

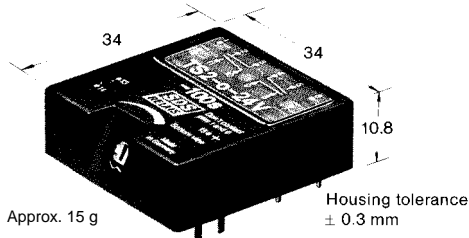
Discontinued

TS

**Panasonic**  
ideas for life

**NEW PCB TIME DELAY RELAY  
TIME-ON OR TIME-OFF DELAY  
OR PULSE RELAY**

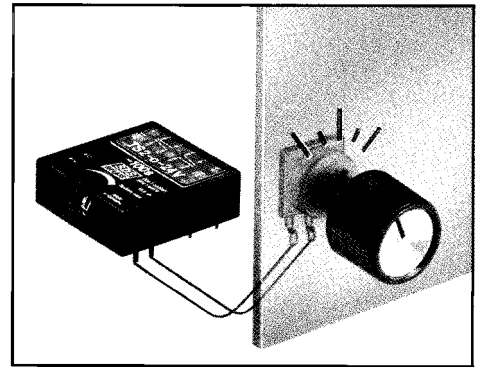
**TS-RELAYS**



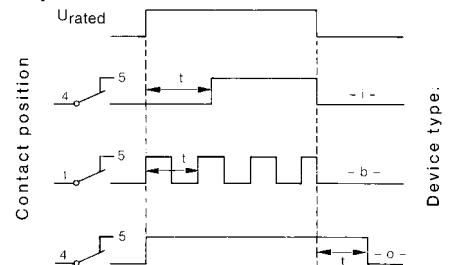
Approx. 15 g  
Housing material: CRASTIN SK-615 FR Polycarbonate  
Basic grid 2.54 mm  
PCB hole dia.  $\varnothing$  1.3 mm  $\pm$  0.1 mm

- The elegant solution to time delay problems.
- High repeat accuracy and reliability.
- Not susceptible to external disturbance.
- Increase in timing delay by using an external capacitor with time-off delay device – o –.
- No auxiliary power supply required with time-off delay operation.
- No „first cycle effect“, with the time-on delay device. The first and following operations are of the same duration.

Characteristics		Remarks	
Contact arrangement	(NO = normally open, NC = normally closed, CO = changeover)	2NO2NC (2CO)/3NO1NC (2NO1CO)/4NO	
Max. make/rated/break current	A	20 / 5 / 5	
Voltage switching range	V	10 <sup>5</sup> -250	
Power switching range	W (VA)	10 <sup>-10</sup> -100 (1000)	
Contact material		AuAg10	See also the S relay data sheet
Volumetric/contact resistance	m $\Omega$	30/10	
Operational life <sup>1)</sup>			
	5 A, 1000 VA/5 A, 100 W switching ops.	6 · 10 <sup>4</sup> /3 · 10 <sup>5</sup>	
	4 A, 1000 VA/0.1 A, 1 W switching ops.	10 <sup>5</sup> /2 · 10 <sup>5</sup>	
Voltage withstand: cont./cont.- control circuitry	V <sub>eff</sub>	750 / 1500	
Insulation resistance: cont./cont.- control circuitry	$\Omega$	10 <sup>13</sup> /10 <sup>10</sup>	
Shock-, vibration resistance	g, g/Hz	50, 20 / 1000	Independant of position
Life of trimmer		>100 operations	Typically 1000 ops.
Type of protection	Potentiometer/Contacts		dust tight / IP50
Storage temperature	°C	-20 / +85	
Permiss. ambient temp. at max. load	°C	-20 / +65	Consequently, time tol.: < 4% with -i- devices 25% with -o- devices
Min. control pulse duration at rated voltage.	ms	100	



**Operation**



+ The trimmer is omitted on the -i/-o- devices. This must be replaced by an external potentiometer. The time delay thus achievable is 20s per 100 k $\Omega$  with the -i- devices and approx 20s per 1 M $\Omega$  with the -o- devices. The minimum time delays are 1s (with -i-) and 0.3 s (with -o-).  
\* With the -o- device, the pulse frequency is 5 Hz. max., and is inversely proportional to R<sub>ext</sub> (e.g. at 12 k $\Omega$  the pulse frequency is 1 Hz).  
\*\* Connect C<sub>ext</sub> between pins 12 and 13!

Operating characteristics								
Type: -i- "on" delay -b- pulse relay	Operating voltage V	Current consumpt. mA	Type: -o- "off" delay	Operating voltage V	Current consumpt. mA			
TS2-/TS3-/TS4 -i/-b- 5 V	4.0 – 9.0	40	TS2-/TS3-/TS4 -o- 5 V	4.0 – 9.0	31			
TS2-/TS3-/TS4 -i/-b- 12 V	8.5 – 18.0	20	TS2-/TS3-/TS4 -o- 12 V	8.5 – 18.0	23			
TS2-/TS3-/TS4 -i/-b- 24 V	17.0 – 30.0	11	TS2-/TS3-/TS4 -o- 24 V	18.0 – 28.0	23			
Rated time: „on“ delay „i“	0 s +)	10 s	100 s	800 s	Rated time: „off“ delay „o“	0 s +)	10 s	100 s
Minimum timing range [s] typical at rated voltage	1-1000	0.3-10	1-100	8-800	Minimum timing range [s] typical at rated voltage	0.3-100	0.3-10	1-100
Time tolerance at U <sub>rated</sub> $\pm$ 10% < 1%			Time tolerance at U <sub>rated</sub> $\pm$ 10%			- approx 20%		
pulse relay „b“ pulse frequency 0.04 ... 5 Hz*			Time delay increase with C <sub>ext</sub> per $\mu$ F**			- 1.5s 4.7s		

**Connection diagrams (bottom view) Warning! No reverse battery protection** Warning! pins 1 and 6 may not be connected. Pins 7 and 12 are negative and connected internally

<p>TS2-i, -o- or -b - 5, 12, 24 V - 0 s</p> <p>0 &lt; R<sub>ext</sub> &lt; 5 M<math>\Omega</math></p>	<p>TS3-i, -o- or -b - 5, 12, 24 V - 0 s</p> <p>0 &lt; R<sub>ext</sub> &lt; 5 M<math>\Omega</math></p>	<p>TS4-i, -o- or -b - 5, 12, 24 V - 0 s</p> <p>0 &lt; R<sub>ext</sub> &lt; 5 M<math>\Omega</math></p>	<p>TS2-i, -o- or -b - 5, 12, 24 V - 10 s or - 100 s - i - 800 s, - b - 25 s</p>	<p>TS3-i, -o- or -b - 5, 12, 24 V - 10 s or - 100 s - i - 800 s, - b - 25 s</p>	<p>TS4-i, -o- or -b - 5, 12, 24 V - 10 s or - 100 s - i - 800 s, - b - 25 s</p>
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**Ordering example**

TS 2 - i - 24 V - 10 s

Type \_\_\_\_\_  
i = time-„on“ o = time-„off“ delay  
b = pulse relay \_\_\_\_\_  
Rated voltage \_\_\_\_\_  
Rated time \_\_\_\_\_

Note:  
Excitation voltage ripple should be maintained below 5% by use of appropriate smoothing.  
Strong external magnetic fields influence relay data.  
1) Data concerning operational life is based on resistive loads and ambient temperature of 20-30°C.

TR-W Wiping function on request

With surge voltages (1.2/50 $\mu$ sec) over DC 500V TS-i. b. w relays may not operate as intended.

Please initialise relays required state whenever power is turned on. The  statements for latching relays in our General Application Guidelines are  applicable.