



INSTALLATION INSTRUCTIONS

THR-3816U, THR-3836U & THR-3856U

ENCAPSULATED TIME DELAY RELAYS

March, 2013

READ INSTRUCTIONS BEFORE INSTALLING OR OPERATING THIS DEVICE.
KEEP FOR FUTURE REFERENCE.

901-0000-295

TURN OFF ALL POWER SUPPLYING THIS EQUIPMENT BEFORE CONNECTING OR DISCONNECTING WIRE.

Installation & Setup

Mount the product to a panel in a suitable enclosure with one (1) #10 screw with a maximum tightening torque of 15 in-lbs. Use ¼" quick-connect terminals and make all wiring connections as described on Page 2. If mounting to 35mm DIN rail, use Macromatic DIN-rail mounting kit Catalog Number 70500.

Setup is accomplished through the use of a 6-position DIP-switch. A small screwdriver or pointed tool makes DIP-switch selection easier. Select the settings for function, time delay & onboard or remote pot adjustment as described below.

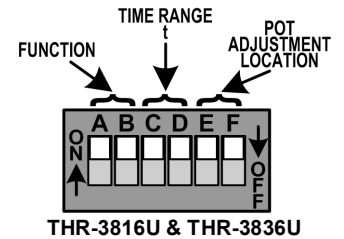


THR-3816U & THR-3836U

CATALOG NUMBER	FUNCTION	SWITCHES		TIME RANGE	SWITCHES		POT SELECT	SWITCHES	
		A	B		C	D		E	F
THR-3816U	ON DELAY	ON	ON	0.1 – 10S	ON	ON	ONBOARD POT	ON	ON
	OFF DELAY	OFF	ON	1 – 100S	OFF	ON	REMOTE POT 100K	OFF	ON
	INTERVAL	ON	OFF	10 – 1000S	ON	OFF	REMOTE POT 1M	ON	OFF
	SINGLE SHOT	OFF	OFF	1 – 100M	OFF	OFF	REMOTE POT 2M	OFF	OFF
THR-3836U	FLASHER OFF	ON	ON	0.1 – 10S	ON	ON	ONBOARD POT	ON	ON
	FLASHER ON	OFF	ON	1 – 100S	OFF	ON	REMOTE POT 100K	OFF	ON
	WATCHDOG	ON	OFF	10 – 1000S	ON	OFF	REMOTE POT 1M	ON	OFF
	ONE SHOT FALLING EDGE	OFF	OFF	1 – 100M	OFF	OFF	REMOTE POT 2M	OFF	OFF

Each product comes with four user-selectable functions (see table above to determine which functions are included with each Catalog Number). Switches A & B are used to select one of these four functions (see the descriptions of how each function operates on Page 2 as a guide). Using the table above, set Switches A & B to ON or OFF to select the function. **NOTE:** Selecting a function must be done without Input Voltage applied. Changes made with Input Voltage applied will not be recognized until the next application of Input Voltage.

There are four user-selectable time ranges (t) available in each product that are used with either onboard or remote adjustment. Switches C & D are used to select one of these time ranges. Using the table above, set Switches C & D to ON or OFF to select the time range. Then adjust within the selected time range using either the onboard potentiometer or remote potentiometer. **NOTE:** Selecting a time range must be done prior to the start of a timing cycle. Changes made during a timing cycle will be ignored until the start of the next timing cycle.



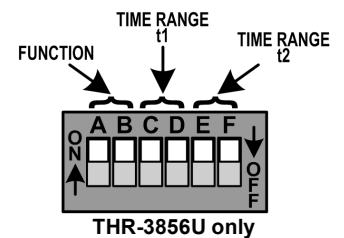
These products come with an option to choose either onboard time delay adjustment that use the blue knob or remote time delay adjustment using one of three different remote pot values. Switches E & F are used to select one of these options. Using the table above, set Switches E & F to ON or OFF to select either onboard or remote adjustment. If selecting remote pot, a value of 100KΩ, 1MΩ or 2MΩ must be chosen to match the value of the remote potentiometer. **NOTE:** Selecting a pot adjustment option must be done without Input Voltage applied. Changes made with Input Voltage applied will not be recognized until the next application of Input Voltage. If Remote Pot option is selected, the onboard Potentiometer setting is ignored. Continue set-up & installation on the next page.

THR-3856U only

CATALOG NUMBER	FUNCTION	SWITCHES		TIME RANGE (t1)	SWITCHES		TIME RANGE (t2)	SWITCHES	
		A	B		C	D		E	F
THR-3856U	REPEAT CYCLE OFF	ON	ON	0.1 – 10S	ON	ON	0.1 – 10 S	ON	ON
	REPEAT CYCLE ON	OFF	ON	1 – 100S	OFF	ON	1 – 100 S	OFF	ON
	DELAYED INTERVAL	ON	OFF	1 – 100M	ON	OFF	1 – 100 M	ON	OFF
	TRIGGERED DELAYED INTERVAL	OFF	OFF	10 – 1000M	OFF	OFF	10 – 1000 M	OFF	OFF

This product comes with four user-selectable functions (see table above), each with separate ON & OFF time delays. Switches A & B are used to select one of these four functions (see the descriptions of how each function operates on Page 2 as a guide). Using the table above, set Switches A & B to ON or OFF to select the function. **NOTE:** Selecting a function must be done without Input Voltage applied. Changes made with Input Voltage applied will not be recognized until the next application of Input Voltage.

There are four user-selectable time ranges for both the first time (t1) and the second time (t2), allowing for independently selectable & adjustable ON & OFF times. Switches C & D are used to select the time range for t1. Switches E & F are used to select the time range for t2. Using the table above, set Switches C, D, E & F to ON or OFF to select the time range for t1 & t2. Then adjust within the selected time range using the onboard potentiometers. This product comes with onboard adjustable pot option only—it does not have an option to choose remote pot adjustment. **NOTE:** Selecting a time range must be done prior to the start of a timing cycle. Changes made during a timing cycle will be ignored until the start of the next timing cycle. Continue set-up & installation on the next page.



Troubleshooting

If the unit fails to operate properly, check that all connections are correct per the appropriate diagram on the next page. If problems continue, contact Macromatic at 800-238-7474 or e-mail tech-support@macromatic.com for assistance.

Warranty

All Catalog-listed THR-3 products manufactured by Macromatic are warranted to be free from defects in workmanship or material under normal service and use for a period of five (5) years from date of manufacture.



TURN OFF ALL POWER SUPPLYING THIS EQUIPMENT BEFORE CONNECTING OR DISCONNECTING WIRE.

Replacing Existing Products

These products are designed to replace thousands of Catalog Numbers from Macromatic & other manufacturers. Follow these directions for set-up & wiring the unit depending on the options offered on the product being replaced:

Onboard Adjustable Time Delay

To replace a product that has Onboard Adjustable Time Delay, set the time delay as shown on the previous page for onboard time delay adjustment, then set the onboard potentiometer to the same delay value as the old unit.

Onboard Fixed Time Delay

Although these units come with an onboard potentiometer, they can be used to replace products with fixed time delays. After selecting the desired time range as shown on the previous page for onboard time delay adjustment, set the top-mounted potentiometer at the fixed delay required (epoxy can be applied to prevent further changes if desired).

Remote Time Delay (THR-3816U & THR-3836U only)

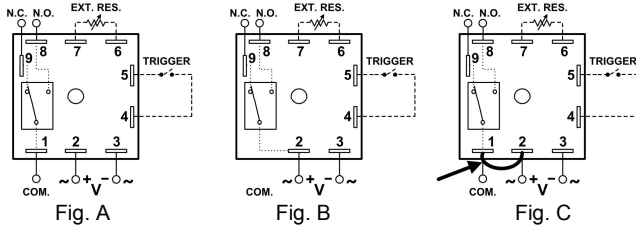
To replace a product that has a Remote Time Delay, use Terminals 6 & 7 for connecting either a separate potentiometer for remote time delay adjustment or a resistor for fixed time delay. First, set the time delay as shown on the previous page for remote time delay adjustment. Then select remote pot time delay adjustment with Switches E & F. Either connect a separate potentiometer with a value of 100KΩ, 1MΩ or 2MΩ to terminals 6 & 7 or a resistor with a value as calculated below:

$$R = \frac{T}{T_{max}} \times R_T$$

R = Resistance value required by T
 T = Desired time delay
 T_{max} = Maximum time delay of selected range
 R_T = Value of remote pot selected with Switches E & F

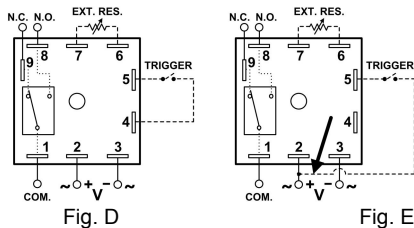
Relay Common

If the product being replaced has a connection to the Relay Common as a separate terminal (Fig. A below), connect the wires as shown in Fig. A. If the product being replaced has an internal connection between Input Voltage & the relay common (Fig. B), a jumper must be added between terminals 1 & 2 as shown in Fig. C to simulate the internal connection (see arrow below). No other connection is required to Terminal 1 other than this jumper:



Trigger (Control Switch)

If the product being replaced has the Trigger isolated (Fig. D below), make wire connections as shown in Fig. D. If the product being replaced has the Trigger Switch connected to Input Voltage (Fig. E below), connect one wire of the Trigger Switch to Pin 5 & the other wire to Input Voltage as shown in Fig. D (see arrow below):



NOTE: Some Functions (noted by an asterisk in the tables at right) require the use of a Trigger to initiate the unit as indicated by the dotted line in the wiring diagrams above. For Triggered DC Input Voltages, make sure the polarity matches the connection diagram. 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.

Function Descriptions

THR-3816U

Function	Timing Chart						
ON DELAY Delay on Make Delay on Operate	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	OUTPUT	[Delay t]		
INPUT VOLTAGE	[Pulse]						
OUTPUT	[Delay t]						
INTERVAL ON Interval	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	OUTPUT	[Delay t]		
INPUT VOLTAGE	[Pulse]						
OUTPUT	[Delay t]						
OFF DELAY * Delay on Release Delay on Break Delay on De-Energization	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>TRIGGER</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	TRIGGER	[Pulse]	OUTPUT	[Delay t]
INPUT VOLTAGE	[Pulse]						
TRIGGER	[Pulse]						
OUTPUT	[Delay t]						
SINGLE SHOT * One Shot Momentary Interval	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>TRIGGER</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	TRIGGER	[Pulse]	OUTPUT	[Delay t]
INPUT VOLTAGE	[Pulse]						
TRIGGER	[Pulse]						
OUTPUT	[Delay t]						

* Requires Trigger

THR-3836U

Function	Timing Chart						
FLASHER (Off First)	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	OUTPUT	[Delay t]		
INPUT VOLTAGE	[Pulse]						
OUTPUT	[Delay t]						
FLASHER (On First)	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	OUTPUT	[Delay t]		
INPUT VOLTAGE	[Pulse]						
OUTPUT	[Delay t]						
WATCHDOG * Retriggerable Single Shot	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>TRIGGER</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	TRIGGER	[Pulse]	OUTPUT	[Delay t]
INPUT VOLTAGE	[Pulse]						
TRIGGER	[Pulse]						
OUTPUT	[Delay t]						
SINGLE SHOT FALLING EDGE *	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>TRIGGER</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	TRIGGER	[Pulse]	OUTPUT	[Delay t]
INPUT VOLTAGE	[Pulse]						
TRIGGER	[Pulse]						
OUTPUT	[Delay t]						

* Requires Trigger

THR-3856U

Function	Timing Chart						
REPEAT CYCLE (OFF 1st)	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t1, t2]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	OUTPUT	[Delay t1, t2]		
INPUT VOLTAGE	[Pulse]						
OUTPUT	[Delay t1, t2]						
REPEAT CYCLE (On 1st)	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t1, t2]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	OUTPUT	[Delay t1, t2]		
INPUT VOLTAGE	[Pulse]						
OUTPUT	[Delay t1, t2]						
DELAYED INTERVAL Single Cycle	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t1, t2]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	OUTPUT	[Delay t1, t2]		
INPUT VOLTAGE	[Pulse]						
OUTPUT	[Delay t1, t2]						
TRIGGERED DELAYED INTERVAL * Single Cycle	<table border="1"> <tr> <td>INPUT VOLTAGE</td> <td>[Pulse]</td> </tr> <tr> <td>TRIGGER</td> <td>[Pulse]</td> </tr> <tr> <td>OUTPUT</td> <td>[Delay t1, t2]</td> </tr> </table>	INPUT VOLTAGE	[Pulse]	TRIGGER	[Pulse]	OUTPUT	[Delay t1, t2]
INPUT VOLTAGE	[Pulse]						
TRIGGER	[Pulse]						
OUTPUT	[Delay t1, t2]						

* Requires Trigger