

MOTOR PROTECTION CIRCUIT BREAKERS - MS32



MOTOR PROTECTION CIRCUIT BREAKERS ARE SPECIAL TYPE OF CIRCUIT BREAKERS DESIGNED FOR PROTECTION OF WIDE RANGE OF SINGLE-PHASE AND THREE-PHASE AC MOTORS AGAINST OVERLOAD AND SHORT CIRCUIT. THEY ARE USED IN INDUSTRY, SMALL MACHINES, AGRICULTURAL MACHINES, COMPRESSORS ETC.



FOR MOTOR PROTECTION:

- All kind of AC induction motors
- For three-phase motors up to 22 kW

PROTECTION OF OTHER LOADS:

- Various low-inductive loads
- Version for transformer protection MS32TR

OTHER BENEFITS:

- Manual control:
 - START, STOP, push-buttons - with a trip indication (i.e. push-buttons stay in the middle position)
- Automatic switch-off at over-current with thermal or magnetic release
- Control with under-voltage release or shunt release
- An auxiliary switch for side mounting or flush mounting used for indication of the switching state
- Indication of release with trip indicating auxiliary switch
- ON/OFF buttons positions unequivocally indicates switching position of main contacts
- Contact material :
 - resistant to contact welding
 - enables low contact heating
- Isolating distance between contacts: 4.5 mm per contact place
- Connection of a rigid or flexible conductor
- Assembly to 35 mm wide mounting rail in compliance with EN 60715
- Vertical or horizontal operational position

ORDERING DATA

Motor protection circuit breakers MS32 up to 32 A page 2

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MOTOR PROTECTION CIRCUIT BREAKERS - MS32

Motor protection circuit-breakers areas of use

Type	Motor protection	Overload protection	Short-circuit protection	Single-phase consumers	Transformer protection
MS18	■	■	■	■	
MS32	■	■	■	■	
MS32TR		■	■		■

MOTOR PROTECTION CIRCUIT BREAKERS MS32

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)
MS32-0.16	0.1 ... 0.16		30.108.757	279	1
MS32-0.25	0.16 ... 0.25	0.06	30.108.758	279	1
MS32-0.4	0.25 ... 0.4	0.09	30.108.759	279	1
MS32-0.63	0.4 ... 0.63	0.12 ... 0.18	30.108.760	279	1
MS32-1	0.63 ... 1	0.18 ... 0.25	30.108.761	279	1
MS32-1.6	1 ... 1.6	0.37 ... 0.55	30.108.762	279	1
MS32-2.5	1.6 ... 2.5	0.75	30.108.763	279	1
MS32-4	2.5 ... 4	1.1 ... 1.5	30.108.764	279	1
MS32-6.3	4 ... 6.3	2.2	30.108.765	279	1
MS32-10	6.3 ... 10	3 ... 4	30.108.766	279	1
MS32-14	9 ... 14	5.5	30.108.767	279	1
MS32-18	13 ... 18	7.5	30.108.768	279	1
MS32-23	17 ... 23	9 ... 11	30.108.769	279	1
MS32-27	23 ... 27	11	30.108.770	279	1
MS32-32	25 ... 32	15	30.108.771	279	1



CIRCUIT BREAKERS FOR TRANSFORMER PROTECTION MS32TR

With overload and short-circuit release

AC-3 acc. to IEC/EN 60947-4-1

Type	Setting range (A)	Ordering No.	Weight (g)	Packaging (pcs)
MS32TR-2.5	1.6 ... 2.5	30.109.359	279	1
MS32TR-4	2.5 ... 4	30.109.360	279	1
MS32TR-6.3	4 ... 6.3	30.109.361	279	1
MS32TR-10	6.3 ... 10	30.109.362	279	1
MS32TR-14	9 ... 14	30.109.363	279	1
MS32TR-18	13 ... 18	30.109.364	279	1
MS32TR-23	17 ... 23	30.109.365	279	1
MS32TR-27	23 ... 27	30.109.366	279	1
MS32TR-32	25 ... 32	30.109.367	279	1



ORDERING DATA

MS32 - 4

Setting range (A)

Type

EXAMPLE:

The same switch with under-voltage release for control voltage 380 V with an auxiliary switch with two NO contacts, built in the enclosure, with an emergency stop push-button and green signal lamp for 230 V:

MS32 - 4 / UR 380 / HS 20 / HO41 / NAT / SSz 230

ORDERING DATA

MOTOR PROTECTION CIRCUIT BREAKERS - MS32

	Type	Symbol	Unit	MS32
				motor protection
GENERAL	Use			IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60204, UL 60947 CSA 22.2 No. 14
	Standards			CE, UL, CSA, EAC
	Approvals			Constant damp heat acc. to IEC 60068-2-78 Cyclic damp heat acc. to IEC 60068-2-30
	Climatic class			IP20, after terminals covering IP40
	Degree of protection			35 mm DIN rail (EN 60715)
	Mounting			any
	Mounting position			°C
	Ambient temperature			-25 ... +60
	Storage temperature			°C
	Temperature range of thermal compensation			-25 ... +70
	Maximum altitude (MSL) *			°C
	Mechanical endurance			-5 ... +40
	Electrical endurance			m
	Trip class acc. to IEC 60947-4-1			2000
	Utilization category acc. to IEC 60947-4-1			op. c.
	Utilization category acc. to IEC 60947-2			100.000
	Max. switching frequency			op. c.
	Shock resistance acc. to IEC 68-2-27			100.000 (AC-3), 20.000 (DC-5)
	Vibration resistance acc. to IEC 68-2-6			10
	Overvoltage category			AC-3
	Pollution degree			A
	Rated insulation voltage	U_i	V	25
	Rated impulse withstand voltage	U_{imp}	kV	20
	Weight		g	5 (at f= 5 ... 150 Hz)
MAIN CIRCUIT	Terminal capacity:			III
	rigid	S	mm ²	3
	flexible			1 ... 10
	flexible with end sleeve			1 ... 6
	Conductor insulation stripping length		mm	0.75 ... 6
	Screw			10
	Screw type			M3
	Tightening torque		Nm	PZ2, with self-lifting clamp protected from falling out
	Nominal current	I_n	A	2.0
	Current setting	I_T	A	0.16, 0.25, 0.4, 0.63, 1, 1.6, 2.5, 6.3, 10, 14, 18, 23, 27, 32
	Nominal current range	I_n	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, 2.4-4, 4-6.3, 6.3-10, 9-14, 13-18, 17-23, 20-27, 25-32
	Nominal frequency	f	Hz	0.16 ... 32
	Max. operational voltage	U_e	V	50/60
	Thermal current	I_{th}	A	690
	Max. motor current AC-3		A	32
	Number of all poles			32
	Number of protected poles			3
	Contact gap (per pole)		mm	3
	Release type			9.2
	Operating current of thermal overload release			thermal-magnetic
	Operating current of magnetic release (fixed)			$1.05 I_n < I \leq 1.2 I_n$
	Sensitivity to phase failure			$12 I_n \pm 20 \%$
	Power dissipation at I_n (all poles)		W	yes
SAFETY	MTTF - Mean time to failure		h	6 ... 7.5
	$MTTF = 1/\lambda = B10/(0.1 n_{op})$			
	MTTF _d - Mean time to failure dangerous		h	
	$MTTF_d = 1/\lambda_d = B10_d/(0.1 n_{op})$			
	B10 - Number of operating cycles until 10 % of devices fail		op.	1666
	B10 _d - Number of operating cycles until 10 % of device dangerous		op.	5000
	B10 _d = B10/ratio of dangerous failures			20.000
	λ - Failure rate		1/h	60.000
	$\lambda = (0.1 n_{op})/B10$			6×10^{-4}
	λ - Failure rate dangerous		1/h	2×10^{-4}
	$\lambda_d = (0.1 n_{op})/B10_d$			
	Ratio of dangerous failures		%	33
	n_{op} - Operating cycles (operating cycles/h)		op./h	120

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

MOTOR PROTECTION CIRCUIT BREAKERS - MS32

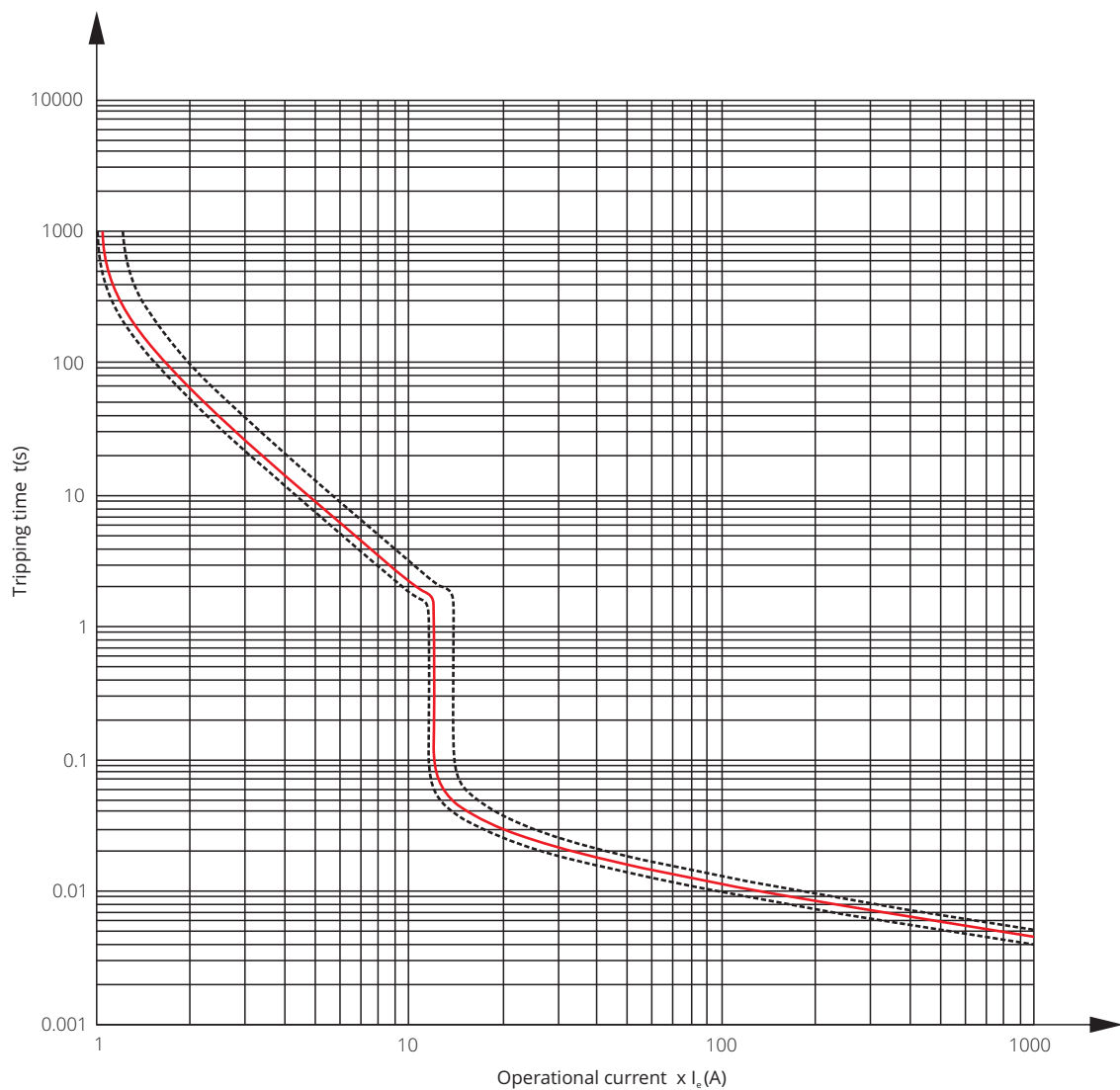
Switch selection for motor protection

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						
					0.06	0.1 ... 0.16
		0.06	0.06	0.06 ... 0.9	0.06 ... 0.12	0.16 ... 0.25
	0.06	0.09	0.12	0.09 ... 0.12	0.18	0.25 ... 0.4
	0.09	0.12 ... 0.18	0.18	0.18	0.25	0.4 ... 0.63
0.06 ... 0.09	0.09 ... 0.12	0.18 ... 0.25	0.25 ... 0.37	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 ... 0.75	0.75 ... 1.1	1 ... 1.6
0.18 ... 0.25	0.37	0.75	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	2.2 ... 3	2.2 ... 3	4	4 ... 6.3
1.1 ... 1.5	1.5 ... 2.2	3 ... 4	4	4 ... 5.5	5.5 ... 7.5	6.3 ... 10
2.2	2.2 ... 3	5.5	5.5 ... 7.5	5.5 ... 7.5	9 ... 11	9 ... 14
3	4	7.5	7.5 ... 9	9 ... 11	15	13 ... 18
	5.5	9 ... 11	11	11	15 ... 18.5	17 ... 23
	5.5 ... 7.5	11	11	15	18.5 ... 22	20 ... 27
	7.5	15	15	18.5	22	25 ... 32

MS32 motor protection switches, rated ultimate and service short-circuit breaking capacity I_{cu} and I_{cs} and max. back-up fuses if short circuit current I_{cp} exceeds I_{cu}

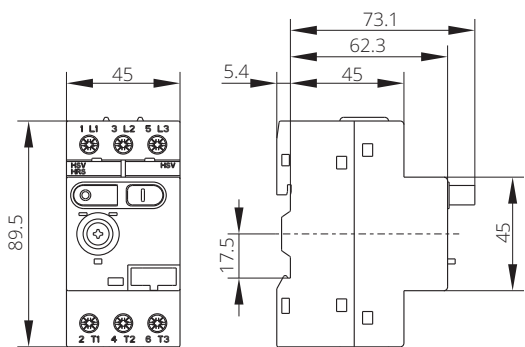
Type	Operating current of short-circuit release (A)	Rated ultimate short-circuit breaking capacity I_{cu} , I_{cs} (kA)								Max. back-up fuse, if $I_{cp} > I_{cu}$ (gL) (kA)			
		230 V		400 V		500 V		690 V		230 V	400 V	500 V	690 V
		I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}	I_{cu}	I_{cs}				
MS32 - 0.16	2	100	100	100	100	100	100	100	100	No back-up fuse required			
MS32 - 0.25	3	100	100	100	100	100	100	100	100				
MS32 - 0.4	5	100	100	100	100	100	100	100	100				
MS32 - 0.63	8	100	100	100	100	100	100	100	100				
MS32 - 1	13	100	100	100	100	100	100	100	100				
MS32 - 1.6	22	100	100	100	100	100	100	100	100				
MS32 - 2.5	33	100	100	100	100	100	100	5	5				
MS32 - 4	55	100	100	100	100	100	100	3	3				
MS32 - 6.3	75	100	100	100	100	6	4.5	3	2				
MS32 - 10	126	100	100	100	100	6	4.5	3	2				
MS32 - 14	170	25	12.5	25	12.5	6	4.5	3	2	80	63	50	50
MS32 - 18	230	25	12.5	25	12.5	6	4.5	3	2	80	63	50	50
MS32 - 23	270	25	12.5	25	12.5	4	3	3	2	80	63	50	50
MS32 - 27	360	25	12.5	25	12.5	4	3	3	2	80	63	50	50
MS32 - 32	400	25	12.5	25	12.5	4	3	3	2	80	63	50	50

Tripping characteristics

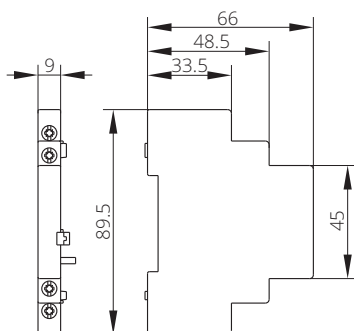


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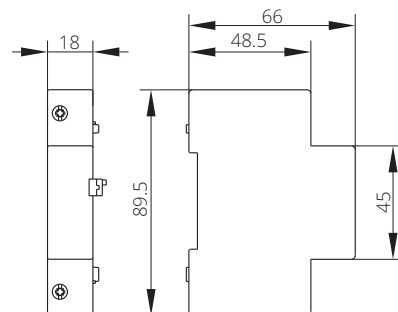
MS32



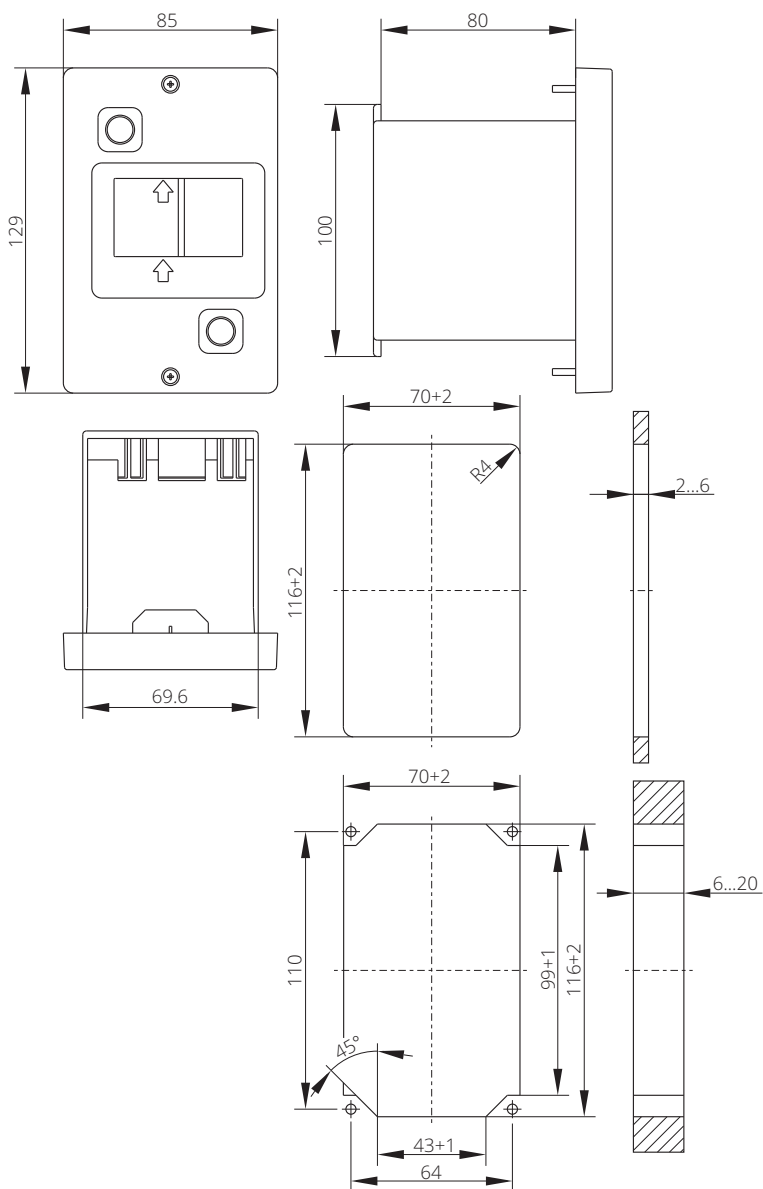
Auxiliary switch HS



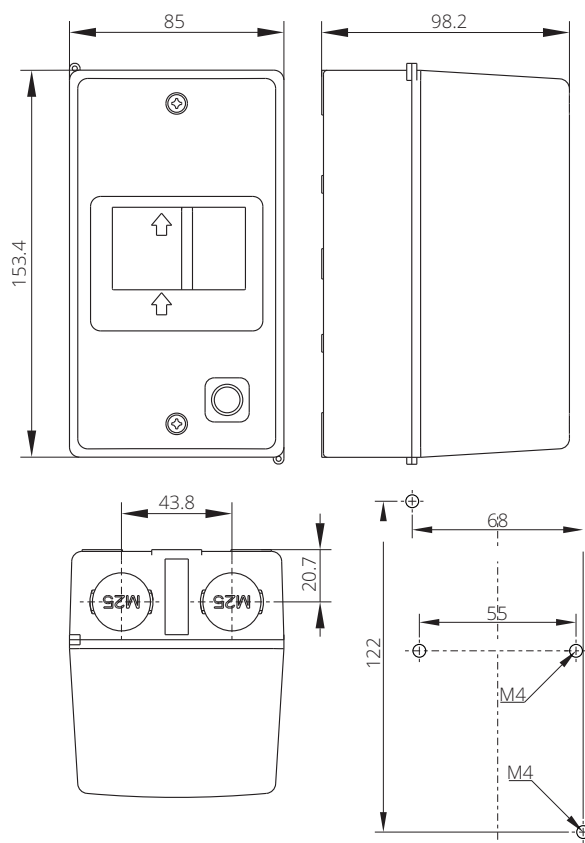
Under-voltage release UR
Shunt release AR



FP-41/55



HO-41/55



DIMENSIONS