# Conductivity Controller

## Programming and Operations Manual

## *OVERVIEW OF CONDUCTIVITY METER MENU OPERATION*

The following manual demonstrates how a user of the conductivity meter can navigate through the menu system and change parameters as needed. The menus shown in this manual are represented as a schematic hierarchy with main menu headings and subsequent submenus (input menus) offset to the right. The main menu headings have no user adjustable settings, however all submenus do consist of adjustable settings. All navigation is performed using the keypad (two keys—*SELECT* and *CHANGE*). The *SELECT* button generally selects the desired menu and the *CHANGE* button is used to change values. Other functions will be discussed as needed.

## *RELAY STATUS and USER INPUT MENUS*

When the unit is powered up, the user should see the **RLY1** screen which will indicate the range measured in milliSiemens. The display should read as shown.

From the **RLY1** screen, the user has access to 3 submenus (**SETPOINT**, **WINDOW**, and **ALARM**). These screens are accessed by pushing and holding the *SELECT* button until the cursor begins to flash. Settings are accomplished by pressing the *CHANGE* button. This procedure must be repeated to access any of these submenus. To leave the submenus and accept the selected options press and hold the *SELECT* key while in the **ALARM** submenu. The user will be returned to the **RLY1** menu.
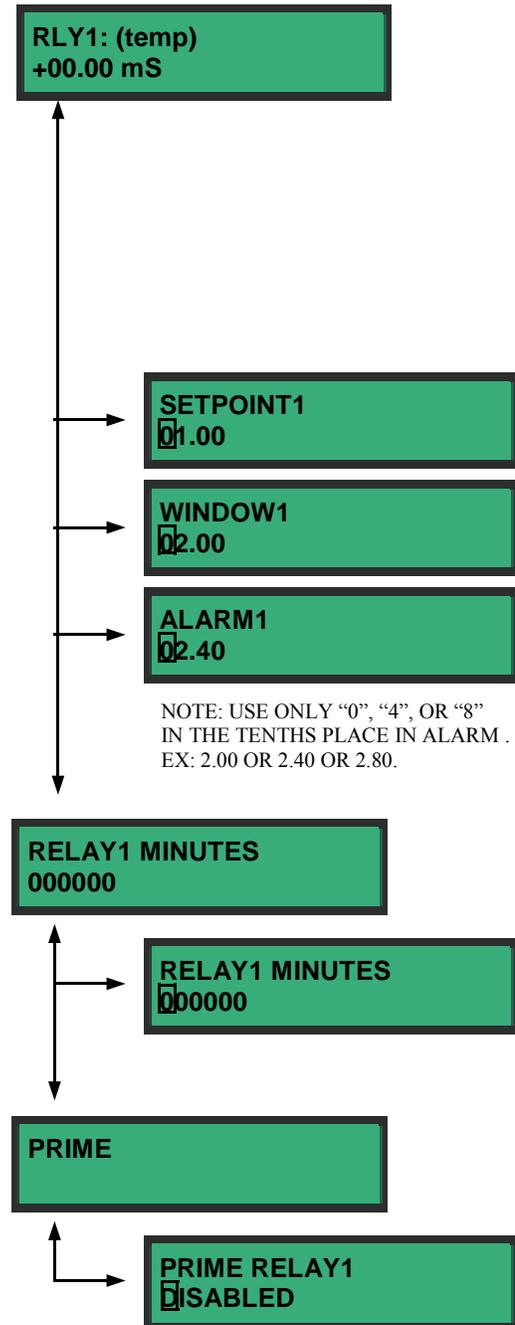
1. **SETPOINT**: The setpoint is the desired conductivity value at which the pumps will not pump. This value is determined by the user and set using the *CHANGE* key to cycle through values. Note: to move cursor one spot to the right from within submenus, press the *SELECT* button.
2. **WINDOW**: The value of the window setting will be either above or below the setpoint and will represent the point at which the pumps are operating at maximum.
3. **ALARM**: The alarm value can be set either above or below the **SETPOINT** value. If this level is surpassed, an alarm will be triggered after a predetermined delay (1-99sec—this is set in the **ALARM DELAY** menu).

After pressing and holding the *SELECT* key while in the **ALARM** submenu, the unit will reset to the previous main menu. For example, if the user has set the **SETPOINT**, **WINDOW**, and **ALARM**, pressing the *SELECT* key will bring the user back to the **RLY1** main menu. From here simply press the *SELECT* button to cycle to the next main menu. The user will now be at the **RELAY1 MINUTES** menu. As in all cases, to enter the submenu press and hold the *SELECT* key until the cursor flashes.

1. **RELAY1 MINUTES**: The total on time of the unit is shown in this menu. The user can either reset this to zero or enter a value.

After completing the parameters for the relay, return to the main menu by pressing and holding both keys simultaneously. Using the *SELECT* button, cycle through until the **PRIME** screen is displayed. Press and hold the *SELECT* key to enter the submenu

1. **PRIME RELAY**: The user can either enable or disable prime by pressing the *CHANGE* key to cycle through the two options.

RLY1: (temp)
+00.00 mS

SETPOINT1
01.00

WINDOW1
02.00

ALARM1
02.40

NOTE: USE ONLY "0", "4", OR "8"
IN THE TENTHS PLACE IN ALARM .
EX: 2.00 OR 2.40 OR 2.80.

RELAY1 MINUTES
000000

RELAY1 MINUTES
000000

PRIME

PRIME RELAY1
DISABLED

## SETUP and USER INPUT MENUS

After completing the parameters for priming the relay, return to the **PRIME** menu by pressing and holding the *SELECT* key. Press the *SELECT* button to get to the **SETUP** screen shown at right. This section is used to set the physical hookup to the corresponding channel. Press and hold the *SELECT* key to enter the first submenu.
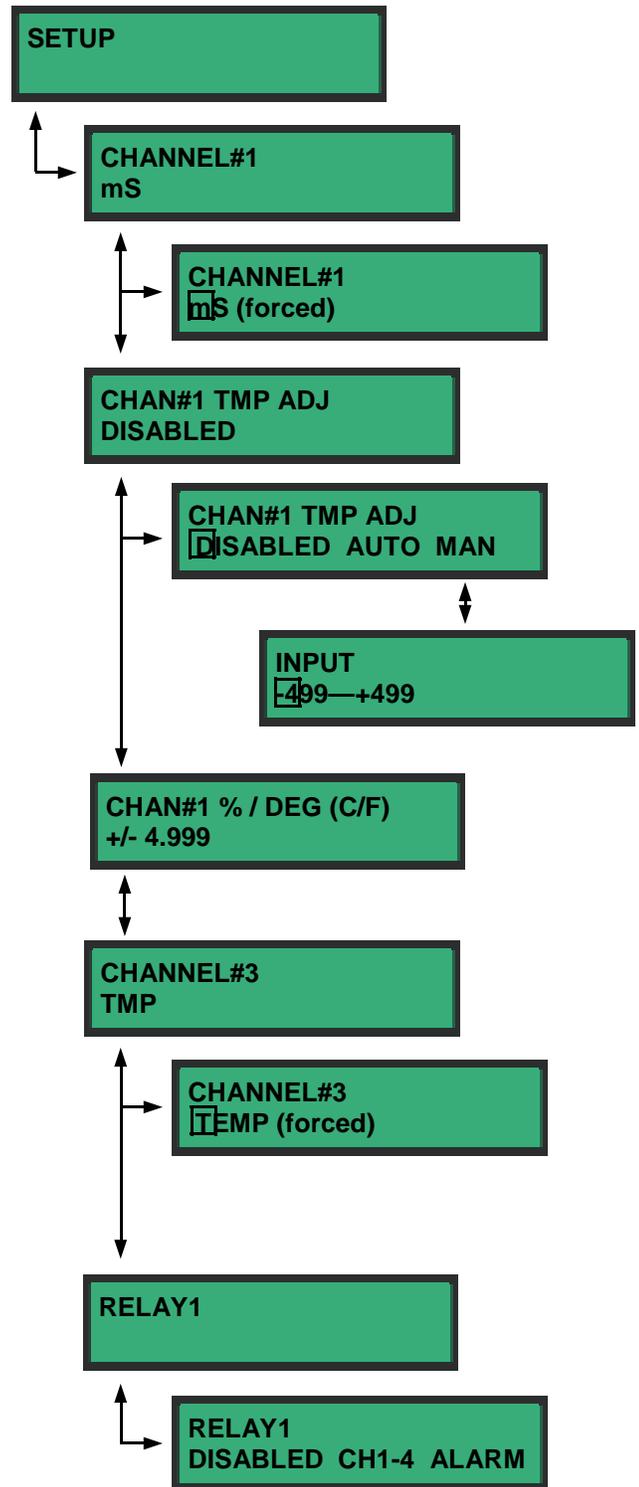
1. **CHANNEL #1**: **Channel #1** is forced to mS and can not be changed by the user.
2. **CHAN#1 TMP ADJ**: Press the *SELECT* key to enter the **CHAN#1 TMP ADJ** submenu. To change the options press and hold the *SELECT* key until the cursor flashes. Select either the **DISABLED**, **AUTO**, or **MAN** option. If the **MAN** option is selected, the user will then have to specify a value.
3. **CHAN#1 %/DEG (C/F)**: Press the *SELECT* key to enter the **CHAN#1 %DEG (C/F)** submenu. This screen is used to adjust the Channels input signal by a factor of X.XXX percent per degree Celsius or Fahrenheit. A positive number will add to the channels input signal and a negative number will subtract from the channels input signal.

After setting up channels #1, return to the **CHANNEL #1** screen by pressing the *SELECT* key until the cursor stops flashing. Press the SELECT key to move to **CHANNEL#3**

1. **CHANNEL #3**: **Channel #3** is forced to to TMP and can not be changed by the user.

After the Channel options have been set, press and hold the *SELECT* key until the cursor stops flashing. Press the *SELECT* key again to display the **RELAY1** screen.

1. **RELAY1**: From this screen, the user will press and hold the *SELECT* button to enter the submenu. By pressing the *CHANGE* key the user can cycle through the options which include the ability to **DISABLE** the relay, have the relay read from **CHANNEL#1**, **CHANNEL#4**, or set it as an **ALARM**.

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SETUP

CHANNEL#1
mS

CHANNEL#1
mS (forced)

CHAN#1 TMP ADJ
DISABLED

CHAN#1 TMP ADJ
DISABLED  AUTO  MAN

INPUT
-499—+499

CHAN#1 % / DEG (C/F)
+/- 4.999

CHANNEL#3
TMP

CHANNEL#3
TEMP (forced)

RELAY1

RELAY1
DISABLED  CH1-4  ALARM

## *SETUP and USER INPUT MENUS*

After completing the parameters for the relay, return to the **RELAY1** menu by pressing and holding the *SELECT* key until the cursor stops flashing. Using the *SELECT* button, cycle through until the **PUMP MX. ON TIME** screen is displayed.

1. **PUMP BASE TIME**: From this screen, press and hold the *SELECT* button until the cursor flashes. This will allow the user to set the time period in which the pumps complete 1 on/off cycle. This value can be set for any value between 1 and 99 seconds. The percentage of the **PUMP BASE TIME** that the pumps are running is a function of the percent deviation from the user specified **SETPOINT** value and the user specified **WINDOW** value.

After setting up pump base time, return to the **PUMP BASE TIME** main menu by pressing the *SELECT* key until the cursor stops flashing. Using the *SELECT* key cycle through the menus until the **TEMP DISPLAY** menu is displayed.
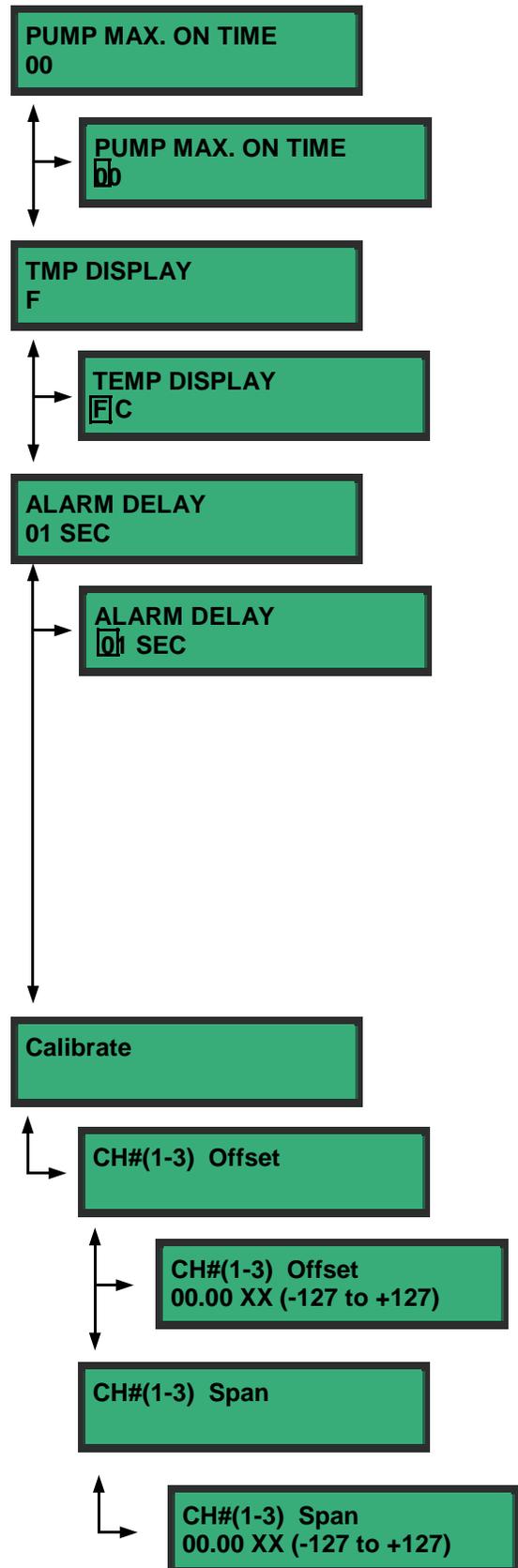
1. **TEMP DISPLAY**: From this screen press and hold the *SELECT* key until the cursor flashes. Then choose either **F** (Fahrenheit) or **C** (Celsius) using the *CHANGE* key. NOTE: SETPOINTS and ALARMS do not recalculate after changing this parameter. The user will have to adjust the temperatures accordingly.

After setting up **TMP DISPLAY**, return to the **TMP DISPLAY** main menu by pressing and holding the *SELECT* key until the cursor stops flashing. Using the *SELECT* key cycle through the menus until the **ALARM DELAY** menu is displayed.

1. **ALARM DELAY**: From this screen press and hold the *SELECT* key until the cursor flashes. Then choose a value between 1 and 99 seconds using the *CHANGE* key. This will become the time in which an alarm will be triggered after reaching the **ALARM** setting determined previously.

After setting up **ALARM DELAY** parameters, return to the **ALARM DELAY** main menu by pressing the *SELECT* key until the cursor stops flashing. Using the *SELECT* key cycle through the menus until the **CALIBRATE** menu is displayed. From the **CALIBRATE** screen, press and hold the *SELECT* button to access the individual **CHANNEL** screens listed below.

1. **CHANNEL #1**: **Conductivity In**. From the CHANNEL #1 screen, press and hold the *SELECT* button to access the OFFSET and SPAN screens for **Conductivity In** settings
2. **CHANNEL #2: 4-20mA out.** From the CHANNEL #2 screen, press and hold the *SELECT* button to access the OFFSET and SPAN screens for **4-20mA out** settings
3. **CHANNEL #3: Temperature In.** From the CHANNEL #3 screen, press and hold the *SELECT* button to access the OFFSET and SPAN screens for **Temperature In** settings

PUMP MAX. ON TIME
00

PUMP MAX. ON TIME
00

TMP DISPLAY
F

TEMP DISPLAY
F C

ALARM DELAY
01 SEC

ALARM DELAY
01 SEC

Calibrate

CH#(1-3) Offset

CH#(1-3) Offset
00.00 XX (-127 to +127)

CH#(1-3) Span

CH#(1-3) Span
00.00 XX (-127 to +127)

## *PROPORTIONING DISABLED:*

Acts essentially as an ON/OFF switch. The pump on-time is equal to 100% of the user selected **PUMP BASE TIME**. In other words, the pump will remain OFF until the conductivity reading increases and becomes equal to the **WINDOW** setting. At this time it will remain ON until it falls back to the **SETPOINT .**

*Important*: The only time the pump will change it's state is if it achieves either the **WINDOW** value or the **SETPOINT** value.

The figures to the right show non-proportioning examples when the **WINDOW** value is set higher then the **SETPOINT** and when the **WINDOW** value is set below the **SETPOINT.**
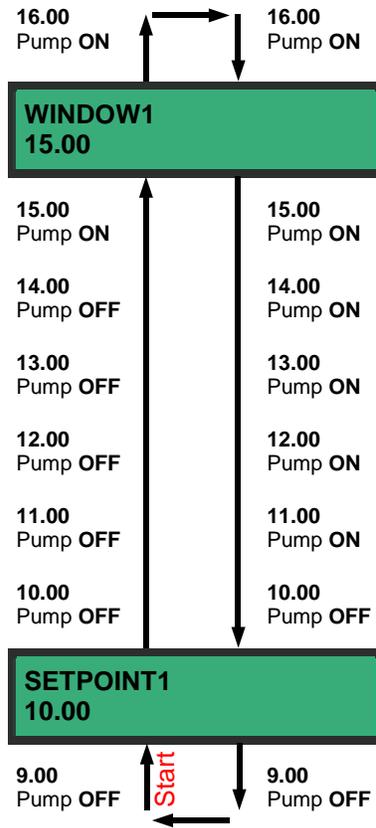
| | |
|---|---|
| 16.00 Pump **ON** | 16.00 Pump **ON** |
| **WINDOW1** **15.00** | |
| 15.00 Pump **ON** | 15.00 Pump **ON** |
| 14.00 Pump **OFF** | 14.00 Pump **ON** |
| 13.00 Pump **OFF** | 13.00 Pump **ON** |
| 12.00 Pump **OFF** | 12.00 Pump **ON** |
| 11.00 Pump **OFF** | 11.00 Pump **ON** |
| 10.00 Pump **OFF** | 10.00 Pump **OFF** |
| **SETPOINT1** **10.00** | |
| 9.00 Pump **OFF** | 9.00 Pump **OFF** |

Figure 1: **Window** value above **Setpoint**

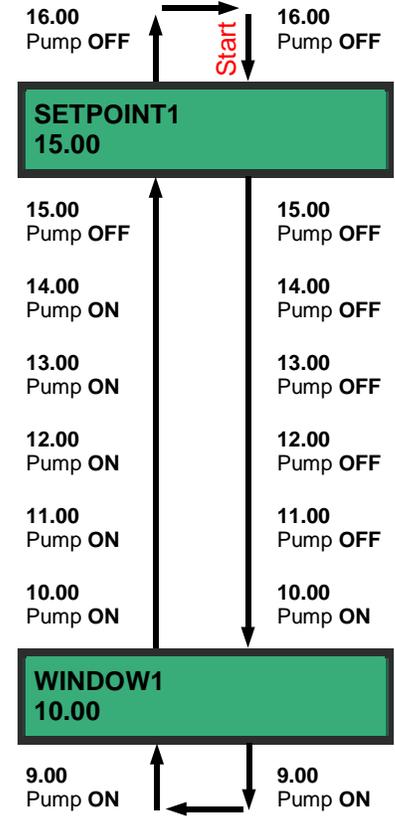| | |
|---|---|
| 16.00 Pump **OFF** | 16.00 Pump **OFF** |
| **SETPOINT1** **15.00** | |
| 15.00 Pump **OFF** | 15.00 Pump **OFF** |
| 14.00 Pump **ON** | 14.00 Pump **OFF** |
| 13.00 Pump **ON** | 13.00 Pump **OFF** |
| 12.00 Pump **ON** | 12.00 Pump **OFF** |
| 11.00 Pump **ON** | 11.00 Pump **OFF** |
| 10.00 Pump **ON** | 10.00 Pump **ON** |
| **WINDOW1** **10.00** | |
| 9.00 Pump **ON** | 9.00 Pump **ON** |

Figure 2: **Window** value below **Setpoint**

## *PROPORTIONING ENABLED:*

Allows the pumps to operate at a proportion equal to the percentage move of the conductivity reading between the **SETPOINT** and **WINDOW** values. If the conductivity reading increases through 20% of this range then the pump will operate for 20% of the user selected **PUMP BASE TIME** (fig.2). If the conductivity reading reaches the **WINDOW** setting, the pump will operate for the full **PUMP BASE TIME.** As the conductivity reading begins to fall so does the percentage of pump on time until it reaches the **SETPOINT** value where it will not pump.

The figures to the right show non-proportioning examples when the **WINDOW** value is set higher then the **SETPOINT** and when the **WINDOW** value is set below the **SETPOINT.**
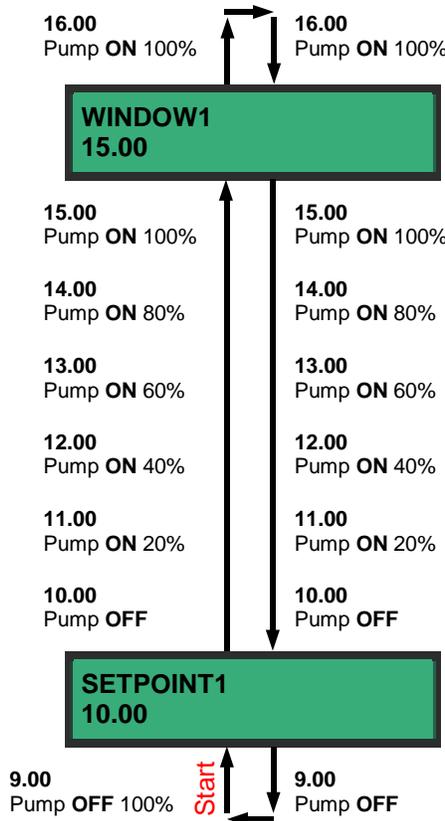
| | |
|---|---|
| 16.00 Pump **ON** 100% | 16.00 Pump **ON** 100% |
| **WINDOW1** **15.00** | |
| 15.00 Pump **ON** 100% | 15.00 Pump **ON** 100% |
| 14.00 Pump **ON** 80% | 14.00 Pump **ON** 80% |
| 13.00 Pump **ON** 60% | 13.00 Pump **ON** 60% |
| 12.00 Pump **ON** 40% | 12.00 Pump **ON** 40% |
| 11.00 Pump **ON** 20% | 11.00 Pump **ON** 20% |
| 10.00 Pump **OFF** | 10.00 Pump **OFF** |
| **SETPOINT1** **10.00** | |
| 9.00 Pump **OFF** 100% | 9.00 Pump **OFF** |

Figure 3: **Window** value above **Setpoint**

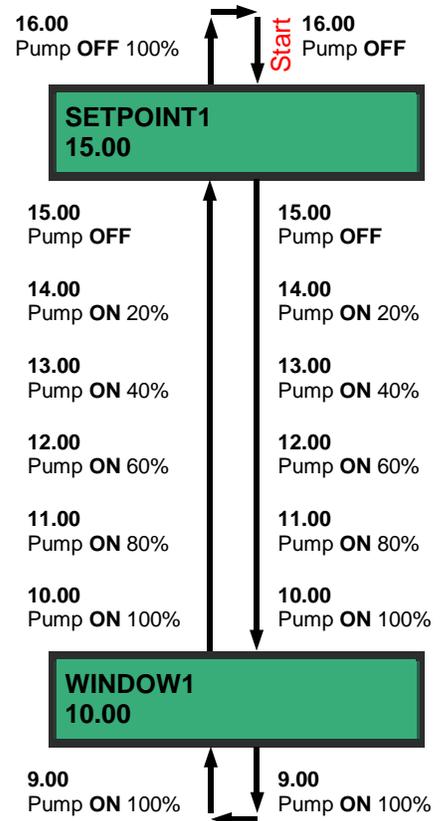| | |
|---|---|
| 16.00 Pump **OFF** 100% | 16.00 Pump **OFF** |
| **SETPOINT1** **15.00** | |
| 15.00 Pump **OFF** | 15.00 Pump **OFF** |
| 14.00 Pump **ON** 20% | 14.00 Pump **ON** 20% |
| 13.00 Pump **ON** 40% | 13.00 Pump **ON** 40% |
| 12.00 Pump **ON** 60% | 12.00 Pump **ON** 60% |
| 11.00 Pump **ON** 80% | 11.00 Pump **ON** 80% |
| 10.00 Pump **ON** 100% | 10.00 Pump **ON** 100% |
| **WINDOW1** **10.00** | |
| 9.00 Pump **ON** 100% | 9.00 Pump **ON** 100% |

Figure 4: **Window** value below **Setpoint**

# TOROIDAL CALIBRATION:

## ONE POINT CALIBRATION:
1. **Use a conductivity calibration solution close to the maximum of the meter range. Pour enough into beaker so round head of the probe can be completely immersed with 1" on the sides and 1" from the bottom of the beaker.**
2. **Go to the "CALIBRATION" screen, press and hold the SELECT key until the CHANNEL #1 – OFFSET" screen shows.  Release the SELECT key and than toggle the SELECT key once to move to the CHANNEL #1 – SPAN screen.  Press and hold the SELECT KEY again until a flashing cursor appears.**
3. **Place the toroidal probe into the beaker of calibration solution.  While gently swirling the probe in the solution, toggle either the SELECT key or the CHANGE key to increase / decrease the value shown in the SPAN screen left of the calibration reference number you are changing.  Match the value to that of the calibration solution you are using.  For example, if you are using a 7000uS solution, toggle the SELECT or CHANGE keys until the meter reads 7000.  Once it has, press and hold the SELECT key a gain to lock the calibration reference number in and to back out of this screen.**
4. **Pressing BOTH keys together will bring you back to the main screen.**


## TWO POINT CALIBRATION:
1. **Use two conductivity solutions, one very low and the other close to the maximum range of the meter.  Again fill beaker as explained above.**
2. **Go the Calibration screen, entering it to the first screen: CHANNEL #1 – OFFSET. Press and hold the SELECT key to enter this screen.  The flashing cursor will be on the calibration reference number.**
3. **Place the toroidal probe into the beaker and gently swirl.  Toggle either the SELECT key or the CHANGE key to match the value of the calibration solution to the meter.**
4. **Once set, press/hold the SELECT key to back out of this screen.  Once out, toggle the SELECT key to go to the next screen (CHANNEL #1 – SPAN).  Enter this screen.**
5. **Place the probe into the  maximum calibration solution and repeat the same method of calibration as you did in the OFFSET screen.**
6. **Once done, go back to the OFFSET calibration screen, place the probe into the LOW calibration solutions to check / make adjustments to the OFFSET calibration. Go back to the SPAN and do the same thing.  Keep doing this until the calibration stays close to the desired value.**


## TEMPERATURE CALIBRATION:
1. **The temperature sensor is inside the probe.  Therefore, you must let the probe adjust to the temperature values to be calibrated at.  CHANNEL #3 – OFFSET has been calibrated to 32 degrees F while CHANNEL #3 – SPAN has been calibrated to 212 degrees F.**
2. **Use the same procedure as above to calibrated the temperature.**


**CHANNEL #2 IS USED FOR 4-20mA  output signal.**

# PARTS LIST FOR COND-PMP-3/2

| ITEM | PART NUMBER |
|------|-------------|
| ELASTIC SQUEEZE TUBE<br>( Standard with unit. Good for weak to strong alkalis, weak to medium acids.) | 245-4-ELSQZTUB |
| THERMISTANT SQUEEZE TUBE<br>(Has superior acid-resistant and alkali-resistant qualities.) | 245-4-TMSQZTUB |
| FLUORO-VITON SQUEEZE TUBE<br>( Good for Strong solvents and acids.) | 245-4-FVSQZTUB |
| SQUEEZE TUBE LUBRICANT | 245-4-SQZLUBE |
| 24 VDC PERISTALTIC GEAR MOTOR | 245-4-GEARMOT |
| ROLLER FOR PERISTALTIC UNITS | 245-4-ROLLER |
| FACEPLATE FOR PERISTALTIC UNITS | 245-4-FACEPLT |
| ROLLER / TUBE  BODY HOUSING | 245-4-PMPBODY |
| RED/BLACK TWISTED PAIR SIGNAL WIRE | 210-1-TWPR22RD |
| DELIVERY TUBING—50' ROLL<br>(Polyethylene 1/4' OD, rigid wall tubing) | 245-4-PLYTB50 |
| DELIVERY TUBING—100' ROLL | 245-4-PLYTB100 |
| PERISTALTIC HINGE | 245-4-HINGE |

NOTE:  CHECK YOUR SQUEEZE TUBES PERIODICALLY FOR INTEGRITY (ABLE T0 EXPAND AF-
TER BEING SQUEEZED BY THE ROLLERS).

ORDER BY:

| | | |
|---|---|---|
| PHONE: | 1-262-642-7671 | POST:  JP TECH, INC. |
| FAX: | 1-262-642-7681 | P.O. BOX 863 |
| E-MAIL | sales@jptechinc.com | East Troy, WI 53120 |
| | | USA |

# MAINTENANCE

The PERISTALTIC Series of metering pumps require a minimal amount of maintenance to achieve optimal performance.  Periodically check the squeeze tube for cracks, deterioration, or swelling.  The squeeze tube will typically need to be  replaced about every 6 months (chemical compatibility and duty cycle can cause this interval to vary).  NOTE:  Squeeze tubes are NOT a warranty item.

**VERY IMPORTANT**: When replacing squeeze tubes, **DO NOT TWIST THE TUBES WHEN FITTING THEM AROUND THE ROLERS.**  Insert them so they remain flat in the same plane.  (The writing on the tubes should be inline on both sides of the rollers.)

Appling lube to the squeeze tube once a month will extend the life of the tube, minimize wear on other contacting parts, and promote smoother pump operation. Use Knight Tube Lube (P/N 245-4-SQZLUBE) or an equivalent silicone-based lubricant.

1.  Remove the faceplate of the pump.

2.  Apply a thin bead of Tube Lube to the inner surface (the side that the rollers contact) of the squeeze tube between the 9 o'clock and 3 o'clock positions.  Avoid getting the lube near the pinch points where the bottom of the faceplate grips the tube.

3.  Put the faceplate back on the pump
Activate the pump under normal conditions—the lubricant will be evenly distributed as the pump rotates.

CAUTION: To avoid severe or fatal shock, always disconnect main     power when servicing the unit.

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JP Tech warrants to first user of each new JP Tech product or component that it is free from defect in material and workmanship.  The obligations of JP Tech under this warranty are expressly limited to the following:

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- If JP Tech elects to send a service technician to a customer site to repair a defect, the cost of transportation and/or living expenses will be paid for by the customer.  Should the defect turn out to be the result of the customer's misuse, improper installation, or maintenance of the product or component, the customer will be responsible for the full cost of the service call including labor charges plus the aforementioned travel and living expenses.
- JP Tech will repair or replace any defective part within a product at the sole discretion of JP Tech.  If JP Tech should choose to supply a part to the customer as a no-charge warranty replacement, the customer assumes all cost of installation associated with the replacement part.  If the product needs to be returned for warranty service, a Returned Material Authorization (RMA) must be issued by JP Tech prior to such return.  All returned material must be sent freight prepaid or it will not be accepted by JP Tech irrespective of warranty issues.
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- JP Tech will in no case or under any circumstances be liable for special, incidental or consequential damages, loss of profit or commission for any loss caused by any delay in production or shipment of product, or defect of any kind in any product or component covered by the sale.  Without limitation, JP Tech will not be so liable with respect to furnishing of any product, or component, delay in such furnishing, use, resale, or other cause.  JP Tech's liability arising out of the supply of any product or component, its use, resale or other disposition, or out of any guarantee or warranty, express or implied, or any other cause, shall in no way exceed the cost to JP Tech of the product or component which JP Tech agrees to repair or replace.  JP Tech's liability for any product or component terminates upon expiration of the applicable repair or replacement period.

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- All sales are final. Any decisions to accept return of product after shipment and receipt by purchaser shall be at the sole discretion of JP Tech and not until payment has been made and agreement by purchaser to pay all shipping, cancellation, and restocking charges that may accrue.
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