DIL ER, DIL R Industrial Control Relays
Technical Data

				DIL ER(-C) ... DIL E(-C)	DIL R(-C) ... DIL(-C)
General					
Standards				UL, CSA, IEC/EN 60 947, VDE 0660, CE	
Mechanical lifespan					
AC operated	Operations		$\times 10^6$	10	20
DC operated	Operations		$\times 10^6$	20	20
Max. switching frequency, mechanical			Ops./h	9000	7000
Climatic proofing				Damp heat, constant to IEC 60 068-2-3 Damp heat, cyclical to IEC 60 068-2-30	
Ambient temperature					
open	min./max.		°C	–25/+50	–25/+50
enclosed	min./max.		°C	–25/+40	–25/+40
Mounting position				as required, except vertical with A1/A2 at bottom	as required, except hanging upside down
Mechanical shock resistance					
Sinusoidal impulse 10 ms					
Basic device	N.O./N.C. contact		g	10/8	–
Basic device with auxiliary contact module	N.O./N.C. contact		g	10/8	–
Sinusoidal impulse 20 ms					
Basic device	N.O./N.C. contact		g	–	10/6
Basic device with auxiliary contact module	N.O./N.C. contact		g	–	10/6
Degree of protection				IP 20	IP 20 (DIL R) IP 00 (... DIL)
Finger-safe, back of hand safe to VDE 0106, part 100				yes	
Dimensions				→ page 02/059	→ page 02/060
Weight					
AC operated			kg	0.17	→ page 14/020
DC operated			kg	0.2	→ page 14/020
Terminal capacity					
solid			mm^2	1 × (0.75 – 2.5)	1 × (0.75 – 4)
			mm^2	2 × (0.75 – 2.5)	2 × (0.75 – 4)
flexible with ferrule to DIN 46 228			mm^2	1 × (0.75 – 1.5)	1 × (0.75 – 2.5)
			mm^2	2 × (0.75 – 1.5)	2 × (0.75 – 2.5)
solid or stranded		min.	AWG	18	18
		max.	AWG	14	12
Terminal screw				M3.5	M3.5
Pozidriv screwdriver	size			2	2
Standard screwdriver			mm	0.8 × 5.5	0.8 × 5.5
			mm	1 × 6	1 × 6
Tightening torque		max.	Nm	1.2	1.2
Cage clamp terminals					
solid			mm^2	1 × (1.0 – 2.5)	1 × (1.0 – 2.5)
			mm^2	2 × (1.0 – 2.5)	2 × (1.0 – 2.5)
flexible with ferrule to DIN 46 228			mm^2	1 × (1.0 – 2.5)	1 × (1.0 – 2.5)
			mm^2	2 × (1.0 – 2.5)	2 × (1.0 – 2.5)
Standard screwdriver			mm	0.6 × 3.5	0.6 × 3.5

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				DIL ER(-C) ... DIL E(-C)	DIL R(-C) ... DIL(-C)
Contacts, IEC Data (EN 60 947)					
Positively driven contacts to ZH 1/457, including auxiliary contact module				yes	yes
Rated impulse withstand voltage U_{imp}			V	6000	6000
Overvoltage category / pollution degree				III/3	III/3
Rated insulation voltage U_i			V AC	690	690
Rated operational voltage U_e			V AC	600	500
Safe isolation to IEC 536 between coil and auxiliary contacts, and between the auxiliary contacts			V AC	300	440
Rated operational current I_e					
AC-15	220/240 V		A	6 (4)[1]	6
	380/415 V		A	3 (2)[1]	4
	500 V		A	1.5	1.5
DC-13[2]					
Above 110V and at L/R > 15ms: it is essential that an arc-quenching device (RC suppressor) be used in parallel with the contacts. C: 1µF, R: 0.5 Ω in series					
L/R ≤15 ms: e.g. contactor coils, solenoid valves, DC motors					
Contacts in series					
1	24 V		A	2.5	10
2 (1)	60 V		A	2.5	10 (6)
3 (1)	110 V		A	1.5	6 (3)
3 (1)	220 V		A	0.5	5 (1)
L/R ≤ 50 ms: e.g. magnetic clutches, solenoid brakes					
Contacts in series					
2	24 V		A	–	6
2	60 V		A	–	6
3 (1)	110 V		A	–	3 (1.5)
3 (1)	220 V		A	–	2 (1)
Control circuit reliability U_e = 24 V					
U_{min} = 17 V, I_{min} = 5.4 mA	Fault probability		H_F	< 10^{-8}, < 1 fault in 100 million operations	
Conv. thermal current I_{th}			A	10	16
Component lifespan U_e 240 V					
AC-15				→ page 02/029	→ page 02/028
DC-13					
L/R 50 ms: 2 contacts in series at I_e 0.5 A	operations		× 10^6	0.15	→ page 02/028
Short-circuit rating when taken directly from mains or transformer > 1000 VA; without welding					
Max. overcurrent protective device (fuseless)	220/240 V		PKZM 0	4	4
	380/415 V		PKZM 0	4	2.4
	220/230 V		FAZ-C	–	4
Maximum fuse	500 V		A gL/gG	6	16
	500 V		A fast	10	–
Current heat loss at I_{th}					
per contact	AC operated		W	0.2	0.8
	DC operated		W	0.3	0.8
Contacts, UL/CSA data					
Pilot duty				A 600, P 300	A 600, P 300

Notes

[1] Auxiliary contact module
[2] Make and break conditions to DC-13, time constant as stated

DIL ER, DIL R Industrial Control Relays
Technical Data

				DIL ER(-C) ... DIL E(-C)	DIL R(-C) ... DIL(-C)
Magnet systems					
Voltage tolerance (U_C = rated control voltage)					
AC operated					
Single voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz					
	Pick-up		× U_c	0.8 - 1.1	0.8 - 1.1
Dual-frequency coil ... V, 50/60 Hz	Pick-up		× U_c	0.85 - 1.1	0.85 - 1.1
DC operated [1]	Pick-up		× U_c	0.85 - 1.3	0.85 - 1.1
without auxiliary contact module	Pick-up		× U_c	0.7 - 1.3	–
Power consumption					
AC operated					
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz					
	Pull-in		VA/W	25/22	67/52
	Sealing		VA/W	4.6/1.3	8.5/2.5
Dual-frequency coil					
... V, 50/60 Hz at 50 Hz	Pull-in		VA/W	30/26	–
	Sealing		VA/W	5.4/1.6	–
... V, 50/60 Hz at 60 Hz	Pull-in		VA/W	29/24	–
	Sealing		VA/W	3.9/1.1	–
DC operated	Pull-in = sealing		W	2.6	9.5
Duty factor			% DF	100	100
Switching times at 100 % U (approximate values)					
AC operated	closing time		ms	14 – 21	22
N.O. contact	opening time		ms	8 – 18	14
with auxiliary contact module	max. closing time		ms	45	–
DC operated	closing time		ms	26 – 35	38
N.O. contact	opening time		ms	15 – 25	9
with auxiliary contact module	max. closing time		ms	70	–

Notes [1] Smoothed DC or three-phase bridge rectifier required

TP Timer Modules, V Latching Modules, VS Interface Modules
Technical Data

				TPE11DIL TPD11DIL	VDIL	VS1DIL VS2DIL	ETS4-VS3
General							
Standards				UL, CSA, IEC/EN 60 947, VDE 0660, CE			
Mechanical lifespan							
AC operated	operations		× 10^6	1	5	–	–
DC operated	operations		× 10^6	1	1	10	30
Max. operating frequency, mechanical							
AC operated			Ops./h	3600	1500	–	–
DC operated			Ops./h	3600	1500	9000	72000
Climatic proofing				Damp heat, constant, to IEC 60 068-2-3 Damp heat, cyclical, to IEC 60 068-2-30			
Ambient temperature							
open	min./max.		°C	–25/+50	–25/+50	–25/+50	–25/+60
enclosed	min./max.		°C	–25/+40	–25/+40	–25/+40	–25/+45
Mounting position				as required, except hanging upside down [1]	as required	as required	as required
Mechanical shock resistance (sinusoidal shock 20ms)							
	N.O./N.C. contact		g	10/6	–	10/–	10/–
	mechanical latching		g	–	20	–	–
Degree of protection				IP 00	IP 00	IP 00	IP 20
Finger safe, back of hand safe to VDE 0106, part 100				yes			
Dimensions				→ page 02/060	→ page 02/059	→ page 02/059	→ page 02/060
Weight			kg	0.08	0.1	0.04 (VS1) 0.05 (VS2)	0.09
Terminal capacity							
solid			mm^2	1 × (0.5 – 2.5)	1 × (0.5 – 2.5)	1 × (0.75 – 4)	1 × (0.75 – 2.5)
			mm^2	2 × (0.5 – 2.5)	2 × (0.5 – 2.5)	2 × (0.75 – 4)	2 x (0.75 – 1.5)[2]
flexible with ferrule to DIN 46 228			mm^2	1 × (0.5 – 1.5)	1 × (0.5 – 1.5)	1 × (0.75 – 2.5)	1 × (0.75 – 2.5)
			mm^2	2 × (0.5 – 0.75)	2 × (0.5 – 0.75)	2 × (0.75 – 2.5)	2 × (0.75 – 1.5)[2]
solid or stranded	min.		AWG	18	18	18	18
	max.		AWG	14	14	12	14
Terminal screw				M3	M3	M3.5	M3,5
Pozidriv screwdriver			size	2	2	2	2
Standard screwdriver			mm	0.8 × 5.5	0.8 × 5.5	0.8 × 5.5	0.8 × 5.5
			mm	1 × 6	1 × 6	1 × 6	1 × 6
Tightening torque	max.		Nm	1.2	1.2	1.2	1.2

Notes

[1] DIL R ... -G + TPD11 DIL, do not mount vertically
[2] Use equal cross-sections

TP Timer Modules, V Latching Modules, VS Interface Modules
Technical Data

				TPE11DIL TPD11DIL	VDIL	VS1DIL VS2DIL	ETS4-VS3
Contacts, IEC Data (EN 60 947)							
Positively driven contacts to ZH 1/457, including auxiliary contact module				yes	–	–	–
Rated impulse withstand voltage U_{imp}			V	6000	8000	4000	6000
Overvoltage category / pollution degree				III/3	III/3	III/2	III/3
Rated insulation voltage U_i			V AC	690	690	440	440
Rated operational voltage U_e			V AC	500	415	415	440
Rated operational current I_e							
AC-15	220/240 V		A	4	–	1.5	2
	380/415 V		A	4	–	1	2
DC-13 [1]							
Above 110V and at L/R >15 ms: it is essential that an arc-quenching device (RC suppressor) be used in parallel with the contacts. C: 1 µF, R: 0,5 Ω in series							
L/R ≤ 15 ms: e.g. contactor coils, solenoid valves, DC motors							
Contacts in series							
1	24 V		A	10	–	1	2.6
1	60 V		A	6	–	1	1.0
1	110 V		A	3	–	1	0.6
1	220 V		A	1	–	1	0.2
L/R ≤ 50 ms: e.g. magnetic clutches, solenoid brakes							
Contact in series							
1	24 V		A	4	–	0.5	2.0
1	60 V		A	4	–	0,5	0,6
1	110 V		A	1	–	0.5	0.08
1	220 V		A	0.5		0.5	0.08
L/R ≤ 300 ms							
1	24 V		A	–	–	0.2	0.6
1	60 V		A	–	–	0.2	0.2
1	110 V		A	–	–	0.2	0.08
1	220 V		A	–	–	0.2	0.03
Control circuit reliability U_e = 24 V, U_{min} = 17 V, I_{min} = 5,4 mA		Fault probability	H_F	< 10^{-8}, < 1 fault in 100 million operations			
Conv. thermal current I_{th}			A	10	–	8	6
Component lifespan at I_e 0.1 A/1.2 A							
AC-15	230 V	operations	× 10^6	–	–	8/–	7/1
DC-13	230 V	operations	× 10^6	–	–	0.85/–	–
Short-circuit rating when taken directly from mains or transformer > 1000VA; without welding							
Max. overcurrent protective device, (fuseless)	220/240 V		PKZM 0	2.5	–	–	–
	380/415 V		PKZM 0	1.6	–	–	–
Maximum fuse	500 V		A gL/gG	6	–	–	–
			A fast	–	–	4	4
Current heat loss at I_{th}							
per contact		max.	W	0.3	–	–	–
Contacts, UL/CSA Data							
Pilot duty				A 300	–	B 300 / R 300	B 300

Notes [1] Making and breaking conditions to DC-13, L/R, time constant as stated

TP Timer Modules, V Latching Modules, VS Interface Modules
Technical Data

			TPE11DIL TPD11DIL	VDIL	VS1DIL VS2DIL	ETS4-VS3
Magnet systems						
Voltage tolerance						
AC operated						
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	unlatching	× U_c	–	–	0,8 – 1.1	–
Dual-voltage coil ... V, 50/60 Hz	unlatching	× U_c	–	–	0.8 – 1.1	–
DC operated [1]	pick-up	× U_c	–	–	0.75 – 1.25	0.85 – 1.2
	unlatching	× U_c	–	0.85 – 1.1	–	–
Power consumption						
AC operated						
Single-voltage coil 50 Hz and dual-voltage coil 50 Hz, 60 Hz	pull-in	VA/W	–	13/12	–	–
	sealing	VA/W	–	5/2	–	–
DC operated	pull-in = sealing	W	–	26	0.27	0.6
Duty factor		% DF	100	100 at AC 200 ms at DC	100	100
Switching times 100 % U (approximate values)						
DC operated	closing delay	ms	–	–	6	7
	opening delay	ms	–	–	2.5	3
Minimum command time						
AC operated 50 Hz	latching	ms	–	35	–	–
	unlatching	ms	–	25	–	–
DC operated	latching	ms	–	45	–	–
	unlatching	ms	–	25	–	–
Repetition accuracy		%	< 3	–	–	–
Time deviation in relation to ambient temperature based on 20 °C		%/K	0.2	–	–	–
Long-time deviation		%	15	–	–	–
Recovery time (after 100% time delay)		ms	20	–	–	–
Mechanical lifespan	coil 50/60 Hz		at 50Hz, approximately 30% less than shown under "General Technical Data"			

Notes [1] smoothed DC or three-phase bridge rectifier