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. Time delay relays are available as plug-in units for use with industry standard 8 & 11 pin octal or 11 pin blade sockets, or as an open board version for OEM applications. Choose between analog or digital-set time delay relays. Refer to the Selection Table on these two pages for more information.

	Standard Non-Programmable Single-Range Plug-in	***Time Ranger* Multi-Range Programmable Plug-in**	**Compact Non-Programmable Single-Range Plug-in**
Series	TR-5	TR-6	SS-6 & SS-8
			
Timing Functions Available	* On Delay * Interval On * Flasher * Off Delay * Single Shot * Watchdog * Repeat Cycle * Delayed Interval	* On Delay * Interval On * Flasher * Off Delay * Single Shot * Watchdog * Repeat Cycle * Delayed Interval	* On Delay * Interval On * Off Delay * Single Shot
Timing Ranges Available	20 separate timing ranges from 0.02 Seconds to 24 Hours	16 field-programmable timing ranges covering up to 2 Hours (24 Hours on Dual Knob units) in one unit	6 separate timing ranges from 0.02 to 300 Seconds
Output Contacts	DPDT or SPDT 10A @ 240V AC 10A @ 28V DC 1/2HP @ 240V AC 1/3HP @ 120V AC B300/R300	DPDT 10A @ 240V AC 10A @ 28V DC 1/2HP @ 240V AC 1/3HP @ 120V AC B300/R300	SPDT 5A @ 120V AC 5A @ 28V DC 1/6HP @ 120V AC
Input Voltages	12V AC/DC, 24V AC/DC, 120V AC/DC & 240V AC	12V AC/DC, 24V AC/DC, 120V AC/DC & 240V AC	12V AC/DC, 24V AC/DC & 120V AC
Approvals	with appropriate socket	with appropriate socket	with appropriate socket
See Page	34-39	40-43	44

TIME DELAY RELAYS

Product Summary

See pages 32 & 33 for a detailed description of all timing functions available. If you have any questions regarding the selection or application of time delay relays, either visit our on-line Technical Resource Center (www.macromatic.com) or call us at 800-238-7474.

Need modifications such as fixed time delays, remote adjustments or special pin configurations? We can do most of these modifications within our normal lead-times. See pages 50 & 51 for more information.

	Spade Base Non-Programmable Single Range Plug-in	***Time Ranger* Digital-Set Multi-Range Programmable Plug-in**	***Time Ranger III* Digital-Set Multi-Function Multi-Range Programmable**
Series	SS-4	TD-7	981
			
Timing Functions Available	* On Delay * Off Delay	* On Delay * Interval On * Flasher * Off Delay * Single Shot Available in both single function & multifunction	<u>All in One Unit</u>: * On Delay * Interval On * Flasher * Off Delay (2 versions) * Interval On/Off Delay * On Delay/Off Delay * Delayed Interval
Timing Ranges Available	3 separate timing ranges from 0.1 to 300 Seconds	0.05 Seconds to 999 Hours programmable timing range	0.1 Seconds to 9,999 Hours programmable timing range
Output Contacts	DPDT 12A @ 240V AC 12A @ 30V DC 1/2HP @ 240V AC B300/R300	DPDT 10A @ 240V AC 10A @ 28V DC 1/2HP @ 240V AC 1/3HP @ 120V AC B300/R300	SPDT 3A @ 240V AC 5A @ 30V DC 1/2HP @ 240V AC
Input Voltages	12V AC/DC, 24V AC/DC & 120V AC	12V AC/DC, 24V AC/DC, 120V AC/DC & 240V AC	24-240V AC & 12-240V DC in one unit
Approvals	with appropriate socket	with appropriate socket	
See Page	45	46-47	48-49

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:

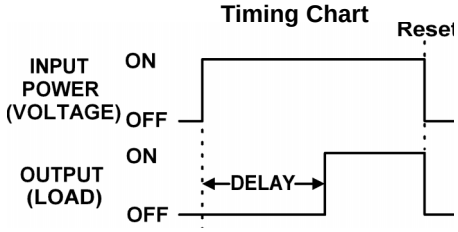
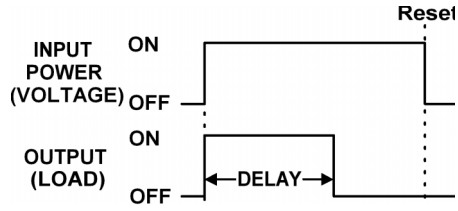
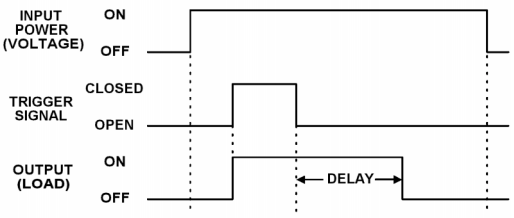
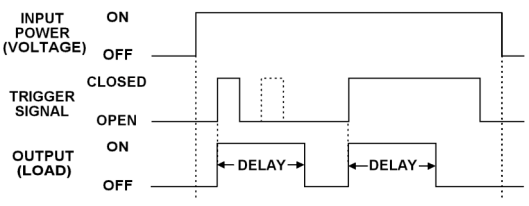
- application of input voltage (On Delay, Interval On, Flasher, Repeat Cycle & Delayed Interval)
- opening or closing of a trigger signal (Off Delay, Single Shot, Watchdog & Triggered Delayed Interval)

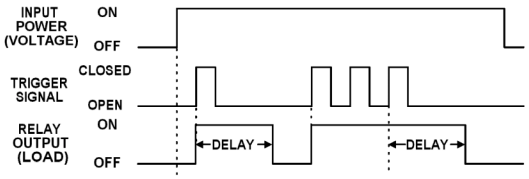
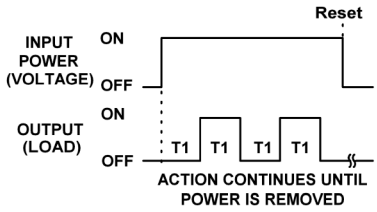
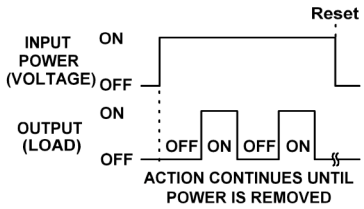
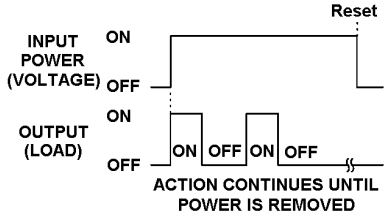
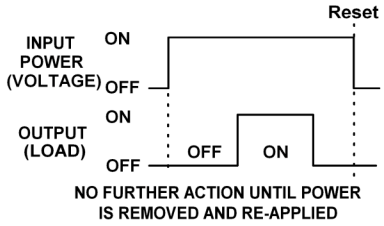
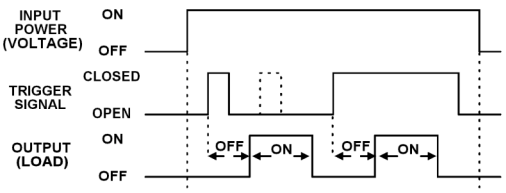
These trigger signals can be one of two designs: a control switch (dry contact), i.e., limit switch, push button, float switch, etc., or by voltage (commonly known as a power trigger).

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 signal is applied.
- Trigger Signal-on certain timing functions, a trigger signal is used to initiate the unit after input voltage has been applied. As noted above, this trigger signal can either be a control switch (dry contact switch) or a power trigger (voltage).
- Output (Load)-every time delay relay has an internal relay (usually mechanical) with contacts that open & close to control the load. They are represented by the dotted lines in the wiring diagrams. Note that the user must provide the voltage to power the load being switched by the output contacts of the time delay relay.

Below and on the following page are both written and visual descriptions on how the common timing functions operate. A Timing Chart shows the relationship between Input Voltage, Trigger Signal (if present) and Output Contacts. 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	Operation	Timing Chart
ON DELAY Delay on Operate Delay on Make	Upon application of input voltage, the preset time begins. At the end of the preset time, the relay contacts transfer. Input voltage must be removed and reapplied to reset the time delay relay.	
INTERVAL ON Interval	Upon application of input voltage, the relay contacts transfer and the preset time begins. At the end of the preset time, the contacts return to their normal condition. Input voltage must be removed and reapplied to reset the time delay relay.	
OFF DELAY Delay on Release Delay on De-Energization Delay on Drop-Out	Upon application of input voltage, the time delay relay is ready to accept trigger signals. Upon application of the trigger signal, the relay contacts transfer and hold. Upon release of the trigger signal, the preset time begins and the relay contacts stay held. At the end of the preset time, the relay contacts return to their normal condition. Any application of the trigger signal will reset the time.	
SINGLE SHOT One Shot Momentary Interval	Upon application of input voltage, the time delay relay is ready to accept trigger signals. Upon application of the trigger signal, the relay contacts transfer and the preset time begins. During time-out, the trigger signal is ignored. The time delay relay is reset by applying the trigger signal when the relay is not energized.	

Function	Operation	Timing Chart
WATCHDOG Retriggerable Single Shot	Upon application of input voltage, the time delay relay is ready to accept trigger signals. Upon application of the trigger signal, the relay contacts transfer and the preset time begins. At the end of the preset time, the relay contacts return to their normal condition unless the trigger signal is opened and closed prior to time out (before preset time elapses). Continuous cycling of the trigger signal at a rate faster than the preset time will cause the relay contacts to remain closed.	
FLASHER	Upon application of the input voltage, the preset time (T1) begins. At the end of the preset time, the relay contacts transfer and remain in that condition for the preset time (T1). At the end of this time, the relay contacts drop out and the sequence repeats until input voltage is removed.	
REPEAT CYCLE Off/On Delay	Upon application of input voltage, a preset delay begins. At the end of the preset delay, the relay contacts transfer and remain in that condition for a second, independently adjustable preset time. At the end of this time, the relay contacts drop out and the sequence repeats until input voltage is removed.	
REPEAT CYCLE On/Off Delay	Upon application of input voltage, the relay contacts transfer and a preset delay begins. At the end of the preset delay, the relay contacts drop out and remain in that condition for a second, independently adjustable preset time. At the end of this time, the relay contacts pull in and the sequence repeats until input voltage is removed.	
DELAYED INTERVAL Single Cycle	Upon application of input voltage, a preset delay begins (OFF). At the end of the preset delay, the relay contacts transfer and remain in that condition for a second, independently adjustable preset time (ON). At the end of this time, the contacts drop out and the sequence stops. Input voltage must be removed and reapplied to reset the time delay relay.	
DELAYED INTERVAL (TRIGGERED) Single Cycle	Upon application of input voltage, the time delay relay is ready to accept trigger signals. Upon application of the trigger signal, a preset delay begins (OFF). At the end of the preset delay, the relay contacts transfer and remain in that condition for a second, independently adjustable preset time (ON). At the end of the second preset time, the relay contacts return to their normal condition. During timing, the trigger signal is ignored.	

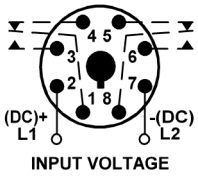
TIME DELAY RELAYS

Non-Programmable Plug-in

On Delay, Interval & Flasher

- Each unit has a single timing range
- Choose from 20 separate timing ranges from 0.02 Seconds to 24 Hours
- Uses industry-standard 8 pin octal sockets
- 10A DPDT output contacts
- with appropriate socket

SINGLE KNOB UNITS

FUNCTION ■	INPUT VOLTAGE	PRODUCT NUMBER ** COMPLETE PRODUCT NUMBER USING 2 DIGIT CODE FROM TABLE BELOW	WIRING/ SOCKETS ▲
ON DELAY	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TR-50222-** TR-50226-** TR-50228-** TR-50221-**	8 PIN OCTAL ▲ **70169-D**  INPUT VOLTAGE **DIAGRAM 1**
INTERVAL ON	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TR-50522-** TR-50526-** TR-50528-** TR-50521-**	
FLASHER	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TR-50822-** TR-50826-** TR-50828-** TR-50821-**	

■ See Pages 32-33 for definitions & explanations of Timing Functions.

▲ Note: if these products are ordered with the Remote Adjust Potentiometer modification (suffix -Rx), they will require an 11 pin octal socket–see Page 50 for more information.

Sockets & Accessories–Page 58
Dimensions–Page 37
Application Data–Page 37
Standard Modifications–Pages 50-51

Timing Ranges

**** TIMING RANGE TABLE**

COMPLETE PRODUCT NUMBER USING TWO DIGIT CODE FROM TABLE BELOW

i.e., TR-50222-04

Time Delay Range	Code	Time Delay Range	Code
0.02 - 2 Sec.	03	6 Sec. - 10 Min.	22
0.05 - 5 Sec.	04	9 Sec. - 15 Min.	14
0.1 - 10 Sec.	05	0.3 - 30 Min.	15
0.15 - 15 Sec.	06	0.6 - 60 Min.	16
0.3 - 30 Sec.	07	1.2 - 120 Min.	17
0.6 - 60 Sec.	08	1.8 - 180 Min.	18
1.2 - 120 Sec.	09	2.4 Min. - 4 Hr.	19
1.8 - 180 Sec.	10	4.8 Min. - 8 Hr.	20
3 - 300 Sec.	12	7.2 Min. - 12 Hr.	21
4.5 - 450 Sec.	13	14.4 Min. - 24 Hr.	23

For Fixed Time Delay (at no additional charge), add suffix "F" and time delay desired to basic Product Number, **i.e.,** TR-50222-F5S is an On Delay with a time delay fixed at 5 seconds.

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TIME DELAY RELAYS

Non-Programmable Plug-in

Off Delay, Single Shot & Watchdog

SINGLE KNOB UNITS

FUNCTION ■ ▲	INPUT VOLTAGE	PRODUCT NUMBER ** COMPLETE PRODUCT NUMBER USING 2 DIGIT CODE FROM TABLE BELOW	WIRING/ SOCKETS
OFF DELAY Control Switch Trigger	120V AC/DC	TR-51622-**	11 PIN OCTAL **70170-D**
	12V AC/DC	TR-51626-**	
	24V AC/DC	TR-51628-**	
	240V AC	TR-51621-**	
SINGLE SHOT Control Switch Trigger	120V AC/DC	TR-51522-**	
	12V AC/DC	TR-51526-**	
	24V AC/DC	TR-51528-**	
	240V AC	TR-51521-**	
WATCHDOG Control Switch Trigger (Retriggerable Single Shot)	120V AC/DC	TR-51322-**	
	12V AC/DC	TR-51326-**	
	24V AC/DC	TR-51328-**	
	240V AC	TR-51321-**	
			CONTROL SWITCH; 1 2 3 4 5 6 7 8 9 10 11; (DC)+ L1; (DC)- L2; INPUT VOLTAGE; **DIAGRAM 2**
OFF DELAY Power Trigger	120V AC/DC	TR-51922-**	11 PIN OCTAL **70170-D**
	12V AC/DC	TR-51926-**	
	24V AC/DC	TR-51928-**	
	240V AC	TR-51921-**	
SINGLE SHOT Power Trigger	120V AC/DC	TR-51722-**	
	12V AC/DC	TR-51726-**	
	24V AC/DC	TR-51728-**	
	240V AC	TR-51721-**	
WATCHDOG Power Trigger (Retriggerable Single Shot)	120V AC/DC	TR-51822-**	
	12V AC/DC	TR-51826-**	
	24V AC/DC	TR-51828-**	
	240V AC	TR-51821-**	
			POWER TRIGGER * + −; 1 2 3 4 5 6 7 8 9 10 11; (DC)+ L1; (DC)- L2; INPUT VOLTAGE; * SHOULD BE SAME VOLTAGE AS INPUT VOLTAGE; **DIAGRAM 4**

■ See Pages 32-33 for definitions & explanations of Timing Functions.

▲ 8 Pin SPDT versions of these functions are available–see Page 38.

- Each unit has a single timing range
- Choose from 20 separate timing ranges from 0.02 Seconds to 24 Hours
- Uses industry-standard 11 pin octal sockets
- 10A DPDT output contacts
- UL, CSA, CE

UL LISTED with appropriate socket

Sockets & Accessories–Page 58
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Application Data–Page 37
Standard Modifications–Pages 50-51

Timing Ranges

**** TIMING RANGE TABLE**

COMPLETE PRODUCT NUMBER USING TWO DIGIT CODE FROM TABLE BELOW

i.e., TR-51622-04

Time Delay Range	Code	Time Delay Range	Code
0.02 - 2 Sec.	03	6 Sec. - 10 Min.	22
0.05 - 5 Sec.	04	9 Sec. - 15 Min.	14
0.1 - 10 Sec.	05	0.3 - 30 Min.	15
0.15 - 15 Sec.	06	0.6 - 60 Min.	16
0.3 - 30 Sec.	07	1.2 - 120 Min.	17
0.6 - 60 Sec.	08	1.8 - 180 Min.	18
1.2 - 120 Sec.	09	2.4 Min. - 4 Hr.	19
1.8 - 180 Sec.	10	4.8 Min. - 8 Hr.	20
3 - 300 Sec.	12	7.2 Min. - 12 Hr.	21
4.5 - 450 Sec.	13	14.4 Min. - 24 Hr.	23

For Fixed Time Delay (at no additional charge), add suffix “F” and time delay desired to basic Product Number, **i.e.,** TR-51622-F5S is an Off Delay with a time delay fixed at 5 seconds.

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TIME DELAY RELAYS

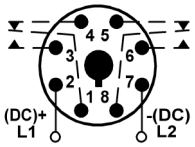
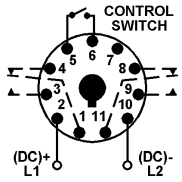
Non-Programmable Plug-in

Repeat Cycle & Delayed Interval

- Each unit has a single timing range
- Choose from 20 separate timing ranges from 0.02 Seconds to 24 Hours
- Independently adjustable ON & OFF times on dual knob timers
- Uses industry-standard 8 or 11 pin octal sockets
- 10A DPDT output contacts
- UL CSA CE

UL LISTED with appropriate socket

DUAL KNOB UNITS *

FUNCTION ■	INPUT VOLTAGE	PRODUCT NUMBER ** COMPLETE PRODUCT NUMBER USING 2 DIGIT CODE FROM TABLE BELOW	WIRING/ SOCKET
REPEAT CYCLE (OFF Time First Followed By ON Time and Repeating)	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TR-53122-** TR-53126-** TR-53128-** TR-53121-**	8 PIN OCTAL **70169-D**  INPUT VOLTAGE **DIAGRAM 1**
REPEAT CYCLE (ON Time First Followed By OFF Time and Repeating)	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TR-55122-** TR-55126-** TR-55128-** TR-55121-**	
DELAYED INTERVAL (OFF Time Followed by ON Time Followed by OFF State Until Reset)	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TR-56122-** TR-56126-** TR-56128-** TR-56121-**	
DELAYED INTERVAL Control Switch Trigger (OFF Time Followed by ON Time Followed by OFF State Until Reset)	120V AC/DC 12V AC/DC 24V AC/DC 240V AC	TR-56522-** TR-56526-** TR-56528-** TR-56521-**	11 PIN OCTAL **70170-D**  INPUT VOLTAGE **DIAGRAM 2**

* All Dual Knob units have independently selectable & adjustable ON & OFF times. To order a Dual Knob unit with the same ON & OFF timing ranges, complete the Product Number by adding one two-digit code from the table below, i.e., a TR-55122-08 is a Repeat Cycle unit with both the ON time & OFF time adjustable between 0.6 - 60 seconds. To order a Dual Knob unit with different ON & OFF timing ranges, complete the Product Number by adding two different two-digit codes from the table below. The first suffix indicates the first timing range of the unit and the second suffix indicates the second timing range, i.e., a TR-53122-05-12 is a Repeat Cycle unit with an OFF timing range first of 0.1-10 seconds and an ON timing range second of 3-300 seconds.

■ See Pages 32-33 for definitions & explanations of Timing Functions.

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Timing Ranges

**** TIMING RANGE TABLE**

COMPLETE PRODUCT NUMBER USING TWO DIGIT CODE FROM TABLE BELOW

i.e., TR-55122-04

Time Delay Range	Code	Time Delay Range	Code
0.02 - 2 Sec.	03	6 Sec. - 10 Min.	22
0.05 - 5 Sec.	04	9 Sec. - 15 Min.	14
0.1 - 10 Sec.	05	0.3 - 30 Min.	15
0.15 - 15 Sec.	06	0.6 - 60 Min.	16
0.3 - 30 Sec.	07	1.2 - 120 Min.	17
0.6 - 60 Sec.	08	1.8 - 180 Min.	18
1.2 - 120 Sec.	09	2.4 Min. - 4 Hr.	19
1.8 - 180 Sec.	10	4.8 Min. - 8 Hr.	20
3 - 300 Sec.	12	7.2 Min. - 12 Hr.	21
4.5 - 450 Sec.	13	14.4 Min. - 24 Hr.	23

For Fixed Time Delay (at no additional charge), add suffix "F" and time delay desired to basic Product Number, **i.e.,** TR-53122-F5S is a Repeat Cycle with a time delay fixed at 5 seconds.

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Application Data

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

Load (Burden):
2 VA

Setting Accuracy:
Maximum Setting (Adjustable): +5%, -0%
Minimum Setting (Adjustable): +0%, -50%
Fixed Time Delay: > 2 Seconds +1%
0.1 - 2 Seconds +5%

Repeat Accuracy (constant voltage and temperature)**:**
> 2 Seconds Delay +0.1%
0.1 - 2 Seconds Delay +2%

Reset Time:
On Delay/Interval/Repeat Cycle/Delayed Interval: 0.1 Seconds
Off Delay/Single Shot/Watchdog: 0.04 Seconds

Start-up Time:
(Time from when power is applied until unit is timing)
120 & 240V units 0.05 Seconds
12, 24 & 48V units 0.08 Seconds

Maintain Function Time:
(Time unit continues to time after power is removed)
0.01 Seconds for all units

Temperature:
12-120V Input Voltage: -28° to 65°C (-18° to 150°F)
240V Input Voltage: -28° to 50°C (-18° to 122°F)

Insulation Voltage:
2,000 volts

Output Contacts:
DPDT 10A @ 240V AC/28V DC,
1/2HP @ 240V AC, 1/3HP @ 120V AC
B300 & R300; AC15 & DC13

Life:
Mechanical: 10,000,000 operations
Full Load: 100,000 operations

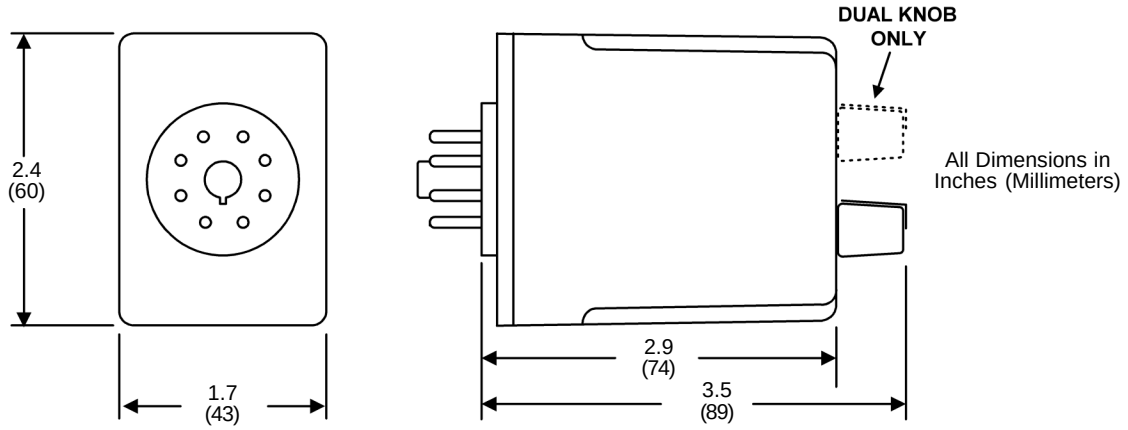
Compatibility:
On all units triggered by input voltage or by a control switch, do not use a solid state switch to initiate the timing sequence-problems with leakage current could occur. On all units with a power trigger, do not use a solid state switch with leakage current exceeding 0.5ma. Contact Macromatic Controls for additional information.

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 0.1 seconds.

Approvals:

File #E109466 File #LR45565 Low Voltage & EMC Directives EN60947-1, EN60947-5-1 LISTED IND. CONT. EQUIP. 50U7 with appropriate socket File #E109466

Dimensions



All Dimensions in Inches (Millimeters)