

Motor protective circuit breaker MSP

Technical data		according to IEC 60947-1; IEC 60947-2; IEC 60947-4-1							
Type		MSP0				MSP1			
General data									
Number of poles		3				3			
Max. rated current I_n									
• motor protection	A	25				52			
Permissible ambient temperature									
• at full rated current	°C	-20 ... +55							
• in storage	°C	-50 ... +80							
Rated operational voltage U_e	V	690							
Rated frequency	Hz	50/60							
Rated insulation voltage U_i	V	750							
Rated impulse withstand voltage U_{imp}	kV	6							
Utilization category									
• to IEC 60947-2 (motor starter protectors)		A							
• to IEC 60947-4-1 (motor starters)		AC-3							
Mechanical endurance									
• up to 25 A	Operating cycles	100000				100000			
• 25 A upwards		--				30000			
Number of operating cycles/h (on load)	1/h	25				25			
Degree of protection with open terminals/with conductors connected		IP00/IP20							
Temperatures compensation to IEC 60947-4-1		✓							
Phase failure sensitivity to IEC 60947-4-1		✓							
Power loss P_v per breaker									
I_n	A	0,6	4	6	25	2,4	6	25	63
P_v	W	5	6	7	9	8	7	14	23

Auxiliary contacts				
Utilization category		AC-15		
Rated operational voltage U_e	ACV	230	400	500
Rated operational current I_e	A	3	1.5	1
Utilization category		DC-13		
Rated operational voltage U_e DC L/R200 ms	DCV	24	60	220
Rated operational current I_e	A	2.3	0.7	0.3

Type		MSP0		MSP1	
Cross-section for main conductors					
Solid or stranded	mm ²	2 x (1 ... 6)		1 x 1.5 ... 2 x 16 or 1 x 25 + 1 x 10	
Finely stranded with end sleeve	mm ²	2 x (1 ... 4)		1 x 1.5 ... 2 x 10 or 1 x 16 + 1 x 10	
Cross-sections for auxiliary and control connecting leads					
Solid or stranded	mm ²	1 x 0.5 ... 2 x 2.5		--	
Finely stranded with end sleeve	mm ²	1 x 0.5 ... 2 x 1.5		--	

Rated short-circuit breaking capacity

The table shows the rated ultimate short-circuit breaking capacity

I_{cu} and the rated service short-circuit breaking capacity I_{cs} for the MSP motor starter protectors with respect to rated current I_n and rated operational voltage U_e .

Infeed is permitted at top or bottom without reduction of rated data. In the short-circuit proof areas, I_{cu} is at least 100 kA. A backup fuse is therefore not necessary.

In the other areas, when the short-circuit current at the installation point exceeds the rated short-circuit breaking capacity given in the table for the motor starter protectors, the motor starter protector must be protected by a backup fuse. See the following table for the maximum rated current for the backup fuse. With a backup fuse according to the table, the maximum short-circuit current is permitted to equal the rated breaking capacity of the backup fuse.

Technical data

Motor Starter Protectors	Rated current I_n	Up to AC 240 V			Up to AC 415 V			Up to AC 440 V			Up to AC 500 V			Up to AC 690 V		
		I_{cu}	I_{cs}	Max. Backup fuse (gL/gG)	I_{cu}	I_{cs}	Max. Backup fuse (gL/gG)	I_{cu}	I_{cs}	Max. Backup fuse (gL/gG)	I_{cu}	I_{cs}	Max. Backup fuse (gL/gG)	I_{cu}	I_{cs}	Max. Backup fuse (gL/gG)
Type	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A	kA	kA	A
MSPO	≤ 1 A	Short-circuit proof up to 100 kA, backup fuse is not necessary														
	1.6 A	fuse is not necessary														
	2.4 A															
	3.2 & 4 A															
	5 & 6 A															
	8 & 10 A															
	13 & 16 A															
	20 & 25 A	10 (50)	10 (50)	100	6 (50)	6 (50)	80	5 (30)	5 (30)	80	3 (5)	3 (5)	80	2	2	80
MSP1	≤ 2.4 A	Short-circuit proof up to 100 kA, backup fuse is not necessary														
	4 A															
	6 A															
	10 A															
	16 A															
	25 A															
	32 & 52 A															
					35	17	200	25	13	200	10	5	200	4	4	160

Relation between short-circuit breaking capacity I , related power factor and minimum short-circuit making capacity to IEC 60947-2.

Short-circuit breaking capacity	Power factor $\cos \phi$	Short-circuit making capacity
$I \leq 3000$	0.9	1.42 x I
$3000 < I \leq 4500$	0.8	1.47 x I
$4500 < I \leq 6000$	0.7	1.5 x I
$6000 < I \leq 10000$	0.5	1.7 x I
$10000 < I \leq 20000$	0.3	2.0 x I
$20000 < I \leq 50000$	0.25	2.1 x I
$50000 < I$	0.2	2.2 x I

Curves

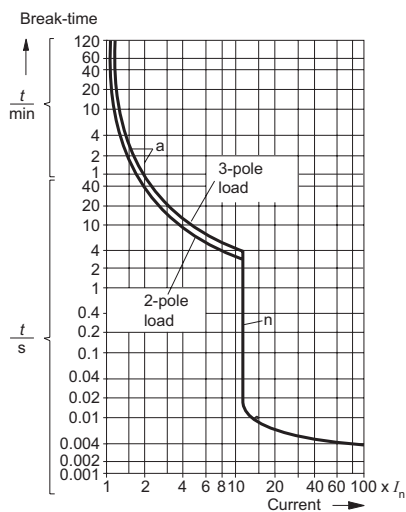
Characteristic curves

The characteristic curves are obtained in the cold state and 3-pole loading.

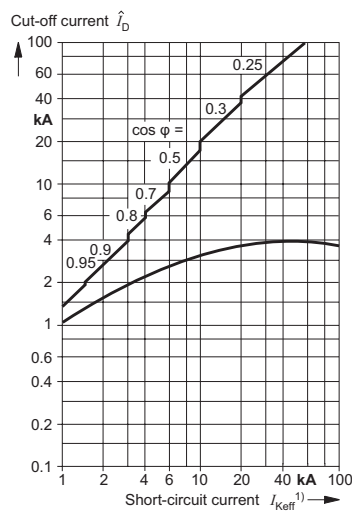
At operating temperature, the tripping time of the thermal releases drops by about 25 %. With 3-pole loading, the deviation in tripping time for 3 times the current and upwards is ± 20 %.

Characteristic curves for MSPO

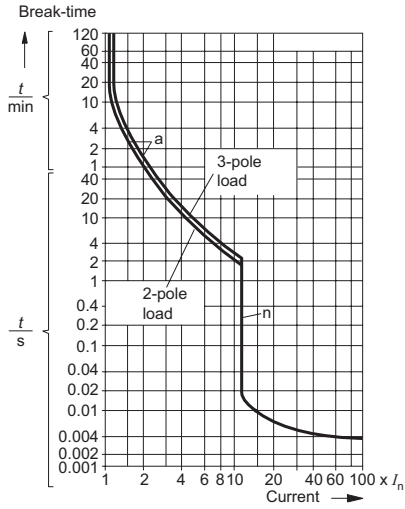
The characteristic curves shown here apply for a MSPO-6 motor starter protector with a rated current of 6 A, a current setting range of 4 to 6 A and a tripping current for the instantaneous overcurrent release of 72 A, at a rated voltage of AC 50 Hz, 400 V.



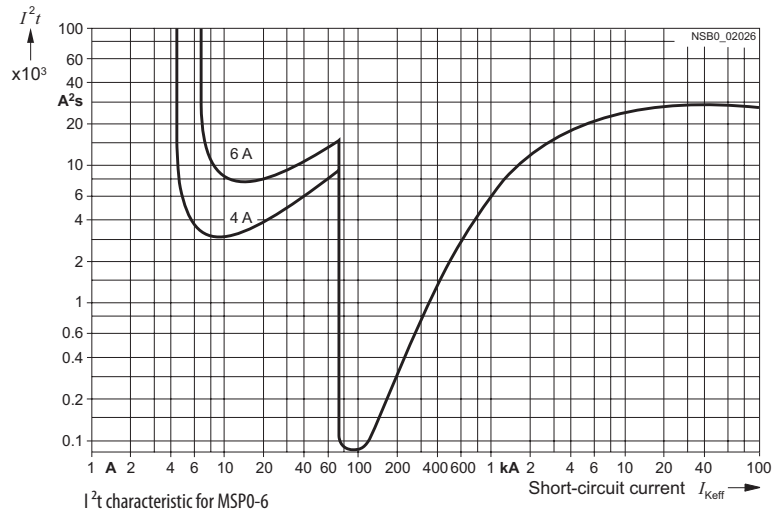
Schematic representation of the time/current characteristic for MSPO



Current limiting characteristic for MSPO-6



Schematic representation of the time/current characteristic for MSP1



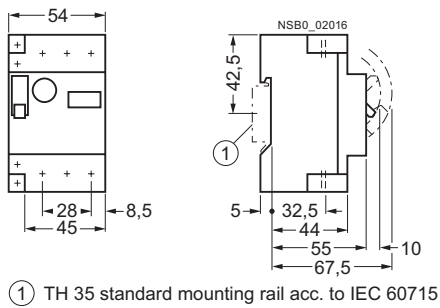
I^2t characteristic for MSP0-6

Characteristic curves for MSP1

The characteristic curves shown here apply for a motor starter protector with a rated current of 25 A and a tripping current for the instantaneous overcurrent release of 300 A, at a rated voltage of AC 50 Hz, 400 V.

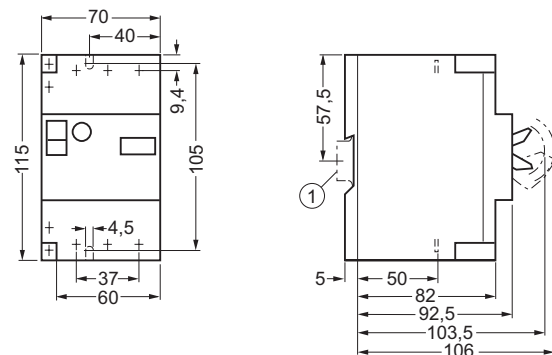
Dimensions

MSP0



① TH 35 standard mounting rail acc. to IEC 60715

MSP1



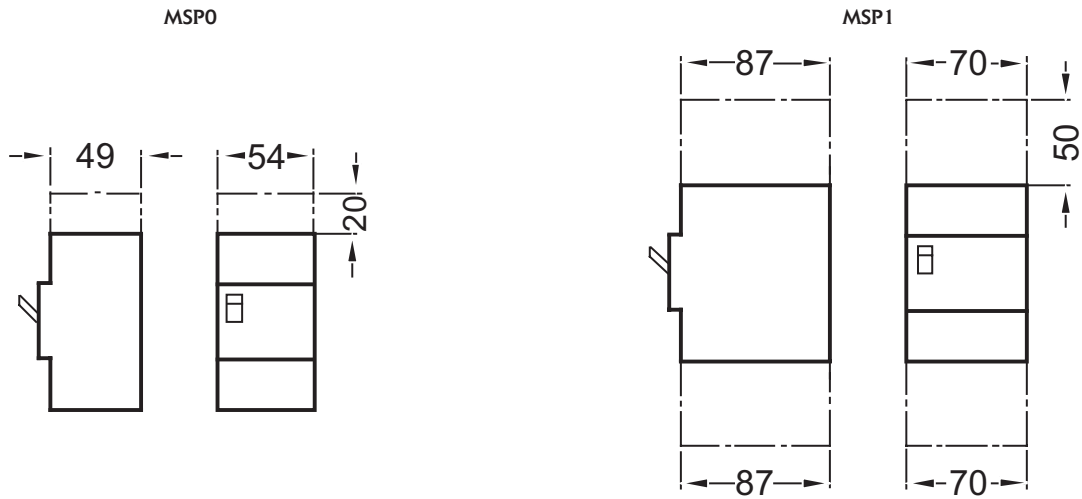
① TH 35 standard mounting rail acc. to IEC 60715

Technical data

Space required above arc chutes

Minimum clearance with rated voltage to adjacent parts as well as non-insulated live parts.

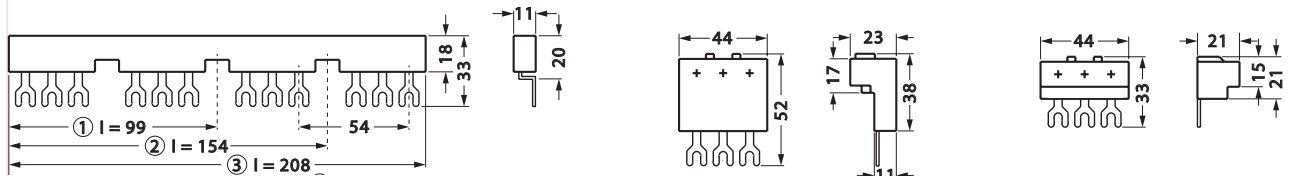
The spacing of minimum 1 cm with MSP0 and minimum 2 cm with MSP1 between large-surface covers and arc openings should be observed.



Uninsulated conductors must be insulated within the space required above arc chutes.

Permissible mounting position

MSP0, MSP1 motor starter protectors permissible mounting position due to the position of the operating parts



three-phase busbar

- ① For 2 devices: MSP-1Z2
- ② For 3 devices: MSP-1Z3
- ③ For 4 devices: MSP-1Z4

MSP-TA2 three-phase feed-in terminal, type I

MSP-TA1 three-phase feed-in terminal, type II