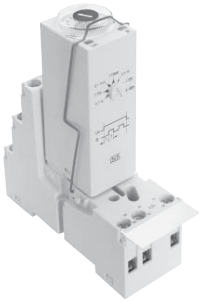


• Single-function, single-voltage time relays offered in the following versions: **T-R4E** - relay with time function E, **T-R4Wu** - relay with time function Wu, **T-R4Bp** - relay with time function Bp, **T-R4Bi** - relay with time function Bi • Cadmium - free contacts • AC and DC input voltages • For plug-in sockets, 35 mm DIN rail mount, EN 50022 or on panel mounting • Applications: as time systems in electric circuits of machines, technological lines, in automation systems, etc.
• Recognitions, certifications, directives: recognitions R4, CE

Type of relay		**T-R4**
Output circuits - contact data		
Number and type of contacts		4 C/O - changeover
Contact material		**AgNi**
Max. switching voltage	AC/DC	250 V / 250 V
Min. switching voltage		5 V
Rated load	AC1	6 A / 230 V AC
Min. switching current		5 mA
Max. inrush current		12 A
Rated current		6 A
Max. breaking capacity	AC1	1 500 VA
Min. breaking capacity		0,3 W
Contact resistance		≤ 100 mΩ
Max. operating frequency		
• at rated load	AC1	1 200 cycles/hour
• no load		18 000 cycles/hour
Input control circuit		
Rated voltage	50/60 Hz AC	**24**-115-**230** V
	DC	**12**-**24** V
Must release voltage		AC: ≥ 0,2 U_n DC: ≥ 0,1 U_n
Operating range of supply voltage		0,8 < U_n < 1,1 see Tables 1, 2
Rated power consumption	AC	2,2 VA
	DC	1,2 W
Range of supply frequency		48...63 Hz
Insulation		
Insulation category		B250
Insulation rated voltage		250 V AC
Overvoltage category		III PN-EN 60664-1
Dielectric strength		
• input - outputs		2 500 V AC
• contact clearance		1 500 V AC
• pole - pole		2 000 V AC
Input - outputs distance		
• clearance		≥ 1,6 mm
• creepage		≥ 3,2 mm
General data		
Operating time (typical value)		10 ms
Release time (typical value)		8 ms
Electrical life		
• resistive AC1		≥ 10^5 6 A, 250 V AC
• cosϕ		see Fig. 2
Mechanical life (cycles)		≥ 2 x 10^7
Dimensions (L x W x H)		21,2 x 29,5 x 62,5 mm
Weight		49 g
Ambient temperature		
• storage		-20...+85 °C
• operating		-20...+55 °C
Cover protection category		IP 20 (with socket)
Environmental protection		T-R4: RTI GZM4: RT0 PN-EN 116000-3
Shock resistance	(NO/NC)	10 g / 5 g
Vibration resistance		5 g 10...150 Hz

The data in bold type pertain to the standard versions of the relays.

Time module data

Functions ❶	E, Wu, Bp, Bi
Time intervals	0,1 s ❷; 10 s; 1 min.; 10 min.; 1 h; 10 h; 100 h
Timing adjustment	range - with the range-adjusting knob / switch within the range - with the time-adjusting knob / potentiometer
Setting accuracy	± 5% (calculate from final range value) ❷
Repeatability	± 1% ❷
Temperature influence	± 0,01% / °C
Recovery time	100 ms
LED indicator	green LED - indication of supply voltage U yellow LED - indication of time period T and the status of outputs after the time T has been measured ❸

❶ Descriptions of time functions - see pages 20-21. ❷ For first range setpoint (1 s) setting accuracy and repeatability are smaller than the given ones in technical parameters (significant influence of the operational relay operating time). Recommend to set measuring time by experimental method. ❸ The yellow LED - T time measurement (flashing); excited operational relay, time not measured (steady light); de-excited operational relay, time not measured (no light).

Input data - DC voltage version — Table 1

Input voltage code	Rated input voltage U_n V DC	Input resistance ± 10% at 20°C Ω	Input - voltage range V DC	
			min. (at 20°C)	max. (at 55°C)
1012	**12**	**160**	**9,6**	**13,2**
1024	**24**	**640**	**19,2**	**26,4**

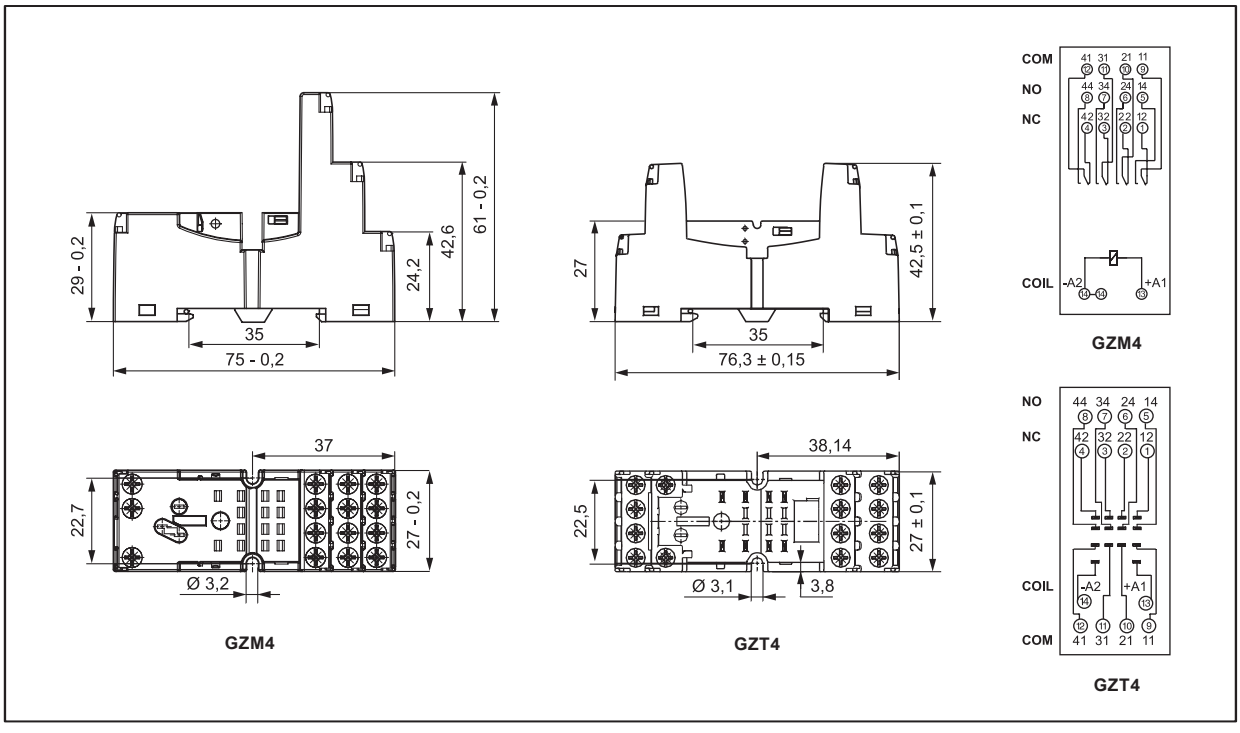
The data in bold type pertain to the standard versions of the relays.

Input data - AC 50/60 Hz voltage version — Table 2

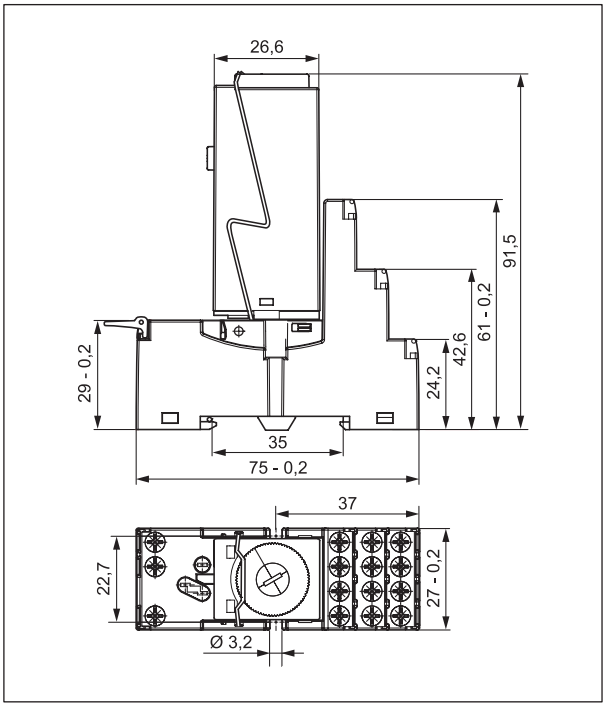
Input voltage code	Rated input voltage U_n V AC	Input resistance ± 10% at 20°C Ω	Input - voltage range V AC	
			min. (at 20°C)	max. (at 55°C)
5024	**24**	**158**	**19,2**	**26,4**
5115	115	3 610	92,0	127,0
5230	**230**	**16 100**	**184,0**	**253,0**

The data in bold type pertain to the standard versions of the relays.

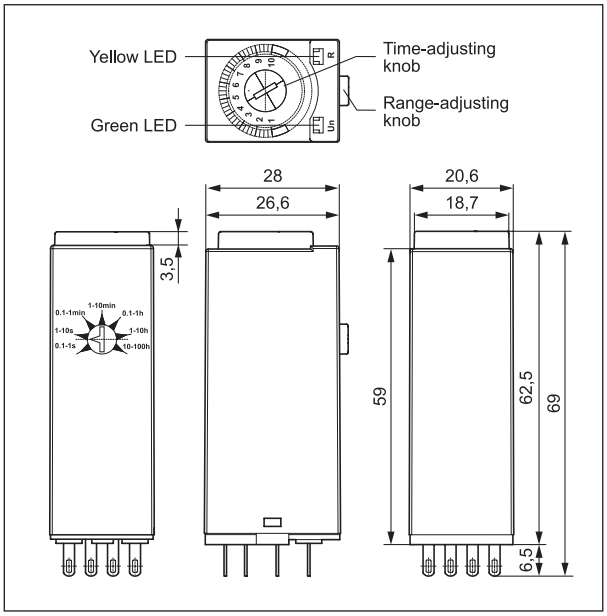
Dimensions, connections diagrams - sockets with screw terminals for **T-R4** relays



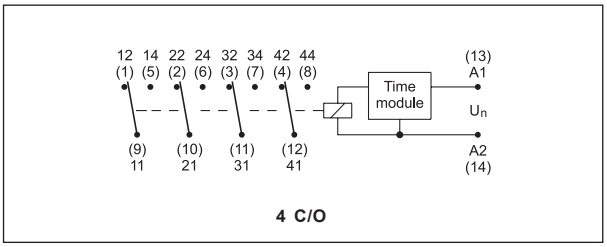
Dimensions - T-R4 relays with GZM4 sockets



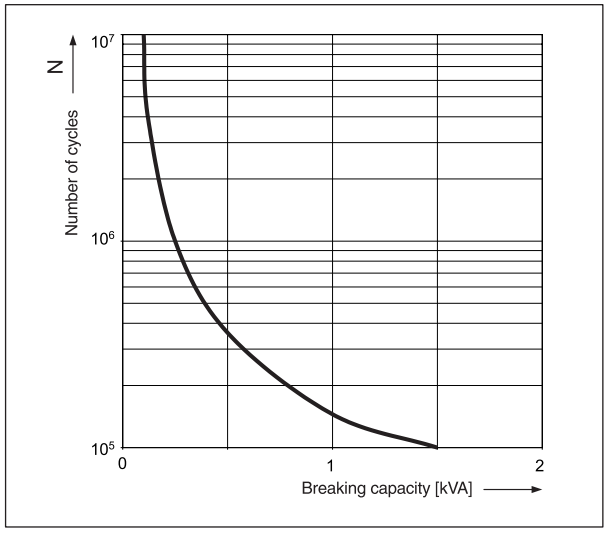
Dimensions - T-R4 relays



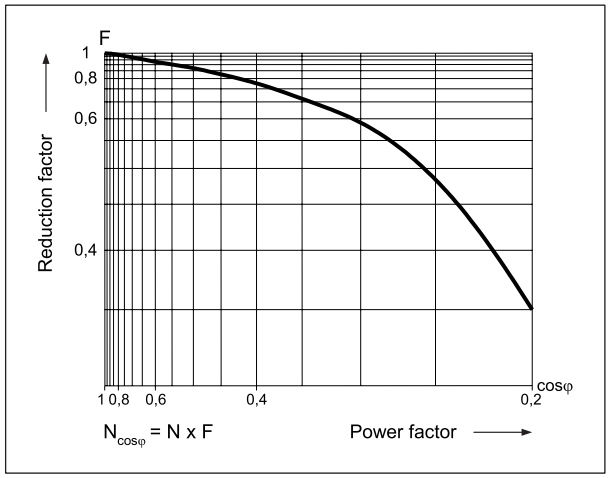
Connections diagram



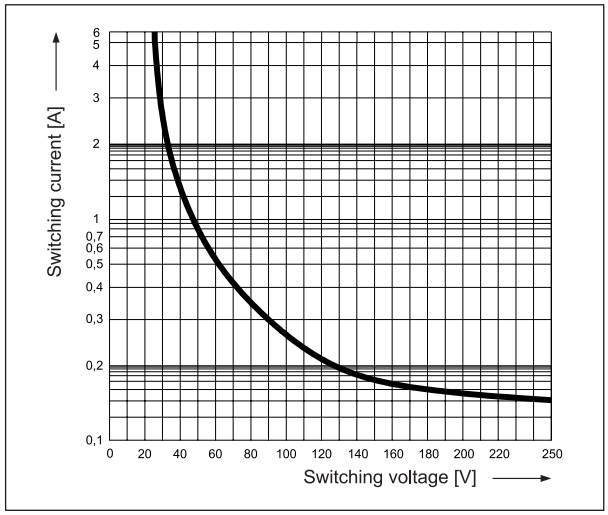
Electrical life at AC resistive load — Fig. 1



Electrical life reduction factor at AC inductive load — Fig. 2



Max. DC resistive load breaking capacity — Fig. 3



Mounting

Relays **T-R4E**, **T-R4Wu**, **T-R4Bp**, **T-R4Bi** are designed for screw terminals plug-in sockets **GZM4** or **GZT4**, 35 mm DIN rail mount, EN 50022 or on panel mounting with two M3 screws. For sockets are offered description plates **GZT4-0035** and clips **TR4-2000**.

Separate T-R4 control circuits from load circuits (T-R4 contacts)	GZM4: yes GZT4: no
Increased dielectric strength spacing between coil and contacs clamps	GZM..: min. 5 kV GZT.. : min. 4 kV
Double A2(14) terminal is introduced for easy wiring in electrical devices	GZM2/3/4: yes GZT2/3/4: no


T-R4


GZM4


GZM4

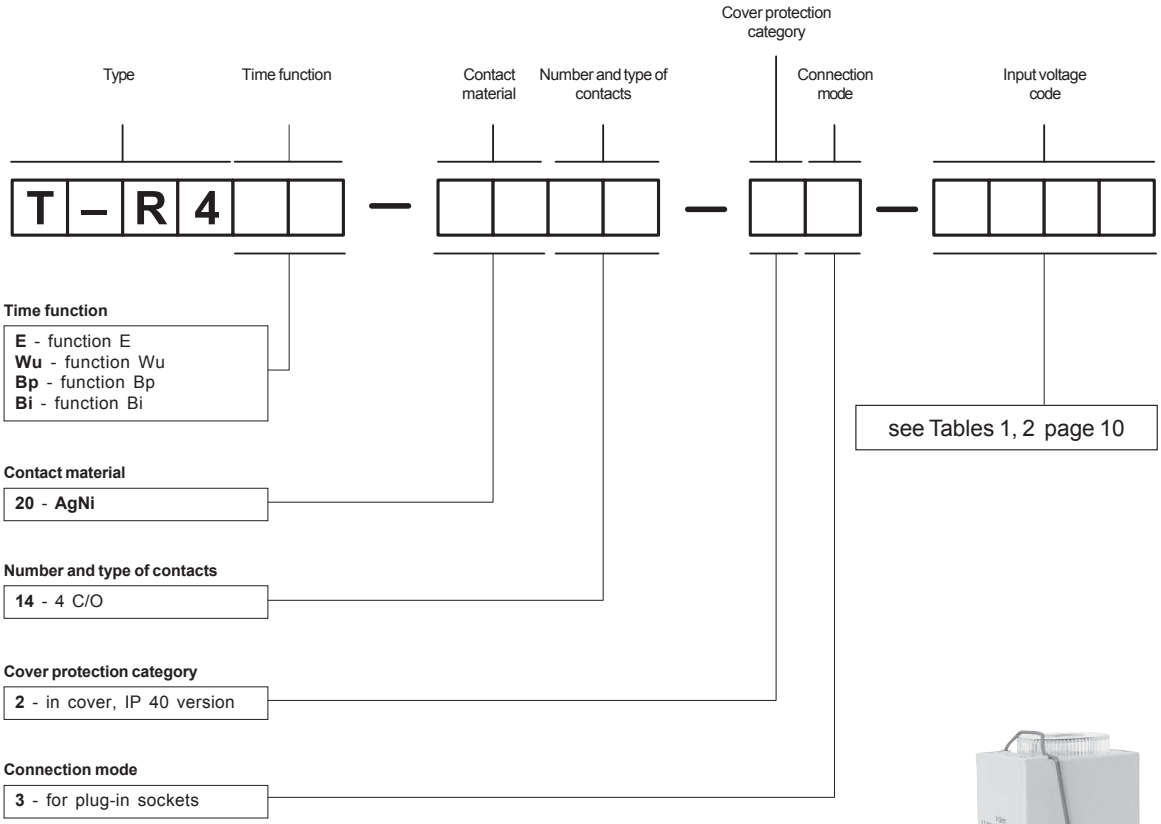

GZT4


TR4-2000


GZT4-0035

Note: sockets **GZM4** are available in black and gray colours.

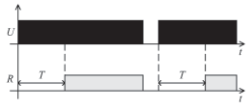
Ordering codes



Example of ordering code:

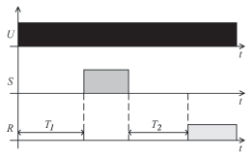
T-R4E-2014-23-1012 time relay **T-R4**, performing the time function **E** - ON Delay Voltage Controlled, contact material AgNi, with four changeover contacts, in cover IP 40, for plug-in sockets, rated input voltage 12 V DC

E - ON Delay Voltage Controlled



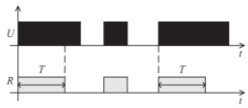
After the supply voltage [U] has been applied, the preset time [T] measurement starts. After the time [T] has been measured, the output relay [R] switches to ON position and remains in such until the supply voltage [U] is removed.

E(S) - ON Delay Voltage Controlled with Control Contact



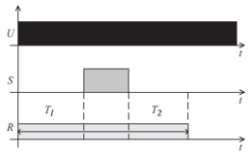
After the supply voltage [U] has been applied, the time [T] measurement starts. If the control contact [S] is switched on, the measurement of time [T] is interrputed for the time of switching the control contact [S]. After the control contact [S] has been switched of, the time [T] (T=T1+T2) is continued to be measured. After the time [T] has been measured, the output relay [R] will switch, and it will be in operating postion until the supply voltage [U] is removed.

Wu - Single Shot Leading Edge Voltage Controlled



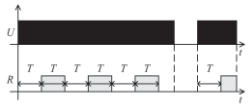
After the supply voltage [U] has been applied, the output relay [R] switches immediately, and the preset time [T] is measured. After the preset time [T] has been measured, the output relay [R] returns to the initial state.

Wu(S) - Single Shot Leading Edge Voltage Controlled with Control Contact



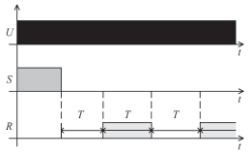
After the supply voltage [U] has been applied, the output relay [R] switches immediately and the preset time [T] measurement starts. If the control contact [S] is switched on, the time [T] measurement will be interrupted for the time for which the control contact [S] is switched. After the control contact [S] has been released, the time [T] (T=T1+T2) is continued to be measured. After the preset time [T] has been measured, the output relay [R] returns to the initial position.

Bp - Flasher Pause First



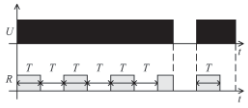
After the supply voltage [U] has been applied, the preset time [T] measurement starts. After the time [T] has been measured, the output relay [R] switches to ON position and the preset time [T] is being measured once more. After the preset time [T] has been measured, the output relay [R] returns to the initial state, and the next operating cycle of the relay starts. The relay operates until the supply voltage is removed.

Bp(S) - Flasher Pause Firstwith Control Contact



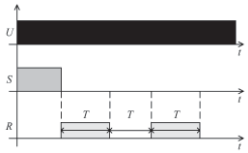
After the control contact [S] has been switched on and then off at the supply voltage [U] being applied, the measurement of the preset time [T] starts. After the time has been measured, the output relay [R] switches, and the time [T] is measured again. After the time has been measured, the output relay returns to the initial position, and the next cycle of the relay operation starts. The relay operates until the supply voltage is removed.

Bi - Flasher Impulse First



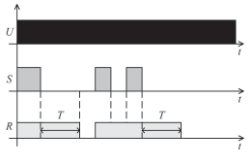
After the supply voltage [U] has been applied, the preset time [T] measurement starts simultaneously with switching of the output relay [R]. After the preset time [T] has been measured, the output relay [R] returns to the initial state, and the next operating cycle of the relay starts. The relay operates until the supply voltage is removed.

Bi(S) - Flasher Impulse First with Control Contact



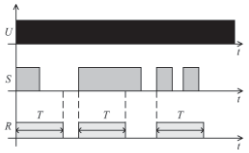
After the control contact [S] has been switched on and then off at the supply voltage [U] being applied, the measurement of the preset time [T] starts with the simultaneous switching of the output relay [R]. After the time[T] has been measured, the output relay [R] returns to the initial position and the time [T] measurement starts again. After the time [T] has been measured, the next cycle of the relay operation starts. The relay operates until the supply voltage is removed.

R - OFF Delay with Control Contact



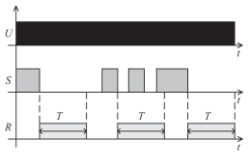
The supply voltage [U] must be applied to the time relay continuously. After the control contact [S] has been closed, the output relay [R] switches immediately. After opening of the control contact [S] measurement of the preset time [T] starts. After the preset time [T] has lapsed, the output relay [R] returns to the initial position. If the control contact [S] is closed again, even before the preset time [T] has lapsed, the previously measured time is cancelled, and after the control contact [S] has been opened, the preset time [T] is measured again.

Ws - Single Shot Leading Edge with Control Contact



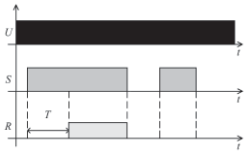
The supply voltage [U] must be applied to the time relay continuously. After the control contact [S] has been closed, the output relay [R] switches immediately. After opening of the control contact [S] measurement of the preset time [T] starts. After the preset time [T] has lapsed, the output relay [R] returns to the initial position. In course of the time [T] measurement the control contact [S] may be repeatedly closed and opened with no influence upon the output relay [R]. It is only after the time [T] has lapsed that closing of the control contact [S] causes switching the output relay [R] on again and measurement of the time [T].

Wa - Single Shot Trailing Edge with Control Contact



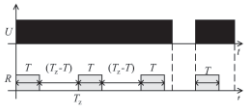
The supply voltage [U] must be applied to the time relay continuously. Closing of the control contact [S] does not result in measurement of the time delay or switching of the output relay [R]. It is only when the control contact [S] is opened that the output relay [R] switches immediately and the preset time [T] measurement starts. After the preset time [T] has lapsed, the output relay [R] returns to the initial position. In course of the time [T] measurement the control contact [S] may be repeatedly closed and opened with no influence upon the output relay [R]. It is only after the time [T] has lapsed that closing and opening of the control contact [S] causes switching the output relay [R] on again and measurement of the time [T].

Es - ON Delay with Control Contact



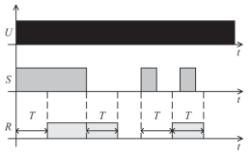
The supply voltage [U] shall be applied to the time relay continuously. After the control contact [S] has been closed, the preset time [T] is measured after which the output relay [R] is switched on and remains in this position until the control contact [S] is opened. If the closing time of [S] is shorter than the preset time [T], the relay [R] will not operate.

PWM - Pulse with Modulation



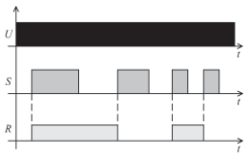
After the supply voltage has been applied, the output relay switches on for the preset time [T], and then switches off for the remaining time interval to complete the full value of the preset interval [Tz].

Esa - Delayed Switching ON and OFF Controlled with Control Contact



The supply voltage [U] must be applied to the time relay continuously. After the control contact [S] has been closed, the preset time [T] measurement starts, and after it has lapsed, the output relay [R] is switched on. If closing time of control contact [S] is shorter than seting time delay [T] output relay [R] will switch on after time delay [T] and will be on during time [T]. Closing of control contact [S] during time of switch on output relay [R] will not influence for realize function.

B - Flasher with Control Contact



Each closing of the control contact [S] results in the change of the output relay position to the opposite one (a feature of bistable relay).

Permanent switching ON and OFF

The functions available in TR4N relays. The functions ON and OFF are selected with TIME potentiometer. In the ON function, the normally open contacts are closed all the time whereas in the OFF function they are open. The position of the FUNC potentiometer is of no significance in these functions as is the preset measurement time. The ON or OFF functions are used for the time relay operation control in electric systems.

OFF - OFF mode

The mode available in PIR6WT-1Z relays. The OFF mode is selected with the switches of TIME range settings. In the OFF mode the normally open contact is permanently open. The position of MODE setting switches is of no significance with this mode. The OFF mode appears useful in operation control of the the time relay in electrical system.

U - supply voltage; **R** - output state of the relay; **S** - control contact state; **T**, **T1**, **T2** - measured times; **Tz** - value of the set interval; **t** - time axis