



Manual motor starters Overview and benefits

ABB offers a complete standard motor-protection concept for the world market

Why manual motor starters?

Manual motor starters are protection devices for electrical installations and motor applications. They combine motor control and protection in a single device.

These devices are mainly used to switch motors manually on/off and protect them against short-circuit, overload and phase failures. Fuse less protection with a manual motor starter saves costs, space and ensures a quick reaction under short-circuit condition, by switching off the motor within milliseconds.

Customer benefits

- Compact design / space saving
- Various functions in one device
- Quick reaction / fast current limitation
- Motor protection concept for the world market (IEC, UL)
- Safe and cost-saving solution

ABB offers a customer-orientated overall concept for the world market, which delivers experience and expertise in motor protection

- Efficient standard and high performance products
- Worldwide approvals and services
- Solutions for special technical applications



Protection functionalities

- Overload
- Short-circuit
- Phase loss sensitivity

Features

- Manual control
- Disconnect function
- Handle can be locked in the off position
- Remote control via undervoltage release or shunt trip
- Trip indication
- Temperature compensation
- Adjustable current setting

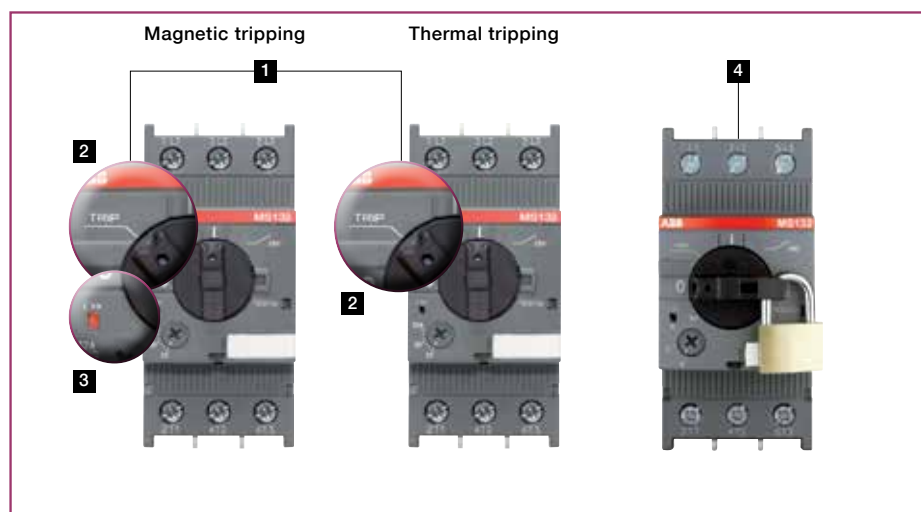
Products for a complete ABB offer

- Short-circuit breaking capacity up to 100 kA
- Magnetic-only devices (only short-circuit protection)
- Manual motor starters in modular DIN rail design
- Special version for transformer protection
- Full range of accessories
- System solutions

Further benefits

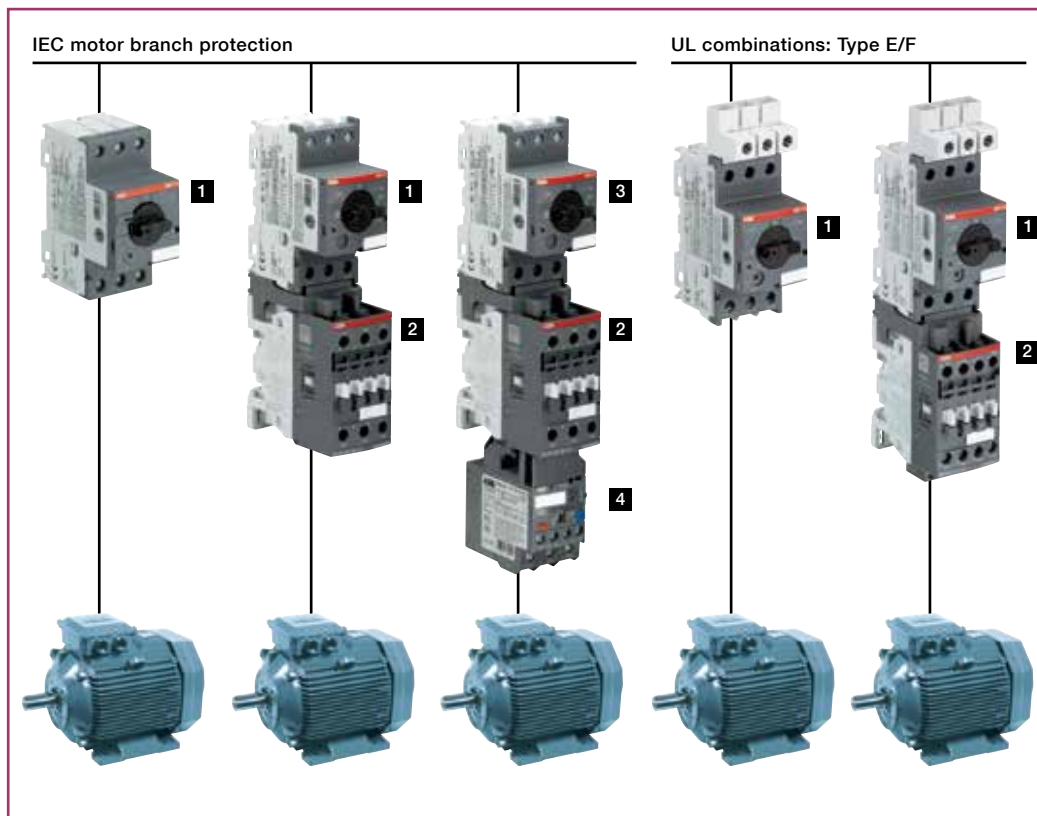
- Handle in the middle position after tripping (overload and short-circuit (MS132, MO132, MS4xx, MO4xx, MS132-T))
- Clear and reliable indication of fault in a separate window in the event of short-circuit tripping (MS132, MO132, MS132-T)
- Handle can be locked directly in the off position via standard lock (MS132, MO132, MS4xx, MO4xx, MS132-T) without accessories
- Optimized match to the ABB contactors

Benefits of type MS132



- 1 Clear trip indication
- 2 Handle in TRIP position
- 3 Optical indication for short-circuit
- 4 Easy locking

ABB manual motor starters can be equipped with many other components. Connection links ensure that the ABB manual motor starter can be connected to ABB contactors and overload relays easily and wiring-free.



Motor applications with fuseless protection

- 1** Short-circuit protection
+ overload protection
+ switch
+ disconnect
- 2** Control
- 3** MO... short-circuit protection
+ switch
+ disconnect
- 4** Overload protection



Segments

- HVAC
- Water and waste water
- Wind power
- General machinery
- Critical power
- Building and infrastructure

Applications

- Small machine tools
- Compressors
- Pumps
- Saw mills
- Pitch control
- Conveyor systems
- Ventilation systems
- And many other motor applications

Manual motor starters



Type	MS116	MS132	MS450	MS495	MS497	MS325
Thermal and electromagnetic protection	Yes	Yes	Yes	Yes		Yes
Electromagnetic protection	-	-	-	-		-
Phase loss sensitivity	Yes	Yes	Yes	Yes		Yes
Switch position	ON/OFF	ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP		ON/OFF
Magnetic trip indication	-	Yes	-	-		-
Lockable handle without accessories	-	Yes	Yes	Yes		-
Disconnecting feature	Yes	Yes	Yes	Yes		Yes
Width	45 mm	45 mm	55 mm	70 mm		54 mm
Rated operational current I _b	0.16 ... 32 A	0.16 ... 32 A	40 ... 50 A	63 ... 100 A	32 ... 100 A	0.16 ... 25 A
Setting range	0.1 ... 32 A	0.1 ... 32 A	28 ... 50 A	45 ... 100 A	22 ... 100 A	0.1 ... 25 A
Ambient air temperature	-25 ... +55 °C *)	-25 ... +60 °C *)	-20 ... +60 °C *)	-20 ... +60 °C *)		-25 ... +50 °C *)

*) Compensated

Table for short-circuit ratings for 400 V

	Standard range MS116, MS450, MS495	High performance range MS132, MS497	Modular DIN rail design MS325
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Selection parameters

Rated operational power	Setting range for thermal release	Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity I _{cu} / I _{cs}
			I _{cu}	I _{cs}		I _{cu}	I _{cs}		
0.03 kW	0.1 ... 0.16 A	MS116-0.16	50 kA	50 kA	MS132-0.16	100 kA	100 kA	MS325-0.16	100 kA
0.06 kW	0.16 ... 0.25 A	MS116-0.25	50 kA	50 kA	MS132-0.25	100 kA	100 kA	MS325-0.25	100 kA
0.09 kW	0.25 ... 0.4 A	MS116-0.4	50 kA	50 kA	MS132-0.4	100 kA	100 kA	MS325-0.4	100 kA
0.18 kW	0.4 ... 0.63 A	MS116-0.63	50 kA	50 kA	MS132-0.63	100 kA	100 kA	MS325-0.63	100 kA
0.25 kW	0.63 ... 1.0 A	MS116-1.0	50 kA	50 kA	MS132-1.0	100 kA	100 kA	MS325-1.0	100 kA
0.55 kW	1.0 ... 1.6 A	MS116-1.6	50 kA	50 kA	MS132-1.6	100 kA	100 kA	MS325-1.6	100 kA
0.75 kW	1.6 ... 2.5 A	MS116-2.5	50 kA	50 kA	MS132-2.5	100 kA	100 kA	MS325-2.5	100 kA
1.5 kW	2.5 ... 4.0 A	MS116-4.0	50 kA	50 kA	MS132-4.0	100 kA	100 kA	MS325-4.0	100 kA
2.2 kW	4.0 ... 6.3 A	MS116-6.3	50 kA	50 kA	MS132-6.3	100 kA	100 kA	MS325-6.3	100 kA
4.0 kW	6.3 ... 10 A	MS116-10	50 kA	50 kA	MS132-10	100 kA	100 kA	MS325-9	100 kA
5.5 kW	8 ... 12 A	MS116-12	25 kA	25 kA	MS132-12	100 kA	100 kA	MS325-12,5	75 kA
7.5 kW	10 ... 16 A	MS116-16	16 kA	16 kA	MS132-16	100 kA	100 kA	MS325-16	60 kA
9.0 kW	16 ... 20 A	MS116-20	15 kA	10 kA	MS132-20	100 kA	100 kA	MS325-20	55 kA
12.5 kW	20 ... 25 A	MS116-25	15 kA	10 kA	MS132-25	50 kA	50 kA	MS325-25	50 kA
15 kW	25 ... 32 A	MS116-32	10 kA	10 kA	MS132-32	50 kA	25 kA		
15 kW	22 ... 32 A	MS132-32	50 kA	25 kA	MS497-32	100 kA	50 kA		
18.5 kW	28 ... 40 A	MS450-40	50 kA	25 kA	MS497-40	100 kA	50 kA		
22 kW	36 ... 45 A	MS450-45	50 kA	25 kA	MS497-50	100 kA	50 kA		
22 kW	40 ... 50 A	MS450-50	50 kA	25 kA	MS497-50	100 kA	50 kA		
30 kW	45 ... 63 A	MS495-63	50 kA	25 kA	MS497-63	100 kA	50 kA		
37 kW	57 ... 75 A	MS495-75	50 kA	25 kA	MS497-75	100 kA	50 kA		
45 kW	70 ... 90 A	MS495-90	50 kA	25 kA	MS497-90	100 kA	50 kA		
55 kW	80 ... 100 A	MS495-100	50 kA	25 kA	MS497-100	100 kA	50 kA		

The currents given above concern standard three-phase four-pole cage motors (1500 r.p.m. at 50 Hz 1800 r.p.m. at 60 Hz).



MO132	MO450	MO495	MO496	MO325	MS132-T
-	-	-	-	-	Yes
Yes	Yes	Yes	-	Yes	-
-	-	-	-	-	Yes
ON/OFF/TRIP	ON/OFF/TRIP	ON/OFF/TRIP	-	ON/OFF	ON/OFF/TRIP
-	-	-	-	-	Yes
Yes	Yes	Yes	-	-	Yes
Yes	Yes	Yes	-	Yes	Yes
45 mm	55 mm	70 mm	-	54 mm	45 mm
0.16 ... 32 A	40 ... 50 A	63 ... 100 A	32 ... 100 A	0.4 ... 25 A	0.16 ... 32 A
-	-	-	-	-	0.1 ... 25 A
-25 ... +60 °C	-20 ... +60 °C	-20 ... +60 °C	-	-25 ... +50 °C	-25 ... +60 °C *)

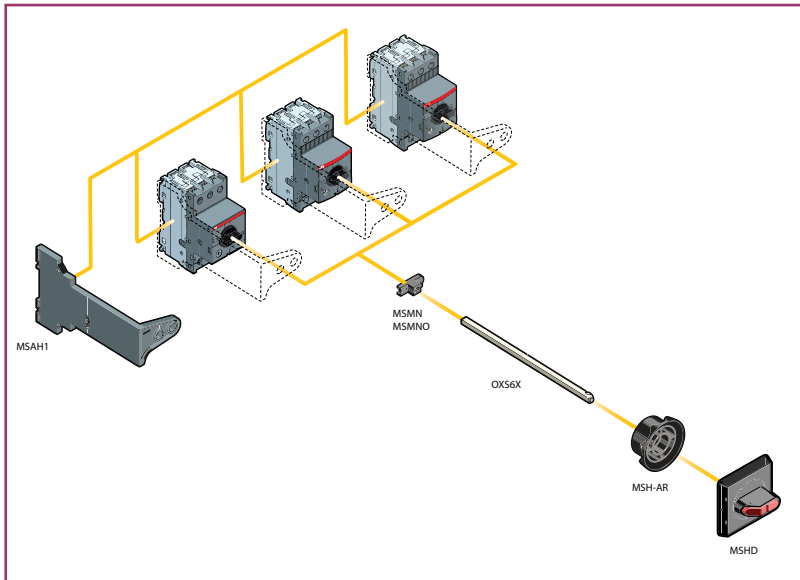
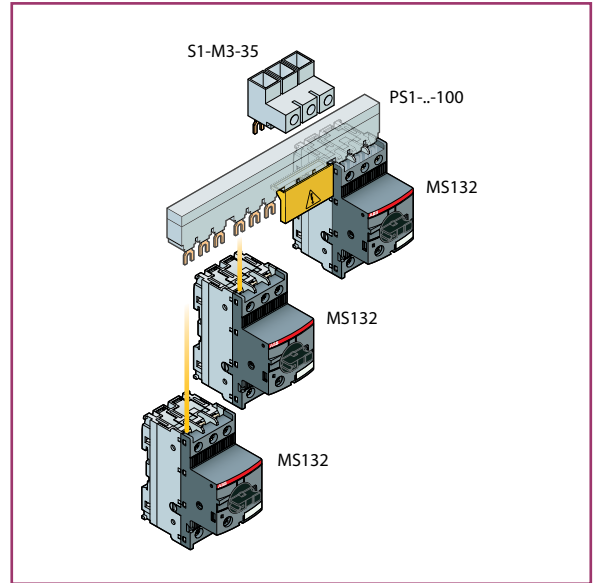
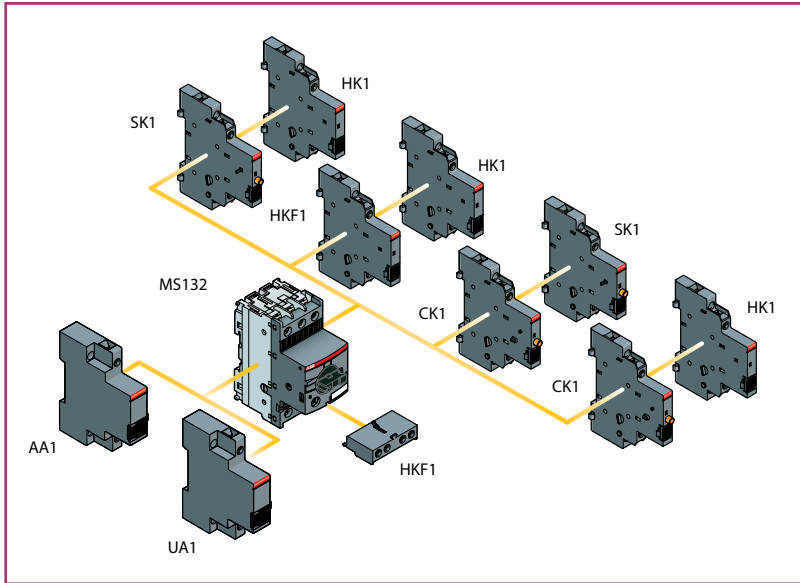
Standard range MO132, MO450, MO495	High performance range MO132, MO496	Modular DIN rail design MO325	Transformer protection MS132-T
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Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity		Type	Short-circuit breaking capacity	Type	Short-circuit breaking capacity
	I _{cu}	I _{cs}		I _{cu}	I _{cs}				
MO132-0.16	100 kA	100 kA	MO132-0.16	100 kA	100 kA			MS132-0.16T	100 kA
MO132-0.25	100 kA	100 kA	MO132-0.25	100 kA	100 kA			MS132-0.25T	100 kA
MO132-0.4	100 kA	100 kA	MO132-0.4	100 kA	100 kA	MO325-0.4	100 kA	MS132-0.4T	100 kA
MO132-0.63	100 kA	100 kA	MO132-0.63	100 kA	100 kA	MO325-0.63	100 kA	MS132-0.63T	100 kA
MO132-1.0	100 kA	100 kA	MO132-1.0	100 kA	100 kA	MO325-1.0	100 kA	MS132-1.0T	100 kA
MO132-1.6	100 kA	100 kA	MO132-1.6	100 kA	100 kA	MO325-1.6	100 kA	MS132-1.6T	100 kA
MO132-2.5	100 kA	100 kA	MO132-2.5	100 kA	100 kA	MO325-2.5	100 kA	MS132-2.5T	100 kA
MO132-4.0	100 kA	100 kA	MO132-4.0	100 kA	100 kA	MO325-4.0	100 kA	MS132-4.0T	100 kA
MO132-6.3	100 kA	100 kA	MO132-6.3	100 kA	100 kA	MO325-6.3	100 kA	MS132-6.3T	100 kA
MO132-10	100 kA	100 kA	MO132-10	100 kA	100 kA	MO325-9	100 kA	MS132-10T	100 kA
MO132-12	100 kA	100 kA	MO132-12	100 kA	100 kA	MO325-12,5	75 kA	MS132-12T	100 kA
MO132-16	100 kA	100 kA	MO132-16	100 kA	100 kA	MO325-16	60 kA	MS132-16T	100 kA
MO132-20	100 kA	100 kA	MO132-20	100 kA	100 kA	MO325-20	55 kA	MS132-20T	100 kA
MO132-25	50 kA	50 kA	MO132-25	50 kA	50 kA	MO325-25	50 kA	MS132-25T	50 kA
MO132-32	50 kA	25 kA	MO132-32	50 kA	25 kA			Transformer protection: The instantaneous short-circuit current setting is 20 times the rated operational current.	
MO132-32	50 kA	25 kA	MO496-32	100 kA	50 kA				
MO450-40	50 kA	25 kA	MO496-40	100 kA	50 kA				
MO450-45	50 kA	25 kA	MO496-50	100 kA	50 kA				
MO450-50	50 kA	25 kA	MO496-50	100 kA	50 kA				
MO495-63	50 kA	25 kA	MO496-63	100 kA	50 kA				
MO495-75	50 kA	25 kA	MO496-75	100 kA	50 kA				
MO495-90	50 kA	25 kA	MO496-90	100 kA	50 kA				
MO495-100	50 kA	25 kA	MO496-100	100 kA	50 kA				

For motor protection, an appropriate thermal or electronic overload relay must be used.

Accessories

Manual motor starters can be equipped with different busbars, auxiliary contacts, signalling contacts, undervoltage releases and shunt trips. Moreover it is possible to order IP65 door mounting kits, IP65 enclosures and shafts for doors.



Description accessories

- PS1.. Three-phase busbars
- S1.. Three-phase feeder terminals
- HKF1.. Auxiliary contacts (mountable on the front)
- HK1.. Auxiliary contacts (mountable on the right)
- SK1.. Signalling contacts (tripped alarm)
- CK1.. Signalling contacts (short-circuit alarm)
- AA1.. Shunt trip units
- UA1.. Undervoltage releases
- MSAH1 Shaft supporter
- MSMN Driver
- MSMNO Driver
- OXS6X Shafts
- MSH-AR Shaft alignment ring
- MSHD IP64 handles (UL: Type 1, 3R, 12)

Accessories for panel applications and enclosures for indoor/outdoor mounting



Rotary handle for MS116, MS/MO132, MS/MO325 MS/MO45x, MS/MO49x

Shaft holder for exact and easy mounting for MS116, MS/MO132

Door mounting kit IP65 (UL: Type 12) for MS116, MS/MO132, MS/MO325

Enclosures with water and dust protection IP65 (UL: Type 12) for MS116, MS/MO132, MS/MO325

For further accessories please check our ABB catalogue motor control and protection

Solutions

Motor starting solutions

ABB offers first-class specialized motor protection components: manual motor starters, contactors, overload relays and softstarters for motor starting solutions.

With the complete range of products and accessories it is possible to create various motor starter types like direct-on-line-, star-delta- and reversing starters.

Coordination tables

The selection of the right components is a real challenge: Because of this ABB provides coordination tables in accordance to IEC and UL standards for a fast and secure selection of the right protection devices. To find the coordination tables for motor protection, please see:

www.abb.com/lowvoltage then go to the right menu:

“Support”, select: “Online Product Selection Tools” then select “Coordination Tables for motor protection”.

Recommended protection devices

- Manual motor starters (MMS)
- Overload relays (TOL and EOL)
- Universal motor controller (UMC)
- Moulded-case circuit breakers (MCCB)
- Air circuit breakers (ACB)
- Fuses

Additional planning and design tools

- DOC Win planning tool for electrical installation design
- Cadenas for downloading CAD files
- EPLAN Electric P8 data



Examples of motor starting combinations

System solutions

High short-circuit protection and full selectivity for motor groups with self-resetting S800-SCL-SR limiter.

In industries with high short-circuit ratings, it is necessary to use special backup fuses or limiters in addition to each motor branch. This requires more space and an upstream selective breaker.

ABB now offers a self-resetting limiter, S800-SCL-SR, which can protect the entire motor group with full selectivity for each branch.

Customer benefits

Maximum system availability, maintenance free

- Backup for high short-circuit levels, 100 kA at 440 V, 50 kA at 690 V, 65 kA at 480/600 V
- Full selectivity for any downstream motors, no discrimination tables needed

Cost saving

- Short-circuit calculation is easy, or even not required at all
- Space saving motor group protection. A single device can protect a large number of motor branches, in total up to 100 A.

High safety

- All the advantages of fuseless protection
- Low energy let through values
- Limited current peak
- High personal safety

Segments

- MCC installation
- Shipbuilding
- Mining
- Oil & gas
- Power generation
- Wind power

Motor starter group with S800-SCL-SR limiter



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