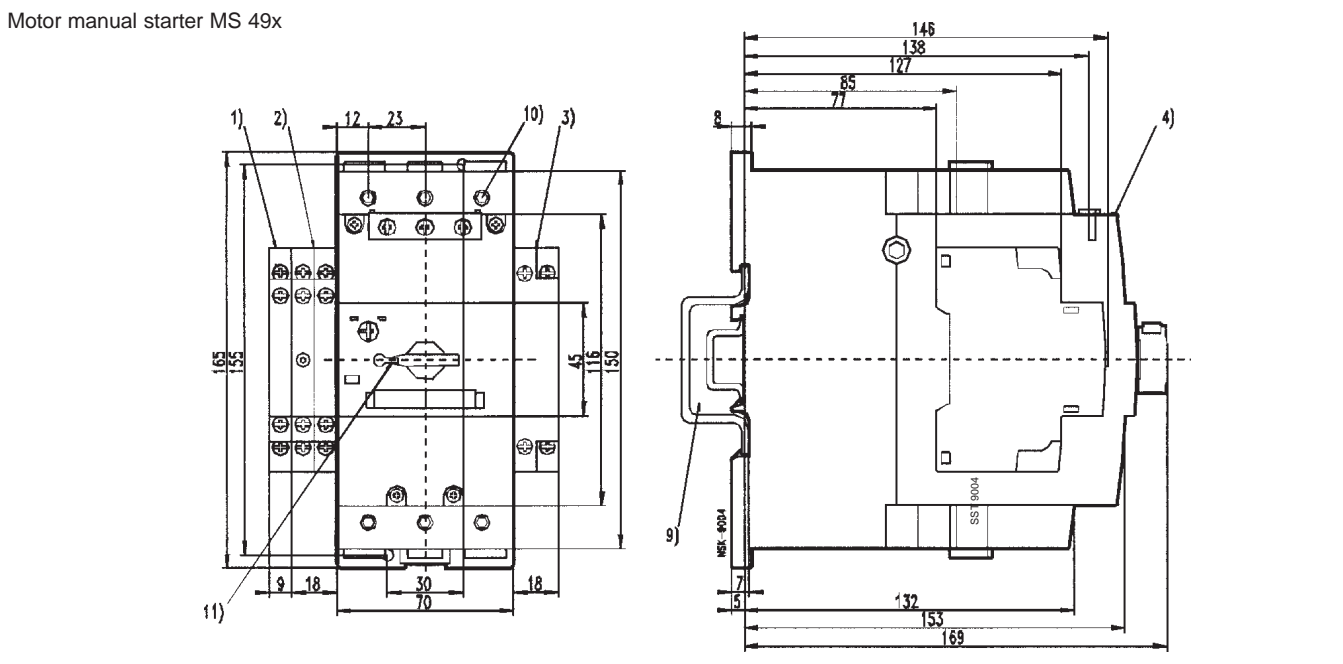
Manual Motor Starters MS 45x / MS 49x

Dimension diagrams

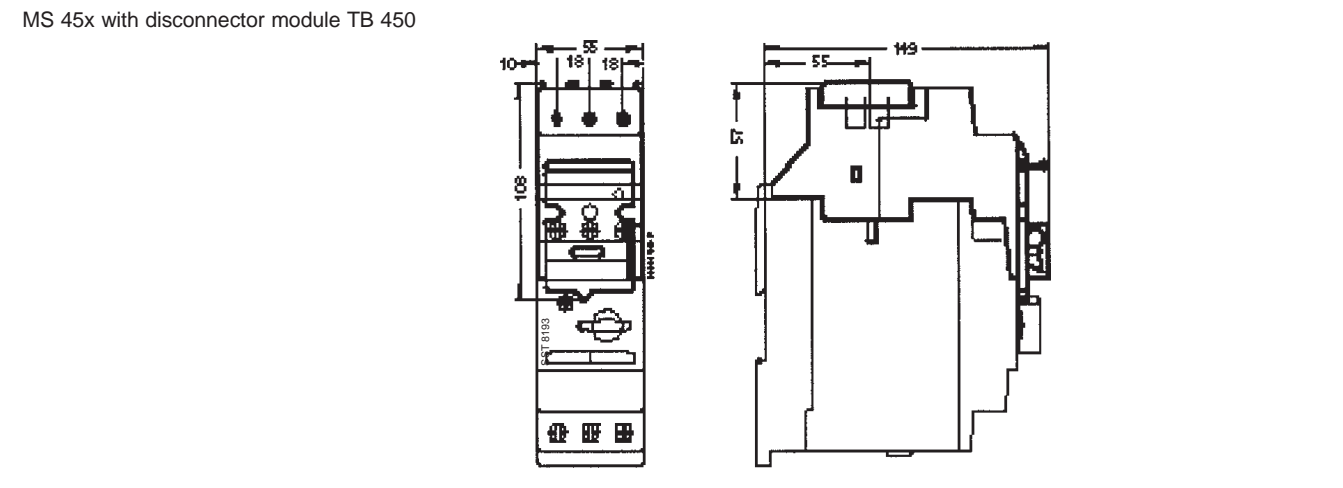
Motor manual starter MS 45x



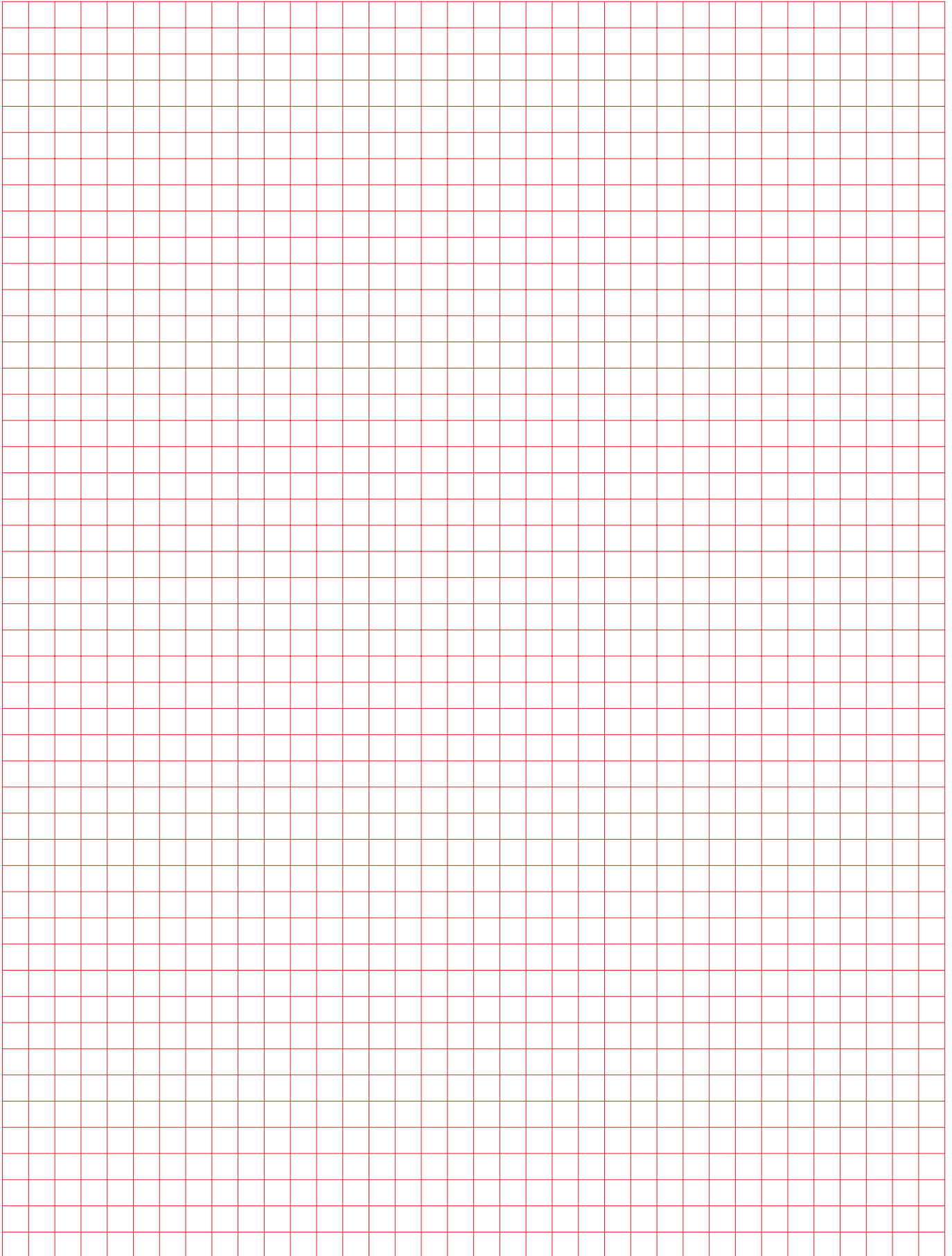
Motor manual starter MS 49x



MS 45x with disconnecter module TB 450



Notes



Manual Motor Starter MS 325

Combinations with Accessories



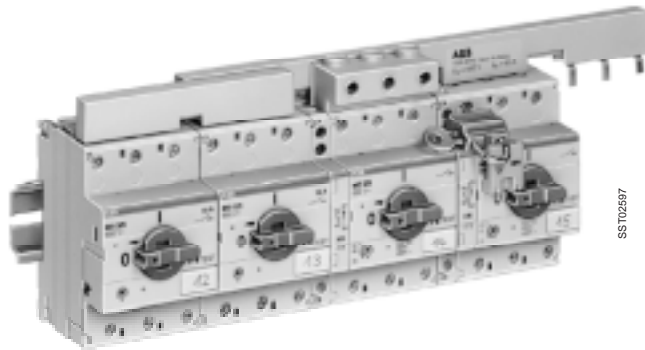
SST02297

MS 325
with undervoltage release UA



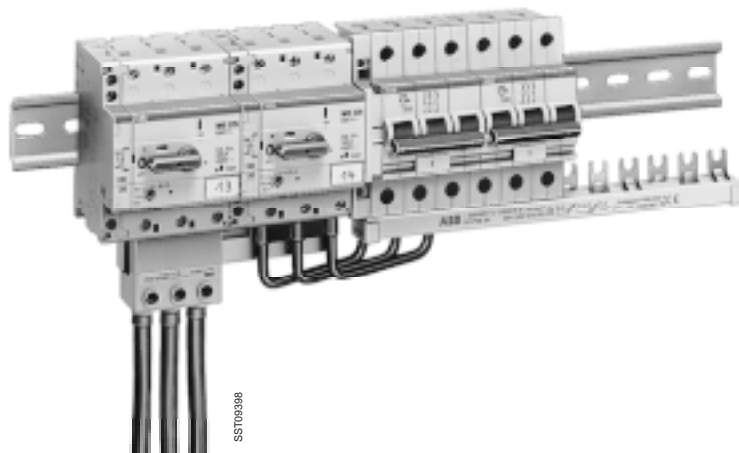
SST0179F

MS 325 with short-circuit current limiter
PROLIM PLM36B on equipment support GA02



SST02297

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



SST03298

MS 225 cross-wired via connecting element SZ-SM3
with 3-pole circuit breaker, power infeed from below

Manual Motor Starter MS 325

Combinations with Accessories



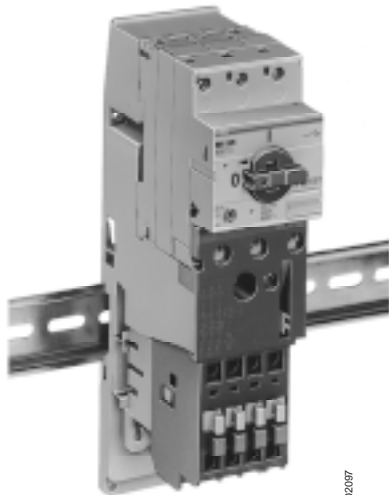
SST01887

MS 325 with mini contactor B6



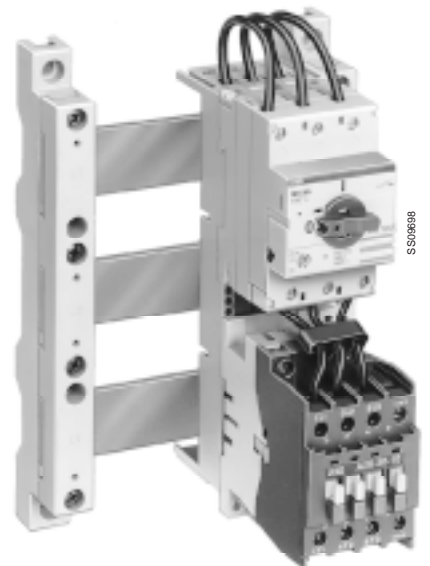
SST02497

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



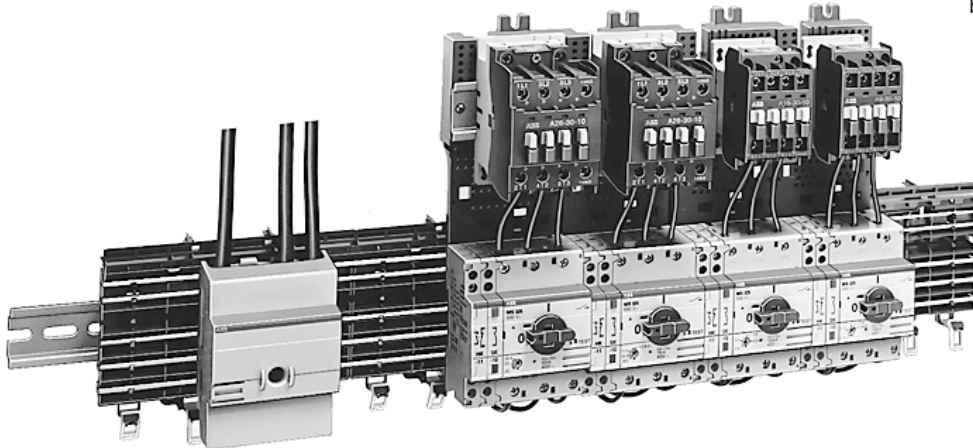
SST02097

MS 325 with starter block DLA



SST06398

MS 325 with contactor A 26 on
busbar adapter SA 11



SST08998

MS 325 and A contactors on combined modules in the socket busbar
system smissline-S

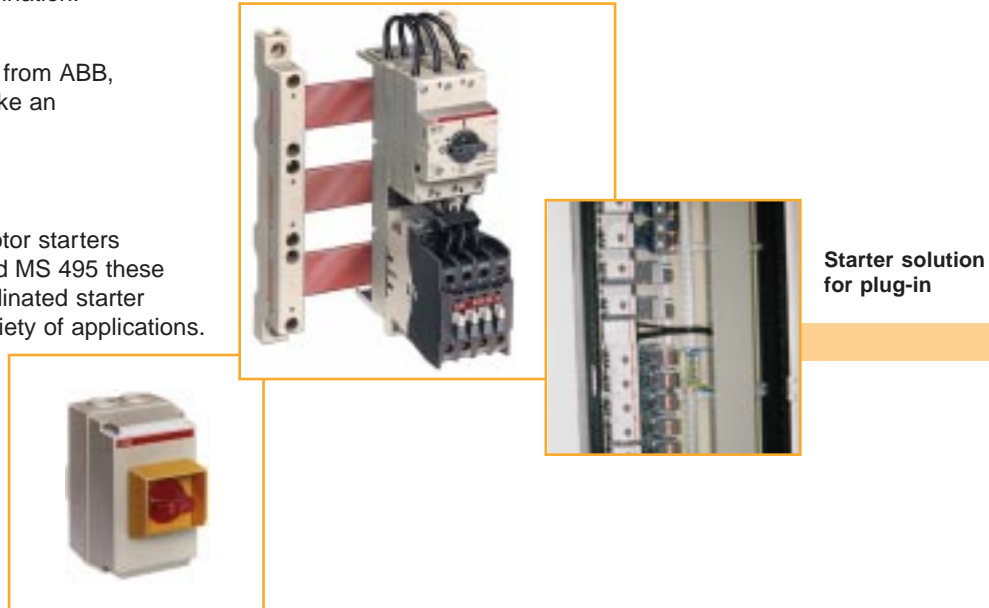
Various Motor Starter combinations

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, e. g. 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 end users an improved service and faster reactions in operating systems.

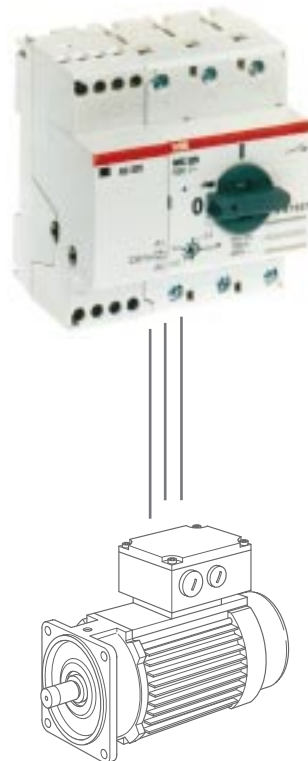


Compact motor starter

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

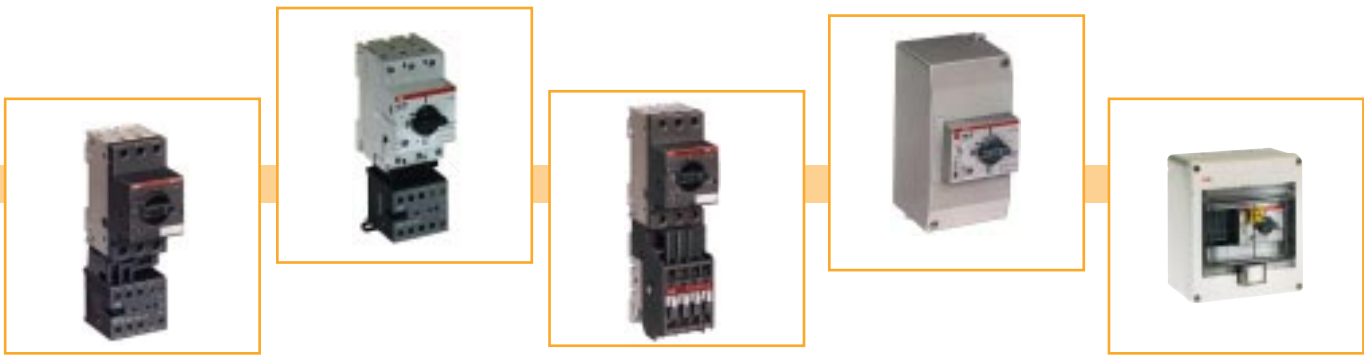
Technical data for the compact motor starter

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
 - save space



DOL Starters

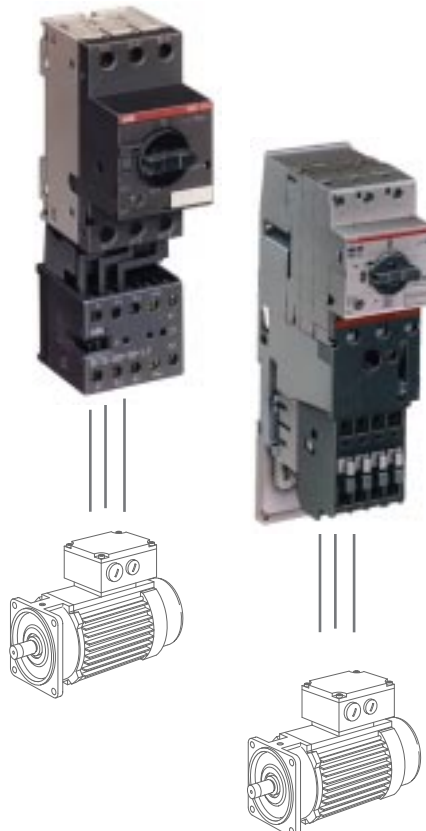
Starters from ABB comprise of a mounting adapter in which a contactor is already incorporated.

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 Manual motor starter and contactor are mounted on a common plate

Customer benefits:

- fully coordinated modular assembly
- easy planing
- no wiring necessary
- compact - space saving
- easy to change
- better and quicker service

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	●	●					



ABB Stotz-Kontakt GmbH
 P.O.BOX 101680
 D-69006 Heidelberg
 Telephone ++49 62 21 / 7 01-00
 Telefax ++49 62 21 / 7 01-1115
 Internet <http://www.abb.de/sst>

Publication
 no: 1SAC 1007 01 D0201
 Printed in Germany (02/01)