



# 3TK28 Safety Relays

## With contactor relay enabling circuits

### Technical specifications

Type		3TK28 50	3TK28 51	3TK28 52	3TK28 53	3TK28 53-0AB1	3TK28 56	3TK28 57	
<b>General data</b>									
<b>Standards</b>		EN 60204-1, EN ISO 12100, EN 954-1, IEC 61508							
<b>Test certificates</b>		TÜV, UL, CSA							
<b>Safety-oriented output contacts</b>									
• Instantaneous $FK_{rel}$		3	2	6	3	6		3	
• Time-delayed $FK_{rel(tv)}$		--	--	--	--	--		--	
<b>Safety-oriented semiconductor outputs</b>									
• Instantaneous $FK_{el}$		--			1				
• Time-delay $FK_{el(tv)}$		--			--				
<b>Signaling contacts <math>MK_{rel}</math></b>		--	1		--	1		--	
<b>Semiconductor signaling outputs <math>MK_{rel}</math></b>		--							
<b>Sensor inputs S</b>		1					--		
<b>Cascading inputs KAS/BS</b>		--				2			
<b>Degree of protection</b> acc. to EN 60529									
• Enclosure		IP20							
• Terminals		IP20							
<b>Shock resistance</b> sine wave	g/ms	5/11					8/10 and 15/5		
<b>Permissible mounting positions</b>		Any							
<b>Touch protection</b>		Finger-safe							
acc. to EN 61140 or EN 60900									
<b>Height</b>	mm	89							
<b>Width</b>	mm	90							
<b>Depth</b>	mm	112		150	112		150	112	
<b>Weight</b>	kg	0.850			0.750				
<b>Connection type</b>		 <b>Screw terminals</b>							
• Terminal screw		M 3 (standard screwdriver, size 2 and Pozidriv 2)							
• Solid	mm <sup>2</sup>	1 x (0.2 ... 2.5)/2 x (0.2 ... 1.0)							
• Finely stranded with end sleeve	mm <sup>2</sup>	1 x (0.25 ... 2.5)/2 x (0.25 ... 1.0)							
• AWG cables, solid or stranded	AWG	2 x (24 ... 12)							
• Tightening torque	Nm	0.8 ... 1.2							
<b>Connection type</b>		 <b>Spring-type terminals</b>							
• Solid	mm <sup>2</sup>	2 x (0.2 ... 2.5)							
• Finely stranded, with end sleeves	mm <sup>2</sup>	2 x (0.25 ... 2.5)							
acc. to DIN 46228									
• Finely stranded	mm <sup>2</sup>	2 x (0.25 ... 2.5)							
• Stripped length	mm	10							
<b>Electrical specifications</b>									
<b>Rated control supply voltage <math>U_s</math></b>	V	24 DC, 24/115/230 AC				24 DC			
<b>Measurement voltage</b>	V	--							
<b>Response value <math>U_{resp}</math></b>	V	--							
<b>Operating range</b>									
• AC operation	V	0.9 ... 1.15 x $U_s$			--				
• DC operation	V	0.85 ... 1.1 x $U_s$			0.85 ... 1.1 x $U_s$				
<b>Rated insulation voltage <math>U_i</math></b>									
• For control circuit	V	50							
• For outputs	V	690							
<b>Rated impulse withstand voltage <math>U_{imp}</math></b>									
• For control circuit	V	500							
• For outputs	V	6000							
<b>Rated power at <math>U_s</math></b>	W	8.5							
<b>Frequency ranges</b>	Hz	50/60				--			
<b>Rated operational current <math>I_e</math> (relay outputs) at</b>									
• AC-15 at 115 V	A	--		--	--		--		
• AC-15 at 230 V	A	6		6	--		--		
• DC-13 at 24 V	A	10		10,	10		10,		
				Auxiliary			Auxiliary		
				switch			switch		
				blocks: 6			blocks: 6		
• DC-13 at 115 V	A	--		--	--		--		
• DC-13 at 230 V	A	--		--	--		--		
<b>Rated operational current <math>I_e</math> (semiconductor outputs) at</b>									
• DC-15 at 24 V	A	--							
• DC-15 at 230 V	A	--							

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<b>Electrical specifications (continued)</b>								
<b>Electrical endurance</b>	Operating cycles	See "3RH1 Characteristic Curves"						
<b>Mechanical endurance</b>	Operating cycles	3 x 10 <sup>7</sup>						
<b>Switching frequency z</b>		10 <sup>3</sup>						
<b>Conventional thermal current I<sub>th</sub></b>	A	--						
<b>Conventional thermal current I<sub>th</sub></b>								
• 1 contact	A	--						
• 2 contacts	A	--						
• 3 contacts	A	--						
• 4 contacts	A	--						
<b>Fusing for output contacts</b>								
Fuse links LV HRC Type 3NA, DIAZED Type 5SB, NEOZED Type 5SE								
• gL/gG	A	10						
• Quick	A	--						
<b>Maximum line resistance</b>	Ω	250			500			
<b>Cable length from terminal to terminal</b>	m	2000						
With Cu 1.5 mm <sup>2</sup> and 150 nF/km								
<b>Times</b>								
<b>Bridging of voltage dips, supply voltage</b>	ms	5						
(only internal, no outputs)								
<b>Make-time t<sub>E</sub></b>								
• For automatic start typ.	ms	100			60		--	
• For automatic start max.	ms	200			100		--	
• For automatic start after mains failure typ.	ms	350			6000		6000	
• For automatic start after mains failure max.	ms	500			7000		7000	
• For monitored start typ.	ms	60			60		--	
• For monitored start max.	ms	100			100		--	
<b>Release time t<sub>R</sub></b>								
• For sensor typ.	ms	30			50		--	
• For sensor max.	ms	50			60		300 adjustable	
• For mains failure typ.	ms	100			120		120	
• For mains failure max.	ms	120			120		120	
<b>Recovery time t<sub>W</sub></b>								
• After sensor	ms	20			500			
• After mains failure	s	0.02			7			
<b>Minimum command duration t<sub>B</sub></b>								
• Sensor input	ms	20			45		--	
• ON button	s	20			0.2 ... 5		--	
• Cascading input	ms	20			45		45	
<b>Simultaneity t<sub>G</sub></b>	ms	∞						
<b>Temperatures</b>								
<b>Permissible ambient temperature</b>								
• During operation	°C	-25 ... +60						
• During storage	°C	-40 ... +80						
<b>Safety specifications</b>								
<b>Safety integrity level SIL CL</b>		2			--			
acc. to IEC 61508								
<b>Performance level PL</b>		--						
acc. to ISO 13849-1								
<b>Safety category CAT</b>		3			4		As basic unit	
acc. to EN 954-1								
<b>Type</b>		--						
acc. to EN 574								
<b>Probability of a dangerous failure</b>	1/h							
• Per hour (PFH <sub>D</sub> )	1/h	1.52 x 10 <sup>-8</sup>			5 x 10 <sup>-11</sup>		9.8 x 10 <sup>-11</sup>	
• On demand (PFD)	--	--						
<b>Proof-test interval T1</b>	a	10						
<b>Environmental data</b>								
<b>EMC</b>		IEC 60947-5-1, IEC 60000-4-3, IEC 60000-4-5, IEC 60000-4-6						
<b>Vibrations</b>								
acc. to EN 60068-2-6								
• Frequency	Hz	5 ... 500						
• Amplitude	mm	0.075						
<b>Climatic withstand capability</b>		EN 60068-2-78						
<b>Clearances in air and creepage distances</b>		EN 60947-1						