Data sheet

Manual motor starter MS165

Manual motor starters are electro-mechanical protection devices for the main circuit. They are used mainly to switch motors manually ON/OFF and protect them fuse less 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. Fuse less starter combinations are setup together with contactors.

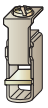


Description

- Overload protection – trip class 10
- Phase loss sensitivity
- Disconnect function
- Temperature compensation from -25 … +60 °C
- Adjustable and sealable current setting for overload protection
- Suitable for three- and single-phase application
- Trip-free mechanism
- Status indication for short-circuit trip
- Clear switch position indication ON/OFF/TRIP
- Lockable handle

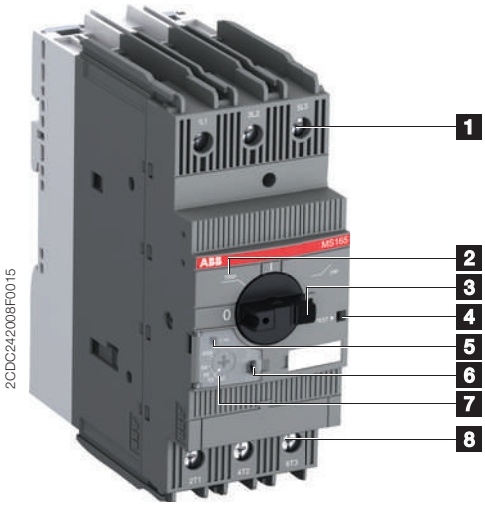
Order data

MS165 screw terminal



Setting range A	Type	Trip class	Order code	Packing unit pc	Weight per pc kg
10...16	MS165-16	10	1SAM451000R1011	1	0.950
14...20	MS165-20	10	1SAM451000R1012	1	0.950
18...25	MS165-25	10	1SAM451000R1013	1	0.960
23...32	MS165-32	10	1SAM451000R1014	1	0.970
30...42	MS165-42	10	1SAM451000R1015	1	0.970
40...54	MS165-54	10	1SAM451000R1016	1	0.970
52...65	MS165-65	10	1SAM451000R1017	1	0.980

Functional description



1 Terminals 1L1, 3L2, 5L3

2 Switch position TRIP

3 Lockable handle

4 Test function

5 Status indication for short-circuit

6 Sealable cover

7 Current setting range / Adjustable current setting for overload protection

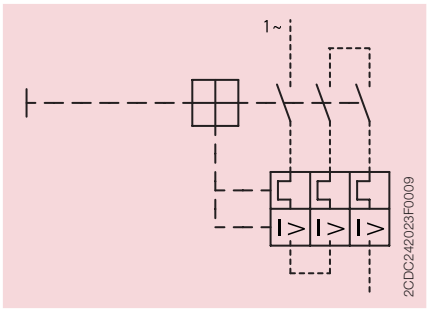
8 Terminals 2T1, 4T2, 6T3

Application

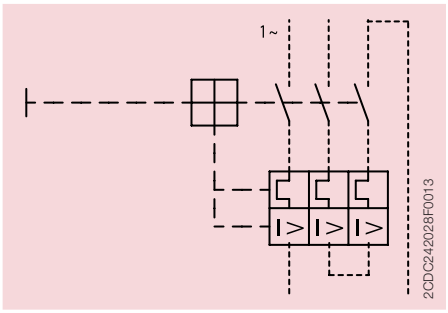
The manual motor starters protect the load and the installation against short-circuit and overload. They are three pole protection devices with thermal tripping elements for overload protection and electromagnetic tripping elements for short-circuit protection. Furthermore, they provide a disconnect function for safely isolation of the installation and the supply and can be used for the manual switching of loads.

The manual motor starters have a setting scale in amperes, which allows the direct adjusting of the device without any additional calculation. In compliance with international and national standards, the setting current is the rated current of the motor and not the tripping current (no tripping at 1.05 x I, tripping at 1.2 x I; I = setting current).

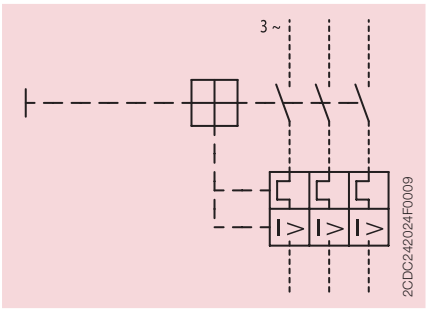
Operation mode



Single-phase operation

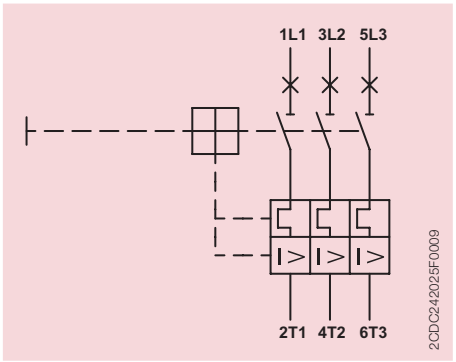


Single-phase operation



Three-phase operation

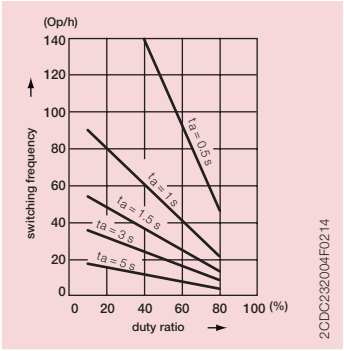
Wiring diagram



Resistance and power loss per pole

Type	Setting range		Resistance per pole	Power loss per pole	
	lower value	upper value		at lower value	at upper value
	A	A	mΩ	W	W
MS165-16	10	16	14.90	1.49	3.81
MS165-20	14	20	9.30	1.82	3.72
MS165-25	18	25	5.80	1.88	3.60
MS165-32	23	32	4.30	2.27	4.40
MS165-42	30	42	3.10	2.79	5.47
MS165-54	40	54	2.40	3.84	6.99
MS165-65	52	65	1.90	5.14	8.02

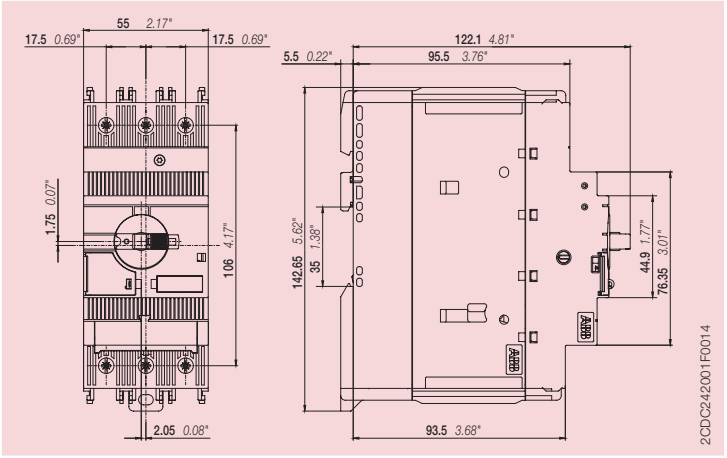
Technical diagram



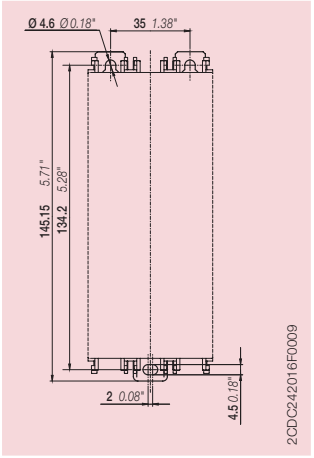
Intermittent periodic duty, t_a: Motor starting time

Dimensions

in **mm** / inches



MS165



MS165 drilling plan

Technical data IEC/EN

Data at T_A = 40 °C and at rated values, if nothing else indicated

Main circuit

	1L1-3L2-5L3 2T1-4T2-6T3
Rated operational voltage U_e	690 V AC
Setting range - thermal overload protection	see table “Order data” on page 1
Rated operational current I_e	see table below
Rated operational current DC-5 I_e 3 conducting paths in series up to 250 V	-
Rated instantaneous short-circuit current setting I_i	see table below
Rated service short-circuit breaking capacity I_{cs}	see table “Short-circuit breaking capacity and
Rated ultimate short-circuit breaking capacity I_{cu}	back-up fuses” on page 6
Rated service short-circuit breaking capacity DC I_{cs} 3 conducting paths in series up to 250 V	-
Trip class	see table “Order data” on page 1
Rated frequency	50/60 Hz
Number of poles	3
Resistance per pole	see table “Resistance and power loss per pole”
Power loss per pole	on page 3

Isolation data	
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	1000 V
Pollution degree	3

Electrical connection		
Connecting capacity	solid	1/2 x 1 ... 50 mm²
	stranded	1/2 x 1 ... 35 mm²
	flexible with ferrule	1/2 x 1 ... 35 mm²
	flexible with ferrule insulated	1/2 x 1 ... 35 mm²
	flexible without ferrule	1/2 x 1 ... 35 mm²
Stripping length		16 mm
Tightening torque		4 Nm
Recommended screw driver		Pozidriv 2

Type	Rated instantaneous short-circuit current setting I_i A	Rated operational current I_e A
MS165-16	240.00	16.00
MS165-20	300.00	20.00
MS165-25	375.00	25.00
MS165-32	480.00	32.00
MS165-42	630.00	42.00
MS165-54	810.00	54.00
MS165-65	975.00	65.00

General data

Mechanical durability		50000
Electrical durability		25000
Duty time		100 %
Operating frequency without early tripping		up to 15 operations/h or 60 operations/h with 40 % duty ratio, if the motor breaking current 6 x I_n and the motor starting time does not exceed 1 s
Dimensions (W x H x D)		see drawing “Dimensions” on page 3
Weight		see table “Order data” on page 1
Mounting		DIN-rail (EN 60715)
Mounting position		position 1-6 (optional for single mounting)
Group mounting		on request
Minimum distance to other units same type	horizontal	0 mm
	vertical	150 mm
Minimum distance to electrical conductive board	horizontal, up to 400 V	0 mm
	horizontal, up to 690 V	> 1.5 mm
	vertical	75 mm
Degree of protection	housing / main circuit terminals	IP20 / IP10
Utilization category		A
Maximum operating altitude permissible		2000 m
Maximum operating frequency		50 cycles/h

Electromagnetic compatibility

Electromagnetic compatibility		not applicable

Environmental data

Ambient air temperature		
Operation	open - compensated	-25 ... +60 °C
	open	-25 ... +60 °C
	enclosed (IB132)	-
Storage		-50 ... +80 °C
Ambient air temperature compensation		acc. to IEC/EN 60947-4-1
Resistance to vibrations acc. to IEC 60068-2-6		5g / 3 ... 150 Hz
Resistance to shock acc. to IEC 60068-2-27		25g / 11 ms

Standards / directives

Standards	IEC/EN 60947-1 IEC/EN 60947-2 IEC/EN 60947-4-1 UL 60947-1 UL 60947-4-1
Low Voltage Directive	2006/95/EC
EMC Directive	2004/108/EC
RoHS Directive	2011/65/EU

Short-circuit breaking capacity and back-up fuses

I_{cs} Rated service short-circuit breaking capacity

I_{cu} Rated ultimate short-circuit breaking capacity

- No back-up fuse required, because short-circuit proof up to 100 kA

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A
MS165-16	100	100	-	100	100	-	8	8	125	8	8	125	8	8	63
MS165-20	100	100	-	100	100	-	8	8	125	8	8	125	8	8	63
MS165-25	100	100	-	100	100	-	8	8	125	8	8	125	8	8	80
MS165-32	75	100	-	75	100	-	5	5	125	5	5	125	5	5	100
MS165-42	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100
MS165-54	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100
MS165-65	25	50	125	25	50	125	5	5	125	5	5	125	5	5	100

Technical data UL/CSA

Main circuit

Maximum operational voltage		600 V
Motor ratings	Horsepower	see table below
	Full Load Amps (FLA)	see table below
	Locked Rotor Amps (LRA)	see table below

Electrical connection		**MS165**
Connecting capacity	stranded	1/2 x AWG 16 ... 3
	flexible without ferrule	1/2 x AWG 16 ... 3
Stripping length		16 mm
Tightening torque		35 lb-In
Recommended screw driver		Pozidriv 2

Motor ratings, single-phase

Type	**120 V AC**			**220 ... 240 V AC**		
	hp	**FLA**	**LRA**	**hp**	**FLA**	**LRA**
MS165-16	1	16	96	2	12	72
MS165-20	1 1/2	20	120	3	17	102
MS165-25	2	24	144	3	17	102
MS165-32	2	24	144	5	28	168
MS165-42	3	34	204	7 1/2	40	240
MS165-54	3	34	204	10	50	300
MS165-65	5	56	336	10	50	300

Motor ratings, three-phase

Type	**200 V AC**			**208 V AC**			**220 ... 240 V AC**			**440 ... 480 V AC**			**550 ... 600 V AC**		
	hp	**FLA**	**LRA**	**hp**	**FLA**	**LRA**	**hp**	**FLA**	**LRA**	**hp**	**FLA**	**LRA**	**hp**	**FLA**	**LRA**
MS165-16	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MS165-20	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MS165-25	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MS165-32	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	30	32	174
MS165-42	10	32.2	186.3	10	30.8	179	15	42	232	30	40	218	40	41	232
MS165-54	15	48.3	267	15	46.2	257	20	54	290	40	52	290	50	52	290
MS165-65	20	62.1	334	20	59.4	321	20	54	290	50	65	363	60	62	348

hp Horsepower
FLA Full Load Amps
LRA Locked Rotor Amps

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range; see ordering detail pages. Horsepower (hp) ratings are for reference only.

Maximum short-circuit current ratings

Type	Manual Motor Controllers								Manual self-protected Combination Motor Controllers (Type E)	
	Branch circuit protection, max. size per NEC/CEC[1]		for motor disconnect		for group installations		for tap conductor protection in group installations			
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480 V	600 V	480Y / 277 V	600 Y / 374V
	A	A	kA	kA	kA	kA	kA	kA	kA	kA
MS165-16	Any Listed fuses. Size per NEC/ CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	30	65	30	65	30	65	30
MS165-20			65	30	65	30	65	30	65	30
MS165-25			65	30	65	30	65	30	65	30
MS165-32			65	30	65	30	65	30	65	30
MS165-42			65	30	65	30	65	30	65	-
MS165-54			65	30	65	30	65	30	65	-
MS165-65			65	30	65	30	65	30	65	-

[1] NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

Maximum short-circuit current ratings – MS165 with AF contactors

Type	Combination Motor Controllers (Type F)		
	Minimum contactor size	480Y / 277 V	600Y / 374 V
		kA	kA
MS165-16	AF09	65	30
MS165-20	AF26	65	30
MS165-25	AF26	65	30
MS165-32	AF26	65	30
MS165-42	AF40	65	-
MS165-54	AF40	65	-
MS165-65	AF40	65	-

Contact us

ABB STOTZ-KONTAKT GmbH
Eppelheimer Straße 82
69123 Heidelberg, Germany
Phone: +49 (0) 6221 7 01-0
Fax: +49 (0) 6221 7 01-13 25
E-Mail: info.desto@de.abb.com

You can find the address of your local sales organization on the ABB home page
http://www.abb.com/contacts
-> Low Voltage Products and Systems

Note:
We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AG does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB AG.

Copyright© 2015 ABB
All rights reserved

Document number 2CDC 131 083 D0201 (03.2015)

Power and productivity
for a better world™