User's Guide

PHCN-37 and OPCN-37
**Microprocessor-Based pH Controller with
Automatic Temperature Compensation**

ΩΞ OMEGA™

PREFACE

Manual Objectives

This manual shows you how to set up and use the Programmable Digital Meter.

Standard Procedures:

* Checking voltage jumpers, or changing voltage power
* Mounting the panel
* Configuring Temperature compensation
* Selecting a decimal point position
* Configuring calibration parameters
* Performing two or three-point calibration
* Setting the setpoint's active band
* Selecting a latched or unlatched operation
* Setting setpoint's deadbands
* Enabling/disabling analog output
* Selecting analog output as current or voltage
* Scaling analog output

Preface

Table A-1. Sections of the Manual

If you want to read about:		Refer to section
Unpacking; safety considerations	1	Introduction
Meter description and features	2	About the Meter
Main board power jumpers; panel mounting, sensor input, main power and analog and relay output	3	Getting Started
Setpoint value, Temperature compensation, decimal point position, calibration, setpoint configuration; setpoint deadbands, analog output configuration and scaling	4	Configuring the Meter
Setpoint values	5	Selecting Setpoint Values
Display messages	6	Display Messages
Meter menu/sub-menu messages	7	Menu Configuration
Setpoint configuration messages	8	Setpoint Configuration Displays
Specifications	9	Specifications
Factory Preset Values	10	Factory Default Setup as Shipped

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Preface

NOTES, WARNINGS and CAUTIONS

Information that is especially important to note is identified by three labels:

- **NOTE**
- **WARNING**
- **CAUTION**
- **IMPORTANT**

Note ☞ **NOTE:** provides you with information that is important to successfully setup and use the Programmable Digital Meter.

CAUTION or WARNING: tells you about the risk of electric shock.

CAUTION, WARNING or IMPORTANT: tells you of circumstances or practices that can effect the meter's functionality and must refer to accompanying documents.

Tip ☞ **TIP:** Provides you helpful hints.

SECTION 1. INTRODUCTION

1.1 UNPACKING

Remove the Packing List and verify that all equipment has been received. If there are any questions about the shipment, use the phone number for the Customer Service Department nearest you.

Upon receipt of shipment, inspect the container and equipment for any signs of damage. Take particular note of any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

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

Verify that you receive the following items in the shipping box:

QTY	DESCRIPTION
1	Programmable Digital Meter indicator/controller with all applicable connectors attached.
1	Owner's Manual
1	Set Mounting brackets

Note ☞ If you ordered any of the available options (except the "BL" blank Lens option), they will be shipped in a separate container to avoid any damage to your indicator/controller.

Tip ☞ For first-time users: Refer to the QuickStart Manual for basic operation and set-up instructions.

1.2   SAFETY CONSIDERATIONS

This device is marked with the **international caution symbol**. It is <u>**important to read**</u> this manual before installing or commissioning this device as it contains important information relating to <u>**Safety and EMC**</u> (Electromagnetic Compatibility).

This instrument is a **panel mount** device protected in accordance with 2014/35/EU, electrical safety requirements for electrical equipment for measurement, control and laboratory. Installation of this instrument should be done by qualified personnel. In order to ensure safe operation, the following instructions should be followed.

This instrument has **no power-on switch**. An external **switch or circuit-breaker** shall be included in the building installation as a disconnecting device. It shall be marked to indicate this function, and it shall be in close proximity to the equipment within easy reach of the operator. The switch or circuit-breaker shall not interrupt the Protective Conductor (Earth wire), and it shall meet the relevant requirements of IEC 947–1 and IEC 947-3 (International Electrotechnical Commission). The switch shall not be incorporated in the main supply cord.

Furthermore, to provide protection against **excessive energy** being drawn from the main supply in case of a fault in the equipment, an **overcurrent** protection device shall be installed.

Note ☞
- Do not exceed voltage rating on the label located on the top of the instrument housing.
- Always disconnect power before changing signal and power connections.
- Do not use this instrument on a work bench without its case for safety reasons.
- Do not operate this instrument in flammable or explosive atmospheres.
- Do not expose this instrument to rain or moisture.
- Unit mounting should allow for adequate ventilation to ensure instrument does not exceed operating temperature rating.
- Use electrical wires with adequate size to handle mechanical strain and power requirements. Install without exposing bare wire outside the connector to minimize electrical shock hazards.

EMC Considerations
- Whenever EMC is an issue, always use shielded cables.
- Never run signal and power wires in the same conduit.
- Use signal wire connections with twisted-pair cables.
- Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

Failure to follow all instructions and warnings may result in injury!

SECTION 2. ABOUT THE METER

2.1 DESCRIPTION

This Digital Programmable meter is a value packed microprocessor-based pH controller or pH/ORP controller. This pH controller includes automatic or manual temperature compensation, quick calibration to 4, 7 and 10 pH; accepts most BNC combination pH electrodes with or without 100 or 1000 ohm RTD. Standard features include analog output and dual relay output. Isolated analog output must be ordered at time of purchase. Retransmission analog output is fully scalable. Dual 5 amp, form C relays control critical processes. A mechanical lockout has been included to guard against unauthorized changes.

2.2 FEATURES

The following is a list of standard features:

* 4-digit 14-segment LED display - red or green display
* NEMA 4 / Type 4 Front Bezel
* ±0.01 pH accuracy
* 0.5ºC Temperature accuracy
* 100 or 1000 ohm RTD input
* Nonvolatile memory-no battery backup
* Dual 5 amp, form C relay outputs
* Scalable non-isolated analog outputs
* 115 or 230 Vac 50/60 Hz power supply
  or 10-32 Vdc or 26-56 Vdc

The following is a list of optional features:

* Scalable isolated analog output

2.3 AVAILABLE ACCESSORIES

Table 2-1. Accessories and Add-Ons

Add-On Options

FS	Special Calibration/Configuration
SPC4	NEMA-4 Splash Proof Cover
SPC18	NEMA-4 Splash Proof Cover, NEW

Accessories

TP1A	Trimplate panel adaptor.
	Adapts DIN1A/DIN2A cases to larger panel cutouts
RP18	19-In. Rack Panel for one (1) 1/8 DIN instrument
RP28	19-In. Rack Panel for two (2) 1/8 DIN instrument
RP38	19-In. Rack Panel for three (3) 1/8 DIN instrument

2.4 FRONT OF THE METER
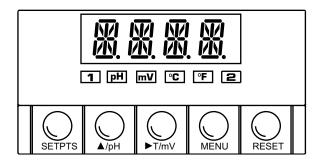
Figure 2-1a. Front of meter - pH Controller
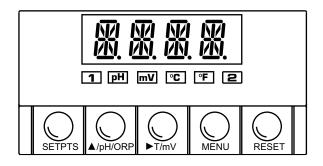
Figure 2-1b. Front of meter - pH/ORP Controller

METER DISPLAY:

Digital LED display   -1.9.9.9. or 9.9.9.9. 4-digit 14 segment, 0.54" high
LED display with programmable decimal point.

These meter display windows light when appropriate:

1   Setpoint 1 status
2   Setpoint 2 status
pH pH displays
mV mV displays
ºC Celsius
ºF Fahrenheit

About The Meter

2.4.1 METER BUTTONS

SETPTS Button

In the run mode, this button will sequentially recall the previous setpoint settings. As necessary, use the ▲**/pH** and ▶**/mV** buttons to alter these settings, then press the **SETPTS** button to store new values.

Unless you press the **SETPTS**, ▶**/pH**, or ▲**/mV** button within 20 seconds, the meter will scroll to setpoint 2 and then to the run mode.

▲**/pH** Button **(for pH Controller)**

In the run mode, this button will view pH value.

In the configuration mode, press this button to change the value of the flashing digit shown on the display and/or toggle between menu choices, such as "**R.2=F**" or "**R.2=C**" on RD.CF menu. When configuring your setpoint values, press the ▲**/pH** button to advance the flashing digit's value from 0 to 9 by 1.

▲**/pH/ORP** Button **(for pH/ORP Controller)**

In the run mode, this button will view pH value.

Note ☞ *If you have a pH/ORP Controller: throughout this manual's text, the ▲**/pH/ORP** button is referenced as the ▲**/pH** button.*

To toggle between the pH and ORP values while in the "Run Mode" (Normal Operation). Use this button also to change the value of the digits while in the "Setpoint" and "Menu" (Configuration) Modes.

▶**T/mV** Button **(for pH Controller)**

In the run mode press the ▶**T/mV** button to recall the mV value of your input signal. Press the ▶**T/mV** button a second time to recall the temperature value of your input.

In the configuration mode, press this button to scroll to the next digit.

▶**T/mV** Button **(for pH/ORP Controller)**

To view temperature while in the "Run Mode" (Normal Operation). Use this button also to select the digit's position while in the "Setpoint" and "Menu" (Configuration) Modes.

2.4.1 METER BUTTONS (Continued)

MENU Button

In the run mode, press the **MENU** button to terminate the current measuring process and enter you into the configuration mode.

In the configuration mode, press the **MENU** button to store changes in the nonvolatile memory and then advance you to the next menu item.

RESET Button

If you hard reset (press the **MENU** button followed by the **RESET** button) or power off/on the meter, it shows "**RST**", followed by "**pH**".

In the run mode, press the **RESET** button to reset the latched setpoints. The meter shows "**SP.RS**" and returns to the run mode.

In the configuration mode, press the **RESET** button once to review the previous menu. Press the **RESET** button twice to perform a hard reset and return to the run mode.

In the setpoint mode, press the **RESET** button to enter the run mode. The meter shows "**RUN**" and enters the run mode.

Note ☞ *When in setpoint or configuration mode, if the meter shows 9999 or -1999 with all flashing digits, the value has overflowed. Press the ▲/MAX button to start a new value.*

2.5 FRONT-PANEL BUTTON LOCK OUT (For Security Purposes)

2.5.1 Jumper Lock Out

To lock all front-panel buttons, remove the S3-A jumper (refer to Figure 3-2).

To lock the MENU button only, verify that the S3-B jumper is removed, then install the S3-A and S3-E jumpers (refer to Table 3-1). If you press the **MENU** button, the meter shows "**LOCK**" and returns to the run mode.

2.5.2 Push Button Lock Out

To lock the **RESET**, **MENU** and **SETPTS** buttons only, verify that the S3-A jumper is installed and the S3-E jumper is not installed, then follow these steps:

In the run mode -

> 1. Press and hold down the **RESET** button. The meter shows "**SP.RS**" or "**RUN**". Do not release the **RESET** button.
>
> 2. Press the **MENU** button and hold the **RESET** button down (3-5 seconds) until the meter shows "**LOCK**".
>
> 3. Release both buttons.

To unlock the **RESET**, **MENU** and **SETPTS** buttons, follow these steps:

> 1. Press and hold down the **RESET** button. The meter shows "**LOCK**". Do not release the **RESET** button.
>
> 2. Press the **MENU** button and hold the **RESET** button down (3-5 seconds) until the meter shows "**UN.LK**".
>
> 3. Release both buttons.

2.6 BACK OF THE METER

Figure 2-2 shows the label describing the connectors on the back of the meter. Table 2-1 on the following page gives a brief description of each connector at the back of the meter.

POWER & INPUT CONNECTIONS □□□□

TB□

1* 2* □*

VOLT CURR RTN

ISOLATED*
ANALOG OUT

- NO EXTERNAL RETURN: INSTALL **S4-A** ■ A ■ S□
- EXT RETURN: REMOVE **S4-A** & CONNECT EXT RTN TO **"-R"**

TB1

— RELAY 1 — — RELAY 2 —

N.O.1 N.C.1 COM1   N.O.2 N.C.2 COM2

1   2   □   □   □   □

□□ INPUT*

TB2

TB1

□ □ □

N□C +   □

═ DC

1□* 11* 12*   1*   2*   □*

L   N ⏚   VOLT CURR RTN   +R   □R   N□C

∿ AC   ANALOG OUT*   RTD INPUT*

* = CONNECT TO LOW VOLTAGE LIMITED ENERGY CIRCUITRY ONLY.

□□□□□□□□ □□□□□□□□□
□□□□□ □□□□□□
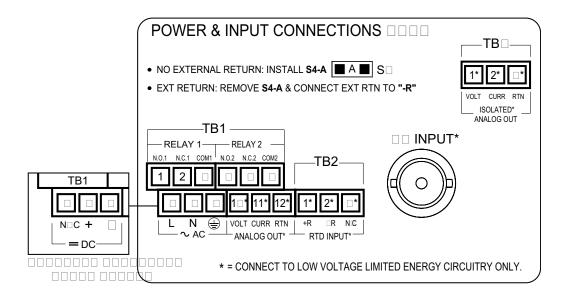
Figure 2-2. ac Power Connector Label (with dc Power detail)

2.6 BACK OF THE METER (Continued)

Table 2-2. Connector Description

Connection	Description
TB1-1	Setpoint 1: Normally Open (N.O.1) connection
TB1-2	Setpoint 1: Normally Closed (N.C.1) connection
TB1-3	Setpoint 1: Common (COM1) connection
TB1-4	Setpoint 2: Normally Open (N.O.2) connection
TB1-5	Setpoint 2: Normally Closed (N.C.2) connection
TB1-6	Setpoint 2: Common (COM2) connection
TB1-7	ac Line connection (no connections on dc-powered units)
TB1-8	ac Neutral connection (+ Input on dc-powered units)
TB1-9	ac Earth ground (dc-power Return on dc-powered units)
TB1-10	Analog Voltage Output connection
TB1-11	Analog Current Output connection
TB1-12	Analog Return connection
TB2-1	+R: RTD connection Pin 1 connection
TB2-2	-R: RTD connection Pin 2 connection
TB5-1	Isolated Analog Voltage Output connection
TB5-2	Isolated Analog Current Output connection
TB5-3	Isolated Analog Output Return connection
J3	Main pH or pH/ORP input BNC connector

2.7 DISASSEMBLY

You may need to open up the meter for one of the following reasons:

- To check or change the 115 or 230 Vac power jumpers.
- To install or remove jumpers on the main board.

Note ☞ Disconnect the power supply before proceeding.

To remove and access the main board, follow these steps:

- Disconnect the main power from the meter.
- Remove the back case cover.
- Lift the back of the main board upwards and let it slide out of the case.

Getting Started

SECTION 3. GETTING STARTED

⚠ **Caution:** The meter has no power-on switch, so it will be in operation as soon you apply power.

If you power off/on the meter, or perform a hard reset (press the RESET button twice), the meter shows "**RST**", followed by "**PH**".

3.1 RATING/PRODUCT LABEL

This label is located on top of the meter housing (refer to Figure 3-4).

3.2 MAIN BOARD POWER JUMPERS (refer to Figure 3-1)

⚠ **Important:** If you want to change the Factory preset jumpers, do the following steps; otherwise go to section 3.3.

Note ☞   Disconnect the power from the unit before proceeding.

1. Remove the main board from the case. Refer to Section 2.7.

2. Locate the solder jumpers W1, W2, and W3 (located near the edge of the main board alongside the transformer).

3. If your power requirement is **115 V ac, solder jumpers W1 and W3 should be wired, but jumper W2 should not.** If your power requirement is **230 V ac, solder jumper W2 should be wired, but jumpers W1 and W3 should not.**

Figure 3-1 shows the location of solder jumpers W1 through W3.
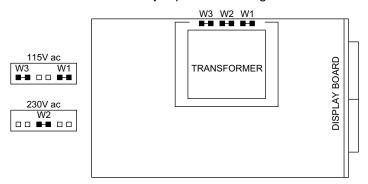
Figure 3.1 Main Board Power Jumpers

3.3 MAIN BOARD JUMPERS

Figure 3-2 shows the location jumper positions on the main board.
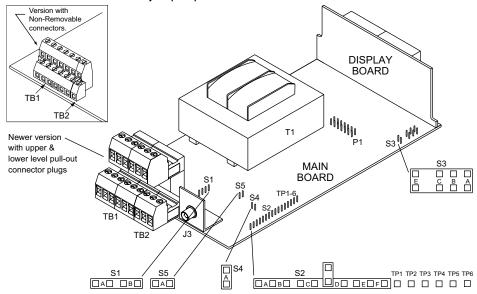
Figure 3-2. Main Board Jumper Positions
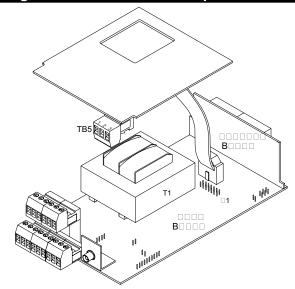
Figure 3-3. Upper Isolated Analog Output Option Board Installation

3.3 MAIN BOARD JUMPERS (Continued)

Note ☞ S1 jumper is for factory use only. Do not install or remove them.

S2 jumper allows you to use the meter without ATC.

S3 jumpers are used for the following: (Refer to Figure 3-2)
*   To enable or disable the front panel push-buttons
*   To allow for an extremely low resistance load for analog output
*   To disable the MENU button
*   To perform calibration procedure

S4 jumpers allow you to use electrode solution ground wire or internal ground for measurement purposes.

S5 jumpers allow you to use 100 ohm or 1000 ohm RTD sensors.

S6 jumper: Not used

This will affect will affect the way the relay outputs work depending on whether they are set for active above or active below.

Table 3-1. Jumper Functions

Jumper	Description
S2-D	Install if Temperature sensor is not used.
S3-A	Install to enable front panel push-buttons. Remove to disable all front panel push-buttons.
S3-B	Removed. Install for meter calibration.
S3-C	Normally removed. Install for analog output when load is less than 1 K Ω impedance. Care should be taken when installing this jumper.
S3-D	Removed. Not used.
S3-E	If installed without S3-B, the MENU button locks out. If you press the MENU button, the meter shows "LOCK".
S4-A	Install when using internal ground. Remove when using electrode solution ground wire.
S5-A	Install for 100 ohm RTD sensor. Remove for 1000 ohm RTD sensor.

3.4   PANEL MOUNTING
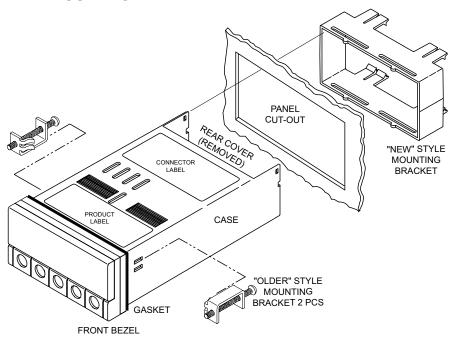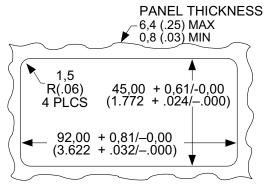
Figure 3-4. Meter - Exploded View

1. Cut a hole in your panel, as shown in **Figure 3-4**. For specific dimensions refer to **Figure 3-5**.

2. Insert the meter into the hole. Be sure the front bezel gasket is flush to the panel.

3. Slide on mounting bracket to secure.

4. Proceed to Section 3.5 to connect your sensor input and main power.

PANEL THICKNESS
6,4 (.25) MAX
0,8 (.03) MIN

1,5
R(.06)   45,00 + 0,61/-0,00
4 PLCS   (1.772 + .024/–.000)

92,00 + 0,81/–0,00
(3.622 + .032/–.000)

NOTE: Dimensions in Millimeters (Inches)

Figure Figure 3-5. Panel Cut-Out

3.5 CONNECTING SENSOR INPUTS
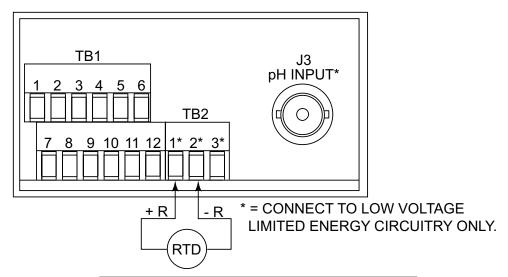
Figure 3-6. pH and RTD Input Connections

3.6 CONNECTING MAIN POWER

Connect the ac main power connections as shown in Figure 3-7.

⚠ *Warning:* Do not connect AC power to your device until you have completed all input and output connections. This device must only be installed by a specially trained electrician with corresponding qualifications. Failure to follow all instructions and warnings may result in injury!

⚠ Check for proper Earth grounding in the power distribution system (single phase).
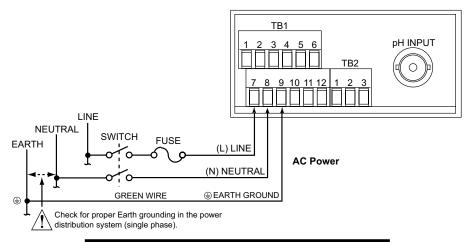
Figure 3-7. Main Power Connections - ac

Table 3-2. ac-Power Connections

		WIRE COLORS	
TB1	**AC POWER**	**EUROPE**	**USA**
7	$\sim$ ac Line	Brown	Black
8	$\sim$ ac Neutral	Blue	White
9	$\sim$ ac Earth	Green/Yellow	Green

3.6 CONNECTING MAIN POWER (Continued)

Connect the dc main power connections as shown in Figure 3-8.
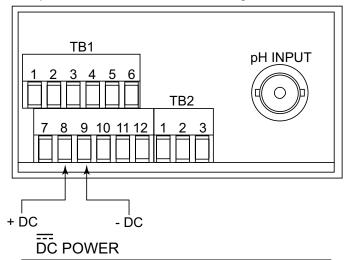
Figure 3-8. Main Power Connections - DC

3.7 CONNECTING ANALOG AND RELAY OUTPUTS
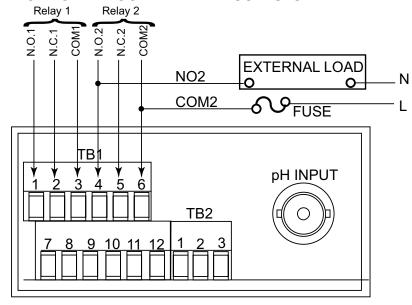
Figure 3-9. Relay Output Connections

3.7 CONNECTING ANALOG AND RELAY OUTPUTS (Continued)
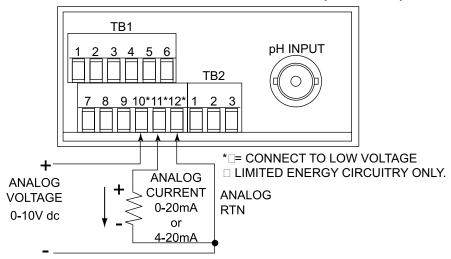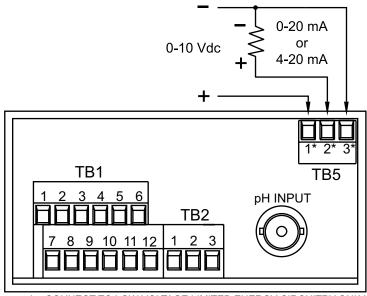
Figure 3-10. Analog Output Connections

* = CONNECT TO LOW VOLTAGE LIMITED ENERGY CIRCUITRY ONLY.

Figure 3-11. Isolated Analog Output Connections

SECTION 4. CONFIGURING THE METER

Note ☞   • Refer to Table 7-1 for a summary list of menu configuration.

• Factory defaults are in bold and italics.

• The Unit of Measurement for setpoints, deadbands, and read 1/read 2 (Output Scale and Offset) is all in Millivolts. The decimal point will always be at position 1 (for right position) for these items.

• The corresponding Unit of Measurement (pH or mV) will flash when viewing values.

4.0 SPECIFYING INPUT TYPE ("INPT") (for pH/ORP controllers ony)

Under this menu there are two choices:

pH: The meter acts as a typical pH meter

ORP: The meter acts as a ORP/pH meter

1.   Press the ▶**T/mV** button once. The current input type is displayed.

2.   Press the ▲**/pH/ORP** button to select pH or ORP. When the desired choice is displayed, press the **MENU** button. This enters the value into the microprocessor and "**STRD**" will momentarily flash on the display. The next menu item, "**A.T.C.**", will automatically appear on the display.

4.1 SELECTING THE TEMPERATURE COMPENSATION MODE ("A.T.C.")

To select your appropriate compensation type, follow these steps:

1.   Press the **MENU** button. The meter shows "**A.T.C**".

2.   Press the ▶**T/mV** button. The meter shows one of the following:

• "***METR***" meter utilizes the RTD input for automatic temperature compensation. (Default)

• "OFF" meter utilizes a constant 25ºC for temperature compensation.

• "MANU" meter utilizes a manually entered value for temperature compensation.

3.   Press the ▲**/pH** button to scroll through available choices.

4.   Press the **MENU** button to store your choice. The meter momentarily shows "**STRD**", followed by "**DEC.P**" (Decimal Point).

4.2 SELECTING A DECIMAL POINT POSITION ("DEC.P")

To select a decimal point display position, follow these steps:

1.   Press the **MENU** button until the meter shows "**DEC.P**".

2.   Press the ▶**T/mV** button. The meter shows one of the following:

   • **"*FFF.F*"** (Default)

   • "FFFF."

   • "FF.FF"

3.   Press the ▲**/pH** button to scroll through available choices.

4.   Press the **MENU** button to store your choice. The meter momentarily shows
     "**STRD**", followed by "**RG.CF**" (Reading Configuration).

4.3 USING READING CONFIGURATION ("RD.CF")

To select the calibration mode and units of measurement, follow these steps:

1.   Press the **MENU** button until the meter shows "**RD.CF**".

2.   Press the ▶**T/mV** button. The meter shows one of the following:

   • "R.1=2" For the two point buffer solution calibration (either 4 and 7, or 7 and 10 buffer solutions are used).

   • "*R.1=3*" For three point buffer solution calibration (4, 7, or 7 and 10 buffer solutions are used). (Default)

3.   Press the ▲**/pH** button to scroll through available choices.

4.   Press the ▶**T/mV** button to advance to the next submenu. The meter shows one of the following:

   • "*R.2=C*" The displayed temperature in degrees Celsius (Default)

   • "R.2=F" The displayed temperature in degrees Fahrenheit.

5.   Press the ▲**/pH** button to scroll through available choices.

6.   Press the **MENU** button to store your choice. The meter momentarily shows "**STRD**", followed by "**CAL.2**" or "**CAL.3**".

▼ *Note* ☞ Refer to step 4.1, during this step a temperature compensation type was chosen.

   If "**OFF**" was chosen then proceed to the "**CAL.2**" or "**CAL.3**" menu.

   If "**METR**" was selected, connect the RTD sensor's leads to the RTD input connector, and proceed to the "**CAL.2**" or "**CAL.3**" menu.

   If "**MANU**" was selected, press the **MENU** button until the "**TEMP**" menu displayed. (step 4.11 - Configuring Temperature).

4.4 PERFORMING TWO-POINT CALIBRATION ("CAL.2")

Note ☞ Only buffer solutions of 4, 7 and 10 are acceptable. IF the buffer value is not accepted, the meter will display a flashing "**PH.ER**".

Note ☞ Two-point calibration should be performed with two combinations of two buffer solutions (4 and 7, or 7 and 10).

1. Place your electrode into a buffer solution.

2. Press the **MENU** button until the meter shows "**CAL.2**"

3. Press the ▶**T/mV** button. The meter shows "**IN 1**" (Input 1)

4. Press the ▶**T/mV** button again. The meter shows the previous value of "**IN 1**".

5. Press the ▶**T/mV** button again. The meter shows the actual buffer solution's pH value.

Note ☞ Please allow enough time for the electrode to settle before processing.

6. Press the **MENU** button to store the "**IN 1**" value. The meter momentarily shows an "**OK**" with buffer value ("**OK.4**", "**OK.7**", or "**OK.10**"), followed by "**IN 2**" (Input 2)

7. Rinse the electrode with distilled water and place it into the second buffer solution.

8. Press the ▶**T/mV** button. The meter shows the previous value of "**IN 2**"

9. Press the ▶**T/mV** button again. The meter shows the actual buffer solution's pH value.

Note ☞ Please allow enough time for the electrode to settle before processing.

10. Press the **MENU** button to store the "**IN 1**" value. The meter momentarily shows an "**OK**" with buffer value ("**OK.4**", "**OK.7**", or "**OK.10**"), then momentarily shows "**STRD**", followed by "**S1.CF**" (Setpoint 1 Configuration).

4.5 PERFORMING THREE-POINT CALIBRATION ("CAL.3")

▼*Note* ☞ Only buffer solutions of 4, 7 and 10 are acceptable. IF the buffer value is not accepted, the meter will display a flashing "**PH.ER**".

1.   Place your electrode into the pH buffer solution.

2.   Press the **MENU** button until the meter shows "**CAL.3**"

3.   Press the ▶**T/mV** button. The meter shows "**IN 1**" (Input 1)

4.   Press the ▶**T/mV** button again. The meter shows the previous value of "**IN 1**".

5.   Press the ▶**T/mV** button again. The meter shows the actual buffer solution's pH value.

▼*Note* ☞ Please allow enough time for the electrode to settle before processing.

6.   Press the **MENU** button to store the "**IN 1**" value. The meter momentarily shows an "**OK.4**", followed by "**IN 2**" (Input 2)

7.   Rinse the electrode with distilled water and place it into the pH 7 buffer solution.

8.   Press the ▶**T/mV** button. The meter shows the previous value of "**IN 2**"

9.   Press the ▶**T/mV** button again. The meter shows the actual buffer solution's pH value.

▼*Note* ☞ Please allow enough time for the electrode to settle before processing.

10.   Press the **MENU** button to store the "**IN 2**" value. The meter momentarily shows an "**OK.7**", followed by "**IN 3**" (Input 3)

11.   Rinse the electrode with distilled water and place it into the pH 10 buffer solution.

12.   Press the ▶**T/mV** button. The meter shows the previous value of "**IN 3**"

13.   Press the ▶**T/mV** button again. The meter shows the actual buffer solution's pH value.

▼*Note* ☞ Please allow enough time for the electrode to settle before processing.

14.   Press the **MENU** button to store the "**IN 3**" value. The meter momentarily shows an "**OK.10**", then momentarily shows "**STRD**", followed by "**S1.CF**" (Setpoint 1 Configuration).

4.6 USING SETPOINT 1 CONFIGURATIONS ("S1.CF")

You may use Setpoint 1 Configuration for the following:

- To set setpoint 1's active band above or below your chosen value
- To select whether setpoint 1's operation is latched or unlatched

4.6.1 Setting Setpoint 1's Active Band

1. Press the **MENU** button until the meter shows "**S1.CF**".

2. Press the **▶T/mV** button. The meter shows one of the following:
    - *"S.1=A" (Active above setpoint)* (Default)
    - "S.1=B" (Active below setpoint)

3. Press ∂/**pH** button to toggle between available choices.

4. Press the **▶T/mV** button to select if setpoint 1 is latched or unlatched or press the **MENU** button to store your selection and enter "**S2.CF**" (Setpoint 2 configurations).

4.6.2 Selecting if Setpoint 1 is Latched or Unlatched

1. Select the **▶T/mV** button. The meter shows one of the following:
    - "S.2=L" Setpoint 1 to be latched
    - *"S.2=U" Setpoint 1 to be unlatched* (Default)

2. Press ▲/**pH** button to toggle between available choices.

3. Press the **MENU** button to store your choices. The meter momentarily shows "**STRD**", followed by "**S2.CF**" (Setpoint 2 Configuration).

4.6.3 Selecting Setpoint 1 (for pH/ORP Controllers only)

1. Select the **▶T/mV** button. The meter shows one of the following:
    - "S.3=P" Setpoint 1 assigned to pH
    - "S.3=O" Setpoint 1 assigned to ORP

2. Press ▲/**pH/ORP** button to toggle between available choices.

3. Press the **MENU** button to store your choices. The meter momentarily shows "**STRD**", followed by "**S2.CF**" (Setpoint 2 Configuration).

4.7 USING SETPOINT 2 CONFIGURATION ("S2.CF")

You may use Setpoint 2 Configuration for the following:

> • To set setpoint 2's active band above or below your chosen value
> • To select whether setpoint 2's operation is latched or unlatched

4.7.1 Setting Setpoint 2's Active Band

1. Press the **MENU** button until the meter shows "**S2.CF**".

2. Press the ▶**T/mV** button. The meter shows one of the following:

    > • *"S.1=A" (Active above setpoint)* (Default)
    > • "S.1=B" (Active below setpoint)

3. Press the ▲**/pH** button to toggle between available choices.

4. Press the ▶**T/mV** button to select if setpoint 2 is latched or unlatched or press the **MENU** button to store your selection and enter "**S1.DB**" (Setpoint 1 Deadband)

4.7.2 Selecting if Setpoint 2 is Latched or Unlatched

1. Press the ▶**T/mV** button. The meter shows one of the following:

    > • "S.2=L" setpoint 2 to be latched
    > • *"S.2=U" setpoint 2 to be unlatched* (Default)

2. Press the ▲**/pH** button to toggle between available choices.

3. Press the **MENU** button to store your choices. The meter momentarily shows "**STRD**", followed by "**S1.DB**" (Setpoint 1 Deadband).

4.7.3 Selecting Setpoint 2 (for pH/ORP Controllers only)

1. Select the ▶**T/mV** button. The meter shows one of the following:

    > • "S.3=P" Setpoint 2 assigned to pH
    > • "S.3=O" Setpoint 2 assigned to ORP

2. Press ▲**/pH/ORP** button to toggle between available choices.

3. Press the **MENU** button to store your choices. The meter momentarily shows "**STRD**", followed by "**S1.DB**" (Setpoint 1 Deadband).

4.8 SETTING THE SETPOINT 1 DEADBAND ("S1.DB")

Factory default deadband is 001.0. The deadband's resolution value depends upon the decimal point position previously set-up in Section 4.2. The minimum deadband setting should be no less than 0.1 pH. To change the deadband (hysteresis) of setpoint 1, follow these steps:

1. Press the **MENU** button until the meter shows "**S1.DB**".

2. Press the ▶**T/mV** button. The meter shows the last stored number (0000 through 9999) with flashing 4th digit.

3. Press the ▲**/pH** button to change the value of the flashing digit. If you continue to press the ▲**/pH** button, the flashing digit's value continues to change.

4. Press the ▶**T/mV** button to scroll to the next digit.

5. Press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", followed by "**S2.DB**" (Setpoint 2 Deadband).
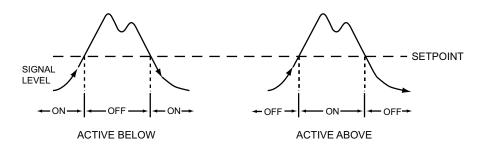
4.9 SETTING THE SETPOINT 2 DEADBAND ("S2.DB")
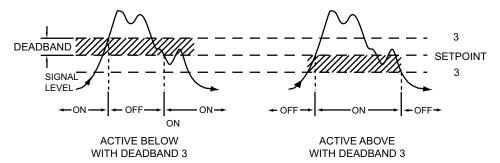
Factory default deadband is 001.0. The deadband's resolution value depends upon the decimal point position previously set-up in Section 4.2. The minimum deadband setting should be no less than 0.1 pH. To change the deadband (hysteresis) of setpoint 2, follow these steps:

1. Press the **MENU** button until the meter shows "**S2.DB**".

2. Press the **T/mV** button. The meter shows the last stored number (0000 through 9999) with flashing 4th digit.

3. Press the ∂**/pH** button to change the value of the flashing digit. If you continue to press the ∂**/pH** button, the flashing digit's value continues to change.

4. Press the **T/mV** button to scroll to the next digit.

5. Press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", followed by "**OT.CF**" (Output Configuration).

Figure 4-1. Relay Output Triggering Example

ACTIVE BELOW

ACTIVE ABOVE

ACTIVE BELOW
WITH DEADBAND 3

ACTIVE ABOVE
WITH DEADBAND 3

NOTE: DEADBAND WORKS AS HYSTERISIS

ACTIVE BELOW LATCHED

ACTIVE ABOVE LATCHED

Note ☞ To reset latched alarms you must:

1. Input a signal "**OUT**" of the Relay Triggering zone
2. Then press **SETPTS** and then, **RESET** button

4.10 USING OUTPUT CONFIGURATION (OT.CF)

Use Output Configuration to select the following:

- To enable or disable the analog output
- To determine if the analog output is current or voltage

4.10.1 Enabling or Disabling the Analog Output

To enable or disable the analog output, follow these steps:

1. Press the **MENU** button until the meter shows "**OT.CF**".

2. Press the ▶**T/mV** button. The meter shows one of the following:

    - ***"O.1=E" (Analog output enabled)*** (Default)
    - "O.1=D" (Analog output disabled)

3. Press the ▲**/pH** button to toggle between available choices.

4. Press the ▶**T/mV** button to select the analog output as current/voltage or press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", followed by "**OT.S.O**" (Output Scale and Offset) - refer to section 4.12.

4.10.2 Selecting Analog Output as Current or Voltage

1. Press the ▶**T/mV** button. The meter shows one of the following:

    - ***"O.2=C" (Analog output = current)*** (Default)
    - "O.2=V" (Analog output = voltage)

2. Press the ▲**/pH** button to toggle between available choices.

3. Press the ▶**T/mV** button to go back to selecting analog output as enabled or disabled or press the **MENU** button to store your choices. The meter momentarily shows "**STRD**", followed by "**OT.S.O**" (Output Scale and Offset) - refer to section 4.12.

4.10.3 Selecting Analog Output as pH or ORP(for pH/ORP Controllers only)

1. Press the **▶T/mV** button. The meter shows one of the following:

    • "O.3=P" (Analog Output assigned to pH)
    • "O.3=O" (Analog Output assigned to ORP)

2. Press the **▲/pH/ORP** button to toggle between available choices.

3. Press the **▶T/mV** button to go back to selecting analog output as enabled or disabled or press the **MENU** button to store your choices. The meter momentarily shows "**STRD**", followed by "**OT.S.O**" (Output Scale and Offset) - refer to section 4.12.

4.11 CONFIGURING TEMPERATURE (C or F - "TEMP")

Note ☞ If you have selected "**MANU**" in "**A.T.C**." menu item (Section 4.1), then you have to specify the constant temperature value. Maximum/minimum values are 0 to 199.9 for C or 0 to 398.0 for F.

1. Press the **MENU** button until the meter shows "**TEMP**".

2. Press the ▶**T/mV** button. The meter shows actual constant temperature value.

3. Press the ▲**/pH** button until the first digit is correct.

4. Press the ▶**T/mV** button to advance to the next digit.

5. Repeat steps 3 and 4 until meter shows the desired "**TEMP**" value.

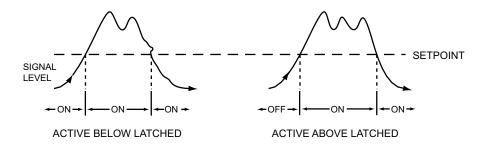6. Press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", followed by "**OT.S.O**" (Output Scale and Offset) - refer to section 4.12.

7. Press the **MENU** button until the meter shows the "**CAL.2** or **CAL.3**" menu.
    If the display shows "**CAL.2**" then proceed to Section 4.4.
    If the display shows "**CAL.3**" then proceed to Section 4.5.

Note ☞ C or F flashes to indicate the unit of measure.

Configuring The Meter

4.12 USING OUTPUT SCALE AND OFFSET (OT.S.O)

Output Scale and Offset ("**OT.S.O"**) scales your analog output to be equal to the meter's display and/or any engineering units you require. You may scale the output for direct (4-20 mA, 0-10 V, etc) or reverse acting (20-4 mA, 10-0 V, etc).

1. Press the **MENU** button until the meter shows "**OT.S.O**".

2. Press the ▶**T/mV** button. The meter shows "**RD 1**" (Read 1).

    Note ☞ This is your first point of display reading.

3. Press the ▶**T/mV** button again. The meter shows the last stored Low pH number with flashing 4th digit.

4. Press the ▲**/pH** button to change the value of Read 1.

5. Press the ▶**T/mV** button to scroll to the next digit.

6. Repeat steps 4 and 5 until the desired value is selected.

7. Press the **MENU** button to store your selection. The meter shows "**OUT.1**" (Output 1) (Low output).

8. Press the ▶**T/mV** button. The meter shows the selected output.

    Note ☞ If you select "**O.2=V**" for voltage, the maximum signal you may select is 10.00 for an 0-10 Vdc signal output. If you select "**O.2=C**" for current, the maximum signal you may select is 20.00 for 0-20 or 4-20 mA dc signal output.

9. Press the ▲**/pH** button to enter the Output 1 signal selection.   If you continue to press the ▲**/pH** button, the flashing digit's value continues to change.

10 Press the ▶**T/mV** button to scroll to the next digit.

11. Repeat steps 9 and 10 until the desired value is selected.

12. Press the **MENU** button to store your selection. The meter shows "**RD 2**" (Read 2).

    Note ☞ This is your second point of display reading.

4.12 USING OUTPUT SCALE AND OFFSET (OT.S.O) (Continued)

13. Press the ▶**T/mV** button. The meter shows the last stored High pH number with flashing 4th digit.

14. Press the ▲**/pH** button to change the value of the flashing digit. If you continue to press the ▲**/pH** button, the flashing digit's value continues to change.

15. Press the ▶**T/mV** button to scroll to the next digit.

16. Repeat steps 14 and 15 until the desired value is selected.

17. Press the **MENU** button to store your selection. The meter shows "**OUT.2**" (Output 2). (High output)

18. Press the ▶**T/mV** button. The meter shows selected output.

    Note ☞ If you select "**O.2=V**" for voltage, the maximum signal you may select is 10.00 for an 0-10 Vdc signal output. If you select "**O.2=C**" for current, the maximum signal you may select is 20.00 for a 0-20 or 4-20 mA dc signal output.

19. Press the ▲**/pH** button to change the value of the flashing digit. If you continue to press the ▲**/pH** button, the flashing digit's value continues to change.

20. Press the ▶**T/mV** button to scroll to the next digit.

21. Repeat steps 19 and 20 until the desired value is selected.

22. Press the **MENU** button to store your selection. The meter momentarily shows "**STRD**", then "**RST**". The meter will enter into the "**RUN**" mode (Normal operation).

⚠ CAUTION: If the meter displays all flashing values on any item, the value has overflowed. Press the ▲/pH button to start new values.

Configuring The Meter

4.12.1 Example for Output Scale and Offset
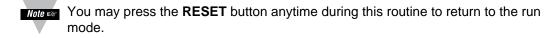
You want to send 4-20 mA output for 0 to 14 pH value (default). The meter has 0.01 pH resolution. Complete the following steps:

1.   Press the **MENU** button until the meter shows "**OT.S.O**".

2.   Press the ▶**T/mV** button. The meter shows "**RD 1**" (Read 1).

3.   Press the ▶**T/mV** button again to show the existing value.

4.   Change the value of "**RD 1**" to 00.00 by pressing the ▲**/pH** and ▶**T/mV** and buttons.

5.   Press the **MENU** button to store your selection. The meter shows "**OUT.1**" (Output 1).

6.   Press the ▶**T/mV** button again to show the existing value.

7.   Change the value of "**OUT.1**" to 04.00 by pressing the ▲**/pH** and ▶**T/mV** and buttons.

8.   Press the **MENU** button to store your selection. The meter shows "**RD 2**" (Read 2).

9   Press the ▶**T/mV** button to show the existing value.

10.   Change the value of "**RD 2**" to 14.00 by pressing the ▲**/pH** and ▶**T/mV** buttons.

11.   Press the **MENU** button to store your selection. The meter shows "**OUT.2**" (Output 2).

12.   Press the ▶**T/mV** button to show the existing value.

13.   Change the value of "**OUT.2**" to 20.00 by pressing the ▲**/pH** and ▶**T/mV** buttons.

14.   Press the **MENU** button to store your selection. The meter shows "**STRD**".

SECTION 5. SELECTING SETPOINT VALUES

Follow the steps below to select values for Setpoint 1 and Setpoint 2.

1.   Press the **SETPTS** button. The meter momentarily shows "**SP1**" (Setpoint 1), followed by the last stored value with flashing 4th digit. The factory default for "**SP1**" is 000.0.

2.   Press the **▲/pH** button to change the value of Setpoint 1.

3.   Press the **▶T/mV** button to scroll to the next digit.

4.   Press the **SETPTS** button to store your selection. The meter momentarily shows "**SP2**" (Setpoint 2), followed by the last stored value with flashing 4th digit. The factory default for "**SP2**" is 000.0.

5.   Press the **▲/pH** button to change the value of Setpoint 2.

6.   Press the **▶T/mV** button to scroll to the next digit.

7.   Press the **SETPTS** button to store new values. The meter momentarily shows "**STRD**", "**RUN**" and then enters the run mode.

▼ Note ☞   You may press the **RESET** button anytime during this routine to return to the run mode.

SECTION 6. DISPLAY MESSAGES

Table 6-1. Display Messages

MESSAGE	DESCRIPTION
pH	Hydrogen Potential
RST	Hard (power on) reset
A.T.C.	Temperature Compensation Mode
DEC.P	Decimal point
RD.CF	Reading configuration
S1.CF	Setpoint 1 configuration
S2.CF	Setpoint 2 configuration
S1.DB	Setpoint 1 deadband
S2.DB	Setpoint 2 deadband
OT.CF	Output configuration
OT.S.O	Output scale and offset
±OPN	Sensor break or temperature outside range
9999	Value overflow in setpoint/menu peak deviation routines
-1999	Value overflow in setpoint/menu peak routines
ER1	2 coordinate format programming error
VOLT	Value Direct from probe in mV
METR	RTD input for A.T.C.
MANU	Manually entered input for A.T.C.
SP.RS	Reset setpoints
SP1	Setpoint 1 value
SP2	Setpoint 2 value
ER2	One or more of these items have overflowed due to decimal point change: setpoint values, setpoint deadbands
PH.ER	pH value is not accepted
±LMT	±pH over limit
LOCK	Lock for RESET, MENU and SETPTS buttons
UN.LK	Unlock for RESET, MENU and SETPTS buttons
CAL.2	Two-point calibration
CAL.3	Three-point calibration
TEMP	Temperature of solution (A.T.C. - METR) or Temperature configuration (A.T.C. - MANU)
OFF	Constant 25ºC input for A.T.C

SECTION 7. MENU CONFIGURATION DISPLAYS

Table 7-1. Configuration Menu

(Defaults in Bold and Italics)

MENU	▶T/mV	▲/pH
A.T.C. Temperature Compensation Mode	Show **A.T.C**. choices:	***METR: Metered - default*** MANU: Manually OFF: Constant 25ºC
DEC.P Decimal Point	Show decimal point position	FFFF. ***FFF.F*** FF.FF
RD.CF Reading Configuration	**R.2**	C: Celsius ***F: Fahrenheit***
	R.1	2: Two-Point Calibration ***3: Three-Point Calibration***
S1.CF Setpoint 1 Configurations	**S.1**	***A: Active above*** B: Active below
	S.2	***U: Unlatched*** L: Latched
S2.CF Setpoint 2 Configurations	**S.1**	***A: Active above*** B: Active below
	S.2	***U: Unlatched*** L: Latched
S1.DB Setpoint 1 Configurations	Scroll right one digit	Change flashing digit's value
S2.DB Setpoint 2 Configurations	Scroll right one digit	Change flashing digit's value
CAL.2 Two-Point Calibration		
IN 1 Input new value and show "**IN 1**"	Show prior and actual value	
IN 2 Enter new value and show "**IN 2**"	Show prior and actual value	

SECTION 7. MENU CONFIGURATION DISPLAYS

Table 7-1. Configuration Menu (Continued)

(Defaults in Bold and Italics)

MENU	▶T/mV	▲/pH
OT.CF Output Configuration	0.1	D: Disabled ***E: Enabled***
Analog Output Option	0.2	V: Voltage Analog out ***C: Current Analog out***
OT.S.O Output Scale & Offset		
Enter new value & show "**OUT1**"	Show "**RD 1**" & prior value Scroll right one digit	Change flashing digit's value
Enter new value & show "**RD 2**"	Show prior value Scroll right one digit	Change flashing digit's value
Enter new value & show "**OUT2**"	Show prior value Scroll right one digit	Change flashing digit's value
TEMP Temperature Configuration	Show prior entered value Scroll right one digit	Change flashing digit's value
CAL.3 Three-Point Calibration		
IN 1 Input new value and show "**IN 1**"	Show prior and actual value	
IN 2 Input new value and show "**IN 2**"	Show prior and actual value	
IN 3 Input new value and show "**IN 3**"	Show prior and actual value	

SECTION 7. MENU CONFIGURATION DISPLAYS

Table 7-2. Run Mode Displays

DISPLAY	▶T/mV	▲/pH	RESET	Description
TEMP Temperature Reading		Shows temperature value of input signal. Press again to show mV value of input signal.		
VOLT mV Reading		Shows mV value of input signal. Press again to show temperature value of input signal.		
SP.RS				**LATCHEDRESET** Press **RESET** button to reset your setpoints.

SECTION 8. SETPOINT CONFIGURATION DISPLAYS

Table 8-1. Setpoint Configuration Displays

MENU	▶T/mV	▲/pH	DESCRIPTION
SP 1 Setpoint 1	Scroll right one digit	Change flashing digit's value	Select from -1999 through 9999
SP 2 Setpoint 2	Scroll right one digit	Change flashing digit's value	Select from -1999 through 9999

SECTION 9. SPECIFICATIONS

INPUT SIGNAL

pH and Volt Specification

Range:	- 2.00 to 16.00 pH (-620 to +620 mV)
Resolution:	1, 0.1, 0.01 pH $\left(\begin{array}{l}\text{From: -199.9 to 620.0 mV: 0.1 mV} \\ \text{From: -200 to -620: 1 mV}\end{array}\right)$
Accuracy:	± 0.03 pH
Calibration:	Two or Three Point
Temperature Compensation:	Automatic: 0ºC to 100ºC (32ºF to 212ºF) Manual: 0ºC to 100ºC (32ºF to 212º F)

Note ☞ Volt specification is only used to verify proper operation of electrodes.

ORP Specification

Range:	-620 to +620 mV
Resolution:	From: -199.9 to 620.0 mV: 0.1 mV From: -200 to -620: 1 mV
Accuracy:	± 0.1 mV

Note ☞ ORP specification is only used to verify proper operation of electrodes.

TEMPERATURE

Range:	0ºC to 100ºC (32ºF to 212ºF)
Resolution:	0.1ºC
Accuracy:	±0.5ºC
Unit of Measure:	ºF or ºC (programmable by software)
Sensor:	100/1000 Ohm Pt RTD (Connection by screw terminals)
Isolation:	Dielectric strength to 2500V transient per 3mm spacing based on EN 61010 for 260Vrms or dc working voltage
Noise Rejection:	Normal Mode Rejection (NMR) = 60dB Common Mode Rejection (CMR) = 120dB
Display:	LED 14-segment, 13.8 mm (0.54")
Symbol:	🔲🔲🔲🔲
Input Impedance:	>10^{12} ohm
Accuracy at 25ºC:	Temperature Stability = 50 ppm/C Warm Up to Rated Accuracy = 30 min

SECTION 9. SPECIFICATIONS (Continued)

ANALOG TO DIGITAL

Technique: Dual Slope
Internal Resolution: 15 bits
Read Rate: 3 per second for pH; 1 per second for Temperature

RELAY OUTPUTS

2 Form "C" on/off relays. Configurable for latched and unlatched by software.

Max current: 5 A, resistive load
Max voltage: 250 Vac or 30 Vd

ANALOG OUTPUT

Signal Type: Current or voltage

Signal Level: Current: 10 V max compliance at 20 mA output
Voltage: 20 mA max for 0-10 V output

Function: May be assigned to a display range or proportional control output with setpoint #1 when used as a control output.

Linearity: 0.2%

Step Response Time: 2 - 3 seconds to 99% of the final value

ISOLATED ANALOG OUTPUT (TB5, if applicable)

Same as non-isolated analog output except isolated to 1000 Vdc.

Signal Type: Current or voltage

Signal Level: Current: 10 V max compliance at 20 mA output
Voltage: 20 mA max for 0-10 V output

Function: May be assigned to a display range or proportional control output with setpoint #1 when used as a control output.

Linearity: 0.2%

Step Response Time: 2 - 3 seconds to 99% of the final value

Note ☞ Only one analog output is available on each unit and it must be factory installed.

SECTION 9. SPECIFICATIONS (Continued)

INPUT POWER INFORMATION

~   AC units   115/230 V~(AC) ±10%, 50/60 Hz
                                7 W max, power consumption (Non-Isolated Analog Output)
                                8 W max, power consumption (Isolated Analog Output)

=== DC units   12-32 Vdc
                                6 W max, power consumption (Non-Isolated Analog Output)
                                7 W max, power consumption (Isolated Analog Output)

External Fuse Protection Recommended:

IEC 127-2/III	
Power	Fuse
115 V	125 mA @ 250 (T)
230 V	63 mA @ 250 (T)
UL 248-14 (Listed Fuse)	
Power	Fuse
115 V	175 mA @ 250 V Slow-Blow
230 V	80 mA @ 250 V Slow-Blow

ENVIRONMENT

Operating temperature: 0° to 50°C (32° to 122°F)

Storage temperature: -40° to 85°C (-40° to 185° F)

Relative humidity: 90% at 40°C (non-condensing)

MECHANICAL

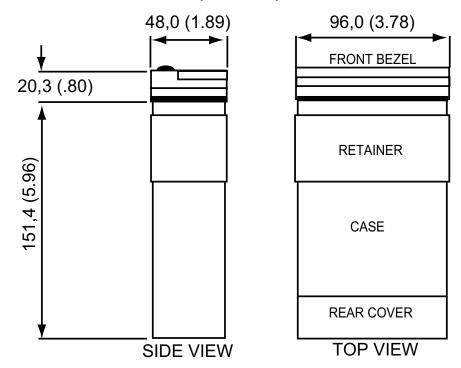Panel cutout: 1/8 DIN 3.62 x 1.78" (45 x 92mm)
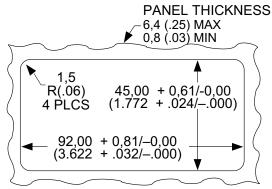
Weight: 1.27 lb (575 g)

Case material: Polycarbonate, 94 V-O UL rated

SECTION 9. SPECIFICATIONS (Continued)

48,0 (1.89)

96,0 (3.78)

20,3 (.80)

151,4 (5.96)

FRONT BEZEL

RETAINER

CASE

REAR COVER

SIDE VIEW

TOP VIEW

PANEL THICKNESS
6,4 (.25) MAX
0,8 (.03) MIN

1,5
R(.06)
4 PLCS

45,00 + 0,61/-0,00
(1.772 + .024/–.000)

92,00 + 0,81/–0,00
(3.622 + .032/–.000)

NOTE: Dimensions in Millimeters (Inches)

Figure 9-1. Dimensions/ Panel Cutout

SECTION 10. FACTORY PRESET VALUES

Table 10-1. Factory Preset Values

MENU ITEM	FACTORY PRESET VALUES
A.T.C.	Temperature Compensation: METR
DEC.P	Decimal Point Position: FFF.F
RD.S.O	Reading Scale and Offset: 4-20 mA dc = 0-1000
RD.CF	Reading Configuration: R.1=3 (3 Point Calibration) R.2=C (Degree Celsius)
S1.CF	Setpoint 1 Configuration: S.1=A (Setpoint is active above) S.2=U (Setpoint is unlatched)
S2.CF	Setpoint 2 Configuration: S.1=A (Setpoint is active above) S.2=U (Setpoint is unlatched)
S1.DB	Setpoint 1 Deadband: 0003
S2.DB	Setpoint 2 Deadband: 0003
OT.CF	Output Configuration: O.1=E (Analog output is enabled) O.2=C (Analog output is current)
OT.S.O	Output Scale and Offset: 0-14 pH = 4-20 mA
SP1	Setpoint 1 Value: 0000
SP2	Setpoint 2 Value: 0000
TEMP	Temperature Compensation value set to 025.0

CE APPROVALS INFORMATION

$C\mkern-2mu\epsilon$ This product conforms to EMC 2014/30/EU (EMC directive)

Electrical Safety: 2014/35/EU (Low Voltage Directive)
Safety requirements for electrical equipment for measurement, control and laboratory.
Double Insulation
Pollution Degree 2
Dielectric withstand Test per 1 min

- Power to Input/Output: 2300 Vac (3250 Vdc)
- Power to Input/Output: 500 Vac (720 Vdc)
  (Low Voltage dc Power Option*)
- Power to Relays Output: 2300 Vac (3250 Vdc)
- Relay 1 to Relay 2:   2300 Vac (3250 Vdc)
- Isolated Analog to Inputs: 1000 Vac (1420 Vdc)
- Analog to Inputs: No Isolation

Measurement Category I

Category I are measurements performed on circuits not directly connected to the Mains Supply (power). Maximum Line-to-Neutral working voltage is 50 Vac/dc. This unit should not be used in Measurement Categories II, III, IV.

Transients Overvoltage Surge (1.2 / 50uS pulse)

- Input Power: 2500 V
- Input Power: 500 V
  (Low Voltage dc Power Option*)
- Isolated Analog: 500 V
- Input/Output Signals: 500 V

  ***Note:** *Units configured for external low power dc voltage, 10-32 Vdc (Basic Insulation)*
  **I/O signal and control lines require shielded cables and these cables
  must be located on conductive cable trays or in conduits. Furthermore, the length of these cables should not exceed 30 meters

Additional Information
RoHS II: The above product has been declared by the original supplier as Compliant. The manufacturer of this item declares that the product complies with the EEE RoHS II Directive 2011/65/EC.

⚠ Refer to the EMC and Safety installation considerations (Guidelines) of this manual for additional information.

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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