Data sheet

Manual motor starter MS116

Manual motor starters are electrome-chanical 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

– Phase unbalance and phase loss sensitivity
– Disconnect function
– Temperature compensation from -25 … +55 °C
– Adjustable current setting for overload protection
– Suitable for three- and single-phase application
– Trip-free mechanism
– Clear switch position indication – ON/OFF

Ordering details

MS116 screw terminal

Setting range [A]	Type	Trip class	Order code	Packaging unit [Pcs]	Weight [g]
0.10 ... 0.16	MS116-0.16	10A	1SAM250000R1001	1	225
0.16 ... 0.25	MS116-0.25	10A	1SAM250000R1002	1	225
0.25 ... 0.40	MS116-0.4	10A	1SAM250000R1003	1	225
0.40 ... 0.63	MS116-0.63	10A	1SAM250000R1004	1	225
0.63 ... 1.00	MS116-1.0	10A	1SAM250000R1005	1	225
1.00 ... 1.60	MS116-1.6	10A	1SAM250000R1006	1	265
1.60 ... 2.50	MS116-2.5	10A	1SAM250000R1007	1	265
2.50 ... 4.00	MS116-4.0	10A	1SAM250000R1008	1	265
4.00 ... 6.30	MS116-6.3	10A	1SAM250000R1009	1	265
6.30 ... 10.0	MS116-10	10A	1SAM250000R1010	1	265
8.00 ... 12.0	MS116-12	10A	1SAM250000R1012	1	265
10.00 ... 16.0	MS116-16	10A	1SAM250000R1011	1	265

Note: MS116 with pre-assembled auxiliary contact HKF1-11, please order as follow 1SAM250005Rxxxx

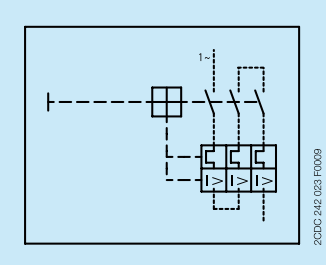
Application

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 electro-magnetic 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.

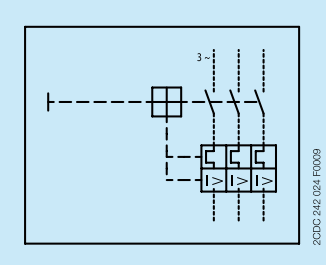
The manual motor starters have a setting scale in Amperes, which allows the direct adjusting of the device without any additional calculation. In compliance with international and national standards, the setting current is the rated current of the motor and not the tripping current (no tripping at 1.05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

Operation mode

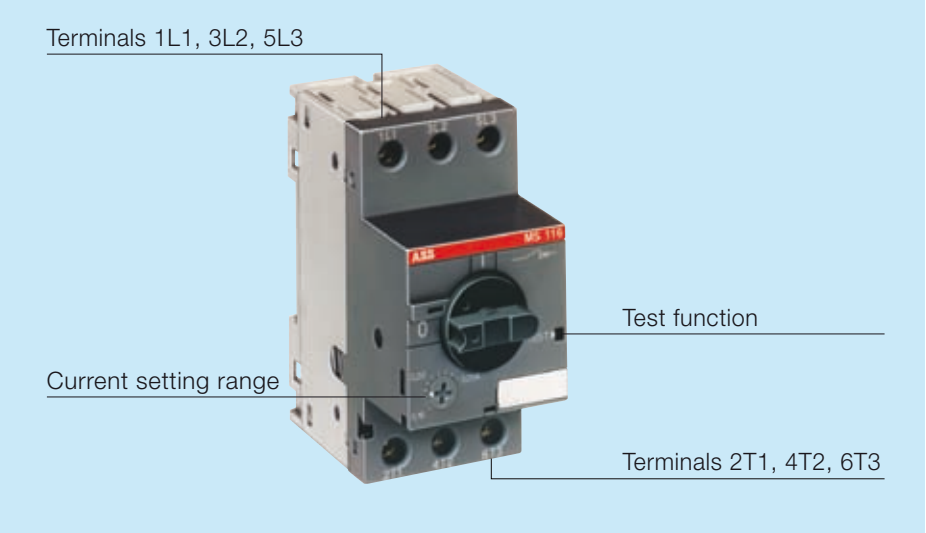
Single-phase operation



Three-phase operation



Connections

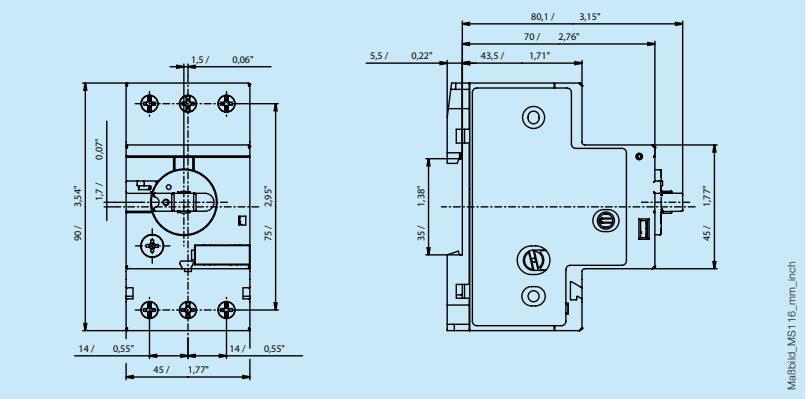


Resistance and power losses per phase

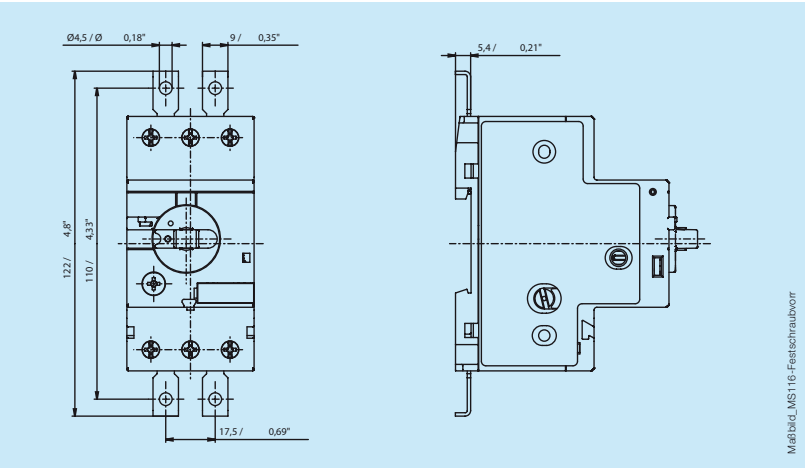
Type	Lower value setting range [A]	Upper value setting range [A]	Resistance per phase [Ω]	Power dissipation per Phase [W] at	
				Lower value of setting range	Upper value of setting range
MS116-0.16	0.10	0.16	66.00	0.7	1.7
MS116-0.25	0.16	0.25	25.50	0.7	1.7
MS116-0.4	0.25	0.40	10.38	0.7	1.7
MS116-0.63	0.40	0.63	4.36	0.7	1.7
MS116-1.0	0.63	1.00	1.605	0.7	1.7
MS116-1.6	1.00	1.60	0.648	0.7	1.7
MS116-2.5	1.60	2.50	0.272	0.7	1.7
MS116-4.0	2.50	4.00	0.106	0.7	1.7
MS116-6.3	4.00	6.30	0.046	0.7	1.7
MS116-10	6.30	10.0	0.024	0.9	2.4
MS116-12	8.00	12.0	0.016	1.0	2.4
MS116-16	10.0	16.0	0.0108	1.1	2.8

Dimensions

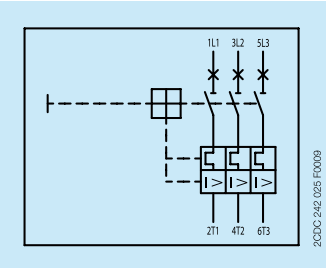
Manual motor starter MS116



Manual motor starter MS116 with FS116



Wiring diagram



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

Type			MS116
Technical data		**Terminals**	
Main circuit		**1L1-3L3-5L5** **2T1-4T2-6T3**	
Rated operational voltage U_e acc. to IEC/EN 60947-1	AC		690 V
	DC		-
Rated operational current I_e			see separate table
Rated current I_n / Conventional free-air thermal current I_{th}			see „Rated Operational Current“
Setting range - thermal overload protection			see ordering data
Rated instantaneous short-circuit current setting I_i			see separate table
Rated service short-circuit breaking capacity I_{cs}			see separate table
Rated ultimate short-circuit breaking capacity I_{cu}			see separate table
Trip class acc. to IEC/EN 60947-4-1			see ordering data
Rated frequency acc. to IEC/EN 60947-1			50 / 60 Hz
Number of poles			3
Resistence per phase			see separate table
Power dissipation per phase	lower value of setting range		see separate table
	upper value of setting range		see separate table
Isolation data			
Rated impulse withstand voltage U_{imp} acc. to IEC/EN 60947-1			6 kV
Rated insulation voltage U_i acc. to IEC/EN 60947-1			690 V
Pollution category acc. to IEC/EN 60664			3
Electrical connection			
Connecting capacity	solid		1/2 x 1 ... 4 mm²
	flexible with ferrule		1/2 x 0.75 ... 2.5 mm²
	flexible with ferrule isolated		1/2 x 0.75 ... 2.5 mm²
	flexible without ferrule		1/2 x 0.75 ... 2.5 mm²
Stripping length			9 mm
Tightening torque			0.8 ... 1.2 Nm
connection screw			M3.5 (Pozidrive 2)
General data			
Mechanical durability			100000
Electrical durability			50000
Duty time			100%
Dimensions (W x H x D)			see dimension drawing
Weight			see ordering data
Mounting			DIN-rail (EN 60715)
Mounting position			optional for single mounting (position 1-6)
Group Mounting			on request
Minimum distance to other units same type	horizontal		none
	vertical		150 mm
Minimum distance to electrical conductive wall (earthed)	horizontal		25 mm
	vertical		75 mm
Degree of protection acc. to IEC/EN 60947-1	enclosure / terminals		IP20
Utilization Category acc. to IEC/EN 60947-2			A
Altitude			up to 2000 m

Type			MS116
Environmental data			
Ambient air temperature range			
Operation	open - compensated		-25 °C ... +55 °C
	open		-25 °C ... +70 °C
Storage			-50 °C ... +80 °C
Temperature compensation			continuous
Vibration (sinusoidal) acc. to IEC/EN 60068-2-6 (Fc)			5 g / 3 - 150 Hz
Shock (half-sine) acc. to IEC/EN 60068-2-27 (Ea)			25 g / 11 ms
Standards / Directives			
Product standard			IEC/EN 60947–2, ICE/EN 60947-4-1, IEC/EN 60947-1, UL 508, CSA 22.2 No. 14
Low Voltage Directive			2006/95/EC
EMC Directive			2004/108/EC
RoHS Directive			2002/95/EC
Electromagnetic compatibility			
			not applicable
Approvals, markings			
Approvals			see last page
Markings			see last page
UL/CSA			
Max. operational voltage			600 V
General purpose rating at max. 600 VAC			see separate table
Motor ratings			
Horse power			see separate table
Full load amps (FLA)			see separate table
Locked rotor amps (LRA)			see separate table
Short circuit rating RMS at 480 VAC			
0.16 ... 2.5 A			30 kA
4.0 ... 16 A			18 kA
Short circuit rating RMS at 600 VAC			5 kA
Short-Circuit Protective devices			see separate table
Electrical connection			
Connecting capacity	solid		1/2 x AWG16 ... AWG12
	stranded		1/2 x AWG16 ... AWG12
	flexible without ferrule		1/2 x AWG16 ... AWG12
Stripping length			9 mm
Tightening torque			10 lb-in
connection screw			M3.5 (Pozidrive 2)

Type	Rated instantaneous short-circuit current setting [A]	Rated operational current [A]
MS116-0.16	1.25 ... 1.87	0.16
MS116-0.25	1.95 ... 2.92	0.25
MS116-0.4	3.12 ... 4.68	0.40
MS116-0.63	4.91 ... 7.37	0.63
MS116-1.0	9.20 ... 13.8	1.00
MS116-1.6	14.7 ... 22.1	1.60
MS116-2.5	23.0 ... 34.5	2.50
MS116-4.0	40.0 ... 60.0	4.00
MS116-6.3	63.0 ... 94.5	6.30
MS116-10	120 ... 180	10.0
MS116-12	144 ... 216	12.0
MS116-16	192 ... 288	16.0

Short-Circuit protection

Setting range, short-circuit breaking capacity and max. back-up fuse

Maximum rated current of the back-up fuses if $I_{CC} > I_{CS}$

Setting ranges	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
A ... A	I_{CU}	I_{CS}	gG, aM	I_{CU}	I_{CS}	gG, aM	I_{CU}	I_{CS}	gG, aM	I_{CU}	I_{CS}	gG, aM	I_{CU}	I_{CS}	gG, aM
	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
0.10 ... 0.16	No back-up fuse required up to I_{cc} = 50 kA						No back-up fuse required up to I_{cc} = 30 kA								
0.16 ... 0.25															
0.25 ... 0.40															
0.40 ... 0.63															
0.63 ... 1.00															
1.00 ... 1.60															
1.60 ... 2.50							10	10	25	10	10	25	5	5	25
2.50 ... 4.00							6	6	25	6	6	25	2	2	25
4.00 ... 6.30							6	6	63	6	6	63	2	2	40
6.30 ... 10.0							6	6	63	6	6	63	2	2	50
8.00 ... 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

I_{CS} = Rated service short-circuit breaking capacity
I_{CU} = Rated ultimate short-circuit breaking capacity
I_{CC} = Prospective short-circuit current at installation location
$I_{CU} = I_{CS}$ in case of MS116

UL / CSA ratings

Type	Motor rating, single phase											
	120 V AC			240 V AC			480 V AC			600 VAC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS116-0.16	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MS116-0.25	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MS116-0.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MS116-0.63	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MS116-1.0	-	1.0	6.0	-	1.0	6.0	-	1.0	6.0	-	1.0	6.0
MS116-1.6	-	1.6	9.6	1/10	-	-	-	1.6	9.6	-	1.6	9.6
MS116-2.5	-	2.5	15.0	1/6	-	-	1/2	-	-	1/2	-	-
MS116-4.0	1/8	-	-	1/3	-	-	1/2	-	-	1-1/2	-	-
MS116-6.3	1/4	-	-	1/2	-	-	1	-	-	2	-	-
MS116-10	1/2	-	-	1-1/2	-	-	2	-	-	3	-	-
MS116-12	1/2	-	-	2	-	-	3	-	-	5	-	-
MS116-16	1	-	-	2	-	-	5	-	-	7-1/2	-	-

Type	Motor rating, three phase											
	120 V AC			240 V AC			480 V AC			600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS116-0.16	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MS116-0.25	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MS116-0.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MS116-0.63	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MS116-1.0	-	1.0	6.0	-	1.0	6.0		1.0	6.0	1/2	-	-
MS116-1.6	-	1.6	9.6	-	1.6	9.6	3/4	-	-	3/4	-	-
MS116-2.5	-	2.5	15.0	1/2	-	-	1	-	-	1-1/2	-	-
MS116-4.0	-	4.0	16.0	1	-	-	2	-	-	3	-	-
MS116-6.3	1/2	-	-	1-1/2	-	-	3	-	-	5	-	-
MS116-10	1	-	-	3	-	-	5	-	-	7-1/2	-	-
MS116-12	1-1/2	-	-	3	-	-	7-1/2	-	-	10	-	-
MS116-16	2	-	-	5	-	-	10	-	-	10	-	-

Type	General purpose rating at max. 600 VAC [A]	Protective devices	
		Fuse K5 / RK5 [A]	Circuit breaker [A]
MS116-0.16	0.16	1200	-
MS116-0.25	0.25	1200	-
MS116-0.4	0.40	1200	-
MS116-0.63	0.63	1200	-
MS116-1.0	1.00	1200	-
MS116-1.6	1.60	1200	-
MS116-2.5	2.50	1200	-
MS116-4.0	4.00	1200	-
MS116-6.3	6.30	1200	-
MS116-10	10.0	1200	-
MS116-12	12.0	1200	-
MS116-16	16.0	1200	-

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