

3RH, 3TH Contactor Relays

3TH2 Contactor Relays, 4- and 8-pole

Technical specifications

Contact relays Type **3TH2**

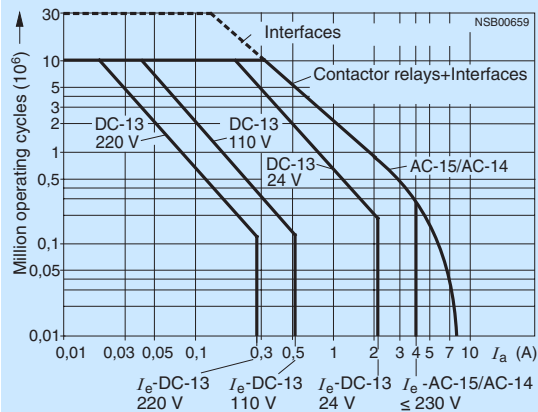
Contact endurance for AC-15/AC-14 and DC-13 utilization categories

The contact endurance is mainly dependent on the breaking current. It is assumed that the operating mechanisms are switched randomly, i.e. not synchronized with the phase angle of the supply system.

If magnetic circuits other than the contactor coil systems or solenoid valves are present, e.g. magnetic brakes, protective measures for the load circuits are necessary. RC elements and freewheel diodes would be suitable as protective measures. Legend for the diagrams:

I_e = Rated operational current

I_a = Breaking current



Type			Contactor relays		Auxiliary switch block
			3TH20 ..-....	3TH22 ..-....	3TX4 ...-..
General data					
Permissible mounting positions	AC and DC operation		Any		
Mechanical endurance	AC operation DC operation	Operating cycles	10 million 30 million		
Rated insulation voltage U_i (degree of pollution 3) • Screw terminal • Flat connector 6.3 mm x 0.8 mm • Solder pin connections			V V V	690 500 500	500 -- --
Rated impulse withstand voltage U_{imp} (degree of pollution 3) • Screw terminal • Flat connector 6.3 mm x 0.8 mm • Solder pin connections			kV kV kV	8 6 6	6 -- --
Safe isolation between coil and contacts (according to DIN VDE 0106 Part 101 and A1 [draft 2/89])			V	Up to 300	
Positively-driven operation of contacts in contactor relays					
3TH20: Yes, in the basic unit and the auxiliary switch block as well as between the basic unit and the snap-on auxiliary switch block (removable) according to: • ZH 1/457 • EN 60947-5-1, Appendix L			Explanations: There is positively-driven operation if it is ensured that the NC and NO contacts cannot be closed at the same time. ZH1/457 Safety rules for control units on power-operated presses in the metal-working industry. EN 60947-5-1, Appendix L Low-voltage controlgear, control equipment, and switching elements. Special requirements for positively-driven contacts SUVA Accident prevention regulations of the "Schweizer Unfallverhütungsanstalt" (Swiss Institute for Accident Insurance)		
3TH22: Yes, in the basic unit and the auxiliary switch block as well as between the basic unit and the snap-on auxiliary switch block (fixed) according to: • ZH 1/457 • EN 60947-5-1, Appendix L • SUVA					
Permissible ambient temperature ¹⁾	During operation	°C	-25 ... +55		
	During storage	°C	-55 ... +80		
Degree of protection according to EN 60947-1 Appendix C			IP00 open IP20 for screw terminal IP40 coil assembly		
Touch protection according to EN 50274			Finger-safe for screw terminal		
Shock resistance					
Rectangular pulse	AC operation	g/ms	7/5 and 4/10		
	DC operation	g/ms	10/5 and 6/10		
Sine pulse	AC operation	g/ms	9/5 and 6/10		
	DC operation	g/ms	13/5 and 8/10		
Conductor cross-sections			2)		

¹⁾ Applies to 50/60 Hz coil
Operating range at 60 Hz: 0.85 ... 1.1 x U_N ;
at 50 Hz, 1.1 x U_N , side-by-side mounting and 100 % ON period
the max. ambient temperature is +40 °C.

²⁾ See page 3/144.

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Contactor relays		Type	3TH2
Short-circuit protection			
Short-circuit protection			
Fuse links gL/gG LV HRC 3NA, DIAZED 5SB, NEOZED 5SE		A	6
Weld-free protection at $I_K \geq 1 \text{ kA}$			
Control			
Magnetic coil operating range ¹⁾			0.8 ... 1.1 x U_s
Power consumption of the magnetic coils (when coil is cold and 1.0 x U_s)			
AC operation, 50 Hz	Closing	VA	15
	• P.f.		0.41
	Closed	VA	6.8
AC operation, 60 Hz	• P.f.		0.42
	Closing	VA	14.4
	• P.f.		0.36
AC operation, 50/60 Hz ¹⁾	Closed	VA	6.1
	• P.f.		0.46
	Closing	VA	16.5/13.2
DC operation	• P.f.		0.43/0.38
	Closed	VA	8.0/5.4
	• P.f.		0.48/0.42
Permissible residual current of the electronics (with 0 signal)			
AC operation	mA		$\leq 3 \times (220 \text{ V}/U_s)$
DC operation	mA		$\leq 1 \times (220 \text{ V}/U_s)$
Operating times at 0.8 ... 1.1 x U_s ²⁾			
Total break time = Opening delay + Arcing time			
Values apply with coil in cold state and at operating temperature for operating range			
• AC operation	ON-delay	ms	5 ... 20
	OFF-delay	ms	4 ... 12
	ON-delay	ms	3 ... 24
	OFF-delay	ms	3 ... 20
• DC operation	ON-delay	ms	16 ... 140
	OFF-delay	ms	13 ... 40
	ON-delay	ms	3 ... 6
	OFF-delay	ms	4 ... 10
Arcing time		ms	10
Operating times at 1.0 x U_s ²⁾			
• AC operation	ON-delay	ms	6 ... 17
	OFF-delay	ms	5 ... 12
	ON-delay	ms	3 ... 24
	OFF-delay	ms	5 ... 20
• DC operation	ON-delay	ms	18 ... 42
	OFF-delay	ms	15 ... 26
	ON-delay	ms	3 ... 5
	OFF-delay	ms	4 ... 10
Main circuit			
AC capacity			
Utilization category AC-12		A	10
Rated operational current I_e (at 60 °C)			
Utilization category AC-15 and AC-14			
Rated operational current I_e			
for rated operational voltage U_e			
	230/220 V	A	4
	400/380 V	A	3
	500 V	A	2
	690/660 V	A	1

¹⁾ Applies to 50/60 Hz coil
Operating range at 60 Hz: 0.85 ... 1.1 x U_s ;
at 50 Hz, 1.1 x U_s , side-by-side mounting and 100 % ON period
the max. ambient temperature is +40 °C.

²⁾ The OFF-delay of the NO contact and the ON-delay of the NC contact are increased if the contactor coils are attenuated against voltage peaks (noise suppression diode 6 to 10 times;
diode assemblies 2 to 6 times, varistor +2 to 5 ms).

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Contactor relays	Type	3TH2
Main circuit		
Load rating with DC		
Utilization category DC-12 Rated operational current I_e for rated operational voltage U_e	A	10
• 1 conducting path ¹⁾	up to 24 V A	4
	60 V A	2
	110 V A	1.1
	240/220 V A	0.5
• 2 conducting paths in series	up to 24 V A	10
	60 V A	10
	110 V A	4
	240/220 V A	2
• 3 conducting paths in series	up to 24 V A	10
	60 V A	10
	110 V A	6
	240/220 V A	2.5
Utilization category DC-13 Rated operational current I_e for rated operational voltage U_e		
• 1 conducting path	up to 24 V A	2.1
	60 V A	0.9
	110 V A	0.52
	240/220 V A	0.27
• 2 conducting paths in series	up to 24 V A	10
	60 V A	3.5
	110 V A	1.3
	240/220 V A	0.9
• 3 conducting paths in series	up to 24 V A	10
	60 V A	4.7
	110 V A	3
	240/220 V A	1.2
Switching frequency		
Switching frequency z in operating cycles/hour Rated operation for utilization category		
Dependence of the switching frequency z' on the operational current I' and operational voltage U'	AC-12/DC-12	h ⁻¹
$z' = z \cdot (I_e/I') \cdot (400\text{ V}/U')^{1.5} \cdot 1/\text{h}$	AC-2	h ⁻¹
	AC-3	h ⁻¹
	AC-15/AC-14	h ⁻¹
	DC-13	h ⁻¹
No-load switching frequency		h ⁻¹
Conductor cross-sections		
Screw terminals	Main and auxiliary conductors	
	Solid	mm ²
	Finely stranded with end sleeve	mm ²
	• Terminal screw	M3
Flat connectors	Finely stranded	
When using a plug-in sleeve	• 6.3 ... 1	mm ²
	• 6.3 ... 2.5	mm ²
Solder pin connection		Only for printed circuit boards
Rated power of induction motors According to utilization category	110 V	kW
AC-2 and AC-3	230/220 V	kW
	400/380 V	kW
	500 V	kW
	690/660 V	kW

¹⁾ Contact endurance 0.1 x 10⁶ operating cycles.