Motor Protection Circuit Breakers
MS25

Motor protection circuit-breakers areas of use

Type	Motor protection	Overload protection	Short-circuit protection	Single-phase consumers	Transformer protection
MS25	■	■	■	■	
MST25	■	■		■	
MS20	■	■	■	■	
MS25-TR		■	■		■
MSZ25			■	■	
MPE				■	

Motor protection circuit breakers MS25

with overload and short-circuit release — AC-3 acc. to IEC/EN 60947-4-1

Type	Setting range (A)	Motor power (3-phase, 400 V) (kW)	Ordering No.	Weight (g)	Packaging (pcs)
MS25-0.16	0.1 ... 0.16	0.02	30.107.955	252	1
MS25-0.25	0.16 ... 0.25	0.06	30.107.956	252	1
MS25-0.4	0.25 ... 0.4	0.09	30.107.957	252	1
MS25-0.63	0.4 ... 0.63	0.12	30.107.958	252	1
MS25-1	0.63 ... 1	0.18 ... 0.25	30.107.959	252	1
MS25-1.6	1 ... 1.6	0.37 ... 0.55	30.107.960	252	1
MS25-2.5	1.6 ... 2.5	0.75 ... 1.1	30.107.961	252	1
MS25-4	2.5 ... 4	1.1 ... 1.5	30.107.962	252	1
MS25-6.3	4 ... 6.3	2.2 ... 2.5	30.107.963	252	1
MS25-10	6.3 ... 10	3 ... 4	30.107.964	252	1
MS25-16	10 ... 16	5 ... 7.5	30.107.965	252	1
MS25-20	16 ... 20	9	30.107.966	252	1
MS25-25	20 ... 25	11 ... 12.5	30.107.967	252	1

Motor protection circuit breakers MST25

with overload release — AC-3 acc. to IEC/EN 60947-4-1

Type	Setting range (A)	Motor power (3-phase, 400 V) (kW)	Ordering No.	Weight (g)	Packaging (pcs)
MST25-0.4	0.25 ... 0.4	0.09	30.108.240	252	1
MST25-0.63	0.4 ... 0.63	0.12	30.108.241	252	1
MST25-1	0.63 ... 1	0.18 ... 0.25	30.108.242	252	1
MST25-1.6	1 ... 1.6	0.37 ... 0.55	30.108.243	252	1
MST25-2.5	1.6 ... 2.5	0.75 ... 1.1	30.108.244	252	1
MST25-4	2.5 ... 4	1.1 ... 1.5	30.108.245	252	1
MST25-6.3	4 ... 6.3	2.2 ... 2.5	30.108.246	252	1
MST25-10	6.3 ... 10	3 ... 4	30.108.247	252	1
MST25-16	10 ... 16	5 ... 7.5	30.108.248	252	1
MST25-20	16 ... 20	9	30.108.249	252	1
MST25-25	20 ... 25	11 ... 12.5	30.108.250	252	1

TECHNICAL DATA

	Type	Symbol	Unit	MS25	MST25	MS20	MPE	MSZ25	MS25TR
GENERAL	Use			motor protection		single-phase consumer	single-phase AC motors with built-in thermal switch	short-circuit protection	transformer protection
	Standards			IEC/EN 60947-4-1, IEC/EN 60947-2, IEC/EN 60204, UL 60947, CSA 22.2 No. 14		IEC/EN 60947-2, IEC/EN 60947-4-1	IEC/EN 60947-2, IEC/EN 60947-4-1	IEC/EN 60947-2	IEC/EN 60947-2
	Approvals			CE, UL, EAC		CE, EAC	CE	CE	CE
	Climatic class			Constant damp heat acc. to IEC 60068-2-78 Cyclic damp heat acc. to IEC 60068-2-30					
	Degree of protection			IP20, after terminals covering IP40					
	Mounting			35 mm DIN rail (EN 60715)					
	Mounting position			any					
	Ambient temperature		°C	-25 ... +60					
	Storage temperature		°C	-25 ... +70					
	Temperature range of thermal compensation		°C	-5 ... +40					
	Maximum altitude (MSL) *		m	2000					
	Mechanical endurance		op. c.	100.000					
	Electrical endurance		op. c.	100.000 (AC-3), 20.000 (DC-5)			100.000 (AC-3)	100.000 (AC-3), 20.000 (DC-5)	
	Trip class acc. to IEC 60947-4-1			10A	10A	10A	10A	/	10A
	Utilization category acc. to IEC 60947-4-1			AC-3, DC-5	AC-3, DC-5	AC-3, DC-5	AC-3	AC-3, DC-5	AC-3, DC-5
	Utilization category acc. to IEC 60947-2			A					
	Max. switching frequency		op. c./h	25					
	Shock resistance acc. to IEC 68-2-27		g	20					
	Vibration resistance acc. to IEC 68-2-6		g	5 (at f= 5 ... 150 Hz)					
	Overvoltage category			III					
	Pollution degree			3					
	Rated insulation voltage	U_i	V	690	400	690	250	400	690
	Rated impulse withstand voltage	U_{imp}	kV	6					
	Weight		g	252					
MAIN CIRCUIT	Terminal capacity: rigid flexible flexible with end sleeve	S	mm^2	 1 ... 6 1 ... 4 0.75 ... 4					
	Conductor insulation stripping lenght		mm	10					
	Screw			M3					
	Screw type			PZ2, with self-lifting clamp protected from falling out					
	Tightening torque		Nm	1.8					
	Nominal current	I_n	A	0.16, 0.25, 0.4, 0.63, 1, 1.6 2.5, 4, 6.3, 10, 16, 20, 25	0.4, 0.63, 1, 1.6, 2.5, 4 6.3, 10, 16, 20, 25	0.16, 0.25, 0.4, 0.63, 1, 1.6 2.5, 4, 6.3, 10, 16, 20, 25	0.4 ... 10	0.16, 0.25	2.5, 4, 6.3, 10, 16, 20, 25
	Current setting	I_T	A	0.1-0.16, 0.16-0.25, 0.25-0.4, 0.4-0.63, 0.63-1 1-1.6, 1.6-2.5, 2.5-4 4-6.3, 6.3-10, 10-16 16-20, 20-25	0.25-0.4, 0.4-0.63, 0.63-1 1-1.6, 1.6-2.5, 2.5-4 4-6.3, 6.3-10, 10-16 16-20, 20-25	0.1-0.16, 0.16-0.25, 0.25-0.4, 0.4-0.63, 0.63-1 1-1.6, 1.6-2.5, 2.5-4 4-6.3, 6.3-10, 10-16 16-20, 20-25	fixed	fixed	2.5-4, 4-6.3, 6.3-10, 10-16, 16-20, 20-25
	Nominal current range	I_n	A	0.16 ... 25	0.4 ... 25	0.16 ... 20	0.4 ...10	0.16 ... 0.25	2.5 ... 25
	Nominal frequency	f	Hz	50/60					
	Max. operational voltage	U_e	V	690	400	690	250	400	690
	Themal current	I_{th}	A	25**	25**	20**	10	0.25	25
	Max. motor current AC-3		A	25	25	20	/	/	/
	Max. motor current DC-5 (max. 250 V DC, all poles in series)		A	25	25	20	0.25	0.25	25
	Number of all poles			3	3	1	1	3	3
	Number of protected poles			3	3	1	1	3	3
	Contact gap (per pole)		mm	9.5					
	Release type			thermal-magnetic	thermal	thermal-magnetic	thermal-magnetic	thermal	thermal-magnetic
	Operating current of thermal overload release			1.05 I_r < I ≤ 1.2 I_r	1.05 I_r < I ≤ 1.2 I_r	1.05 I_r < I ≤ 1.2 I_r	/	/	1.05 I_r < I ≤ 1.2 I_r
	Operating current of magnetic release (fixed)			12 I_n ± 20 %		12 I_n ± 20 %	12 I_n ± 20 %	12 I_n ± 20 %	17 I_n ± 20 %
	Sensitivity to phase failure			yes	yes	/	/	/	yes
	Power dissipation at I_n (all poles)		W	6 ... 7.5	6 ... 7.5	4 ... 5	2 ... 2.5	≈0.5	6 ... 7.5

NOTE:

* Above 2000 m voltages U_i and U_e are reduced by 2% for every 100 m and current I_e by 2% for every 500 m.

** Maximum number of MPCBs mounted close together: 3

TECHNICAL DATA

	Type	Symbol	Unit	MS25	MST25	MS20	MPE	MSZ25	MS25TR
SAFETY	MTTF - Mean time to failure MTTF = 1/λ = B10/(0.1 n_{op})		h	1666					
	MTTF$_d$ - Mean time to failure dangerous MTTF$_d$ = 1/λ$_d$ = B10$_d$/(0.1 n_{op})		h	5000					
	B10 - Number of operating cycles until 10 % of devices fail		op.	20.000					
	B10$_d$ - Number of operating cycles until 10 % of device dangerous B10$_d$ = B10/ratio of dangerous failures		op.	60.000					
	λ - Failure rate λ = (0,1 n_{op})/B10		1/h	6×10^{-6}					
	λ - Failure rate dangerous λ$_d$ = (0,1 n_{op})/B10$_d$		1/h	2×10^{-6}					
	Ratio of dangerous failures		%	33					
	n_{op} - Operating cycles (operating cycles/h)		op./h	120					

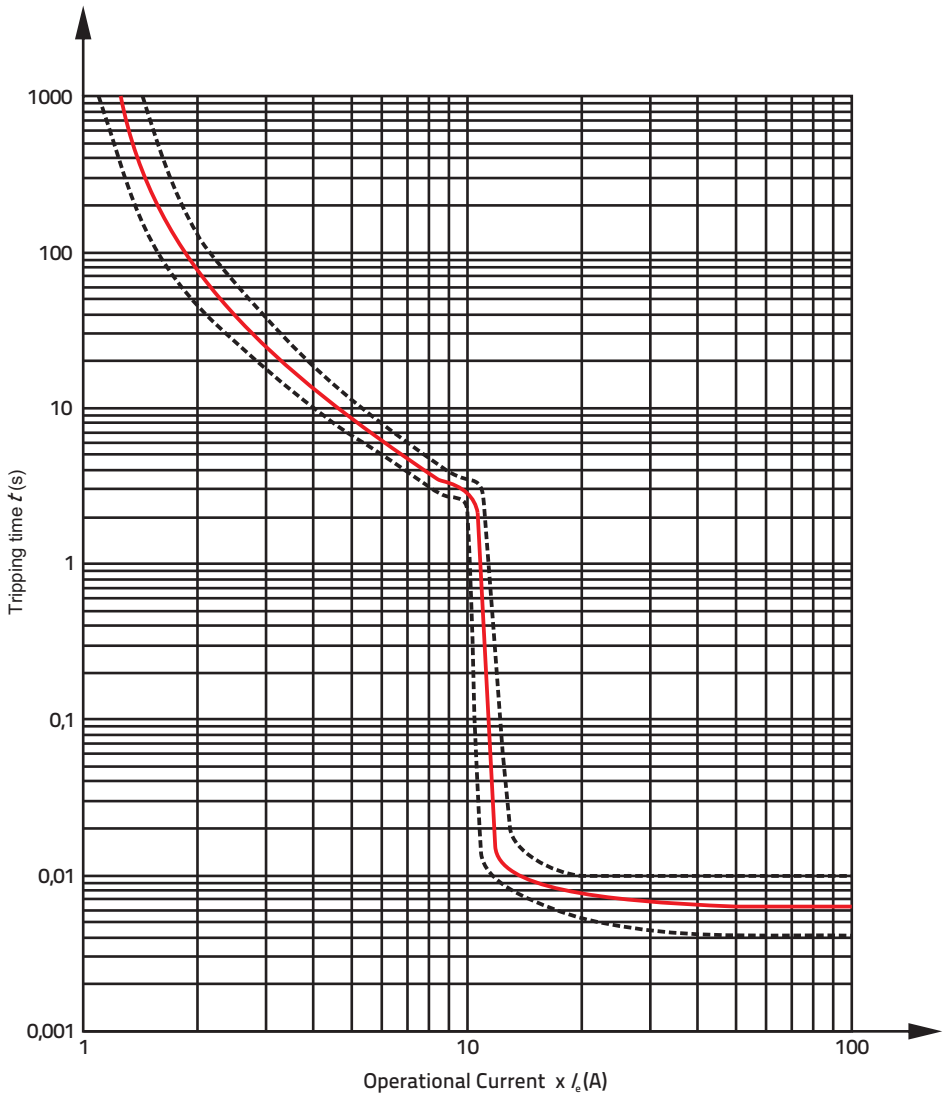
Switch selection for motor protection

Standard motor powers						Setting range
Single-phase	Three-phase					
220 V 230 V 240 V	220 V 230 V 240 V	380 V 400 V 415 V	440 V	550 V	660 V 690 V	
kW						A
		0.02			0.06	0.1 ... 0.16
		0.06	0.06	0.06	0.09	0.16 ... 0.25
	0.06	0.09	0.12	0.12	0.18	0.25 ... 0.4
	0.09	0.12	0.18	0.25	0.25	0.4 ... 0.63
0.06 ... 0.09	0.09 ... 0.12	0.18 ... 0.25	0.25	0.37	0.37 ... 0.55	0.63 ... 1
0.12	0.18 ... 0.25	0.37 ... 0.55	0.37 ... 0.55	0.55 ... 0.8	0.75 ... 1.1	1 ... 1.6
0.18 ... 0.25	0.37	0.75 ... 1.1	0.75 ... 1.1	1.1	1.5	1.6 ... 2.5
0.37	0.55 ... 0.75	1.1 ... 1.5	1.5	1.5 ... 2.2	2.2 ... 3	2.5 ... 4
0.55 ... 0.75	1.1 ... 1.5	2.2 ... 2.5	2.2 ... 3	3	4	4 ... 6.3
1.1 ... 1.5	1.5 ... 2.5	3 ... 4	4 ... 5	4 ... 5.5	5.5 ... 7.5	6.3 ... 10
2.2	3 ... 4	5 ... 7.5	5.5 ... 9	7.5 ... 9	11	10 ... 16
3	5.5	9	11	11 ... 12.5	15	16 ... 20
	5.5 ... 7.5	11 ... 12.5	12.5	15	18.5	20 ... 25

MS25 motor protection switches, rated ultimate and service short-circuit breaking capacity I_{cu} and max. back-up fuses if prospective short circuit current I_{cp} exceeds I_{cu}

Type	Operating current of short-circuit release (A)	Rated ultimate short-circuit breaking capacity I_{cu}, I_{cs} (kA)				Max. back-up fuse, if $I_{cp} > I_{cu}$ (gL) (kA)			
		230 V	400 V	500 V	690 V	230 V	400 V	500 V	690 V
		I_{cu}	I_{cu}	I_{cu}	I_{cu}				
MS25 - 0.16	2	50	50	50	50	No back-up fuse required			
MS25 - 0.25	3	50	50	50	50				
MS25 - 0.4	5	50	50	50	50				
MS25 - 0.63	8	50	50	50	50				
MS25 - 1	13	50	50	50	50				
MS25 - 1.6	22	50	50	50	50				
MS25 - 2.5	33	50	50	3	2.5			25	20
MS25 - 4	55	50	50	3	2.5			35	25
MS25 - 6.3	84	50	50	3	2.5			50	35
MS25 - 10	126	50	6	3	2.5		80	50	35
MS25 - 16	170	6	4	2.5	2	80	80	63	35
MS25 - 20	230	6	4	2.5	2	80	80	63	50
MS25 - 25	270	6	4	2.5	2	80	80	63	50

Tripping characteristics



Mounting positions of accessories