











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

TD-8 SERIES DIP-SWITCH DIGITAL-SET PLUG-IN MULTI-FUNCTION PROGRAMMABLE



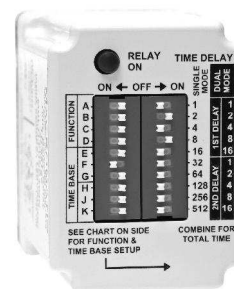
- ◆ Sixteen user-selectable modes in one unit
- ◆ DIP-Switches for accurate digital set of time delay & selection of function
- ◆ 100ms - 1,023 hours programmable time delay (Single Mode functions only)
- ◆ Uses industry-standard 11 pin octal socket



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The TD-881 Series offers the digital-set accuracy of DIP-switch setting as well as the flexible programmability of a multi-function & multi-time range relay. These products provide an easy & accurate method to select any of 16 time delay functions and any time delay between 100ms and 1,023 hours (31 hours maximum for Dual Mode functions). Programming is accomplished through the use of two 10-position DIP-switches. This product can literally replace hundreds of different catalog numbers, thereby reducing inventory requirements.



See Page 68 for instructions on how to program functions & time delay.

MULTI-FUNCTION ■ (16 Functions in One Unit)

Single Mode

- ◆ On Delay
- ◆ Interval On
- ◆ Flasher (OFF 1st)
- ◆ Flasher (ON 1st)
- ◆ Off Delay *
- ◆ Single Shot *
- ◆ Watchdog *
- ◆ Single Shot (Trailing Edge) *
- ◆ Triggered On Delay *

Dual Mode

- ◆ Repeat Cycle (OFF 1st)
- ◆ Repeat Cycle (ON 1st)
- ◆ Delayed Interval
- ◆ Triggered Delayed Interval *
- ◆ On/Off Delay *
- ◆ Single Shot-Flasher *
- ◆ On Delay/Flasher

* These are the only functions requiring use of the Control Switch shown in Wiring Diagrams below.

OUTPUT	INPUT VOLTAGE	PRODUCT NUMBER	WIRING/ SOCKETS
11 Pin DPDT	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TD-88122 TD-88126 TD-88128 TD-88121	11 PIN OCTAL 70170-D DIAGRAM 121
8 Pin SPDT	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TD-88162 TD-88166 TD-88168 TD-88161	8 PIN OCTAL 70169-D DIAGRAM 169

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

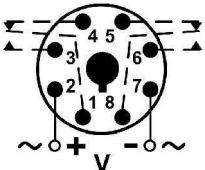
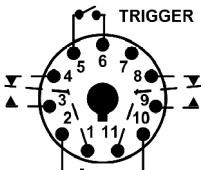
Application Data & Dimensions—Page 68
Sockets & Accessories—Pages 80 & 81

TIME DELAY RELAYS

TD-8 SERIES DIP-SWITCH DIGITAL-SET PLUG-IN

SINGLE FUNCTION PROGRAMMABLE

The TD-8 Series time delay relays offer an easy & accurate method to select any time delay between 100ms & 1,023 minutes. Programming is accomplished through the use of a 10-position DIP-switch. Each position is marked with a binary time increment. The required delay is selected by moving the switch of each increment to the ON position & adding their corresponding values (see examples below). This method provides a greater setting accuracy than is found on other units with an analog potentiometer. An LED indicates relay status.

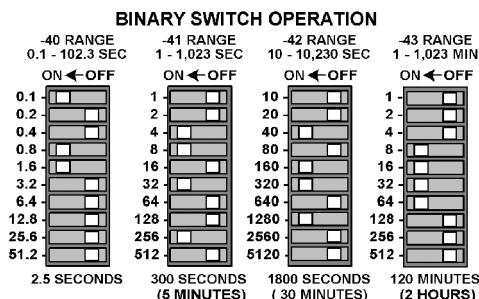
FUNCTION ■	INPUT VOLTAGE 50/60Hz.	PRODUCT NUMBER **	WIRING/ SOCKETS
ON DELAY A	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TD-80222-** TD-80226-** TD-80228-** TD-80221-**	8 PIN OCTAL 70169-D 
INTERVAL ON B	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TD-80522-** TD-80526-** TD-80528-** TD-80521-**	DIAGRAM 1
REPEAT CYCLE * (OFF Time First Followed By ON Time and Repeating) L	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TD-83122-** TD-83126-** TD-83128-** TD-83121-**	
REPEAT CYCLE * (ON Time First Followed By OFF Time and Repeating) M	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TD-85122-** TD-85126-** TD-85128-** TD-85121-**	
OFF DELAY Control Switch Trigger C	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TD-81622-** TD-81626-** TD-81628-** TD-81621-**	11 PIN OCTAL 70170-D 
SINGLE SHOT Control Switch Trigger D	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TD-81522-** TD-81526-** TD-81528-** TD-81521-**	DIAGRAM 2

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

* ON & OFF Time Ranges for these functions are the same. See www.macromatic.com/onoff for information on how to order a unit with different ON & OFF time ranges.

TIMING RANGES

** TIMING RANGE TABLE COMPLETE PRODUCT NUMBER USING TWO DIGIT CODE BELOW: i.e., TD-80222-40	
Time Delay Range	Code
0.1 - 102.3 Sec.	40
1 - 1,023 Sec.	41
10 - 10,230 Sec.	42
1 - 1,023 Min.	43



Single Mode

Dual Mode

- ◆ DIP-Switches for accurate digital set of time delay
- ◆ 100ms - 1,023 minute programmable time delay
- ◆ Uses industry-standard 8 or 11 pin octal sockets
- ◆ 10A DPDT output contacts
- ◆ LED indicates relay status



with appropriate socket



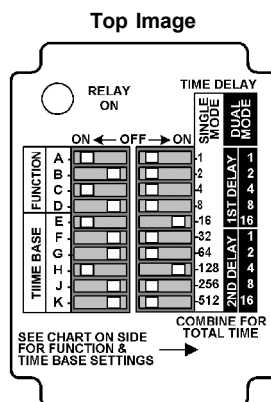
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Application Data & Dimensions—Page 68
Sockets & Accessories—Pages 80 & 81

APPLICATION DATA & DIMENSIONS FOR MULTI- & SINGLE-FUNCTION PRODUCTS

The right-mounted 10-position DIP-switch is used to select the time delay within the time base selected with switches E-K from the first DIP-switch. Each position on the second DIP-switch is marked with a binary time increment. The required delay is selected by moving the switch of each increment to the ON position & adding their corresponding values (see diagram above). Note that dual mode products can either have the same or different ON & OFF times. For more information, see www.macromatic.com/onoff.



Side Nameplate

SELECT FUNCTION

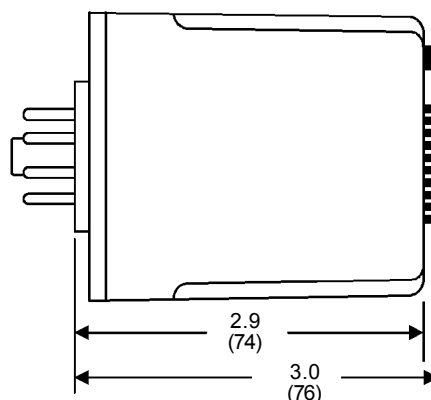
	FUNCTION	A	B	C	D
SINGLE MODE	ON DELAY	OFF	OFF	OFF	OFF
	INTERVAL ON	ON	OFF	OFF	OFF
	OFF DELAY	OFF	ON	OFF	OFF
	TR. ON DELAY	ON	ON	OFF	OFF
	FLASHER (ON)	OFF	OFF	ON	OFF
	FLASHER (OFF)	ON	OFF	ON	OFF
	WATCHDOG	OFF	ON	ON	OFF
	ONE SHOT T. EDGE	ON	ON	ON	OFF
	SINGLE SHOT	OFF	OFF	OFF	ON
	DUAL MODE	CYCLE (ON)	ON	OFF	OFF
CYCLE (OFF)		OFF	ON	OFF	ON
DELAYED INTERVAL		ON	ON	OFF	ON
ON/OFF DELAY		OFF	OFF	ON	OFF
TR. DELAYED INT.		ON	OFF	ON	ON
ONE SHOT-FLASHER		OFF	ON	ON	ON
ON DELAY/FLASHER		ON	ON	ON	ON

SELECT TIME BASE

	BASE	E	F	G
SINGLE MODE	0.1S	ON	OFF	OFF
	1S	OFF	ON	OFF
	0.1M	OFF	OFF	ON
	1M	ON	ON	OFF
	0.1H	ON	OFF	ON
1H	OFF	ON	ON	
DUAL MODE	BASE	H	J	K
	0.1S	ON	OFF	OFF
	1S	OFF	ON	OFF
	0.1M	OFF	OFF	ON
	1M	ON	ON	OFF
	0.1H	ON	OFF	ON
1H	OFF	ON	ON	

NOTE: SWITCHES H, J & K ARE ONLY USED ON DUAL RANGE PRODUCTS

Technical drawing of a square plate with a circular hole and eight smaller holes. The plate has a width of 2.4 (60) and a hole diameter of 1.7 (43).



8/11

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 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.	
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.	
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.	
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.	
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.	
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.	
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.	
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.	