





# Manual Motor Starters

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

### Contents

<b>Manual Motor Starter MS116</b>	
0-16 A, 16/50 kA .....	6
<b>Manual Motor Starter MS325</b>	
0-25 A, 100 kA .....	8
<b>Manual Motor Starters MS45x</b>	
11-50 A, 25/50 kA .....	12
<b>Manual Motor Starters MS49x</b>	
11-50 A, 25/50/100 kA .....	12
<b>Manual Motor Starters MOxxx</b>	
up to 100 A, 25/50 kA .....	14
<b>Starter Combinations with Manual Motor Starters</b> .....	16
<b>Busbar System smissline-S</b>	
up to 200 A, 50 kA.....	18
Technical data, Short circuit switching tables .....	20
Dimension diagrams .....	28
Examples, applications .....	33

# Manual Motor Starters and Motor Starter Combinations

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

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

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

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

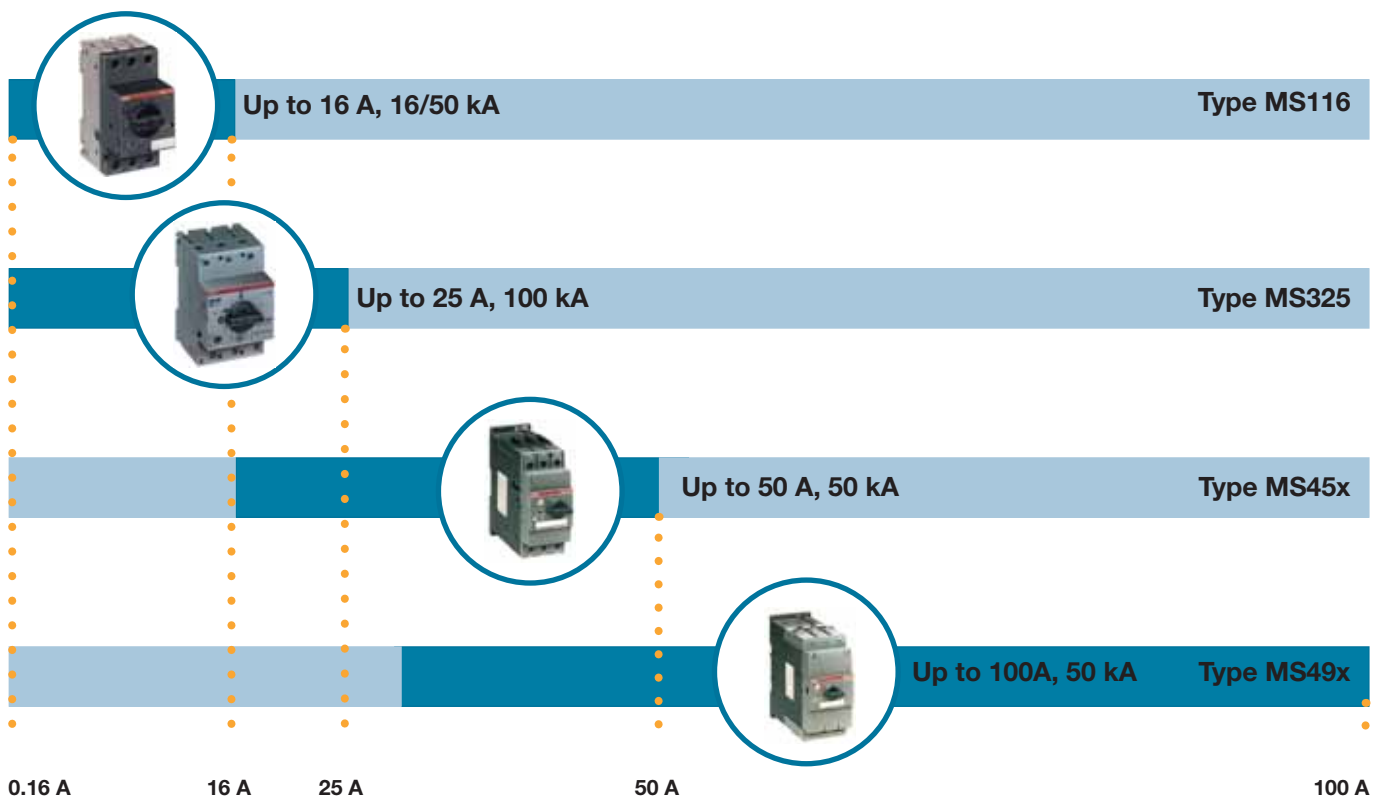
**Manual motor starters provide protection against:**

- Overload
- Short circuit
- Phase failure
- Undervoltage

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



## Switching capabilities of ABB's manual motor starters



# Manual Motor Starters from ABB

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

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

The device-types MS116/325 can be easily coordinated with the ABB MCB-system, which is used in installations for touch-proved enclosures and panels.

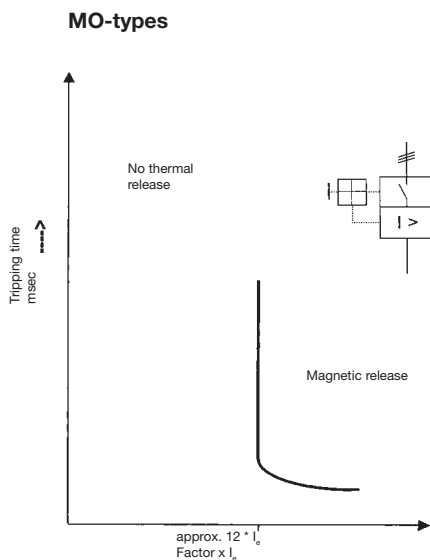
MS450 to MS497 are your best choice for high power applications. These models are used to power up large motors up to 45 kW.

## Technical Data, Overview

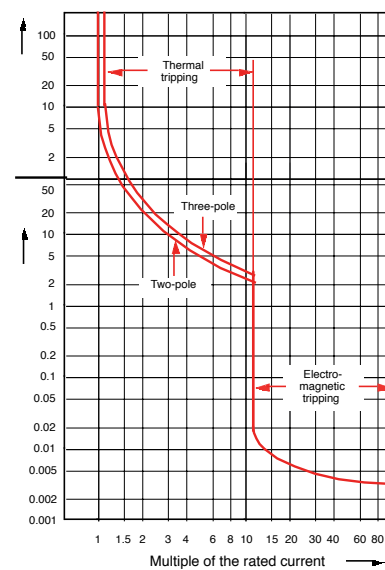
Motorstarter type	MS116	MS325	MS45x	MS49x
$I_n$ /A	16	25	50	100
$I_{CS}$ /kA	16/30/50	50/100	25/50	25/50/100
Tripping class	10	10	10,20	10,20
Magnetic type only		●	●	●
Disconnect Capability, ref. IEC 60947-1	●	●	●	●
UL 508 type E		●	●	●

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

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



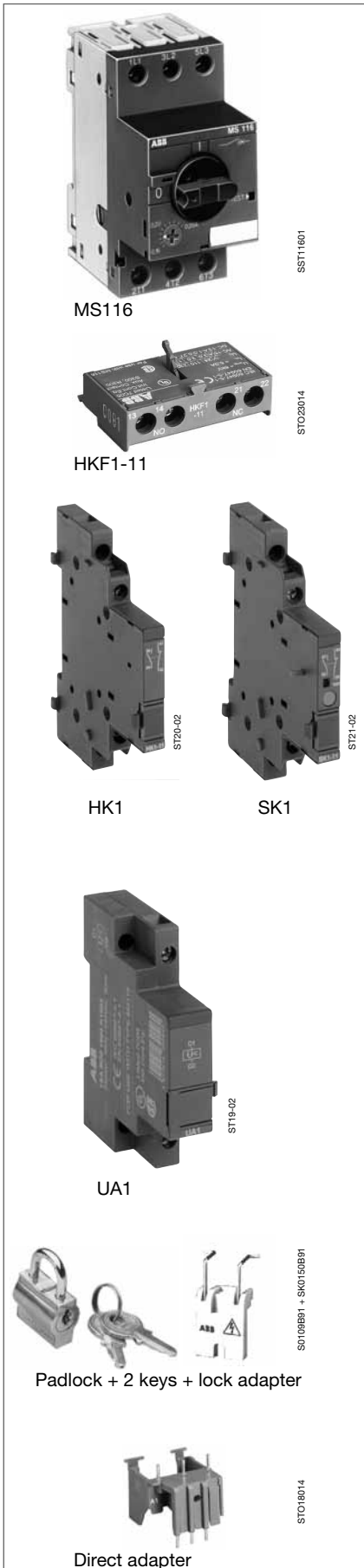
## MSx Tripping curves



# Manual Motor Starter MS116

## Accessories

### Ordering details



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

#### MS116 with thermal and electromagnetic trips, short-circuit-proof up to 50 kA

MS116 - 0.16	0.10 ... 0.16	1SAM 250 000 R1001	0.268	1
MS116 - 0.25	0.16 ... 0.25	1SAM 250 000 R1002	0.268	1
MS116 - 0.4	0.25 ... 0.40	1SAM 250 000 R1003	0.268	1
MS116 - 0.63	0.40 ... 0.63	1SAM 250 000 R1004	0.268	1
MS116 - 1.0	0.63 ... 1.00	1SAM 250 000 R1005	0.268	1
MS116 - 1.6	1.00 ... 1.60	1SAM 250 000 R1006	0.268	1
MS116 - 2.5	1.60 ... 2.50	1SAM 250 000 R1007	0.268	1
MS116 - 4	2.50 ... 4.00	1SAM 250 000 R1008	0.268	1
MS116 - 6.3	4.00 ... 6.30	1SAM 250 000 R1009	0.268	1
MS116 - 10.0	6.30 ... 10.00	1SAM 250 000 R1010	0.268	1
MS116 - 12.0	8.00 ... 12.00	1SAM 250 000 R1012	0.268	1
MS116 - 16.0	10.00 ... 16.00	1SAM 250 000 R1011	0.268	1

#### Accessories

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

HKF1-11	1 NO + 1 NC	1SAM 201 901 R1001	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 R1004	2
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#### Auxiliary switches, lateral attachment at right

HK1-11	1 NO + 1 NC	1SAM 201 902 R1001	2
HK1-20	2 NO	1SAM 201 902 R1002	2
HK1-02	2 NC	1SAM 201 902 R1003	2

#### Shunt release, lateral mounting at the left side

AA1-24	24 V, 50/60 Hz	1SAM 201 910 R1001	1
AA1-110	110 V, 50/60 Hz	1SAM 201 910 R1002	1
AA1-230	200-240 V, 50/60 Hz	1SAM 201 910 R1003	1
AA1-400	350-415 V, 50/60 Hz	1SAM 201 910 R1004	1

#### Signal switch for general "tripped" signal, lateral attachment at right

SK1-11	1 NO + 1 NC	1SAM 201 903 R1001	2
SK1-20	2 NO	1SAM 201 903 R1002	2
SK1-02	2 NC	1SAM 201 903 R1003	2

#### Undervoltage release, lateral attachment at left

UA1-24	24 V, 50 Hz	1SAM 201 904 R1001	1
UA1-48	48 V, 50 Hz	1SAM 201 904 R1002	1
UA1-60	60 V, 50 Hz	1SAM 201 904 R1003	1
UA1-120	110 V 50 Hz/120 V 60 Hz	1SAM 201 904 R1004	1
UA1-208	208 V, 60 Hz	1SAM 201 404 R1008	1
UA1-230	230 V 50 Hz/240 V 60 Hz	1SAM 201 904 R1005	1
UA1-400	400 V, 50 Hz	1SAM 201 904 R1006	1
UA1-415	415 V 50 Hz/480 V 60 Hz	1SAM 201 904 R1007	1

#### Locking device (see also MS325, Page 9)

SA1	lock adapter	GJF1 101 903 R0001	1
SA2	padlock + 2 keys	GJF1 101 903 R0002	1
SA3	lock adapter + padlock + 2 keys	GJF1 101 903 R0003	1
FC116	fixing clip for screw mounting	1SAM 201 909 R1001	

#### Direct adapter, for wiring to contactors

BEA7/116	mini contactors B6/B7	1SBN 080 906 R1000	1
BEA16/116	contactors A9/A12/A16	1SBN 081 406 R1000	1
BEA26/116	contactors A26	1SBN 082 406 R1000	1

① Not suitable for panel mounting

# Manual Motor Starter MS116

## Accessories

### Ordering details



### Accessories

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

① For accommodating spindle and attachment to manual motor starter

② Is screwed directly onto the manual motor starter

# Manual Motor Starter MS325

## Ordering details



MS325

SST01487



MS325 with auxiliary contacts HKF-11 front mounting

SST 02899



2CDC 241 008 F004



2CDC 241 004 F004

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

### MS325 with thermal and electromagnetic trips, short-circuit-proof up to 100 kA

MS325 – 0.16	0.10 ... 0.16	1SAM 150 000 R1001	0.347	1	
MS325 – 0.25	0.16 ... 0.25	1SAM 150 000 R1002	0.347	1	
MS325 – 0.4	0.25 ... 0.40	1SAM 150 000 R1003	0.347	1	
MS325 – 0.63	0.40 ... 0.63	1SAM 150 000 R1004	0.347	1	
MS325 – 1	0.63 ... 1.00	1SAM 150 000 R1005	0.347	1	
MS325 – 1.6	1.00 ... 1.60	1SAM 150 000 R1006	0.347	1	
MS325 – 2.5	1.60 ... 2.50	1SAM 150 000 R1007	0.347	1	
MS325 – 4	2.50 ... 4.00	1SAM 150 000 R1008	0.347	1	
MS325 – 6.3	4.00 ... 6.30	1SAM 150 000 R1009	0.347	1	
MS325 – 9	6.30 ... 9.00	1SAM 150 000 R1010	0.347	1	
MS325 – 12.5	9.00 ... 12.50	1SAM 150 000 R1011	0.347	1	
MS325 – 16	12.50 ... 16.00	1SAM 150 000 R1012	0.347	1	
MS325 – 20	16.00 ... 20.00	1SAM 150 000 R1013	0.347	1	
MS325 – 25	20.00 ... 25.00	1SAM 150 000 R1014	0.347	1	

### MS325 with thermal and electromagnetic trips, short-circuit-proof up to 100 kA, with auxiliary switch 1 NO + 1 NC front mounted

MS325 – 0.16	0.10 ... 0.16	1SAM 150 005 R0001	0.359	1	
MS325 – 0.25	0.16 ... 0.25	1SAM 150 005 R0002	0.359	1	
MS325 – 0.4	0.25 ... 0.40	1SAM 150 005 R0003	0.359	1	
MS325 – 0.63	0.40 ... 0.63	1SAM 150 005 R0004	0.359	1	
MS325 – 1	0.63 ... 1.00	1SAM 150 005 R0005	0.359	1	
MS325 – 1.6	1.00 ... 1.60	1SAM 150 005 R0006	0.359	1	
MS325 – 2.5	1.60 ... 2.50	1SAM 150 005 R0007	0.359	1	
MS325 – 4	2.50 ... 4.00	1SAM 150 005 R0008	0.359	1	
MS325 – 6.3	4.00 ... 6.30	1SAM 150 005 R0009	0.359	1	
MS325 – 9	6.30 ... 9.00	1SAM 150 005 R0010	0.359	1	
MS325 – 12.5	9.00 ... 12.50	1SAM 150 005 R0011	0.359	1	
MS325 – 16	12.50 ... 16.00	1SAM 150 005 R0012	0.359	1	
MS325 – 20	16.00 ... 20.00	1SAM 150 005 R0013	0.359	1	
MS325 – 25	20.00 ... 25.00	1SAM 150 005 R0014	0.359	1	

### Auxiliary switches, for front mounting ①

HKF-11	1 NO + 1 NC	1SAM 101 928 R0001	0.020	10	
HKF-20	2 NO	1SAM 101 928 R0002	0.020	10	

### Auxiliary switches, lateral attachment at left, max. 2 pieces attachable ② ③

HKF-11	1 NO + 1 NC	1SAM 101 901 R0001	0.031	10	
HKF-20	2 NO ④	1SAM 101 901 R0002	0.031	10	
HKF-02	2 NC	1SAM 101 901 R0003	0.031	10	

### Signal switch 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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### UL 508 Type E Accessories

S3-M3	High insulation infeed block	1SAM 101 938 R0004	0.030	10	
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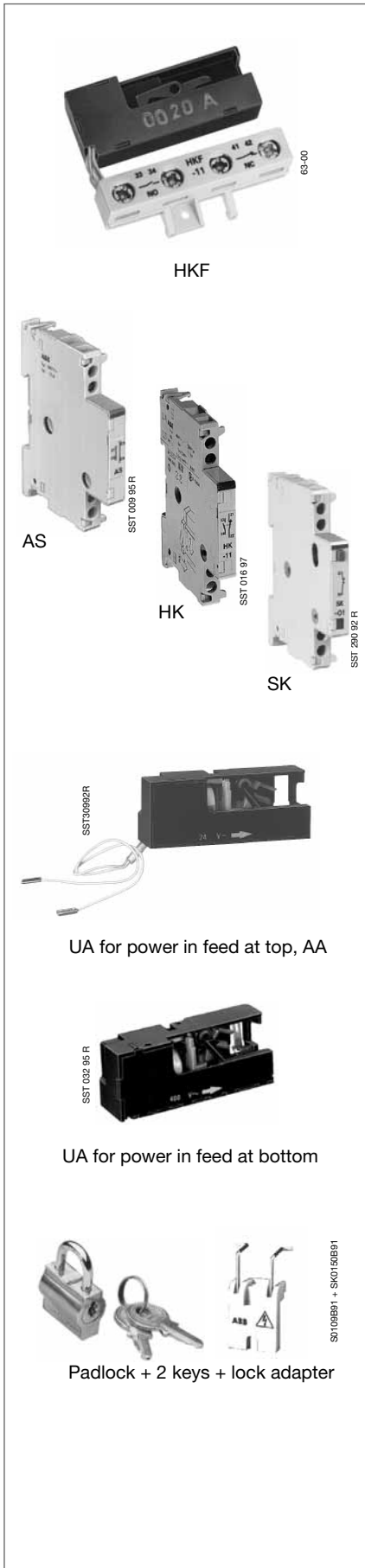
### Signal switch for short circuit tripping, lateral attachment at right

CK-11	1 NO + 1 NC	1SAM 101 943 R0001	0.030	10	
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# Manual Motor Starters MS325

## Accessories

### Ordering details



#### Retrofittable accessories

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

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

<b>HKF-11</b>	1 NO + 1 NC	<b>1SAM 101 928 R0001</b>	0.020	10	
<b>HKF-20</b>	2 NO	<b>1SAM 101 928 R0002</b>	0.020	10	

#### Auxiliary switches, lateral attachment at left, max. 2 pieces attachable ② ③

<b>HK-11</b>	1 NO + 1 NC	<b>1SAM 101 901 R0001</b>	0.031	10	
<b>HK-20</b>	2 NO ④	<b>1SAM 101 901 R0002</b>	0.031	10	
<b>HK-02</b>	2 NC	<b>1SAM 101 901 R0003</b>	0.031	10	

#### Signal contact for general "tripped" signal, lateral attachment at the left max. 1 piece attachable

<b>SK-11</b>	1 NO + 1 NC	<b>1SAM 101 904 R0003</b>	0.031	10	
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#### Undervoltage release, slide-in ⑤

<b>UA</b> , power infeed at <b>bottom</b> , ⑥ U <sub>c</sub> 400 V~		<b>1SAM 101 902 R0400</b>	0.0210		
<b>UAF</b> , power infeed at <b>top</b> , resp. connection U <sub>c</sub> of external voltage	24 V~	<b>1SAM 101 903 R0024</b>	0.0210		
	48 V~	<b>1SAM 101 903 R0048</b>	0.0210		
	60 V~	<b>1SAM 101 903 R0060</b>	0.0210		
	110 V~	<b>1SAM 101 903 R0110</b>	0.0210		
	230 V~	<b>1SAM 101 903 R0230</b>	0.0210		
	400 V~	<b>1SAM 101 903 R0400</b>	0.0210		
	415 V~	<b>1SAM 101 903 R0415</b>	0.0210		
	500 V~	<b>1SAM 101 903 R0500</b>	0.0210		

#### Open circuit shunt release, slide-in ⑦

<b>AA</b>	24 ... 60 V AC/DC	<b>1SAM 101 909 R0001</b>	0.02	10	
<b>AA</b>	110... 240 V AC/DC	<b>1SAM 101 909 R0002</b>	0.02	10	

#### Terminal support, lateral attachment at left to MS325, HK and SK

<b>AS</b> , for UA, AA or as N/LS terminal		<b>1SAM 101 905 R0001</b>	0.031	10	
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#### Locking device for MS325

<b>SA1</b> , lock adapter		<b>GJF1 101 903 R0001</b>	0.004	10	
<b>SA2</b> , padlock + 2 keys		<b>GJF1 101 903 R0002</b>	0.004	10	
<b>SA3</b> , lock adapter + padlock + 2 keys		<b>GJF1 101 903 R0003</b>	0.050	1	

#### Printadapter, for soldering on electronic plates

<b>PA25</b> , for MS325 and 2 aux. contacts		<b>1SAM 101 933 R0001</b>	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 19)

⑦ Recommendation: Connection of external voltage via terminal support AS



# Manual Motor Starters MS325

## Accessories

### Ordering details



### Accessories

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

# Manual Motor Starters MS325

## Accessories

### Ordering details



Switch cubicle mounting kit



Door mounting kit

### Accessories

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

① For accommodating spindle and attachment to manual motor starter

② Is screwed directly onto the manual motor starter

③ Only suitable for MS325

④ See also page 34

# Manual Motor Starters MS4xx

## Ordering details



MS45x

SST02198



MS49x

SST01898



MS495 with A95  
connected via BEA 110/495

ST14-02



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

SST 09498

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

### MS450 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 50 kA ①

MS450 – 16	11 ... 16	1SAM 450 000 R1001	0.96	1	
MS450 – 20	14 ... 20	1SAM 450 000 R1002	0.96	1	
MS450 – 25	18 ... 25	1SAM 450 000 R1003	0.96	1	
MS450 – 32	22 ... 32	1SAM 450 000 R1004	0.96	1	
MS450 – 40	28 ... 40	1SAM 450 000 R1005	0.96	1	
MS450 – 45	36 ... 45	1SAM 450 000 R1006	0.96	1	
MS450 – 50	40 ... 50	1SAM 450 000 R1007	0.96	1	

### MS495 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 50 kA ①

MS495 – 40	28 ... 40	1SAM 550 000 R1005	2.1	1	
MS495 – 50	36 ... 50	1SAM 550 000 R1006	2.1	1	
MS495 – 63	45 ... 63	1SAM 550 000 R1007	2.1	1	
MS495 – 75	57 ... 75	1SAM 550 000 R1008	2.1	1	
MS495 – 90	70 ... 90	1SAM 550 000 R1009	2.1	1	
MS495 – 100	80 ...100 ②	1SAM 550 000 R1010	2.1	1	

### MS497 with thermal and electromagnetic trips, tripping class 10, short-circuit-proof up to 100 kA ①

MS497 – 16	11 ... 16	1SAM 580 000 R1001	2.1	1	
MS497 – 20	14 ... 20	1SAM 580 000 R1002	2.1	1	
MS497 – 25	18 ... 25	1SAM 580 000 R1003	2.1	1	
MS497 – 32	22 ... 32	1SAM 580 000 R1004	2.1	1	
MS497 – 40	28 ... 40	1SAM 580 000 R1005	2.1	1	
MS497 – 50	36 ... 50	1SAM 580 000 R1006	2.1	1	
MS497 – 63	45 ... 63	1SAM 580 000 R1007	2.1	1	
MS497 – 75	57 ... 75	1SAM 580 000 R1008	2.1	1	
MS497 – 90	70 ... 90	1SAM 580 000 R1009	2.1	1	
MS497 – 100	80 ...100 ②	1SAM 580 000 R1010	2.1	1	

### MS451 with thermal and electromagnetic trips, tripping class 20, for heavy start short-circuit-proof up to 50 kA ①

MS451 – 16	11 ... 16	1SAM 470 000 R1001	0.96	1	
MS451 – 20	14 ... 20	1SAM 470 000 R1002	0.96	1	
MS451 – 25	18 ... 25	1SAM 470 000 R1003	0.96	1	
MS451 – 32	22 ... 32	1SAM 470 000 R1004	0.96	1	
MS451 – 40	28 ... 40	1SAM 470 000 R1005	0.96	1	
MS451 – 45	36 ... 45	1SAM 470 000 R1006	0.96	1	
MS451 – 50	40 ... 50	1SAM 470 000 R1007	0.96	1	

### MS496 with thermal and electromagnetic trips, tripping class 20, for heavy start short-circuit-proof up to 100 kA ①

MS496 – 40	28 ... 40	1SAM 570 000 R1005	2.1	1	
MS496 – 50	36 ... 50	1SAM 570 000 R1006	2.1	1	
MS496 – 63	45 ... 63	1SAM 570 000 R1007	2.1	1	
MS496 – 75	57 ... 75	1SAM 570 000 R1008	2.1	1	
MS496 – 90	70 ... 90	1SAM 570 000 R1009	2.1	1	
MS496 – 100	80 ...100 ②	1SAM 570 000 R1010	2.1	1	

### Direct adapter for wiring MS450 - MS497 to contactors

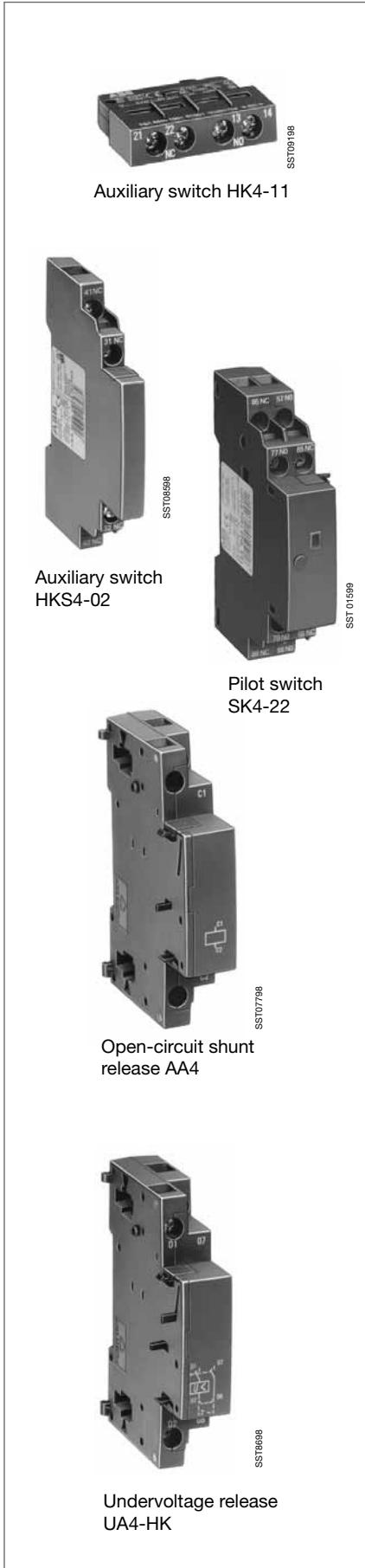
Type	Order code	Weight / piece kg	Packing unit piece	Price
BEA40/450, direct adapter MS450 to A30/A40	1SBN 083 206 R1000	0.061	1	
BEA50/450, direct adapter MS450 to A50 plate	1SBN 083 506 R1000	0.062	1	
BEA75/495, direct adapter MS495-497 to A50/63/75	1SBN 084 106 R1000	0.120	1	
BEA110/495, direct adapter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

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

# Manual Motor Starters MS4xx

## Accessories

### Ordering details



### Retrofittable accessories

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

Type		Order code	Weight/ piece kg	Packing unit piece	Price
<b>Auxiliary switches, for front mounting</b>					
HK4-11,	1 NO + 1NC	1SAM 401 901 R1001	0.02	10	
HK4-W,	1 Changeover	1SAM 401 901 R1002	0.02	10	
<b>Auxiliary switches, for lateral attachment at left, max. 1 mountable</b>					
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	
<b>Signal switch for separate signalling acc. UL508 type E, lateral attachment at left 2 contacts for short circuit tripping and 2 contacts for general tripping</b>					
SK4-22	2 NO + 2 NC	1SAM 401 904 R 1001	0.07	1	
<b>Undervoltage release, for lateral attachment at right</b>					
UA4,	U <sub>e</sub> 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	
<b>Undervoltage release with pre-mating auxiliary switch 2 NO, for lateral attachment at right</b>					
UA4-HK,	U <sub>e</sub> 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	
<b>Shunt release, lateral mounting at the left side ⑤</b>					
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	
<b>Terminal shroud, for additional shock-hazard protection</b>					
KA450,	for MS45x ①	1SAM 401 908 R1001	0.01	1	
KA495,	for MS49x ①	1SAM 501 901 R1001	0.01	1	
KA495C,	for MS49x ②	1SAM 501 902 R1001	0.03	1	
<b>Terminal insulation barrier,</b>					
DX495	necessary for UL 508E, MS49x-Starter	1SAM 401 912 R1001			
<b>Scale cover, lead-sealable</b>					
SA450,	for MS45x ③	1SAM 401 909 R1001	0.007	1 set	
<b>Disconnecter module, for producing a visible gap, lockable</b>					
TB450,	for MS45x	1SAM 401 910 R1001	0.30	1	
<b>Phase busses MS45x, 108 A, 690 V</b>					
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			
<b>Infeed block, 108 A, 690 V, Stranded 50 mm<sup>2</sup>, finely stranded 35 mm<sup>2</sup></b>					
S4-M1,	flat	1SAM 401 911 R1007	10		
<b>Cover for phase bus poles</b>					
BS4-3		1SAM 401 911 R1008			
<b>Switch cubicle mounting kit IP65, with axial extension, lockable in Off position, locked in On position ④</b>					
OHB2AJM,	Twist knob black	1SCA 022 384 R6940			
OHY2AJM,	Twist knob red/yellow	1SCA 022 384 R7080			
OXS5X 85,	axis 85 mm	1SCA 022 347 R3570			
OXS5X105,	axis 105 mm	1SCA 022 347 R3650			
OXS5X130,	axis 130 mm	1SCA 022 353 R4540			
OXS5X180,	axis 180 mm	1SCA 022 353 R4620			
MSMN,	driver ⑦	1SAM 101 923 R0001			

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

# Strategies for motor protection with magnetic only types MO

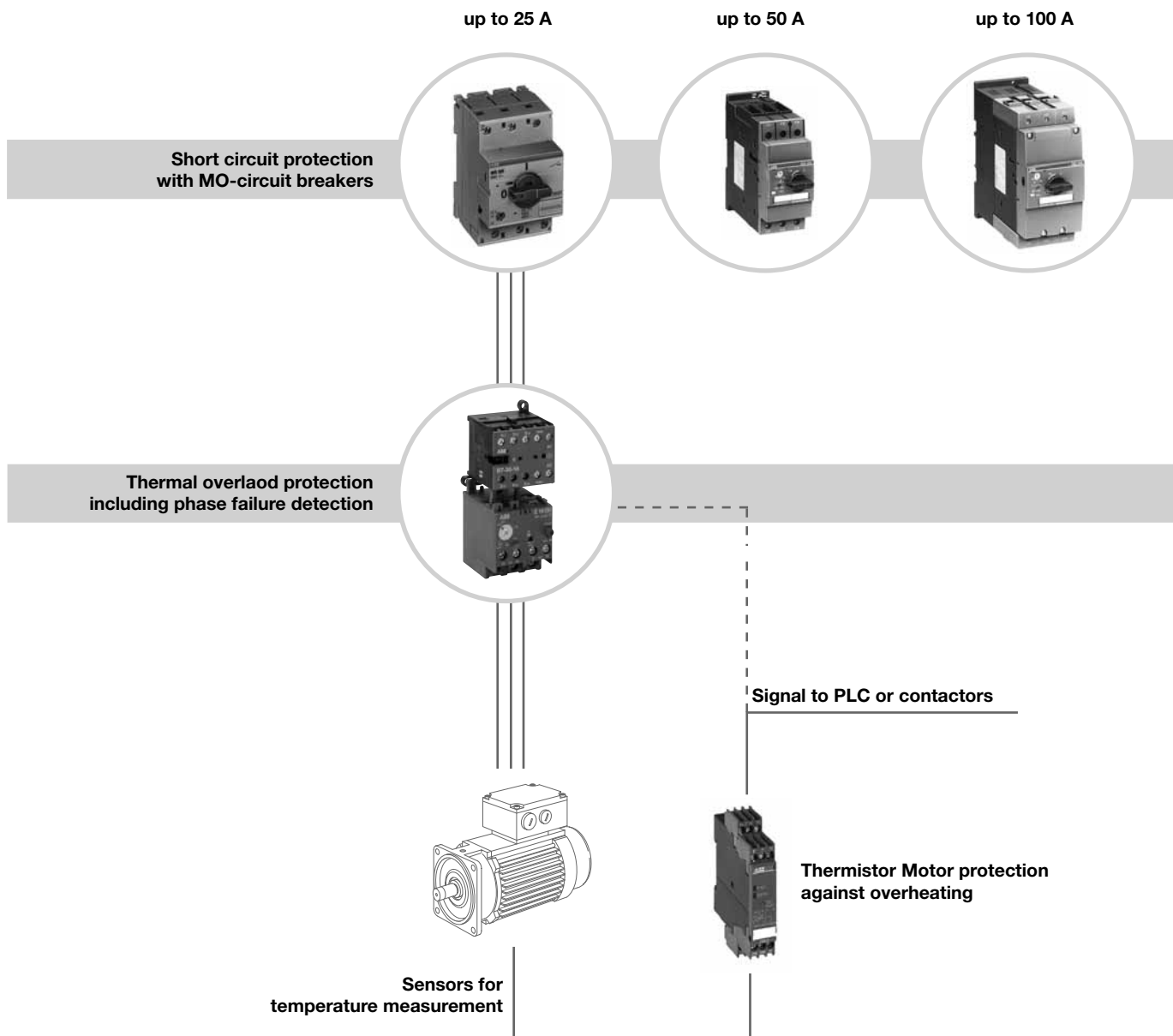
For special applications ABB's manual motor starter of the MS series are also available as versions MO325 / MO450 / MO495 with magnetic tripping only, protecting exclusively against short circuits.

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

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

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

## Examples for motor protection



# Magnetic only types

## MOxxx

### Ordering details, Technical data



MO325 + A26 + TA25DU



MO325



MO450



MO495/495

#### Devices with only electromagnetic tripping for short circuit protection

The MO-types are used as MCB, mainly in combinations with other coordinated products for branch protection.

Type	rated current	Short circuit trip range	Order code	Weight / piece kg	Packing unit piece
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#### MO325, short-circuit – capacity up to 100kA and 50 kA

MO325-0.4	0,4	3 - 4.8	1SAM 160 000 R1003	0.347	1
MO325-0.63	0,63	4.8 - 7.6	1SAM 160 000 R1004	0.347	1
MO325-1	1	9 - 14	1SAM 160 000 R1005	0.347	1
MO325-1.6	1,6	13 - 19	1SAM 160 000 R1006	0.347	1
MO325-2.5	2,5	22 - 32,5	1SAM 160 000 R1007	0.347	1
MO325-4	4	32 - 48	1SAM 160 000 R1008	0.347	1
MO325-6.3	6,3	53 - 82	1SAM 160 000 R1009	0.347	1
MO325-9	9	112 - 155	1SAM 160 000 R1010	0.347	1
MO325-12.5	12,5	155 - 215	1SAM 160 000 R1011	0.347	1
MO325-16	16	200 - 280	1SAM 160 000 R1012	0.347	1
MO325-20	20	250 - 350	1SAM 160 000 R1013	0.347	1
MO325-25	25	312 - 435	1SAM 160 000 R1014	0.347	1

#### MO496, short-circuit – capacity up to 50 kA

MO496-16	16	166 - 250	1SAM 590 000 R1001	2.100	1
MO496-20	20	208 - 312	1SAM 590 000 R1002	2.100	1
MO496-25	25	260 - 390	1SAM 590 000 R1003	2.100	1
MO496-32	32	333 - 499	1SAM 590 000 R1004	2.100	1
MO496-40	40	416 - 624	1SAM 590 000 R1005	2.100	1
MO496-50	50	520 - 780	1SAM 590 000 R1006	2.100	1
MO496-63	63	655 - 983	1SAM 590 000 R1007	2.100	1
MO496-75	75	780 - 1170	1SAM 590 000 R1008	2.100	1
MO496-90	90	936 - 1404	1SAM 590 000 R1009	2.100	1
MO496-95	100	988 - 1482	1SAM 590 000 R1010	2.100	1

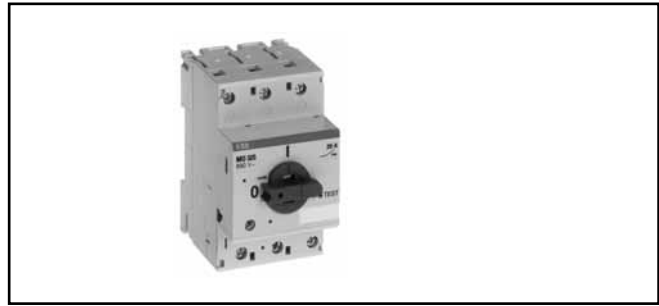
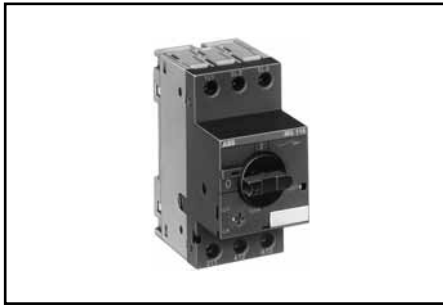
#### MO450, short-circuit – capacity up to 25 kA

MO450-16	16	166 - 250	1SAM 460 000 R1001	0.960	1
MO450-20	20	208 - 312	1SAM 460 000 R1002	0.960	1
MO450-25	25	260 - 390	1SAM 460 000 R1003	0.960	1
MO450-32	32	333 - 499	1SAM 460 000 R1004	0.960	1
MO450-40	40	416 - 624	1SAM 460 000 R1005	0.960	1
MO450-45	45	468 - 702	1SAM 460 000 R1006	0.960	1
MO450-50	50	520 - 780	1SAM 460 000 R1007	0.960	1

#### MO495, short-circuit – capacity up to 25 kA

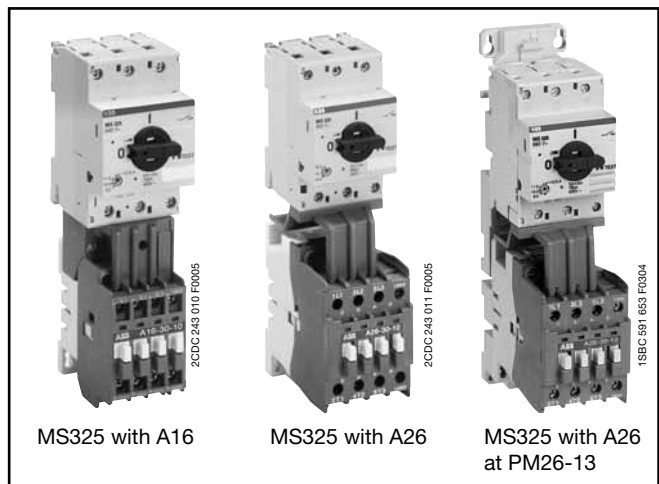
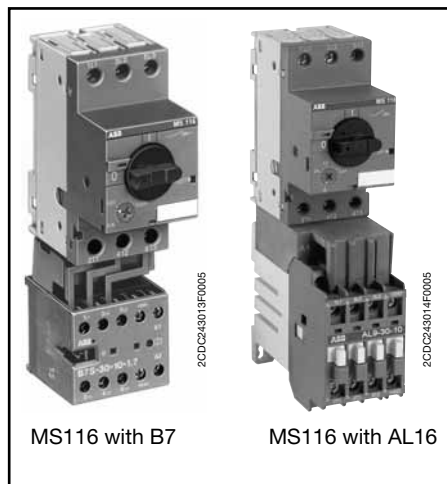
MO495-40	40	416 - 624	1SAM 560 000 R1005	2.100	1
MO495-50	50	520 - 780	1SAM 560 000 R1006	2.100	1
MO495-63	63	655 - 983	1SAM 560 000 R1007	2.100	1
MO495-75	75	780 - 1170	1SAM 560 000 R1008	2.100	1
MO495-90	90	936 - 1404	1SAM 560 000 R1009	2.100	1
MO495-95	100	988 - 1482	1SAM 560 000 R1010	2.100	1

# Starter Combinations with Manual Motor Starters MSxxx Overview



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

## Examples for Starter Combinations



# Starter Combinations with Manual Motor Starters MSxxx Overview



MS45x, MO450 up to 50 A

BEA40/450		BEA50/450	
A30	A40	A50	
-		BEA50/450	
AL30	AL40	AE50 AF50	



MS49x, MO49x up to 100 A

BEA75/495			BEA16/325	
A50	A63	A75	A95	A110
BEA75/495			BEA110/495	
AE50 AF50	AE63 AF63	AE75 AF75	AE95 AF95	AE110 AF110

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

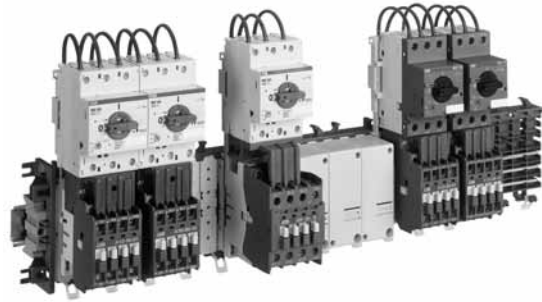
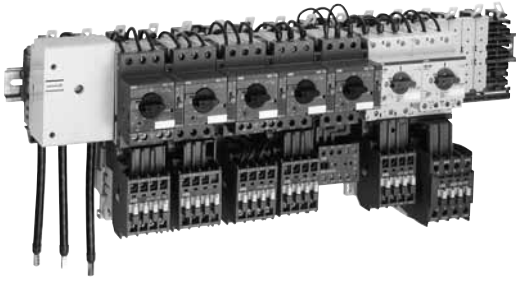
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# Busbar system smissline-S

For power distribution up to 200 A



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

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

### Time and cost savings

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

### Flexibility and availability

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

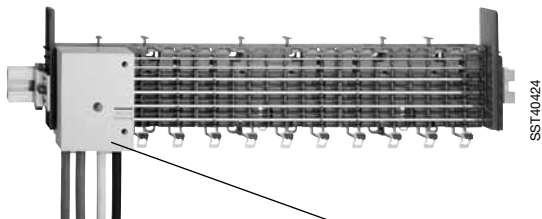
### Safety and transparency

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

## Technical Data

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

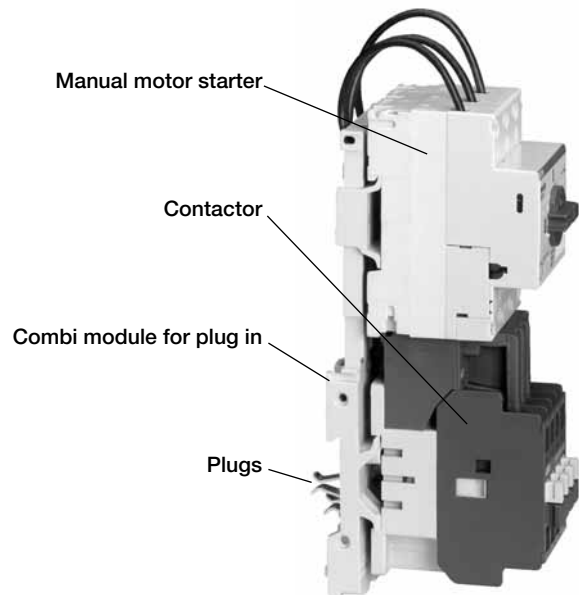
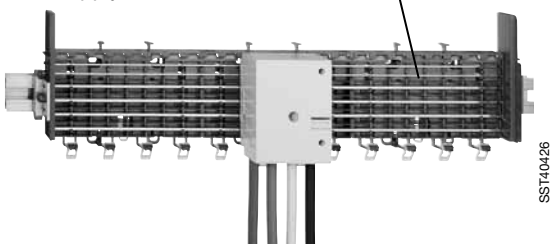
supply on right or left: max. 100 A



Feeder block

Busbar kit including busbars

supply in center: max. 200 A



Manual motor starter

Contactor

Combi module for plug in

Plugs

# Busbar system smissline-S for MS325

## 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: 393 mm	22 PLE	<b>ZLS 760</b>	<b>2CCF 016 420 R0001</b>		
429 mm	24 PLE	<b>ZLS 750</b>	<b>2CCF 015 346 R0002</b>		
537 mm	30 PLE	<b>ZLS 762</b>	<b>2CCF 016 422 R0003</b>		
573 mm	32 PLE	<b>ZLS 752</b>	<b>2CCF 015 348 R0004</b>		
685 mm	38 PLE	<b>ZLS 764</b>	<b>2CCF 016 424 R0005</b>		
717 mm	40 PLE	<b>ZLS 754</b>	<b>2CCF 015 350 R0002</b>		
861 mm	48 PLE	<b>ZLS 756</b>	<b>2CCF 015 352 R0003</b>		
1150 mm	64 PLE	<b>ZLS 766</b>	<b>2CCF 016 426 R0004</b>		
1438 mm	80 PLE	<b>ZLS 758</b>	<b>2CCF 015 354 R0005</b>		

### Infeed block 160A with cover

3-phase block	4 PLE	<b>ZLS225</b>	<b>2CCF 015 197 R0014</b>		
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### Infeed Elements 200A with cover

Infeed Element Phase 1			<b>2CCV 672 501 R0001</b>		
Infeed Element Phase 2			<b>2CCV 672 502 R0001</b>		
Infeed Element Phase 3			<b>2CCV 672 503 R0001</b>		

### Busbar cover pieces for empty places

Busbar cover pieces for empty places	<b>ZLS 100</b>	<b>2CCF 002 762 R0001</b>			
<b>1 piece can cover 4 PLE - 1 PLE can be break down</b>					

### Combi modules wire top feed up to 32A

L1, L2, L3 top feed	<b>ZLS 8403LWT-S</b>	<b>2CCA 180 451 R0001</b>			
L1, L2, L3, N top feed	<b>ZLS 8403LNWT-S</b>	<b>2CCA 180 452 R0001</b>			

### Combi modules wire bottom feed up to 32A

L1, L2, L3 bottom feed	<b>ZLS 8403LWB-S</b>	<b>2CCA 180 465 R0001</b>			
L1, L2, L3, N bottom feed		<b>ZLS 8403LNWB-S</b>	<b>2CCA 180 462 R0001</b>		

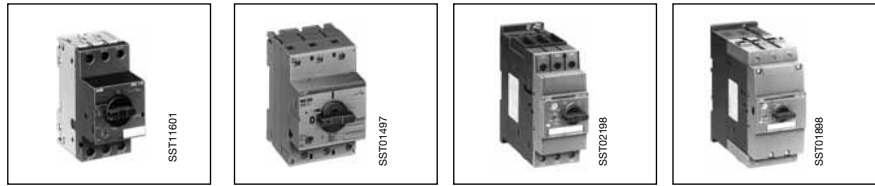
### Adapter plate ZMS915 for MS325 for plug in to the busbar system

adapter plate for max. 415V, 20A	<b>ZMS915</b>	<b>GHE 610 1002 R0030</b>			
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Single Adapter Plates up to 63 A to mount standard control gear and DIN Rail products see smissline-S catalog.

# Manual Motor Starters Type Series MS

## Technical data



Manual motor starter	Type	MS116	MS325	MS450/451	MS495/496/497
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### General technical data

Standards: <b>The devices comply with the major international, European and national regulations IEC 60.../EN 60..</b>		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 <b>operations</b>		100.000	100.000	50.000	
Permissible ambient temperature					
- <b>Operating temperature</b>	°C	- 20... + 55/70 ①	- 25 ... + 55/70 ①	- 20 ... + 60/70 ①	
- <b>Storage temperature</b>	°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
<b>Mounting</b> (mounting hardware not included in scope of delivery)					
<b>Screw fixing</b>		see accessories	see accessories	2 x M5	2 x M5
<b>Quick fastening on top-hat rail</b>	to EN 50022	35 mm	35 mm	35 mm (15 mm high)	35 mm,
	to EN 50023	-	-	-	75 mm
<b>Electrical connection of the main conductors</b> (main circuits)					
<b>Type</b>		Screw terminal	Box terminal + bus	Box terminal	Box terminal
<b>Screw</b>		Pozidrive size 2	Pozidrive size 2 4 mm	Pozidrive size 2	Internal hexagon
	Single-core 1 x mm <sup>2</sup>	1 ... 4	1 ... 10	0.75 ... 35	2.5 ... 70
	2 x mm <sup>2</sup>	1 ... 4	1 ... 4	0.75 ... 25	2.5 ... 50
	Stranded 1 x mm <sup>2</sup>	1 ... 4	1 ... 10	0.75 ... 35	2.5 ... 70
	2 x mm <sup>2</sup>	1 ... 4 ③	-	0.75 ... 25	2.5 ... 50
	Flexible 1 x mm <sup>2</sup>	0.75 ... 2.5	1 ... 6	0.75 ... 25	2.5 ... 50
	2 x mm <sup>2</sup>	0.75 ... 2.5	-	0.75 ... 16	2.5 ... 35
<b>of the auxiliary conductors</b> (auxiliary circuits)					
<b>Type</b>		Screw terminal	Screw terminal ④	Screw terminal	
<b>Screw</b>		Pozidrive size 2	Pozidrive size 1	Pozidrive size 2	
	Single-core 1 x mm <sup>2</sup>	1 ... 2.5	0.5 ... 2.5	0.5 ... 2.5	
	2 x mm <sup>2</sup>	1 ... 2.5	0.5 ... 2.5	0.5 ... 2.5	
	Flexible 1 x mm <sup>2</sup>	0.75 ... 2.5	0.5 ... 2.5	0.5 ... 1.5	
	2 x mm <sup>2</sup>	0.75 ... 2.5 ⑤	0.5 ... 2.5	0.5 ... 1.5	

① Operating conditions up to 70° C on request

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

③ Also applies to auxiliary switches HKF1 and undervoltage release UA1

④ For auxiliary switch HKF.. Pozidrive 2

⑤ Applies to auxiliary switches HK1 and SK1

# Manual Motor Starters Type Series MS

## Technical data

Manual motor starter	Type	MS116	MS325	MS450/451	MS495/496/497
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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 23 / 24.

<b>DC rated operating voltage</b> 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	-	-	-
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	MS116	MS325	MS450/451	MS495/496/497
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### Release

Device for phase failure protection		with			
Electromagnetic trips Response value set ex-works		9.6 ... 14.4 x I <sub>n</sub>	7.5 ... 12 I <sub>n</sub> ① 9 ... 14 I <sub>n</sub> ② 10 ... 15 I <sub>n</sub> ③ 12.5 ... 17.5 I <sub>n</sub> ④	10.4 I <sub>n</sub> ... 15.6 I <sub>n</sub>	
Undervoltage release					
Pick-up value	% of U <sub>c</sub>	≥ 85	≥ 85	≥ 85	
Drop-out value	% of U <sub>c</sub>	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 <sub>c</sub>	≥ 70	≥ 85	≥ 70	
Relative duty	% ED	100	–	100 at voltages 50/60 Hz to	
Power consumption Pick-up	VA	9.0	110-240V: 13-61 ⑤	on request	
Hold	VA	3.0	–	on request	

### Internal resistance values

Setting ranges			Resistance per phase in Ω resp. MS4.. in mΩ					
from	A	to	MS116	MS325	MS450	MS451	MS495/MS497	MS496
0.1	...	0.16	66	71.1	–	–	–	–
0.16	...	0.25	25.5	27.1	–	–	–	–
0.25	...	0.4	10.38	12.3	–	–	–	–
0.4	...	0.63	4.36	5.17	–	–	–	–
0.63	...	1.0	1.602	2.09	–	–	–	–
1.0	...	1.6	0.645	0.805	–	–	–	–
1.6	...	2.5	0.2795	0.34	–	–	–	–
2.5	...	4.0	0.1035	0.141	–	–	–	–
4.0	...	6.3	0.0433	0.051	–	–	–	–
6.3	...	9.0	–	0.0224	–	–	–	–
6.3	...	10.0	0.0217	–	–	–	–	–
8.0	...	12.0	0.0148	–	–	–	–	–
9.0	...	12.5	–	0.0122	–	–	–	–
10.0	...	16.0	0.0088	–	–	–	–	–
11.0	...	16.0	–	–	13.3	13.8	17.3	–
12.5	...	16.0	–	0.0081	–	–	–	–
14.0	...	20.0	–	–	8.74	8.74	11.3	–
16.0	...	20.0	–	0.0048	–	–	–	–
18.0	...	25.0	–	–	5.43	5.83	7.11	–
20.0	...	25.0	–	0.0035	–	–	–	–
22.0	...	32.0	–	–	3.60	4.10	4.75	–
28.0	...	40.0	–	–	2.56	2.90	3.28	3.28
36.0	...	45.0	–	–	1.80	2.20	–	–
36.5	...	50.0	–	–	–	–	2.24	2.52
40.0	...	50.0	–	–	1.46	1.82	–	–
45.0	...	63.0	–	–	–	–	1.40	1.40
57.0	...	75.0	–	–	–	–	0.95	1.00
70.0	...	90.0	–	–	–	–	0.60	0.63
80.0	...	100.0	–	–	–	–	0.54	0.57

① Current ranges 0.16 to 0.63 A

② Current ranges 1 to 2.5 A

③ Current ranges 4 to 6.3 A

④ Current ranges 9 to 25 A

⑤ 24-60 V: 14.4-90 VA

# Manual Motor Starters Type Series MS

## Technical data

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

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

### Short-circuit protection MS325, 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 VAC	
from	to	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A
A	A	Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)									
Setting ranges	0.1 ... 0.16 to 1.0 ... 1.6	Short-circuit proof No back-up fuse required up to $I_{cc} = 100 \text{ kA}$									
	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										

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

		Maximum rated current of the short-circuit fuses if $I_{cc} > I_{cs}$ ①									
		at 230 V AC		at 400 V AC		at 440 V AC		at 500 V AC		at 690 VAC	
from	to	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A	$I_{cs}$ kA	gL, aM A
A	A	Fuse types: Diazed, I.v.h.b.c., utilisation categories: gL, aM (VDE), gL/gG (IEC)									
Setting ranges	0.1 ... 0.16 to 1.0 ... 1.6	Short-circuit proof No back-up fuse required up to $I_{cc} = 50 \text{ kA}$									
	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										

①  $I_{cs}$  = Rated service short-circuit breaking capacity,  $I_{cu}$  = Rated ultimate short-circuit capacity,  $I_{cc}$  = Prospective short-circuit current at installation location.  
 $I_{cs} = I_{cu}$  in the case of MS325 and MS116!

# Manual Motor Starters Type Series MS

## Technical data

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

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cu} \text{ ①}$														
	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 $I_{cc} = 100\text{kA}$			25	50	100	25	50	100	6	12	63	3	5	63
14 ... 20				25	50	125	25	50	100	6	12	80	3	5	63
18 ... 25				25	50	125	15	30	100	6	12	80	3	5	63
22 ... 32				25	50	125	15	30	125	5	10	100	2	4	63
28 ... 40				25	50	160	15	30	125	5	10	100	2	4	63
36 ... 45				25	50	160	15	30	125	5	10	100	2	4	63
36 ... 50				25	50	160	15	30	125	5	10	100	2	4	80

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

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cu} \text{ ①}$														
	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 $I_{cc} = 100\text{kA}$			25	50	125	20	40	125	6	12	100	6	3	63
36 ... 50				25	50	125	20	40	125	6	12	100	6	3	80
45 ... 63				25	50	160	20	40	160	6	12	100	6	3	80
57 ... 75				25	50	160	20	40	160	4	8	125	5	3	100
70 ... 90				25	50	160	20	40	160	4	8	125	5	3	125
80 ... 100				25	50	160	20	40	160	4	8	125	5	3	125

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

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cu} \text{ ①}$														
	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 $I_{cc} = 100\text{kA}$						25	50	160	9	18	160	6	12	80
36 ... 50				25	50	160	7.5	15	160	5	10	100			
45 ... 63				25	50	200	7.5	15	160	4	7.5	100			
57 ... 75				25	50	200	5	10	160	3	6	125			
70 ... 90				25	50	200	5	10	160	3	6	160			
80 ... 100				25	50	200	5	10	160	3	6	160			

### Short-circuit protection MS497, setting ranges, short-circuit strength and max. back-up fuses

Setting ranges in A	Maximum rated current of the short-circuit fuses if $I_{cu} > I_{cu} \text{ ①}$														
	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 $I_{cc} = 100\text{kA}$						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 <sub>e</sub> /kW		Motor protecting switch type	Setting range  A ... A	Contactor Type	Maximum current permitted for the combination  A
	I <sub>e</sub> /A				
0.06	0.22	<b>MS325-0.25</b>	0.16 ... 0.25	A9	0.25
0.09	0.33	<b>MS325-0.4</b>	0.25 ... 0.4	A9	0.4
0.12	0.42	<b>MS325-0.63</b>	0.40 ... 0.63	A9	0.63
0.18	0.72	<b>MS325-1</b>	0.63 ... 1	A9	1
0.25	0.83	<b>MS325-1</b>	0.63 ... 1	A9	1
0.37	1.2	<b>MS325-1.6</b>	1 ... 1.6	A9	1.6
0.55	1.5	<b>MS325-1.6</b>	1 ... 1.6	A9	1.6
0.75	2	<b>MS325-2.5</b>	1.6 ... 2.5	A9	2.5
1.1	2.6	<b>MS325-4</b>	2.5 ... 4	A9	4
1.5	3.5	<b>MS325-4</b>	2.5 ... 4	A12	4
2.2	5	<b>MS325-6.3</b>	4 ... 6.3	A12	6.3
3	6.6	<b>MS325-9</b>	6.3 ... 9	A26	9
4	8.5	<b>MS325-9</b>	6.3 ... 9	A26	9
5.5	11.5	<b>MS325-12.5</b>	9 ... 12.5	A26	12.5
7.5	15.5	<b>MS325-16</b>	12.5 ... 16	A26	16
		<b>MS450-20</b>	14 ... 20	A26	16
9	18.3	<b>MS325-20</b>	16 ... 20	A26	20
11	22	<b>MS3265-25</b>	20 ... 25	A30	25
		<b>MS450-25</b>	18 ... 25	A30	25
15	30	<b>MS450-32</b>	22 ... 32	A30	30
18.5	37	<b>MS450-40</b>	28 ... 40	A40	40
22	44	<b>MS450-50</b>	40 ... 50	A50	50
30	60	<b>MS495-63</b>	45 ... 63	A63	63
37	72	<b>MS495-75</b>	57 ... 75	A95	75
45	85	<b>MS495-90</b>	70 ... 90	A95	90
55	98	<b>MS495-100</b>	80 ... 100	A110	100

Further coordination tables on request

Forward current integrals (I<sup>2</sup> 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 <sup>2</sup>				
	4	2.5	1.5	1.0	0.75
<b>MS325</b>					
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 **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
times the setting current, 3-pole, starting from cold state.						
A	A	s	s	s	s	s
<b>Manual motor starter, Type MS325</b>						
0.1 ... <b>0.16</b>	15	9	6.5	4.8	3.7	3.2
0.16 ... <b>0.25</b>	16	10	6.8	5.2	4	3.6
0.25 ... <b>0.4</b>	16	9.7	6.5	5	3.8	3.3
0.4 ... <b>0.63</b>	17	10.2	7.3	5.7	4.4	3.9
0.63 ... <b>1.0</b>	17.5	10.2	7.2	5.5	4.2	3.8
1.0 ... <b>1.6</b>	17	10	7.1	5.6	4.4	4
1.6 ... <b>2.5</b>	18	10.3	7.5	5.9	4.7	4.2
2.5 ... <b>4.0</b>	18.4	11.5	8.1	6.4	5	4.6
4.0 ... <b>6.3</b>	19	12	8.5	6.7	5.3	4.9
6.3 ... <b>9.0</b>	18.2	11.5	7.9	6	4.5	3.8
9.0 ... <b>12.5</b>	19	11.5	8	6	4.6	4
12.5 ... <b>16</b>	19.5	11.5	7.5	5.4	4	3.3
16 ... <b>20</b>	20	11.5	7.8	5.7	4.2	3.5
20 ... <b>25</b>	20	10.4	7	5	3.7	3.2

### Ident-numbers

of manual motor starters for motors with **Ex e**-Protection:

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

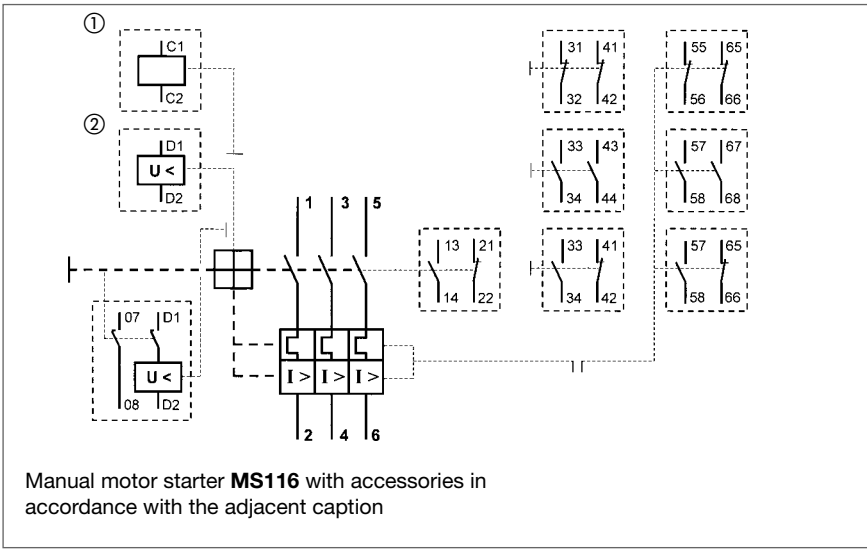
### Approvals and certificates

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

Other approvals CCC/CB/GOST etc. on request

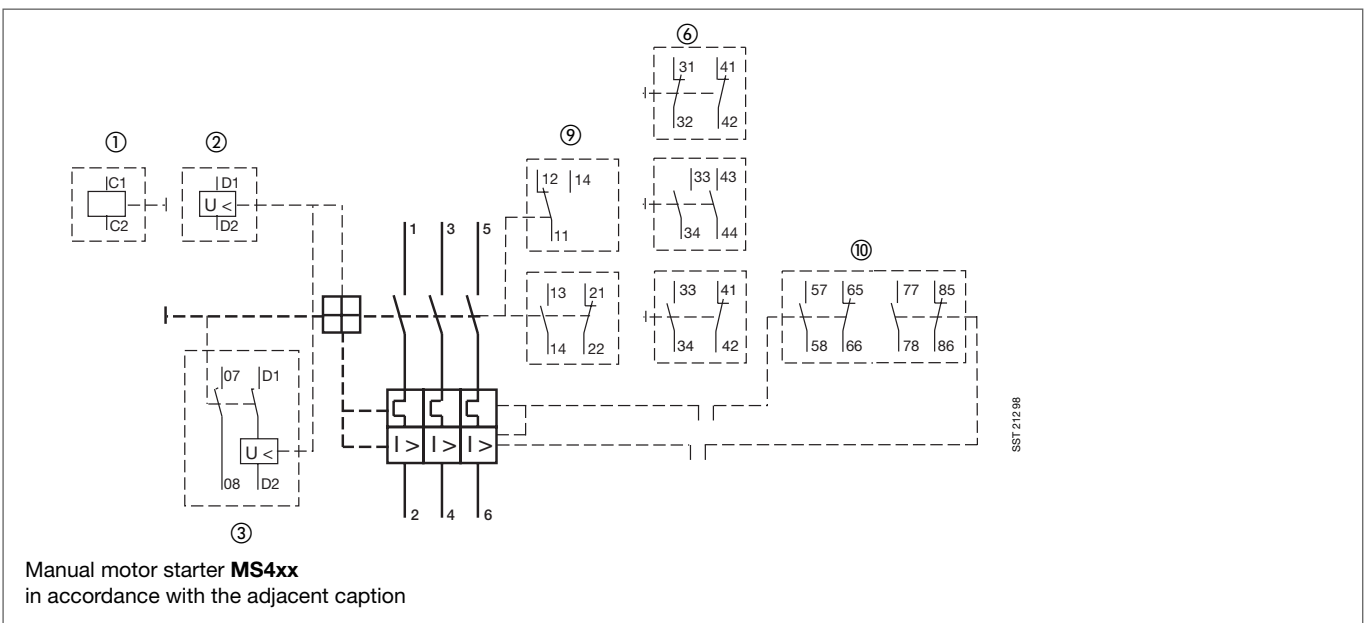
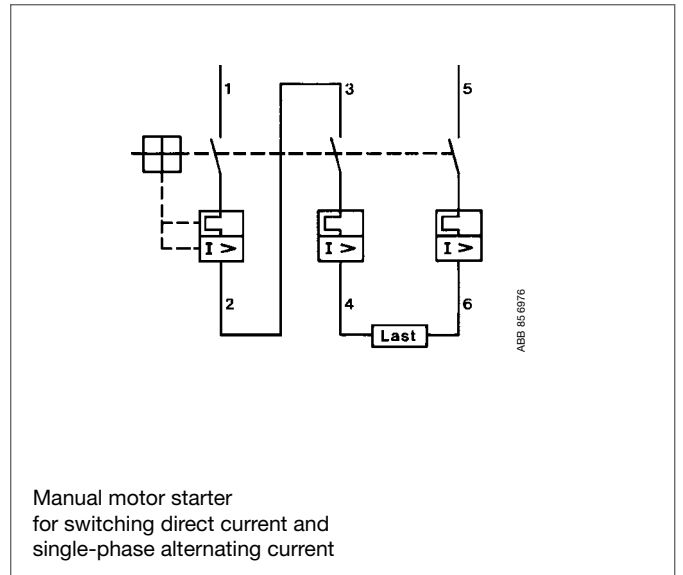
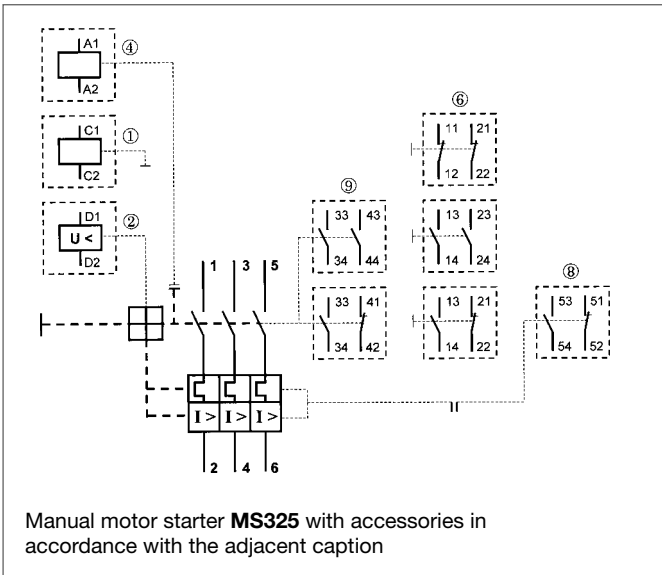
# Manual Motor Starters Type Series MS

## Wiring diagrams



### Caption

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



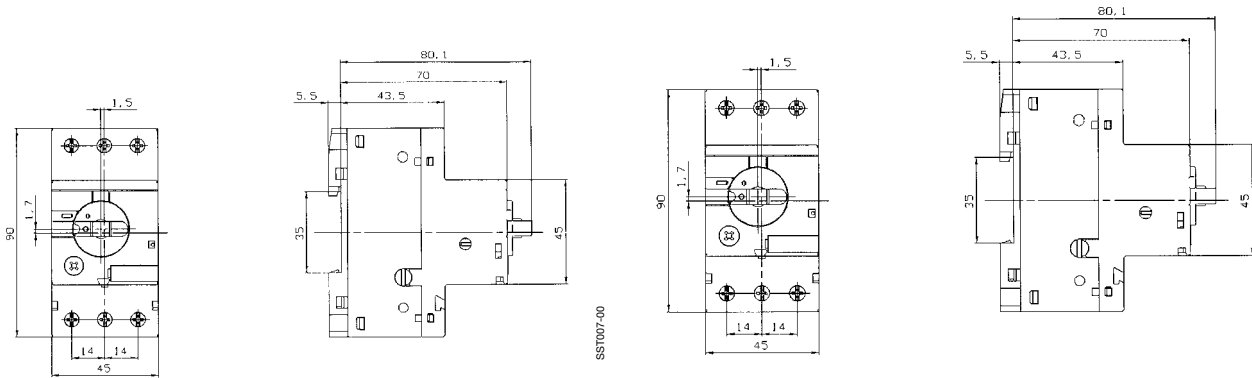
# Manual Motor Starter MS116

## Accessories

### Dimension diagrams

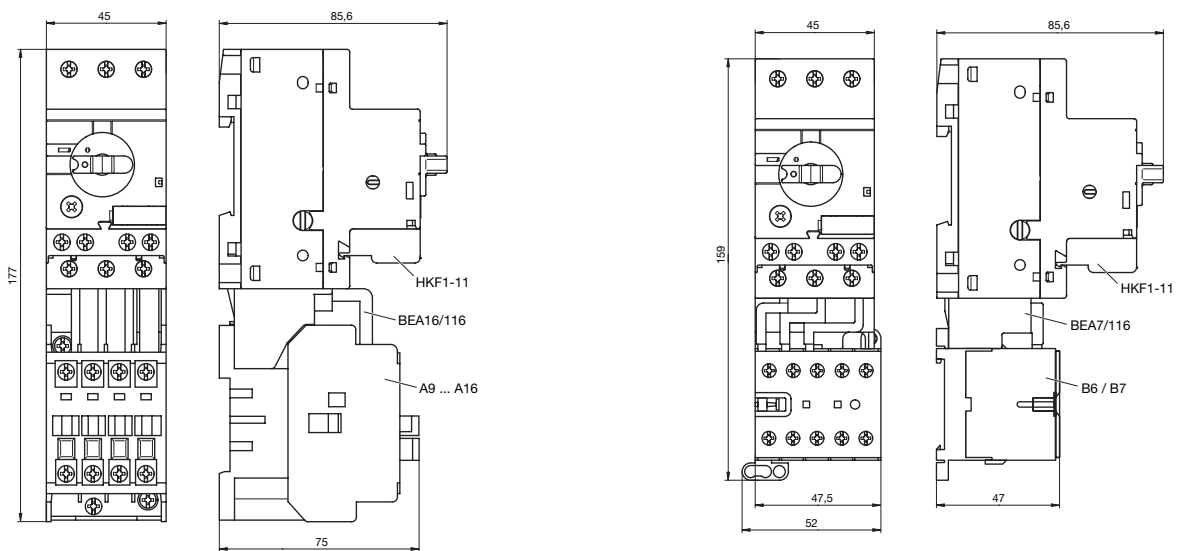
Manual motor starter **MS116**

**MS116** with aux. contact HKF 1 for front mounting

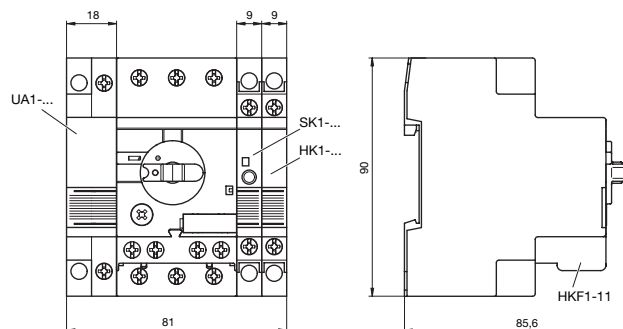


Manual motor starter **MS116** mounted with contactor **A9...A16**

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



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



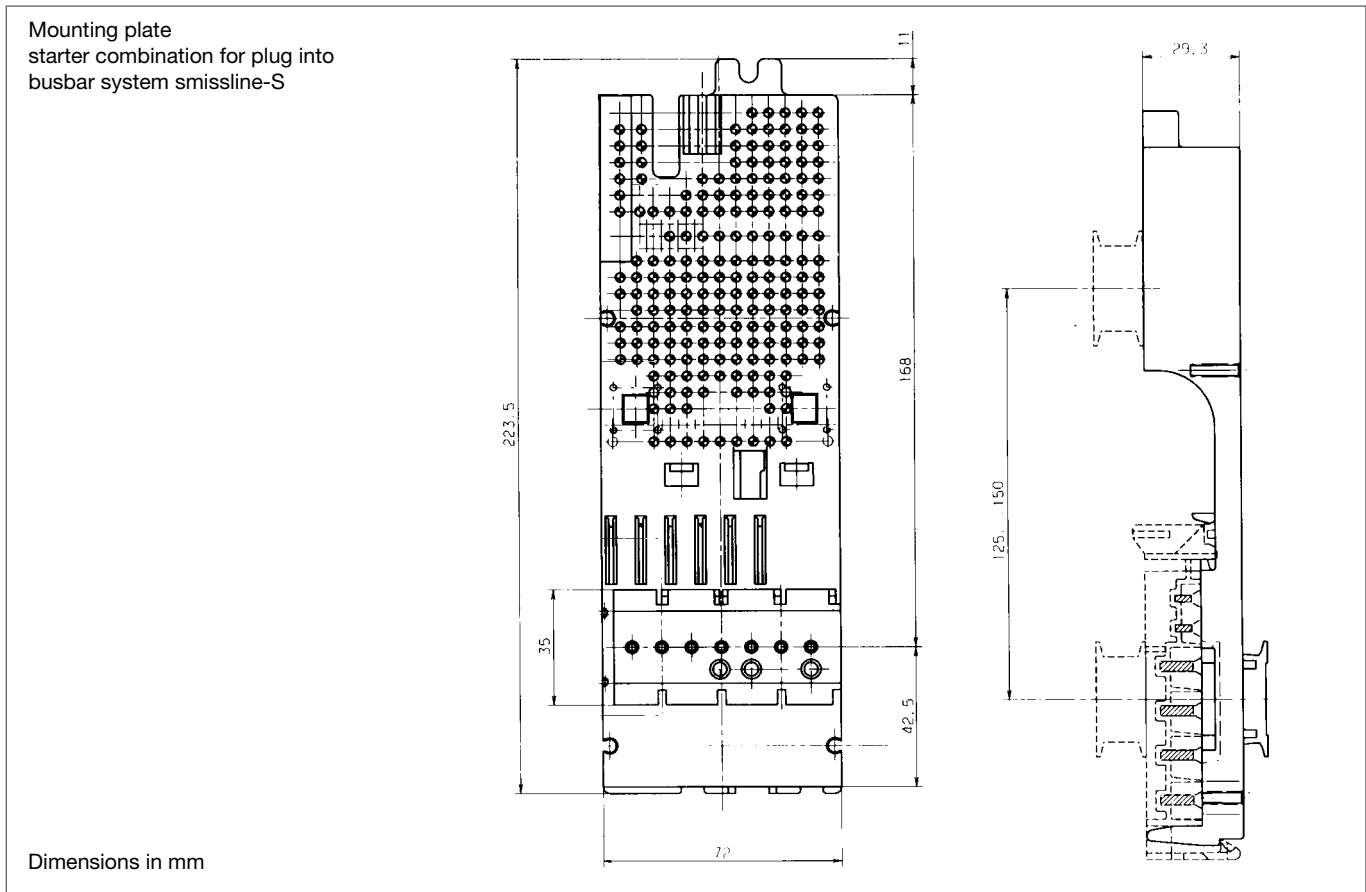
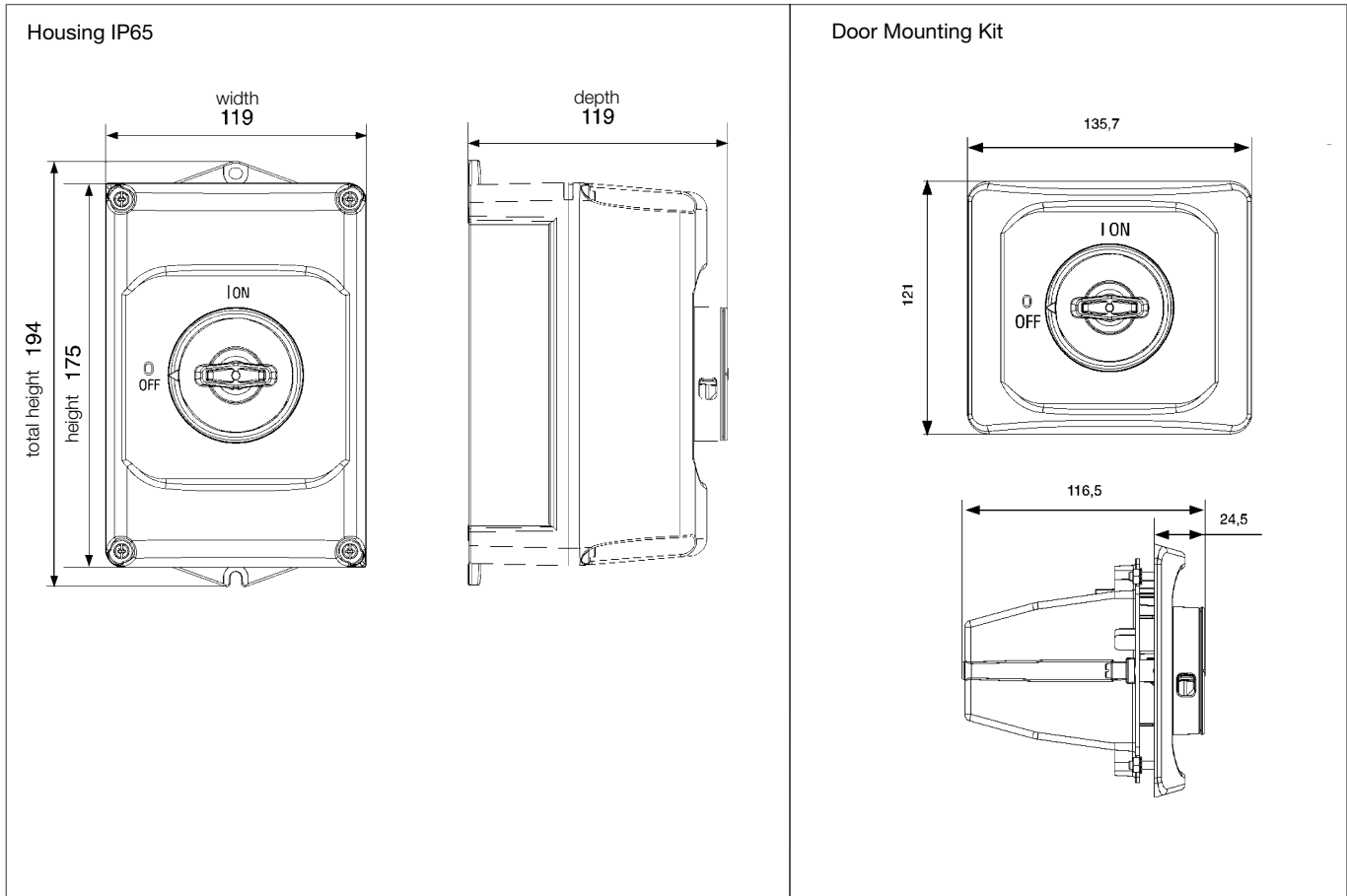
Dimension in mm



# Manual Motor Starters MS325

## Accessories

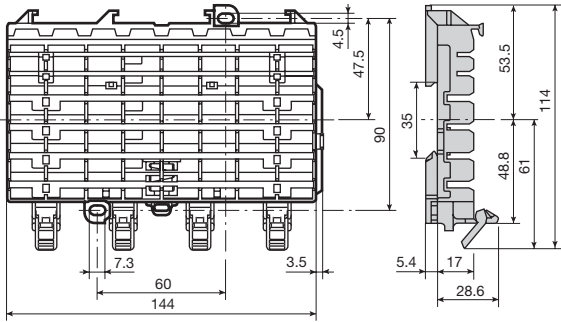
### Dimension diagrams



Dimensions in mm

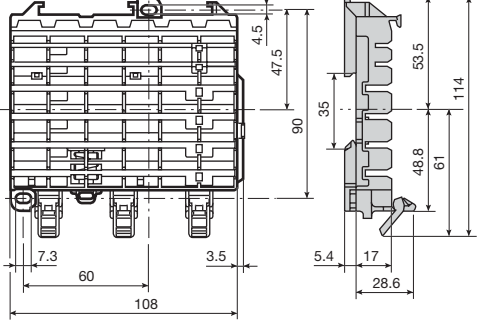
# Busbar system smissline-S

Socket ZLS 808 8 PLE



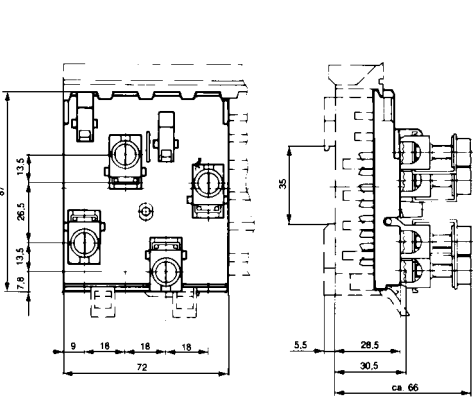
Z20117.eps

Socket ZLS 806 6 PLE

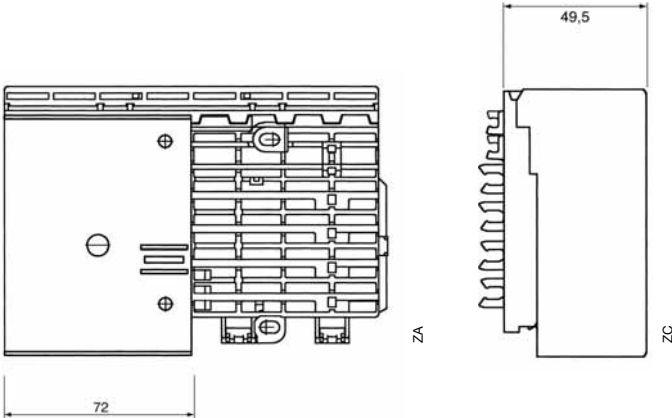


Z20118.eps

Power infeed block ZLS 224 4 PLE



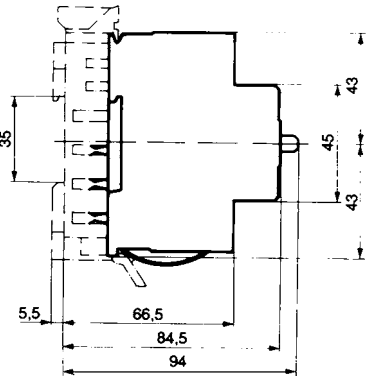
SK 0263 Z 93



ZA

ZC

Motor protection switch MS325 3 PLE



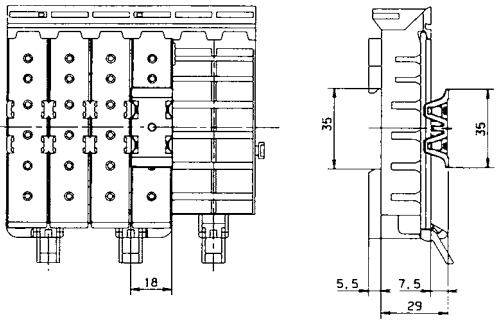
SK 0259 Z 93

Auxiliary switch block HK with empty housing ZLS 930 1 PLE



SK 0260 Z93

Busbar cover ZLS 100 with adapter ZLS 101



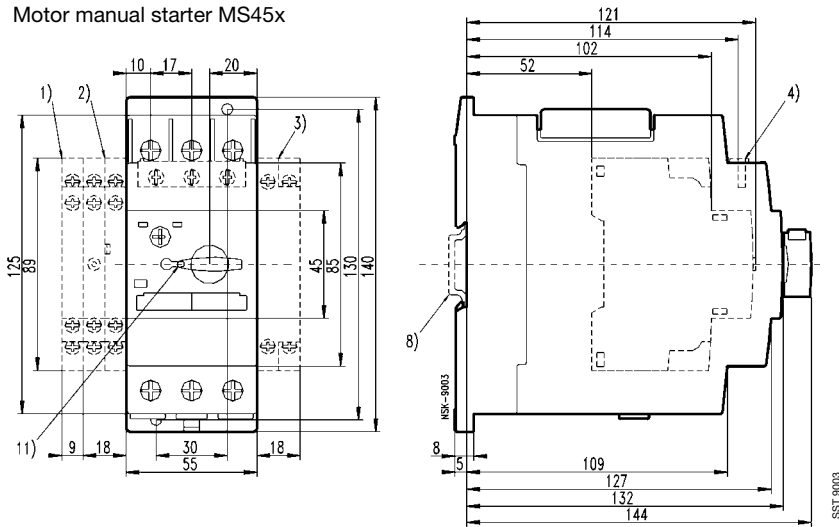
SK 0251 Z 93

Dimensions in mm

# Manual Motor Starters MS45x / MS49x

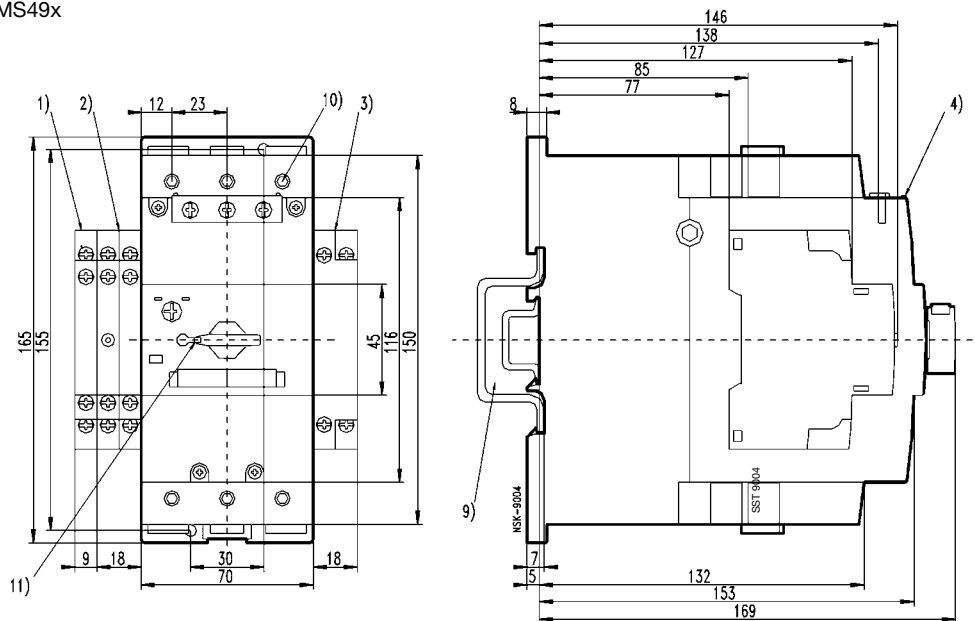
## Dimension diagrams

Motor manual starter MS45x

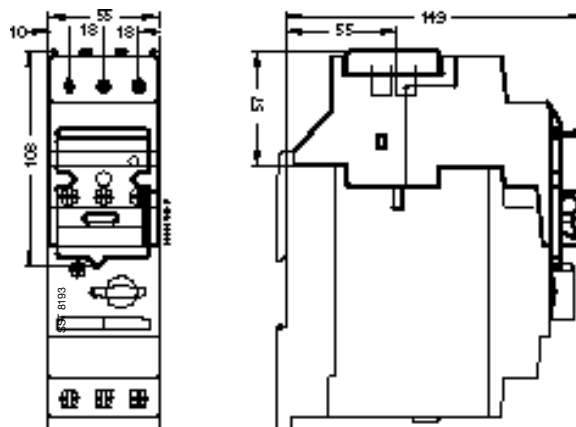


- Auxiliary switch block HKS4
- ▼ Pilot switch SK4
- Open-circuit shunt release/undervoltage release AA4, UA4, UA4-HK
- Auxiliary switch HK4
- Top-hat rail 35 mm to DIN EN 50022
- ⇨ Top-hat rail 35 mm, 15 mm high to DIN EN 50022
- or Top-hat rail 75 mm to DIN EN 50023
- Switch knob lockable in zero position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

Motor manual starter MS49x



MS45x with disconnecter module TB450



# Manual Motor Starter MS325

## Combinations with Accessories



MS325 with undervoltage release UAF



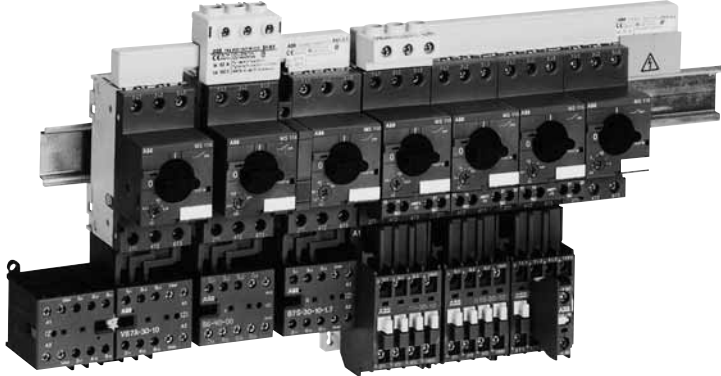
Insulating enclosure IP65



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



QES6/3N



MS116 cross wired via phase busses and power infeed blocks



# Manual Motor Starter MS325

## Combinations with Accessories



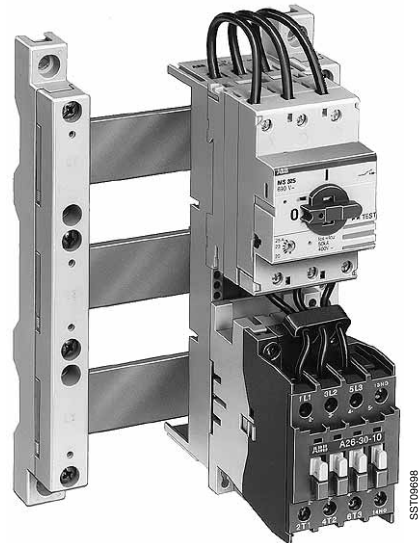
ST02401

MS325 + HK + SK with compact reversing contactor VB6



ST03201

MS325 + HKF with contactor A16

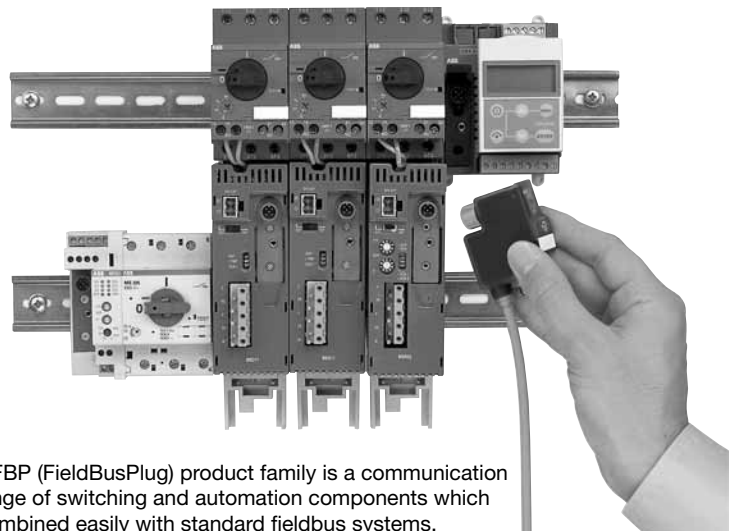


SST09698

MS325 with contactor A26 on busbar adapter SA11



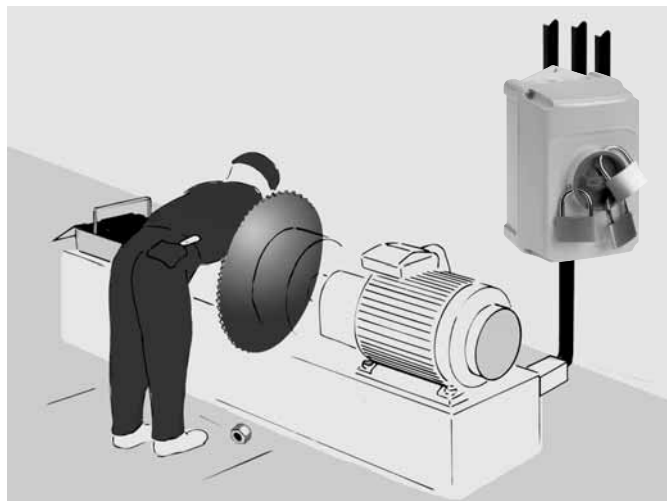
Insulating enclosure IP65 with locks



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



MS495 with A95 connected via BEA 110/495



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

# Various Motor Starter combinations

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

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

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

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



Starter solution for plug-in



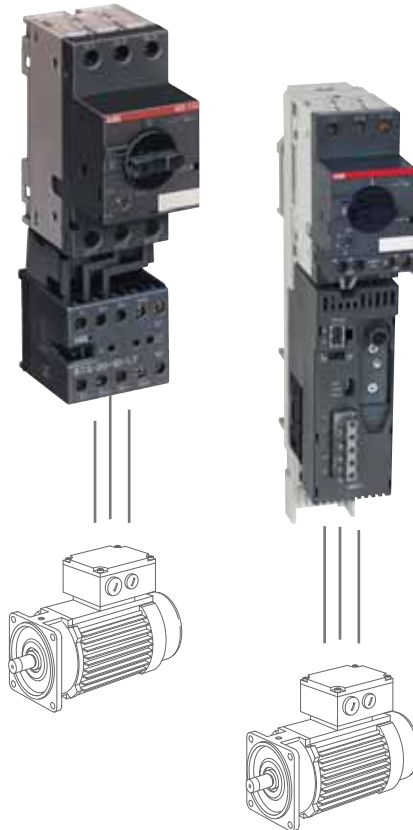
## DOL Starters

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

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

### Seperate gear concept

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



### Modular concept

Motor starter Combinations without or with field bus connection.

### Customer benefits:

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

## Manual Motor Starters MS116, MS325, MS4xx



(6/07 · 2 · GVD)

Printed in the Federal Republic of Germany

Publication No.: 2CDC 130 002 C0205



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