











TIME DELAY RELAYS

PRODUCT SUMMARY

Macromatic offers a wide variety of time delay relays and accessories. Each one has different features and operating characteristics, allowing you to choose the exact product to meet your needs. Our time delay relays are available in either programmable or non-programmable versions. We offer both single or multiple function time delay relays. Choose between SPDT or DPDT relay outputs & solid state outputs for high duty cycle applications. Time delay relays are available as plug-in units for use with industry standard 8 & 11 pin octal sockets. They also come in 2" x 2" encapsulated & 1/16 DIN mounting configurations. Choose between analog or digital-set time delay relays. Refer to the Selection Table on this page for more information.

Product Series		Mounting Configuration	Time Delay Setting & Ranges	Functions	Input Voltages	Output	See Pages	
	THR Series Relay Output	2" x 2" Encapsulated Panel Mounted with One Screw	Analog-Set 0.1 SEC - 100 HR	Single- Function	12VDC, 24VAC/DC, 120VAC/DC, 240VAC	10A SPDT Relay	43-49	
	THS Series Solid State Output		Analog-Set 0.01 SEC - 100 HR	Single- Function	24-240VAC, 12-48VDC	1A SPNO Solid State	50-53	
	THL Series Solid State Inline (Series) Output		Analog-Set 0.01 SEC - 100 HR	Single- Function	24-240VAC & 12-48VDC	1A SPNO Solid State	54-55	
	TR-5 Series Standard	Plug-in Utilizing Industry-Standard 8 & 11 Pin Sockets	Analog-Set 0.05 SEC - 2 HR	Single- Function	12VDC, 24VAC/DC, 120VAC/DC, 240VAC	10A DPDT 10A SPDT Relay	56-59 60-61	
	TR-6 Series Time Ranger Programmable		Analog-Set Multi-Range 0.1 SEC - 24 HR	Single- Function	12VAC/DC, 24VAC/DC, 120VAC/DC, 240VAC	10A DPDT Relay	62-65	
	TD-8 Series Time Ranger Digital-Set Programmable		Digital-Set Multi-Range 0.1 SEC - 1,023 HR	Multi-Function (16) & Single- Function	12VAC/DC, 24VAC/DC, 120VAC/DC, 240VAC	10A DPDT 10A SPDT Relay	66-68	
	TD-7 Series Time Ranger Digital-Set Programmable		Digital-Set Multi-Range 0.05 SEC - 999 HR	Multi-Function (10) & Single- Function	12VAC/DC, 24VAC/DC, 120VAC/DC, 240VAC	10A DPDT 10A SPDT Relay	69-71	
	SS-6 & SS-8 Series Compact		Analog-Set 0.2 - 300 SEC	Single- Function	12VDC, 24VAC/DC, 120VAC	5A SPDT Relay	76	
	TAD Series Digital-Set 1/16 DIN		1/16 DIN (48mm ²)	Digital-Set Multi-Range 0.01 SEC - 9,990 HR	Multi-Function (10)	24-240VAC & 24-240VDC	5A DPDT Relay	72-73
	TAA Series Analog-Set 1/16 DIN			Digital-Set Multi-Range 0.05 SEC - 100 HR	Multi-Function (6)--2 Versions	24-240VAC & 24-240VDC	3A DPDT & SPDT Relay	74-75

TIME DELAY RELAYS

TR-5 SERIES NON-PROGRAMMABLE PLUG-IN

8 PIN SPDT VERSIONS

OFF DELAY, SINGLE SHOT & WATCHDOG



- ◆ These are 8 pin 10A SPDT versions of our standard 11 pin DPDT products
- ◆ Onboard & remote adjustable or fixed time delays from 0.05 seconds to 2 hours
- ◆ Uses industry-standard 8 pin octal socket



with appropriate socket

FUNCTION ■	INPUT VOLTAGE 50/60Hz.	PRODUCT NUMBER **	WIRING/ SOCKETS ▲
OFF DELAY Control Switch Trigger C	120V AC/DC 12V DC 24V AC/DC 240V AC	TR-51662-** TR-51666-** TR-51668-** TR-51661-**	8 PIN OCTAL 70169-D ▲
SINGLE SHOT Control Switch Trigger D	120V AC/DC 12V DC 24V AC/DC 240V AC	TR-51562-** TR-51566-** TR-51568-** TR-51561-**	
WATCHDOG Control Switch Trigger (Retriggerable Single Shot) J	120V AC/DC 12V DC 24V AC/DC 240V AC	TR-51362-** TR-51366-** TR-51368-** TR-51361-**	
OFF DELAY Power Trigger C	120V AC/DC 12V DC 24V AC/DC 240V AC	TR-51962-** TR-51966-** TR-51968-** TR-51961-**	8 PIN OCTAL 70169-D ▲
SINGLE SHOT Power Trigger D	120V AC/DC 12V DC 24V AC/DC 240V AC	TR-51762-** TR-51766-** TR-51768-** TR-51761-**	
WATCHDOG Power Trigger (Retriggerable Single Shot) J	120V AC/DC 12V DC 24V AC/DC 240V AC	TR-51862-** TR-51866-** TR-51868-** TR-51861-**	 * SHOULD BE SAME VOLTAGE AS INPUT VOLTAGE

■ See Pages 77-79 for definitions & explanations of Timing Functions.

** Complete Product Number using two-digit Code from Table below.

▲ Note: if these products are ordered with the Remote Adjust Potentiometer modification (suffix -Rx), they will require an 11 pin octal socket—see www.macromatic.com/remote for information.

TIME DELAYS

TR-5 Series Products have three time delay options:

- **Onboard Adjustable Time Delay**--complete Product Number by adding two-digit Code from Table at right, i.e., TR-51662-05 is an Off Delay with a time delay range of 0.1-10 seconds.
- **Onboard Fixed Time Delay**--replace two-digit Code with suffix "F" followed by delay [0.1 ... 100] followed by (S) seconds, (M) minutes or (H) hours, i.e., TR-51662-F5S is an Off Delay with a time delay fixed at 5 seconds.
- **Remote Time Delay**--Selected TR-5 Series products can be built with two terminals for remote adjustable or fixed time delays. See www.macromatic.com/remote for information.

** TIMING RANGE TABLE	
Time Delay Range	Code
0.05 - 5 Sec.	04
0.1 - 10 Sec.	05
0.3 - 30 Sec.	07
0.6 - 60 Sec.	08
1.2 - 120 Sec.	09
1.8 - 180 Sec.	10
3 - 300 Sec.	12
0.1 - 10 Min.	22
0.3 - 30 Min.	15
0.6 - 60 Min.	16
1.2 - 120 Min.	17



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www.macromatic.com
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Application Data & Dimensions--Page 61
Sockets & Accessories--Pages 80 & 81

TIME DELAY RELAYS

TR-5 SERIES NON-PROGRAMMABLE PLUG-IN 8 PIN SPDT VERSIONS

APPLICATION DATA & DIMENSIONS

APPLICATION DATA

Voltage Tolerance:

AC Operation: +10/-15% of nominal at 50/60 Hz.

DC Operation: +10/-15% of nominal.

Load (Burden):

Maximum of 2 VA for all voltages

Setting Accuracy:

Maximum Setting (Adjustable): +5%, -0%

Minimum Setting (Adjustable): +0%, -50%

Fixed Time Delay: ±2%

Repeat Accuracy (constant voltage and temperature):

±0.1% or ± 0.04 seconds, whichever is greater

Reset Time:

Input Voltage (All Functions) 0.100 Seconds

Triggered Functions only 0.04 Seconds

Start-up Time:

(Time from when power is applied until unit is timing)

0.05 Seconds

Maintain Function Time:

(Time unit continues to operate after power is removed)

0.01 Seconds for all units

Temperature:

-28° to 65°C (-18° to 149°F)

Output Contacts:

SPDT 10A @ 240V AC/30V DC,

1/2HP @ 120/240V AC (N.O.), 1/3HP @ 120/240V AC (N.C.)

B300 & R300; AC15 & DC13

Life:

Mechanical: 10,000,000 operations

Full Load: 100,000 operations

Compatibility:

Using a solid state switch to initiate the time sequence is acceptable. See www.macromatic.com/leakage or contact Macromatic for information regarding leakage current limits and other solid state design considerations.

Triggering Off Delay, Single Shot or Watchdog Units:

Timing sequence must be initiated only after input voltage is applied to unit. Minimum required trigger switch closure time is 0.05 seconds.

Approvals:



File #E109466



File #LR45565

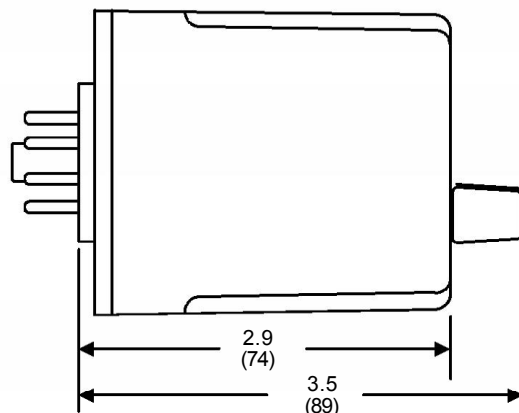
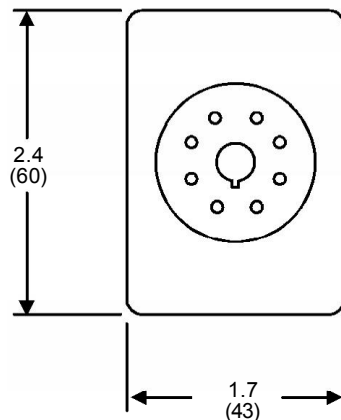


Low Voltage &
EMC Directives
EN60947-1, EN60947-5-1



LISTED
IND. CONT. EQUIP.
SOLE
with
appropriate
socket
File #E109466

DIMENSIONS



All Dimensions in
Inches (Millimeters)

TIME DELAY RELAYS

DEFINITION OF TIMING FUNCTIONS

Understanding the differences between all the functions available in time delay relays can sometimes be a daunting task. To begin with, time delay relays are simply control relays with a time delay built in. Their purpose is to control an event based on time.

Typically, time delay relays are initiated or triggered by one of two methods, depending on the function:

- ◆ application of input voltage
- ◆ application of a trigger

These triggers can be one of two signals: a control switch (dry contact), i.e., limit switch, push button, float switch, etc., or voltage (commonly known as a power trigger).

To help understand, some definitions are important:

- ◆ Input Voltage - control voltage applied to the input terminals. Depending on the function, input voltage will either initiate the unit or make it ready to initiate when a trigger is applied.
- ◆ Trigger- on certain timing functions, a trigger is used to initiate the unit after input voltage has been applied. As noted above, this trigger can either be a control switch (dry contact switch) or a power trigger (voltage).
- ◆ Output (Load) - every time delay relay has an output (either mechanical relay or solid state) that will open & close to control the load. Note that the user must provide the voltage to power the load being switched by the output contacts of the time delay relay. In all wiring diagrams, the output is shown in the normal de-energized position.

Below and on the following pages are both written and visual descriptions on how the common timing functions operate. A Timing Chart shows the relationship between Input Voltage, Trigger (if present) and Output. If you cannot find a product to fit your requirements or have any questions, Macromatic's Application Engineers offer technical information along with product selection and application assistance. Just call us at 800-238-7474 or e-mail us at tech-help@macromatic.com.

Function/Code	Operation	Timing Chart
ON DELAY Delay on Operate Delay on Make A	Upon application of input voltage, the time delay (t) begins. At the end of the time delay (t), the output is energized. Input voltage must be removed to reset the time delay relay & de-energize the output..	
INTERVAL ON Interval B	Upon application of input voltage, the output is energized and the time delay (t) begins. At the end of the time delay (t), the output is de-energized. Input voltage must be removed to reset the time delay relay.	
OFF DELAY Delay on Release Delay on Break Delay on De-Energization C	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the output is energized. Upon removal of the trigger, the time delay (t) begins. At the end of the time delay (t), the output is de-energized. Any application of the trigger during the time delay will reset the time delay (t) and the output remains energized.	
SINGLE SHOT One Shot Momentary Interval D	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the output is energized and the time delay (t) begins. During the time delay (t), the trigger is ignored. At the end of the time delay (t), the output is de-energized and the time delay relay is ready to accept another trigger.	

TIME DELAY RELAYS

DEFINITION OF TIMING FUNCTIONS

Function/Code	Operation	Timing Chart
FLASHER (Off First) E	Upon application of input voltage, the time delay (t) begins. At the end of the time delay (t), the output is energized and remains in that condition for the time delay (t). At the end of the time delay (t), the output is de-energized and the sequence repeats until input voltage is removed.	
FLASHER (ON First) F	Upon application of input voltage, the output is energized and the time delay (t) begins. At the end of the time delay (t), the output is de-energized and remains in that condition for the time delay (t). At the end of the time delay (t), the output is energized and the sequence repeats until input voltage is removed.	
ON/OFF DELAY G	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the time delay (t1) begins. At the end of the time delay (t1), the output is energized. When the trigger is removed, the output contacts remain energized for the time delay (t2). At the end of the time delay (t2), the output is de-energized & the time delay relay is ready to accept another trigger. If the trigger is removed during time delay period (t1), the output will remain de-energized and time delay (t1) will reset. If the trigger is removed during time delay period (t2), the output will remain energized and the time delay (t2) will reset.	
SINGLE SHOT FALLING EDGE H	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the output remains de-energized. Upon removal of the trigger, the output is energized and the time delay (t) begins. At the end of the time delay (t), the output is de-energized unless the trigger is removed and re-applied prior to time out (before time delay (t) elapses). Continuous cycling of the trigger at a rate faster than the time delay (t) will cause the output to remain energized indefinitely.	
WATCHDOG Retriggerable Single Shot J	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the output is energized and the time delay (t) begins. At the end of the time delay (t), the output is de-energized unless the trigger is removed and re-applied prior to time out (before time delay (t) elapses). Continuous cycling of the trigger at a rate faster than the time delay (t) will cause the output to remain energized indefinitely.	
TRIGGERED ON DELAY K	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the time delay (t) begins. At the end of the time delay (t), the output is energized and remains in that condition as long as either the trigger is applied or the input voltage remains. If the trigger is removed during the time delay (t), the output remains de-energized & the time delay (t) is reset.	

TIME DELAY RELAYS

DEFINITION OF TIMING FUNCTIONS

Function/Code	Operation	Timing Chart
REPEAT CYCLE (OFF 1st) L	Upon application of input voltage, the time delay (t1) begins. At the end of the time delay (t1), the output is energized and remains in that condition for the time delay (t2). At the end of this time delay, the output is de-energized and the sequence repeats until input voltage is removed.	<p>The timing chart shows two pulses of INPUT VOLTAGE. The first pulse starts at t=0 and ends at t=t1. The OUTPUT is de-energized until t=t1, then energized for a duration t2. This sequence repeats once more. The final pulse ends at t < t1, and the output is energized for t2.</p>
REPEAT CYCLE (ON 1st) M	Upon application of input voltage, the output is energized and the time delay (t1) begins. At the end of the time delay (t1), the output is de-energized and remains in that condition for the time delay (t2). At the end of this time delay, the output is energized and the sequence repeats until input voltage is removed.	<p>The timing chart shows two pulses of INPUT VOLTAGE. The first pulse starts at t=0 and ends at t=t1. The OUTPUT is energized from t=0 to t=t1, then de-energized for t2. This sequence repeats once more. The final pulse ends at t < t1, and the output is energized for t2.</p>
DELAYED INTERVAL Single Cycle N	Upon application of input voltage, the time delay (t1) begins. At the end of the time delay (t1), the output is energized and remains in that condition for the time delay (t2). At the end of this time delay (t2), the output is de-energized. Input voltage must be removed to reset the time delay relay.	<p>The timing chart shows two pulses of INPUT VOLTAGE. The first pulse starts at t=0 and ends at t=t1. The OUTPUT is de-energized until t=t1, then energized for t2. After t=t2, the output is de-energized. The second pulse of input voltage starts after t=t2 and ends at t=t1. The output remains de-energized.</p>
TRIGGERED DELAYED INTERVAL P	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the time delay (t1) begins. At the end of the time delay (t1), the output is energized and remains in that condition for the time delay (t2). At the end of the time delay (t2), the output is de-energized & the relay is ready to accept another trigger. During both time delay (t1) & time delay (t2), the trigger is ignored.	<p>The timing chart shows two pulses of INPUT VOLTAGE. The first pulse starts at t=0 and ends at t=t1. A TRIGGER pulse is applied at t=t1. The OUTPUT is de-energized until t=t1, then energized for t2. The second pulse of input voltage starts after t=t2 and ends at t=t1. A TRIGGER pulse is applied at t=t1. The output remains de-energized.</p>
TRUE OFF DELAY R	Upon application of input voltage, the output is energized. When the input voltage is removed, the time delay (t) begins. At the end of the time delay (t), the output is de-energized. Input voltage must be applied for a minimum of 0.5 seconds to assure proper operation. Any application of the input voltage during the time delay (t) will reset the time delay. No external trigger is required.	<p>The timing chart shows two pulses of INPUT VOLTAGE. The first pulse starts at t=0 and ends at t=t. The OUTPUT is energized from t=0 to t=t, then de-energized. The second pulse of input voltage starts after t=t and ends at t=t. The output remains de-energized.</p>
ON DELAY/ TRUE OFF DELAY S	Upon application of input voltage, the time delay (t1) begins. At the end of the time delay (t1), the output is energized. When the input voltage is removed, the output remains energized for the time delay (t2). At the end of the time delay (t2), the output is de-energized. Input voltage must be applied for a minimum of 0.5 seconds to assure proper operation. Any application of the input voltage during the time delay (t2) will keep the output energized & reset the time delay (t2). No external trigger is required.	<p>The timing chart shows two pulses of INPUT VOLTAGE. The first pulse starts at t=0 and ends at t=t1. The OUTPUT is de-energized until t=t1, then energized for t2. The second pulse of input voltage starts after t=t2 and ends at t=t1. The output remains energized.</p>
SINGLE SHOT-FLASHER T	Upon application of input voltage, the time delay relay is ready to accept a trigger. When the trigger is applied, the time delay (t1) begins and the output is energized for the time delay (t2). At the end of this time delay (t2), the output is de-energized and remains in that condition for the time delay (t2). At the end of the time delay (t2), the output is energized and the sequence repeats until time delay (t1) is completed. During the time delay (t1), the trigger is ignored.	<p>The timing chart shows two pulses of INPUT VOLTAGE. The first pulse starts at t=0 and ends at t=t1. A TRIGGER pulse is applied at t=t1. The OUTPUT is de-energized until t=t1, then energized for t2. The second pulse of input voltage starts after t=t2 and ends at t=t1. A TRIGGER pulse is applied at t=t1. The output remains de-energized.</p>
ON DELAY-FLASHER X	Upon application of input voltage, the time delay begins (t1). At the end of the time delay (t1), the output is energized and remains in that condition for the time delay (t2). At the end of this time delay (t2), the output is de-energized and remains in that condition for the time delay (t2). At the end of the time delay (t2), the output is energized and the sequence repeats until input voltage is removed.	<p>The timing chart shows two pulses of INPUT VOLTAGE. The first pulse starts at t=0 and ends at t=t1. The OUTPUT is de-energized until t=t1, then energized for t2. The second pulse of input voltage starts after t=t2 and ends at t=t1. The output remains de-energized.</p>