

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		✓	

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.

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
MSP0	≤ 1 A	Short-circuit proof up to 100 kA, backup														
	1.6 A	fuse is not necessary														
	2.4 A										10 (50)	10 (50)	35	2	2	20
	3.2 & 4 A										10 (50)	10 (50)	50	3 (50)	3 (50)	50
	5 & 6 A										5 (50)	5 (50)	63	3 (50)	3 (50)	63
	8 & 10 A										10 (50)	10 (50)	80	3 (5)	3 (5)	80
	13 & 16 A										6 (50)	6 (50)	80	5 (30)	5 (30)	80
	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														
	4 A	fuse is not necessary														
	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 $\cos \varphi$	Short-circuit making capacity
A		
$I \leq 3000$	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

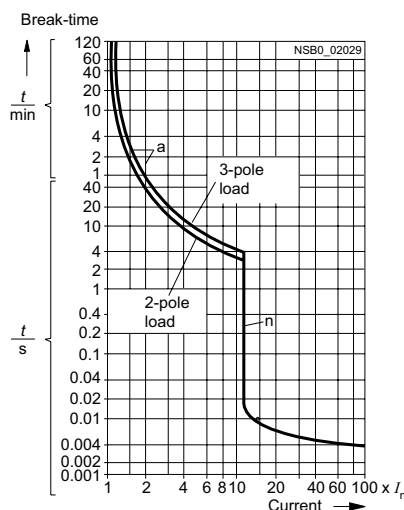
Characteristic curves

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

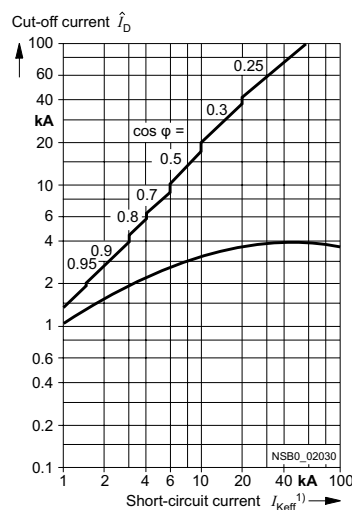
At operating temperature, the tripping time of the thermal releases drops by about 25 %. With 3-pole loading, the deviation in tripping time for 3 times the current and upwards is ± 20 %.

Characteristic curves for MSP0

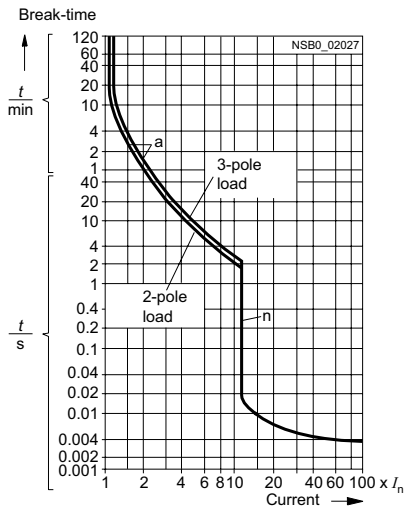
The characteristic curves shown here apply for a MSP0-6 motor starter protector with a rated current of 6 A, a current setting range of 4 to 6 A and a tripping current for the instantaneous overcurrent release of 72 A, at a rated voltage of AC 50 Hz, 400 V.



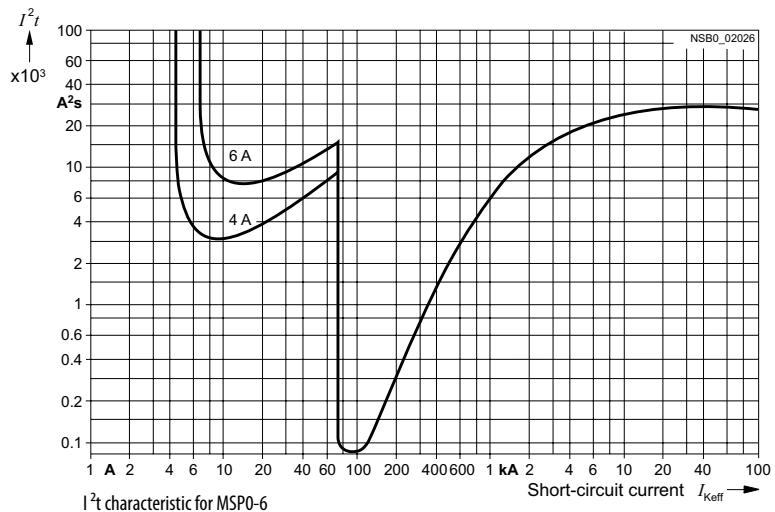
Schematic representation of the time/current characteristic for MSP0



Current limiting characteristic for MSP0-6



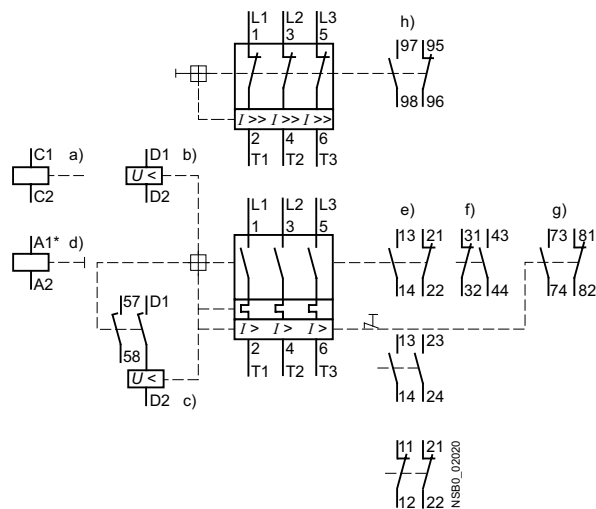
Schematic representation of the time/current characteristic for MSP1

 I^2t characteristic for MSP0-6

Characteristic curves for MSP1

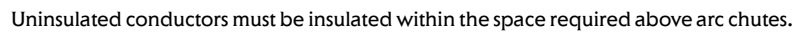
The characteristic curves shown here apply for a motor starter protector with a rated current of 25 A and a tripping current for the instantaneous overcurrent release of 300 A, at a rated voltage of AC 50 Hz, 400 V.

Circuit diagrams



Space required above arc chutes

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



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

