CE

FC

ΩΞ OMEGA®

User's Guide

WIRELESS
INDUSTRIAL TRANSMITTER

2.4 GHz

ΩΞ

FCC ID: OUR–XBEEPRO
IC #4214A–XBEEPRO

FC CE ⚠ ☒

This device complies with Part 15 of the FCC rules.
Operation is subject to the following two conditions:
1) This device may not cause harmful interference;
2) This device must accept any interference received,
including interference that may cause undesired
operation.

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UWPH-2-NEMA
Wireless pH/Temperature
Transmitter

ΩΞ OMEGA®

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Table of Contents

List of Figures

Section 1 - Introduction

Please read this manual completely before installing and operating your wireless end device and receiver system. It's important to read and follow all notes, cautions, warnings and safety precautions before operating this end device. "End device" refers to your transmitter or receiver unit.

1.1 Precautions

- This device is not designed for use in any medical or nuclear applications.

- Do not operate this device in flammable or explosive environments.

- Never operate with a power source other than the one recommended in this manual.

- This device has been designed for dry, moisture free indoor applications only.

- Do not operate this device outside of the recommended use outlined in this manual.

- No co-location with other radio transmitters is allowed. By definition, co-location is when another radio device or it's antenna is located within 20 cm of your end device and can transmit simultaneously with your UWPH unit.

- Never install wireless end devices within 20 cm or less from each other.

- Never install and/or operate your UWPH unit closer than 20 cm to nearby persons.

- Never use your UWPH unit as a portable device. Your unit has been designed to be operated in a permanent installation only.

NOTE:

There are no user serviceable parts inside your device. Attempting to repair or service your unit may void your warranty.

1.2 Safety Warnings and IEC Symbols

This device is marked with international safety and hazard symbols in accordance with IEC standards. It is important to read and follow all precautions and instructions in this manual before operating or commissioning this device as it contains important information relating to safety and EMC. Failure to follow all safety precautions may result in injury and or damage to your device. Use of this device in a manner not specified will void your warranty

IEC symbols   **Description**

Caution, refer to accompanying documentation

EU's Waste Electrical and Electronic Equipment Compliance

Figure 1-1. IEC Symbols

1.3 Product Labeling
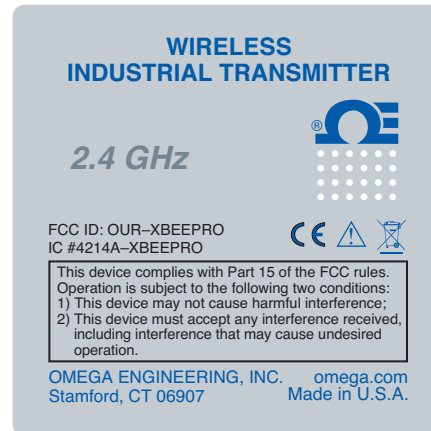
1.3.1 Product Labeling

Figure 1-2. Product Label

1.4 Statement on FCC and CE Marking

1.4.1 FCC Marking

FCC ID: OUR-XBEEPRO   IC #4214A-XBEEPRO

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1.) This device may not cause harmful interference. 2.) This device must accept any interference received, including interference that may cause undesired operation.

1.4.2 CE Marking

It is the policy of OMEGA to comply with all worldwide safety and EMI/EMC regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

1.5 General Description and System Components

1.5.1 General Description

The transmitter provides temperature compensated pH measurement for industrial applications. The unit measures a pH range of 0 to 14 and is compatible with most pH probes with a BNC connector. For automatic temperature compensation, the UWPH accepts a Pt100 RTD probe with a standard (series T) connector.

The transmitter features a stand-alone, compact, battery powered NEMA design that transmits measurements back to a host receiver up to 90 m (300') away. When activated the wireless transmitter will transmit readings continuously at pre set time interval that was programmed by the user during the initial setup. Each unit measures and transmits: pH, Ambient Temperature, RF Signal Strength and Battery Condition to the receiver and is displayed on your PC screen in real time.
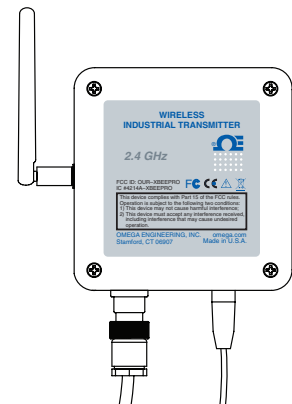

Figure 1-3. Transmitter With Connectors

Section 2 – Hardware

It is important that you read this manual completely and follow all safety precautions before operating this instrument.

2.1 Package Inspection

Remove the packing list and verify that you have received all your equipment. If you have any questions about the shipment, please call our Customer Service Department at

1-800-622-2378 or 203-359-1660. We can also be reached on the Internet at
omega.com
e-mail: cservice@omega.com

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE:

The carrier will not honor any damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

2.2 Included Items

The following items are supplied in the box.

• 1 UWPH-2-NEMA transmitter

• 1 User's Guide

• 3.6V Lithium Battery

• TA3F RTD mating connector

Section 3 - Operation

3.1 Main Transmitter Board
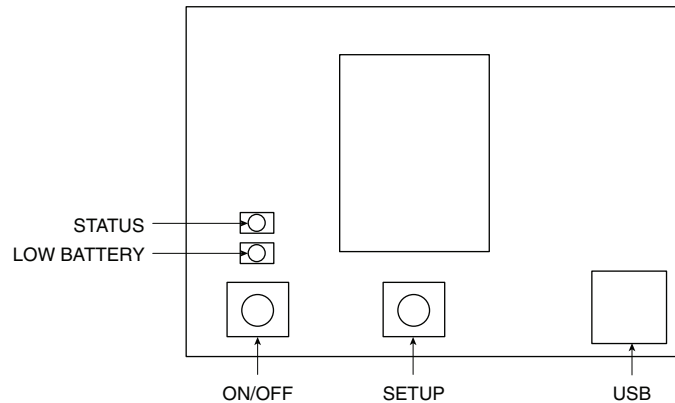
Figure 3-1. Main Transmitter Board

3.2 pH Probe and RTD Probe Connections

The UWPH can provide fast, accurate readings from most pH probes with a BNC connector. For automatic temperature compensation, the UWPH accepts a Pt100 RTD probe through a standard (series T) connector. If the pH probe does not include an RTD sensor or a separate RTD probe is not used, a 110 ohms resistor (included with the transmitter) must be connected to the RTD input by soldering it to the appropriate pins of the included mating connector. This will set the temperature input to a fixed value (about 26°C).

PIN	CONNECTION
1	RTD +
2	RTD –
3	NC

Figure 3-2A. pH Probe/ RTD Connections   **Figure 3-2.B TB3M Pinout**

Section 4 – Software

4.1 Getting Started

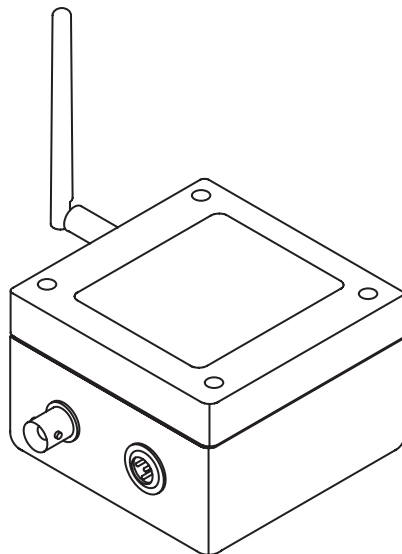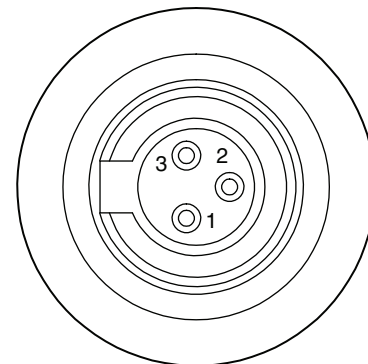The following program files are included on the TC-Central User Software CD supplied with your Receiver. These files can also be downloaded from the omega.com website should you misplace your CD.

• End Device Setup Utility Software

• Receiver/Transceiver Setup Utility Software

• TC-Central Measurement and Data Logging Software

4.2 Software Installation

5.2.1 System Requirements

Your PC should meet the following minimum requirements:

• Pentium Class processor

• Hard Drive Space: 210 meg

• Ram: 256 meg or higher

• 1 Available USB Port

• 1 CD-ROM Drive

• Windows 2000, XB, or Vista (32bit), Windows 7 Operating System

4.2.2 Software Installation

Insert the TC-Central User CD that was included with your receiver unit into the CD-ROM drive on your PC. Your system should begin the installation process automatically.
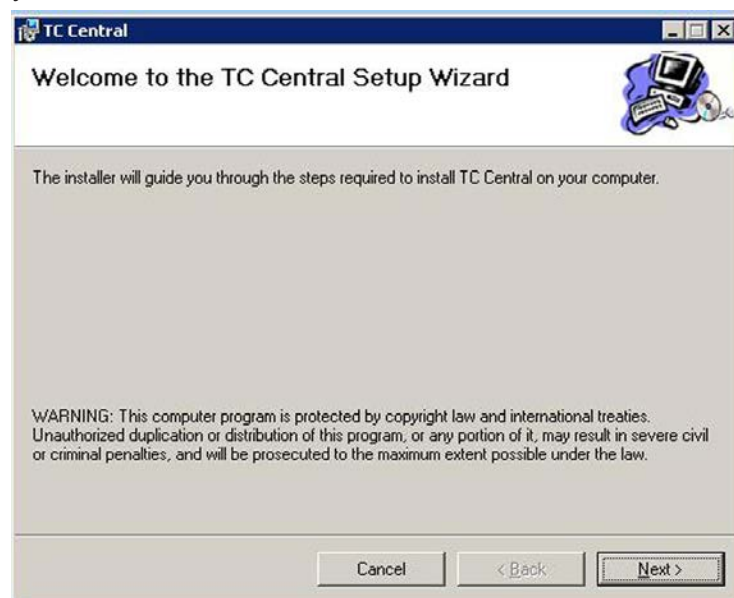
Figure 4-1. Software - Welcome Screen

This welcome screen should be visible on your computer screen.
To continue with installing the program, click the "Next>" button.
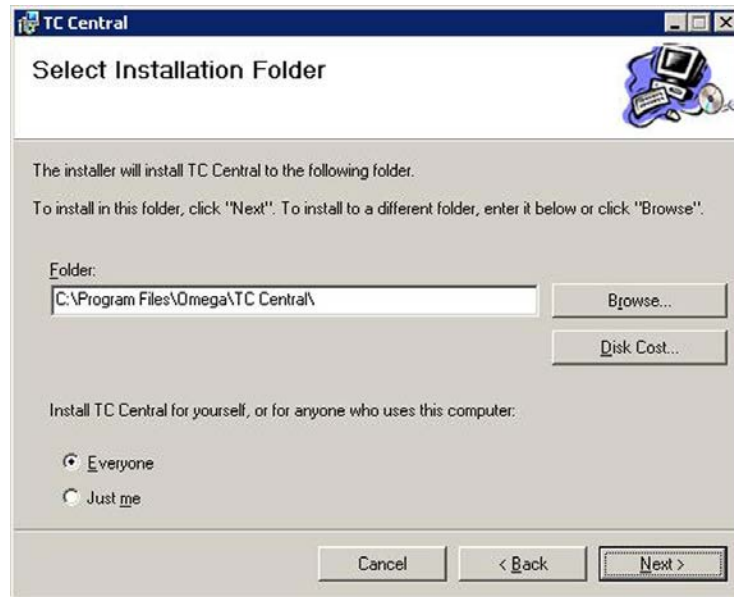
Figure 4-2. Software - Select Installation Screen

From this screen you select the folder were you want the program files installed on your PC. The default setting will install the software under your "Program" folders in a new folder named "Omega". To continue with installing the program click the "Next >" button.

Figure 4-3. Software - Confirm Installation Screen

The setup wizard now has all the information to complete the installation of the software on your PC. To continue with installing the program click the "Next >" button.

Figure 4-4. Software - License Agreement Screen

From this screen you must select "Agree" to continue installing your program. After making your selection click the "Next >" button. The setup wizard will now install the software.

Figure 4-5. Software - Installation Complete Screen

Congratulations! You have just successfully installed the TC-Central Program on your PC. To end installing the program and close the setup wizard click the "Close" Button.

Section 5 - End Device Operation

5.1 Setup and Configuration

5.1.1 Connecting your device

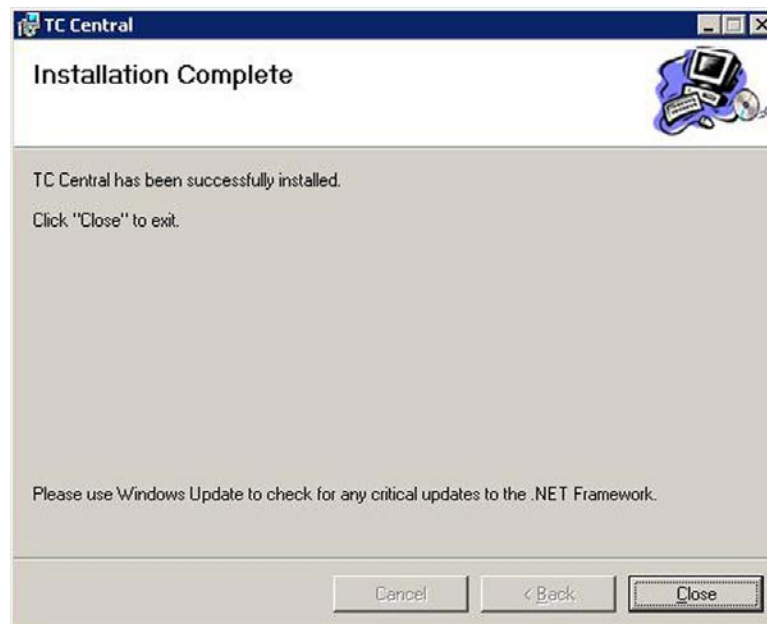Connect the USB cable to your connector/transmitter unit and also to an available USB port on your computer. See figure below. This cable was provided in the box with your receiver unit. This same cable is used for programming your End Device and for receiver operation later.

Figure 5-1. USB Cable

5.1.2 Configure Your End Device

Now that you have connected your USB cable to your PC and transmitter you will complete the following steps to configure your End Device before placing the unit into operation. You will be using the configuration software utility that you installed onto your PC in Section 5. If you have not installed the configuration software utility you should do so now. During this procedure you will be setting the following parameters in your transmitter.

5.1.3 Button Operation

(1.) "ON/OFF"

The "ON/OFF" button on the front of your connector/transmitter is used to turn your unit "ON" or "OFF"

(2.) "SETUP"

The "SETUP" button on the front of your connector/transmitter is only used during the setup and configuration of your unit.

5.1.4 Indicator Lights

(1) Transmit (TX) Green Indicator Light

The green indicator light marked "TX" on the front of the connector/transmitter will blink every time the unit sends data to the receiving unit. Example: If you selected a 5 sec sample rate the green TX led will blink one time every 5 seconds.

(2) Low Battery (Low Bat) Red Indicator Light

The red indicator light marked "Low Bat" on the front of the connector/transmitter will turn on when the battery reaches a level at or below the power level required for normal operation. When this indicator turns on it's time to install a fresh battery in your unit. For procedures on how to change your battery see Section 6.3.

Channel Number

This sets a unique address number into your transmitter. Later, when you set up your measurement software you will again set channel numbers to receive readings from the corresponding unit(s). Each unit must be set for a different channel number for your system to operate correctly.

NOTE:

> If you will be using more than one receiver unit in your area it is important to set the transmitter address numbers to be a corresponding number in your TC-Central software.
> Example Rate
> For the first receiver: Set the channels on your transmitters to 101, 102, 103, 104, etc. Then set the channels in your TC-Central user software to match.
> For the second receiver: Set the channels on your transmitters to 201, 202, 203, 204, etc.
> Then set the channels in your TC-Central user software to match.
> This numbering scheme can be expanded to match the number of receivers you are using.

Sample Rate

This will program your End Device to transmit 1 data reading to your receiver at a specified time interval. Available settings are 2, 3, 5, 15, 30, 45, 60, 75 or 90 seconds

NOTE:

> The sample rate you set will have the most direct effect on the life of the battery in your End Device. It is recommended that you set the longest sample time that your application can live with to extend time between battery replacement. See Section 6.3 for more information on battery

STEP 1. Enter the "SETUP" mode.

To place your transmitter into the "SETUP" mode for programming follow this procedure.

STATUS
LOW BATTERY

ON/OFF   SETUP   USB
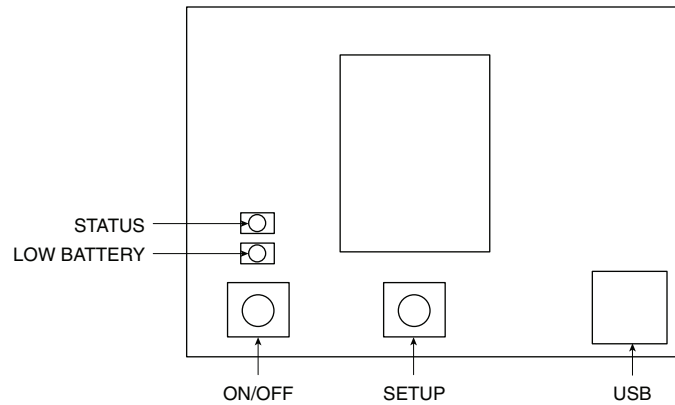
Figure 5-2. Main Transmitter Board

Press and hold the "ON/OFF" button. While the "ON/OFF" button is being held, press the "SETUP" button one time and then release the "ON/OFF" button. The green (TX) indicator on the front of your device should be blinking at a steady rate. This indicates your End Device is ready to run the configuration utility software.

STEP 2. Launch Setup Utility Program.

To launch the End Device setup utility program on your PC begin by accessing the "Programs" list under your "Start Menu".

Scroll through the list of to find the Omega "TC-Central" folder, then select the End Device Configuration Program.
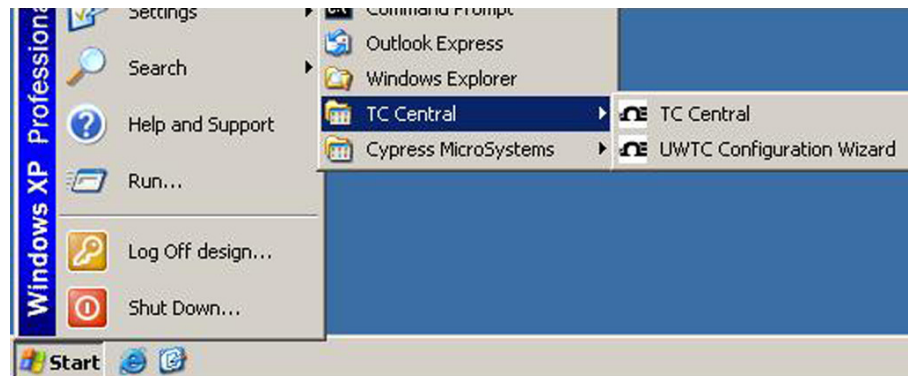
Figure 5-3. Launch Setup Utility Screen

STEP 3. Programming your settings into your End Device

Figure 5-4. Utility Program - Welcome Screen

After starting the setup utility program this will be the first screen you will see. Click the "Next >" button to proceed and continue setting up your End Device. Each screen will provide instruction details on how to proceed.
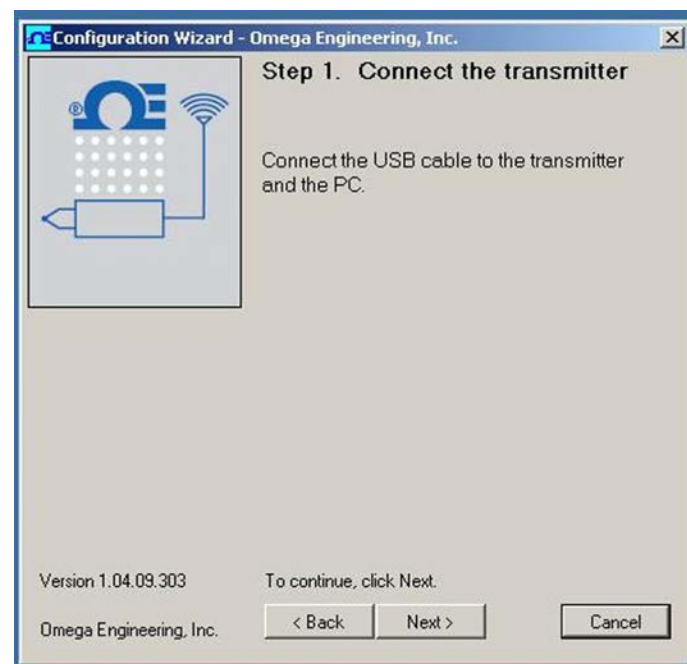
Figure 5-5. Utility Program - Connect To Transmitter Screen

If you have not already connected your End Device to a USB port on your PC you must do this now before continuing. After your unit has been connected click the "Next >" button to proceed and continue setting up your unit.
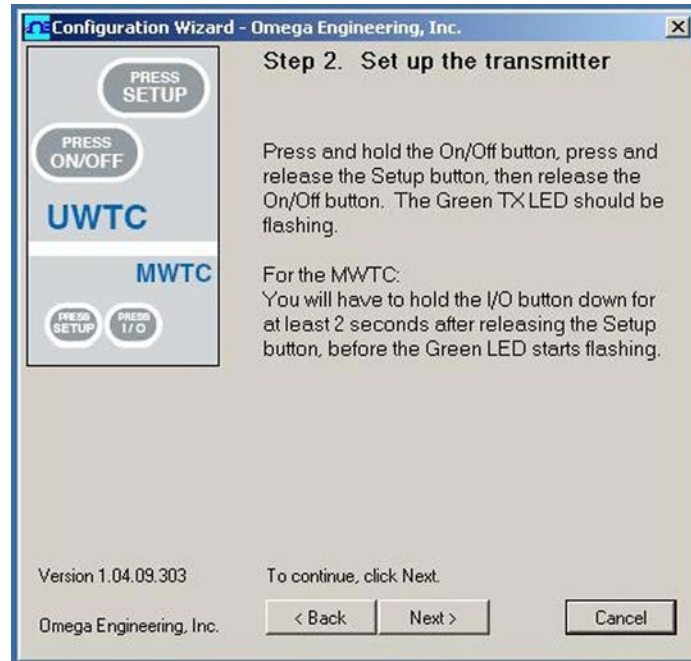
Figure 5-6. Utility Program - Setup Transmitter Screen

If you have not already placed your End Device into the "Setup" mode you should do this now before continuing. After your unit has been placed into the "Setup" mode click the "Next >" button to proceed and continue setting up your unit.
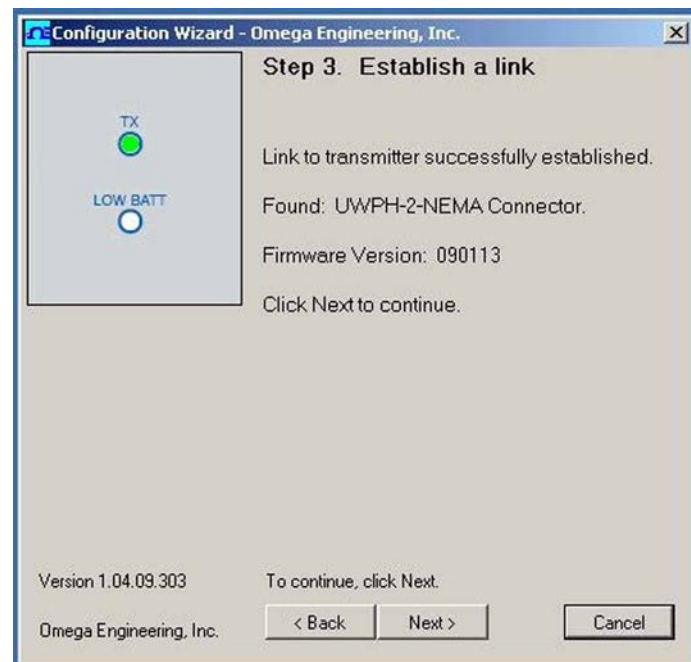
Figure 5-7. Utility Program - Establish Link Screen

After successful communication between your connector/transmitter has been established you can click the "Next >" button to proceed and continue setting up your connector/transmitter. If you did not receive this confirmation of proper communication you should click the "Back" button to try connecting again.
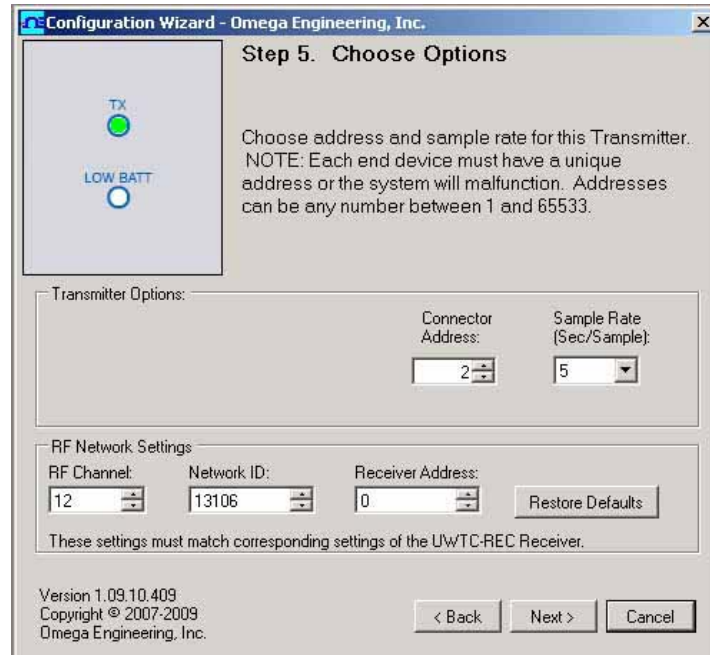
Figure 5-8. Utility Program - Choose Options Screen

From this screen you will select the main operating settings for your end device. (Note: Each end device must have a different address number for proper operation). After making your selections click the "Next >" button to proceed and program your settings into your unit.
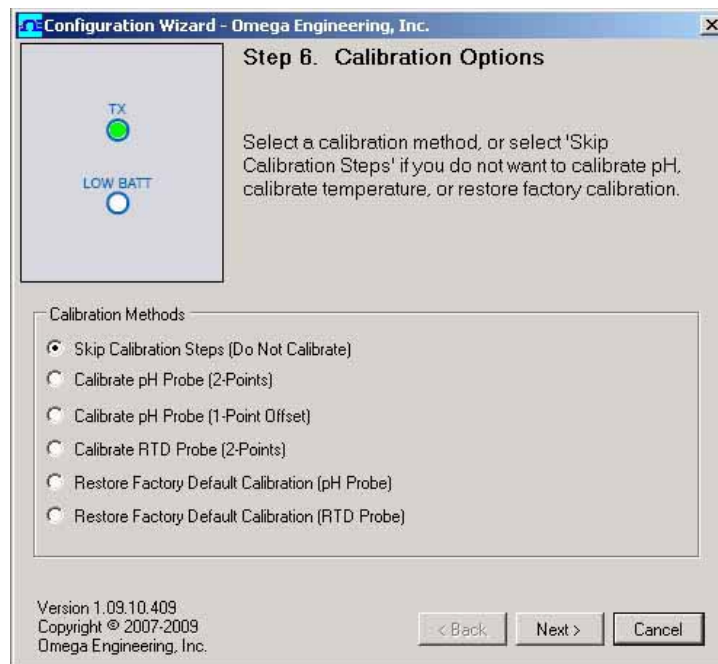
Figure 5-9A. Utility Program - Calibration Options Screen

This screen allows you to select from a number of different calibration options. For pH you can perform a full 2 point calibration or a simple 1 point offset to account for sensor drift. For the RTD input you can also perform a 2 point calibration. You can also restore both inputs to the factory calibration. Select the calibration type you wish to perform and press the "Next>" button and follow the instructions for calibration. For more information see Section 7, Services and Calibration.
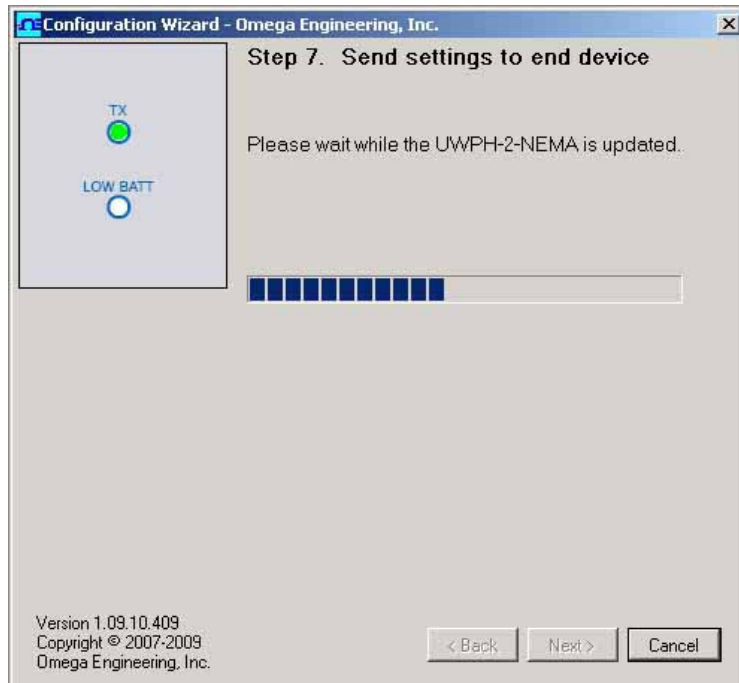
Figure 5-9B. Utility Program - Send Settings To End Device Screen

Congratulations! You have successfully programmed your end device. After your unit has been programmed click the "Finish" button to close the utility program.

5.2 Mounting, Installation and Antenna Connection

5.2.1 Mounting
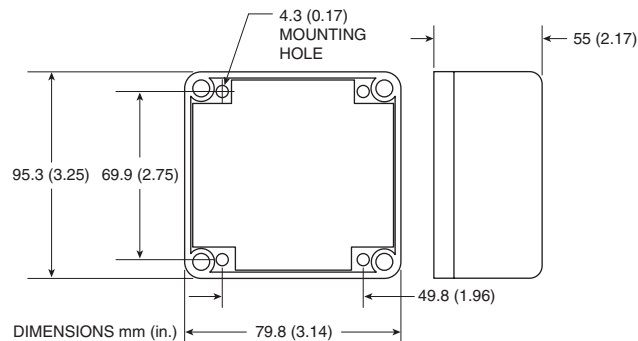
Figure 5-10. Mounting

When mounting your end device, care should be taken to make sure it is as far away from any metal objects. If nearby metal gets too close to your unit, it has the potential to interfere with the way the unit radiates and may cause signal lose or possibly even the inability to communicate at all with your receiver.

5.2.2 Installation

When installing your End Device it is important to position your device in such a way as to optimize the antenna location within what's known as the "Fresnel Zone".

The Fresnel Zone can be thought of as a football-shaped invisible tunnel between two locations that provides a path for RF signals between your End Device and your receiver.
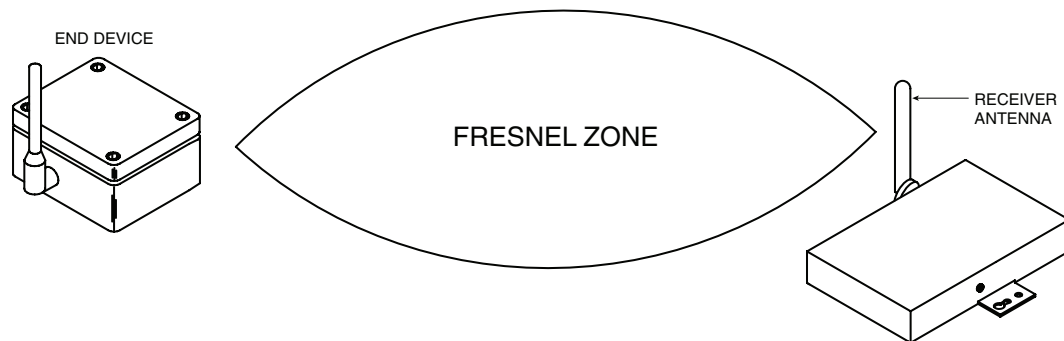
Figure 5-11. Fresnel Zone

In order to achieve maximum range, the football-shaped path in which radio waves travel must be free of all obstructions. Obstacles in the path (especially metal) will decrease the communication range between your End Device and receiver. Also, If the antennas are mounted just barely off the ground, over half of the Fresnel zone ends up being obstructed by the earth resulting in significant reduction in range. To avoid this problem, the antennas should be mounted high enough off of the ground so that the earth does not interfere with the central diameter of the Fresnel zone.

NOTE:

It is important to understand that the environment may change over time due to new equipment or machinery being installed, building construction, etc. If new obstacles exist between your End Device and receiver, the devices can be raised on one end or on both ends to hopefully clear the Fresnel Zone of obstructions.

NOTE:

No co-location with other radio transmitters is allowed. By definition, co-location is when another radio device or the device's antenna is located within 20 cm of your connector/transmitter and can transmit simultaneously with your unit.

NOTE:

Never install multiple End Devices within 20 cm or less from each other.

NOTE:

Never use your End Device as a portable device. Your unit has been designed to be operated in a permanent installation only.

5.2.3 Antenna Connection

Your End Device has been shipped to you with a standard approved antenna.

NOTE:

Use of any other antenna then what's supplied with your End Device will void all FCC, IC and CE regulatory compliance.

5.3 Battery Replacement

5.3.1 Model UWPH-2-NEMA

To install or replace the battery in your End Device you must first remove the four screws located on the Lid of the enclosure. This will allow you to access the battery compartment.
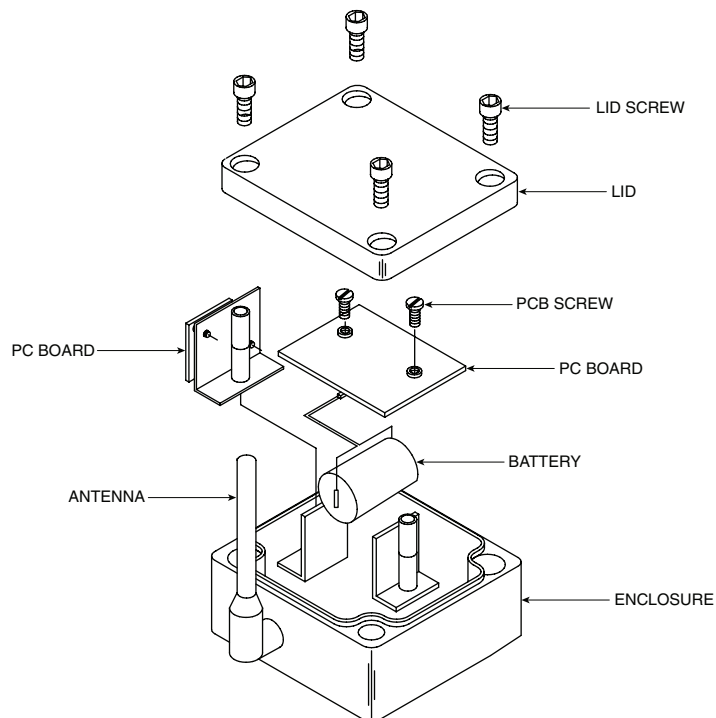
Figure 5-12. Battery Replacement

Your End Device is equipped with a "C" size lithium power cell assembly.
Omega Part Number: UWTC-BATT-C. To install a replacement battery assembly
follow steps outlined here.

A. Remove the two screws that secure the main circuit board assembly.

B. Lift the circuit board just high enough to allow you to unplug the connector
that attaches the battery assembly to the bottom of the circuit board.

C. Remove the old power cell.

D. Install your new battery assembly into the housing in the same position as the
old battery was located.

E. Connect the battery assembly connector to the mating connector on the
bottom of the circuit board.

F. Install the circuit board back into the housing and secure with the two screws
you removed in step one.

G. Installation complete

CAUTION:

Installing your end device in an application were the unit will be
exposed to ambient temperatures above or below the operating
limits specified in this manual will damage your unit and cause
the unit to malfunction and produce incorrect operation.

NOTES:

Section 6 - System Operation

6.1 Introduction

Compared to wired systems, a wireless system provides much simpler installation. Based on the physical principle of the propagation of radio waves, certain basic conditions should be observed. The following simple recommendations are provided to Insure proper installation and correct operation of your wireless system.

6.2 RF Communication Basics

The Model UWPH-2-NEMA sends wireless transmissions to a receiver. The receiver checks the incoming data for accuracy and processes this data for use by the measurement software on your PC. Radio signals are electromagnetic waves, hence the signal becomes weaker the further it travels. While radio waves can penetrate some solid materials like a wall, they are dampened more than when a direct line-of-sight between the transmitting and receiving antenna exist.

6.3 Basic System Overview

A basic wireless pH/Temperature system is comprised of only two main components; a signal conditioner with a built-in battery powered 2.4 GHz radio transmitter, and a USB powered 2.4 GHz radio receiver.
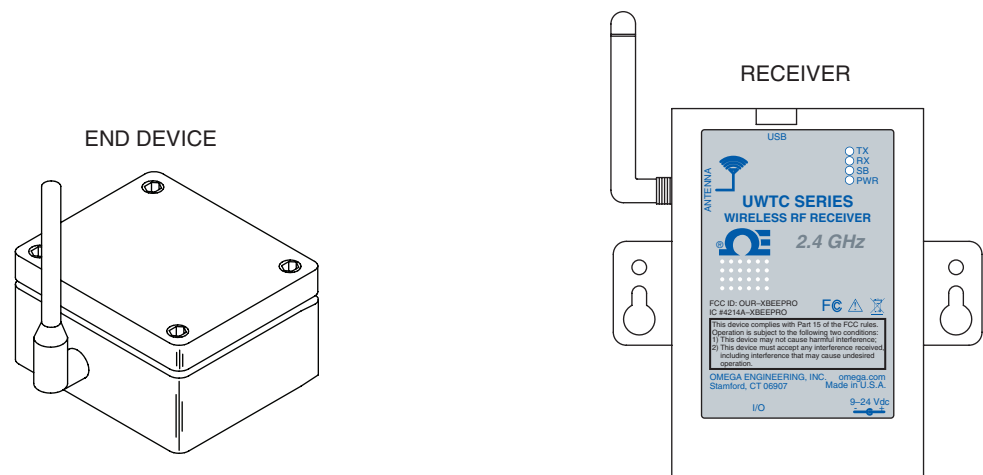

Figure 6-1. End Device/Receiver

NOTE:

Up to 48 end devices can be used with one receiver.

6.4 Environment/Operating Conditions

6.4.1 Environment

Omega's NEMA wireless end devices and receiver units have been designed to be fixed and operated in both indoor and outdoor environments; they are also weather-resistant. Care should be taken to prevent the components of your wireless system from being exposed to toxic chemicals and extreme cold or hot temperature that are outside the specifications listed in this manual.

6.4.2 Operating Conditions

The following is a list of basic good practice you should apply when operating your wireless system.

- Never operate your wireless device or receiver outside the recommended environmental limits specified in this manual.

- Never operate your wireless end device or receiver in flammable or explosive environments.

- Never use your wireless end device or receiver in medical, nuclear or other dangerous applications where an interruption of readings can cause damage or harm.

- Never operate your end device or receiver with any other battery or power source than what's specified in this manual or on the battery compartment label.

- No co-location with other radio transmitters is allowed. By definition, co-location is when another radio device or it's antenna is located within 20 cm of your end device and can transmit simultaneously with your end device.

- Never install end devices within 20 cm or less from each other.

- Never use your end device as a portable device. Your unit has been designed to be operated in a permanent installation.

- Never install and/or operate your end device closer than 20 cm to nearby persons.

- Never operate your end device with any other antenna than what is supplied or listed here in this manual for approved use.

6.5 Transmit Rate vs. Battery Life

Many factors such as ambient temperature conditions and transmitting rate can have a big effect on the life of the battery used in your end device. Transmitting data places a big demand of the battery in your unit. The transmit rate is the single most contributing factor in the life of your battery. The slower the transmit rate you set, the longer the battery in your device will last. The table below gives some estimates on how long the battery should last vs. the transmit rate you selected when you setup your end device and under normal operating conditions.

For Model: UWPH-2-NEMA

Transmit Time	Estimated Battery Life
1 Sample/2 Seconds	102 days
1 Sample/3 Seconds	151 days
1 Sample/4 Seconds	198 days
1 Sample/5 Seconds	245 days
1 Sample/10 Seconds	461 days
1 Sample/15 Seconds	653 days
1 Sample/30 Seconds	1121 days
1 Sample/45 Seconds	1472 days
1 Sample/60 Seconds	1745 days
1 Sample/75 Seconds	1963 days

Section 7 – Service and Calibration

7.1 Calibration

Your UWPH-2-NEMA Wireless pH/Temp Transmitter has been factory calibrated for a pH range of 2 to 12 and a temperature range of 0 to 100°C. Information is provided below on how to perform a field calibration to your unit for custom pH and temperature ranges.

For pH there are 2 options available, a 1 point offset calibration and a more accurate 2 point calibration. The pH calibration performs a temperature correction based on the RTD reading. If you are not using and RTD you must connect a 110 Ohm resistor across the RTD input and maintain the buffer solution temperature as close to 25°C as possible. If you cannot maintain the buffer solution at 25°C, a different resistor value can be used that corresponds to the RTD resistance of the solution temperature in degrees Celsius. For the 2 point calibration any 2 points can be used. The 1 point pH offset calibration, although not as accurate as the two point method, is useful in cases where the UWPH and/or probe are permanently mounted in a hard to reach area, such as in a sump for effluent (waste water) monitoring.

The 2 point RTD probe calibration can be done at any two points between 0 and 100°C. In the case where temperature calibrator is not available, 0 and 100°C are the best points because you can use melting ice and boiling water to obtain accurate results.

7.2 Service

If any of your wireless system components require service, please call our Customer Service Department at 1-800-622-2378 or 203-359-1660. They will assist you in arranging the return of your device. We can also be reached on the Internet at www.omega.com, e-mail: cservice@omega.com

Section 8 – Specifications

pH Input

Input Range:	0 to 14 pH
Accuracy:	±0.1 pH
Resolution:	0.01 pH
Response Time:	2 sec max
Input Connection:	BNC connector
Input Impedance:	1012 ohms, Typical
Temperature Compensation:	Automatic, 0 to 100°C (32 to 212°F)

RTD Temperature Input

Input Type:	Pt100, European curve (0.00385)
Range:	0 to 100°C (32 to 212°F)
Accuracy:	±1°C (1.8°F)
Resolution:	0.1°C or °F
Input Connection:	TA3M connector; TA3F mating connector (included)
Computer Interface:	USB
Transmit Sample Rate:	Programmable from 1 per minute to 30 per min (1 per 2 sec)

Radio Frequency (RF) Transceiver

Carrier:	ISM 2.4 GHz, direct sequence spread spectrum
RF Output Power:	10 dBm (10 mW)
Range of RF Link **Outdoor Line of Sight:** **Indoor/Urban:**	 Up to 120 m (400') Up to 40 m (130')
RF Data Packet Standard:	IEEE 802.15.4, open communication architecture
Software (Included Free):	Requires Windows® 2000, XP or Vista (32 bit) operating system
Power:	One 3.6V, lithium "C" cell (included)
Battery Life (Typical):	3 years; 1 sample/minute reading rate @ 25°C
Enclosure:	NEMA-4X polycarbonate
Enclosure Dimensions:	80 L x 82 mm W (3.15 x 3.23")

Note: pH and RTD probes sold separately.

Section 9 – Approvals, Regulatory Compliance

NOTE:

All approvals outlined in this manual are based on testing that was done with antennas that are supplied with your Wireless Series System Components. Removing and or installing a different antenna will void the product compliance demonstrated in these documents.

9.1 FCC (Domestic Use)

For United States: FCC ID: OUR-XBEEPRO
For Canada: IC #4214A-XBEEPRO

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1.) This device may not cause harmful interference. 2.) This device must accept any interference received, including interference that may cause undesired operation.

WARNING:

To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

9.2 FCC International Usage and CE Marking

NOTE:

It is your (the user's) responsibility to insure that these products are operated within the guidelines here in this manual and in conformance with all local, state, federal or national regulations and laws of the country they are being operated in.
Transmitting Power —Your Wireless Series System Components have been designed, manufactured and tested so that the transmitting power of your connector transmitter will not exceed 10 dBm.

WARNING:

EMC (Electro Magnetic Compatibility) Radio transmission from these devices may be interrupted temporarily when subjected to a strong electromagnetic field between 320MHz and 350MHz.

NOTES:

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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