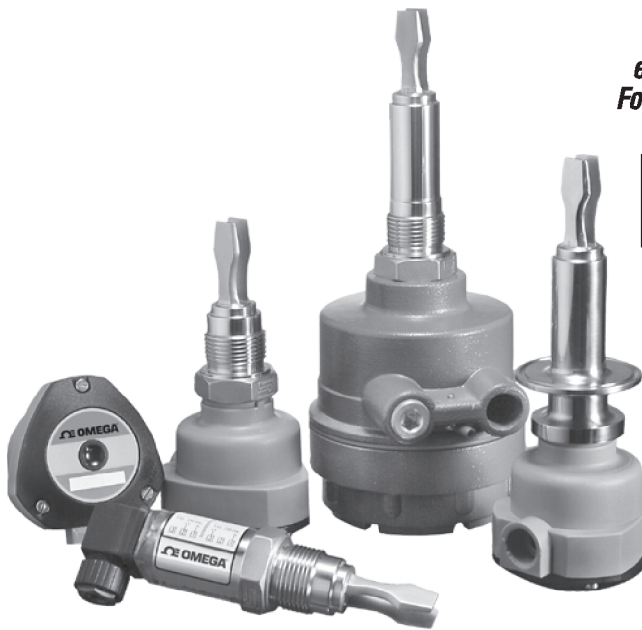




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## ***LTU2000 Series and Tuning Fork Sensors***



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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

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### LTU-2000 Series: Point Level Switch



Omega's LTU-2000 Series use a piezo-electric crystal that enables the switch to vibrate at a fixed pre-defined resonant frequency. When the tuning fork is submerged in the medium the frequency at which the switch is vibrating, changes. This change is detected by the unit's electronics and is converted into a switch output (either relay or PNP/NPN depending on the model).

The red LED in the housing stays blinking when the LTU-2000 is in contact with the product. The same light stays on continuously when there is no contact with the product, giving a positive indication at all times that the LTU-2000 is working.

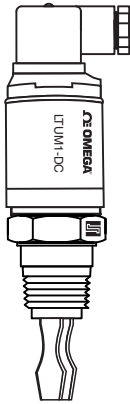
All models are made with 316 Stainless Steel and are available with ECTFE or epoxy coatings and hygienic fittings for sanitary applications. Standard versions can operate at temperatures up to 80°C (176°F) and higher temperature versions can operate at temperatures up to 120°C (248°F). All models (except the mini-versions) have adjustable time delay adjustment of 1, 5, 10 or 20 seconds and also have a Wet/Dry selection for both High and Low level application requirements.

### Features

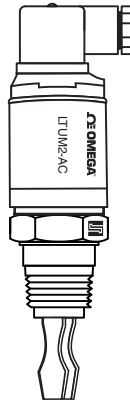
- Unaffected by variations in density, conductivity, dielectric constant or viscosity
- Unaffected by foam, tank agitation or vibration
- Available in Threaded, Sanitary and Flanged connections
- Available with customized length options to best suit your application
- All 316SS body and wetted parts, ECTFE coating when necessary
- Adjustable response time (from 1 to 20 seconds)
- Relay and Transistor outputs available

## Models

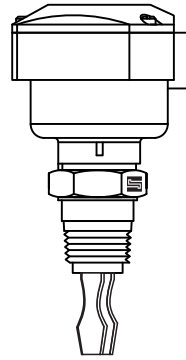
LTUM1-DC



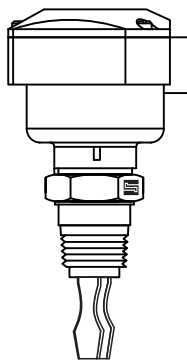
LTUM2-AC



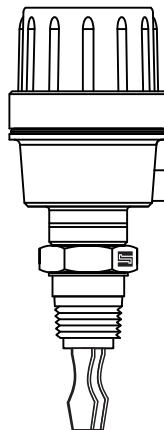
LTUP-DC  
NYLON HOUSING



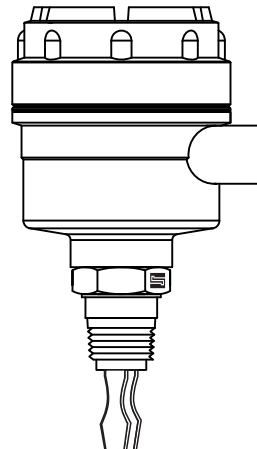
LTUR  
NYLON HOUSING



LTUR  
ALUMINUM HOUSING

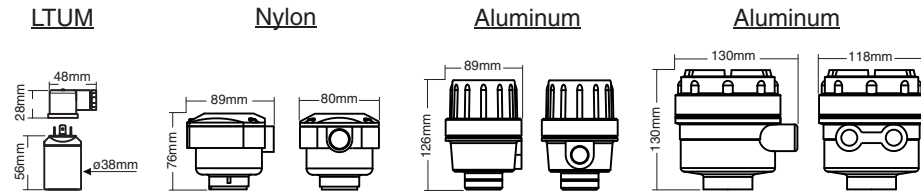


LTUR  
ALUMINUM HOUSING

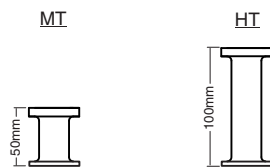


## Models and Dimensions

### Mounting Options for LTU-2000

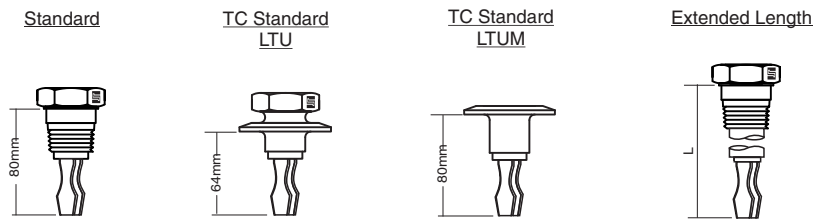


### Extended Necks for High Temperature



Extended necks for medium temperature (up to 100°C) and high temperature (up to 120°C)

### Insertion Length



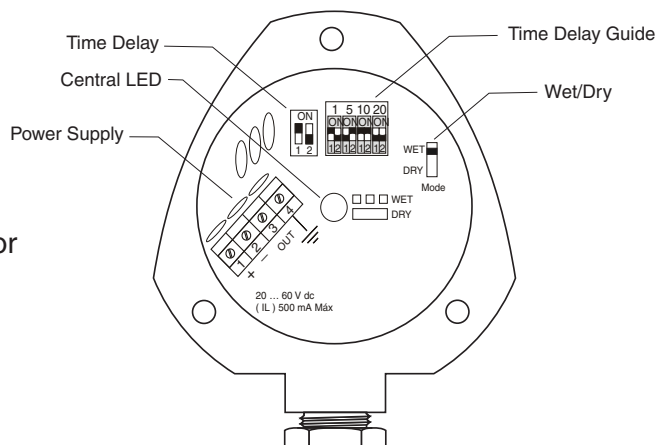
### Process Connections

Threaded Connections		Tri-Clamp Connection		Flange Connections	
3/4"		1 1/2"		1"	FF
1"		2"		1 1/2"	RF
1 1/2"		2 1/2"		2"	RF
2"		3"		2 1/2"	RF

## Wiring Diagram

### LTUP - Housing

- 1 - Power Supply (+)
- 2 - Power Supply (-)
- 3 - PNP/NPN Output  
or +24v/0v (Max 500mA)
- 4 - Ground

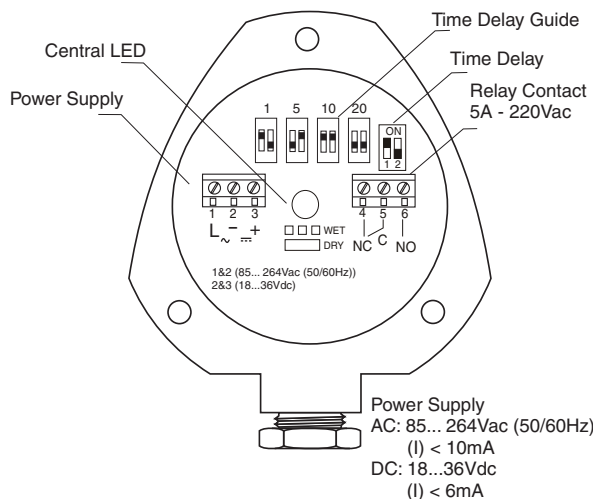


### LTUP - with M12 Connector

- 1 - Power Supply (+)
- 2 - Power Supply (-)
- 3 - PNP/NPN Output  
or +24v/0v (Max 500mA)
- 4 - Ground

### LTUR - Universal Power Supply Nylon Housing

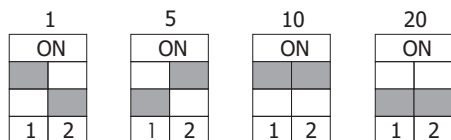
- 1 - Power Supply (L) } AC (~)
- 2 - Power Supply (-) } DC (≡)
- 3 - Power Supply (+) }
- 4 - NC Contact
- 5 - Common
- 6 - NO Contact



### LTUR - with M12 Connector

- 1 - Power Supply (L) or (+)
- 2 - Power Supply (-)
- 3 - NO Contact
- 4 - NC Contact
- 5 - Common

### Time Delay Guide



( 1 ; 5 ; 10 ; 20 sec. )

The different key positions indicate the time delay in seconds.

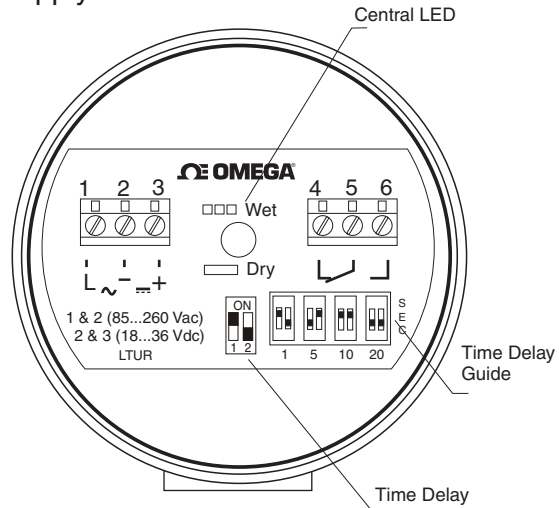
## Wiring Diagram

### LTUR - Universal Power Supply Small Aluminum Housing

- 1 - Power Supply (L) } AC ( $\sim$ )
- 2 - Power Supply (-) } AC ( $\sim$ )
- 3 - Power Supply (+) } DC ( $\Rightarrow$ )
- 4 - NC Contact
- 5 - Common
- 6 - NO Contact

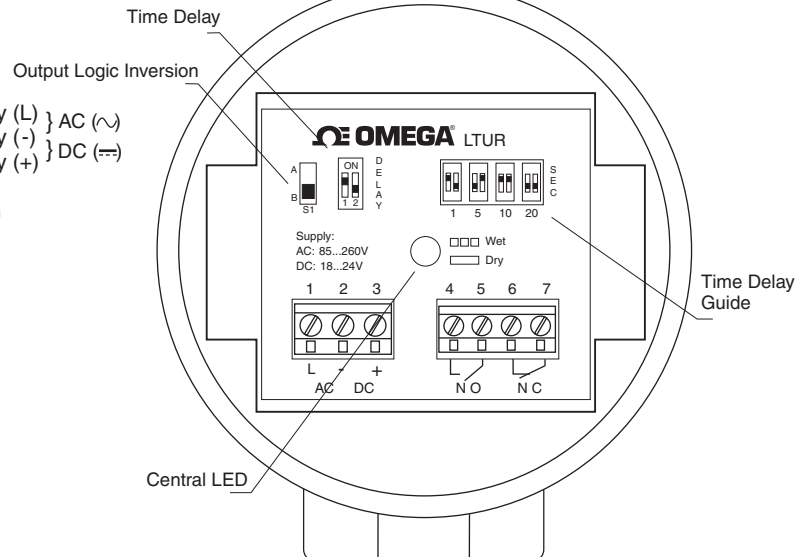
### LTUR - with M12 connector

- 1 - Power Supply (L) or (+)
- 2 - Power Supply (-)
- 3 - NO Contact
- 4 - NC Contact
- 5 - Common



### LTUR - Universal Power Supply Large Aluminum Housing

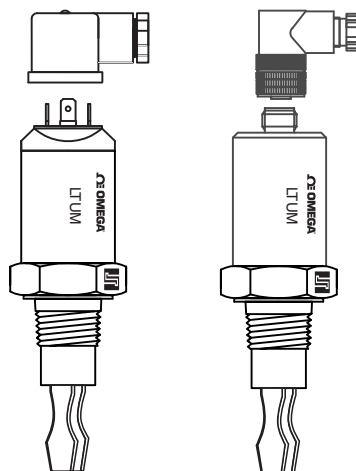
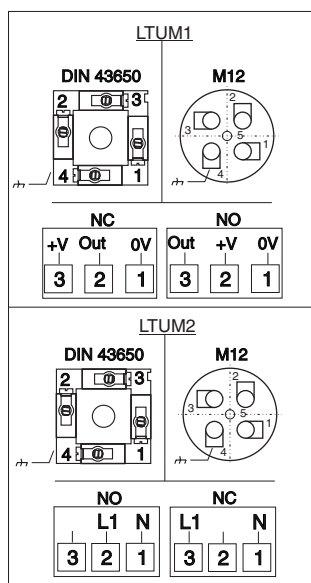
- 1 - Power Supply (L) } AC ( $\sim$ )
- 2 - Power Supply (-) } AC ( $\sim$ )
- 3 - Power Supply (+) } DC ( $\Rightarrow$ )
- 4 - NO Contact
- 5 - NO Common
- 6 - NC Contact
- 7 - NC Common






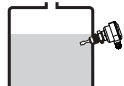
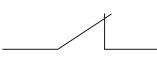
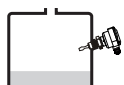
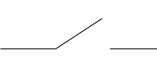


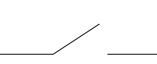


## Wiring Diagram

⚠ To avoid burning the unit, make sure that the load has been installed in series with the LTUM before powering it up.

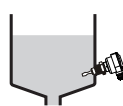
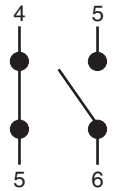
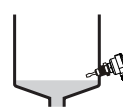
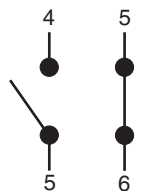


# LTUP and LTUR Status Guide

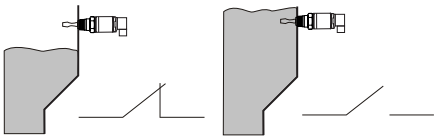
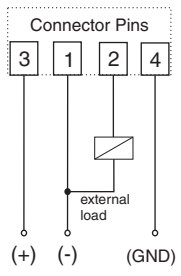
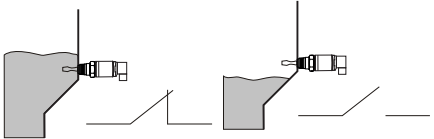
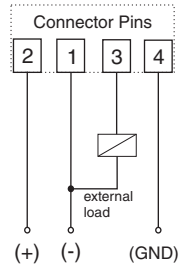
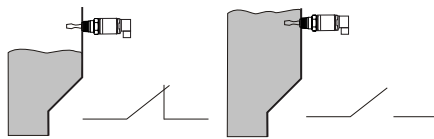
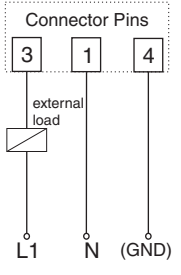
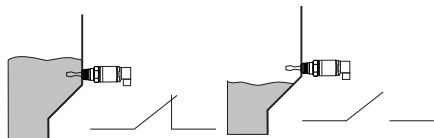
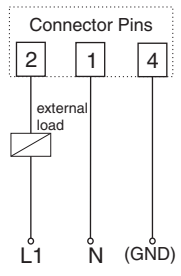
For LTUP / DC

Switch Position	Level	Out	Central LED
<div>WET</div> <div></div> <div>Maximum fail-safe</div>	<div></div> <div>Probe Covered</div>		WET (Blink)
	<div></div> <div>Probe Uncovered</div>		DRY (On)
<div>DRY</div> <div></div> <div>Minimum fail-safe</div>	<div></div> <div>Probe Covered</div>		WET (Blink)
	<div></div> <div>Probe Uncovered</div>		DRY (On)

For LTUR (Universal Power Supply)

Level	NO - NC	Central LED
<div></div> <div>Probe Covered</div>	<div></div>	WET (Blink)
<div></div> <div>Probe Uncovered</div>	<div></div>	DRY (On)

# LTUM Status Guide

<p>LTUM1 / DC ( Operating Mode NC )</p> 	<p>Connector Pins</p> 
<p>LTUM1 / DC ( Operating Mode NO )</p> 	<p>Connector Pins</p> 
<p>LTUM2 / AC ( Operating Mode NC )</p> 	<p>Connector Pins</p> 
<p>LTUM2 / AC ( Operating Mode NO )</p> 	<p>Connector Pins</p> 

## Installation

Confirm that the wire connections are correct and that the available power supply is compatible with the LTU unit.

Verify that the operating pressure and temperature of the process corresponds to the operating parameters of the LTU unit.

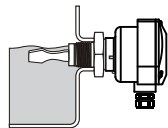
The LTU can be installed at any angle of the pipe or vessel to detect the presence of liquids.

Verify that the forks are inserted into the medium until the proper point within the vessel and that they stay clear from the inside walls (Fig. 1 and 2).

Ensure that the conduit is facing downward and makes a U-turn on the bottom of the cable to avoid moisture from entering the housing enclosure (Fig.3).

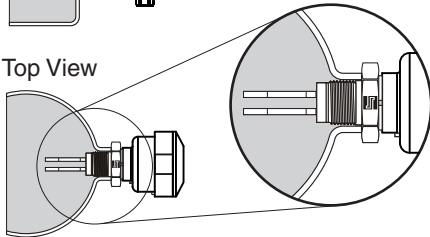
For proper installation of the LTU use the mark as a reference for correctly positioning the forks. It is recommended that the correct orientation be used to avoid build up between the forks (Fig. 4).

Side View

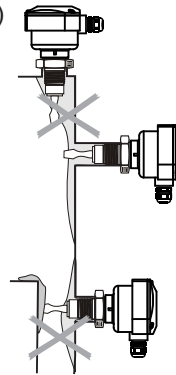


(Fig.4)

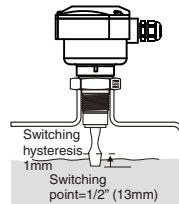
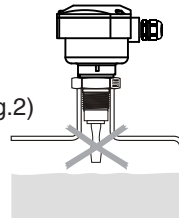
Top View



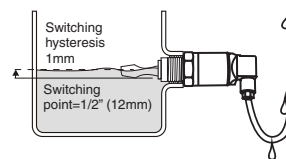
(Fig.1)



(Fig.2)



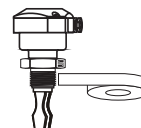
(Fig.3)



## Handling

Seal the thread with Teflon tape before installation (Fig. 1).

Fig. 1



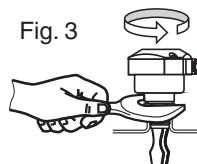
Do not thread the unit into the vessel, or turn it, by the housing (Fig. 2).

Fig. 2



Use the correct tools during the installation of the LTU (Fig. 3).

Fig. 3



The LTU should not be dropped or suffer any impact or fall that could damage the electronics, coating or the forks of the probe (Fig. 4 and 5).

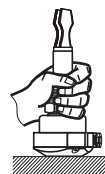
Fig. 4



Periodic visual inspection of the LTU is required to check for corrosion or deposit build-up. If deposits are found, clean the sensor to ensure optimum performance.

When cleaning the Forks use a soft brush to ensure that the coating or polishing is not damaged or scratched.

Fig. 5



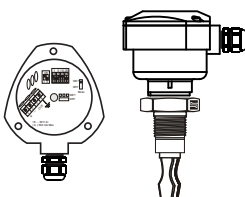
Do not alter or bend the shape of the forks (Fig. 6).

Fig. 6



## Technical Specifications

### LTUP

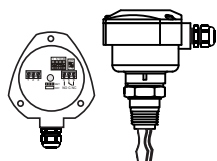


Nylon Enclosure

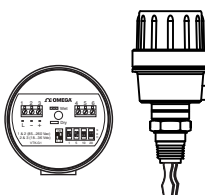
Application	Level Switch for Liquids
Operating Voltage	20...60 Vdc
Current Consumption	+/- 3mA
Output	PNP (3 wires)
Medium Viscosity	Max.: 20.000cs
Accuracy	0.1%
Repeatability	< 0.5mm
Time Delay	1 to 20 seconds (adjustable)
Switching Point	13mm from tip
Load Current	500mA
Enclosure Material	Glass Filled Nylon
Electrical Connection	½" NPT, M12 Connector or Cable Gland
Process Connection	¾" to 1 ½" BSP, NPT or Sanitary
Wetted Material	316 Stainless Steel
Operating Temperature	-14 to 176° F (-10 to 80°C)
Max Pressure	725 PSI (50 Bar)
Class Protection	IP 65

## Technical Specifications

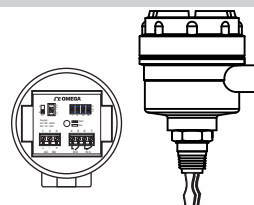
### LTUR



Nylon Enclosure



Aluminum Enclosure



Aluminum Enclosure

Application	Level Switch for Liquids
Operating Voltage	18...36 Vdc 85...264 Vac (50/60Hz)
Current Consumption	DC < 6mA AC < 10mA
Output	Relay (SPDT) N1, G1 / (1NO+1NC) G2
Medium Viscosity	Max.: 20.000cs
Accuracy	0.1%
Repeatability	< 0.5mm
Time Delay	1 to 20 seconds (adjustable)
Switching Point	13mm from tip
Load Current Relay	5A ( 250 Vac)
Enclosure Material	Glass Filled Nylon or Aluminum
Electrical Connection	½" NPT, M12 Connector or Cable Gland
Process Connection	3/4" to 1 ½" BSP, NPT or Sanitary
Wetted Material	316 Stainless Steel
Operating Temperature	-14 to 176° F (-10 to 80°C)
Max Pressure	725 PSI (50 Bar)
Class Protection	IP 65

## Technical Specifications

### LTUM1



LTUM1

Application	Level Switch for Liquids
Operating Voltage	20...60 Vdc
Current Consumption	+/- 3mA
Output	PNP (3 Wires)
Medium Viscosity	Max.: 20.000cs
Accuracy	0.1%
Repeatability	< 0.5mm
Time Delay	1 sec.
Switching Point	13mm from tip
Load Current	500mA
Enclosure Material	316 Stainless Steel
Electrical Connection	Plug DIN 43650 / M12 Connector
Process Connection	3/4" to 1 1/2" BSP, NPT or Sanitary
Wetted Material	316 Stainless Steel
Operating Temperature	-14 to 248° F (-10 to 120°C)
Max Pressure	725 PSI (50 Bar)
Class Protection	IP 65 DIN 43650 connector IP 67 M12 connector



## Technical Specifications

### LTUM2



LTUM2

Application	Level Switch for Liquids
Operating Voltage	85...264 Vac
Current Consumption	+/- 3mA
Output	Direct Load Switching (2 Wire)
Medium Viscosity	Max.: 20.000cs
Accuracy	0.1%
Repeatability	< 0.5mm
Time Delay	1 sec.
Switching Point	13mm from tip
Load Current	100mA
Enclosure Material	316 Stainless Steel
Electrical Connection	Plug DIN 43650 / M12 Connector
Process Connection	3/4" to 1 1/2" BSP, NPT or Sanitary
Wetted Material	316 Stainless Steel
Operating Temperature	-14 to 248° F (-10 to 120°C)
Max Pressure	725 PSI (50 Bar)
Class Protection	IP 65 DIN 43650 connector IP 67 M12 connector

## Trouble Shooting

Fault	Case	Solution
Does not switch	The central LED is not on	Verify the Power Supply
	The LED flashes 3 times/sec.	Internal failure
	The LED flashes once every 2 seconds	Internal failure
	The LED flashes once every 4 seconds	High current load or short circuit. Check the installation.
	The Fork is encrusted with build-up	Clean the forks
Incorrect switching	Dry = on Wet = on	Properly configure the key switch
	Fast switching	Select a longer time delay

## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

**OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.**

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/ DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

## RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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