



**SHARK_{TX} & SHARK_{TXP} MULTI-PARAMETER
TRANSMITTER USER'S MANUAL**



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Introduction

The SHARK_{TX} & SHARK_{TXP} multi-parameter transmitter is a microprocessor based transmitter capable of measuring one of the following parameters, pH, ORP, conductivity or flow.

When shipped from the factory, the Shark is not set to measure any one parameter. When the Shark is powered up for the first time, it will display the meter selection screen where the meter type must be selected. (refer to section 4.5 Meter Selection)

This meter selection screen will only be displayed when the Shark is powered up for the first time.

After the user selects a meter type the Shark will remain set to that meter type until it is changed with the meter selection menu function in the Utilities menu.

To return the Shark to its factory settings, the user must re-select the current meter type from the meter selection menu function. This will override all set-points and return all settings back to the factory settings.

The Shark Users menu has been divided into five main categories

- Calibration, used to calibrate the Shark with the selected sensor
- Utilities, used to manually control or override the outputs.
- Setup, used to configure the Sharks many options
- Diagnostics, used to troubleshoot problems with the Shark or sensor
- Outputs, used to configure the Shark's 4 to 20mA output.

SHARK_{TX} is packaged in a rugged NEMA 4X polycarbonate enclosure with a universal mounting kit for surface, panel and pipe-mount applications. This enclosure is perfect for stand-alone or panel-mount operation.

SHARK_{TXP} enclosure is also polycarbonate with a NEMA 4X front panel. Panel mount, and DIN rail mounting hardware are supplied.



Section I - Specifications

	pH	ORP	Conductivity	Flow																		
Display	2 x 16 alpha-numeric LCD display																					
Power Requirements	4 to 20mA, Loop Powered, 16 to 32 VDC																					
Measuring Range	pH: 0.01 to 14.00 Temp: 0 to 100°C or 32° to +212°F	ORP: -1999 to +1999mV (Dependent on sensor) Temp: 0 to 100°C or 32° to +212°F	<table border="1"> <tr> <td>MΩ/cm³</td> <td>0 to 19.99</td> <td>0.01</td> </tr> <tr> <td rowspan="3">uS/cm³</td> <td>0 to 2.000</td> <td>0.01</td> </tr> <tr> <td>0 to 20.00</td> <td>0.1</td> </tr> <tr> <td>0 to 200.0</td> <td>0.1</td> </tr> <tr> <td rowspan="2">mS/cm³</td> <td>0 to 5000</td> <td>1.0</td> </tr> <tr> <td>0 to 20.00</td> <td>10</td> </tr> <tr> <td></td> <td>0 to 200.0</td> <td>50</td> </tr> </table> Temp: 0 to 100°C or 32° to +212°F	MΩ/cm ³	0 to 19.99	0.01	uS/cm ³	0 to 2.000	0.01	0 to 20.00	0.1	0 to 200.0	0.1	mS/cm ³	0 to 5000	1.0	0 to 20.00	10		0 to 200.0	50	Flow: 0 to 9999 with selectable flow rate units Volume: 0 - 999 with Auto Range Flow rate units: Gallons (GP), Cubic Feet (CF), Liters (LP), Cubic Meters (CM), custom by entering factor related to Gallons Time units: Seconds (S), Minutes (M) Hours (H)
MΩ/cm ³	0 to 19.99	0.01																				
uS/cm ³	0 to 2.000	0.01																				
	0 to 20.00	0.1																				
	0 to 200.0	0.1																				
mS/cm ³	0 to 5000	1.0																				
	0 to 20.00	10																				
	0 to 200.0	50																				
Temperature Compensation	Automatic or Manual 0 - 100°C (32° to +212°F)	Not required	Automatic or Manual User selectable temperature compensation slope 0.0 to 10.0%/°C. 0 to 100°C (32° to +212°F)	Not required																		
Temperature Unit	°C or °F			Not required																		
Temperature Sensor	User selectable: 300Ω NTC Thermistor, 3000Ω NTC Thermistor or Pt. 1000 RTD			Not required																		
Calibration Modes	Auto-Calibration Manual Calibration Temperature Calibration	Manual Calibration Temperature Calibration	Dry Calibration Sample Calibration Temperature Calibration	K factor Input																		
Ambient Conditions	Temperature: -20°C to +60°C or -4°F to +140°F Humidity: 0 to 90% RH (non-condensing)																					
Sensor to Transmitter Distance	Differential Sensor: 3000 ft Combination Sensor: 10 ft		300 ft	2000 ft																		
Analog Output	4 to 20mA Isolated Output, Range expand 0 to 100% of full scale (min segment 10% of full scale), max. load 800Ω																					
Memory Back-up	All user settings are retained indefinitely in memory (EEPROM)																					
Mechanical	SHARKTX Enclosure: NEMA 4X, 1/4 DIN, polycarbonate enclosure with two 1/2" conduit holes SHARKTXP Enclosure: NEMA 4X front panel, 1/4 DIN, polycarbonate SHARKTX Mounting: Universal Mounting kit for surface, pipe and panel mount included SHARKTXP Mounting: Panel and DIN rail mount included																					
Sensor Input	Probe: -600 to +600mV Temp. Sensor: 0 to 9999Ω	Probe: -1999 to +1999mV Temp. Sensor: 0 to 9999Ω	Cell: 0 to 9999Ω Temp. Sensor: 0 to 9999Ω	Paddle: 0 to 2000Hz																		
Invalid Entries	Invalid entries cannot be stored																					
Manual Test Mode	Process value can be simulated with arrow keys to verify correct setup of output																					
Output Hold	4 to 20mA output is placed on hold when the transmitter is in Menu mode																					
Calibration Data	Recall data from last calibration, calibration mode, 1st & 2nd accepted buffer value and probe mV output, calibration temperature, calibration slope, and probe efficiency		Recall data from last calibration, calibration buffer accepted value, and cell resistance, calibration temperature	Recall store K factor.																		
Auto Return	User selectable auto return if the transmitter is left in menu mode for more than 10 min.																					
Display Damping	User can select rate at which the transmitter updates display. Enables display damping of unstable process																					
Net Weight	SHARKTX: 0.71 lbs (0.32 kg) SHARKTXP: 0.25 lbs (0.12 kg)																					
Approvals	ULC (pending)																					



Section 2 - Installation

2.1 Unpacking

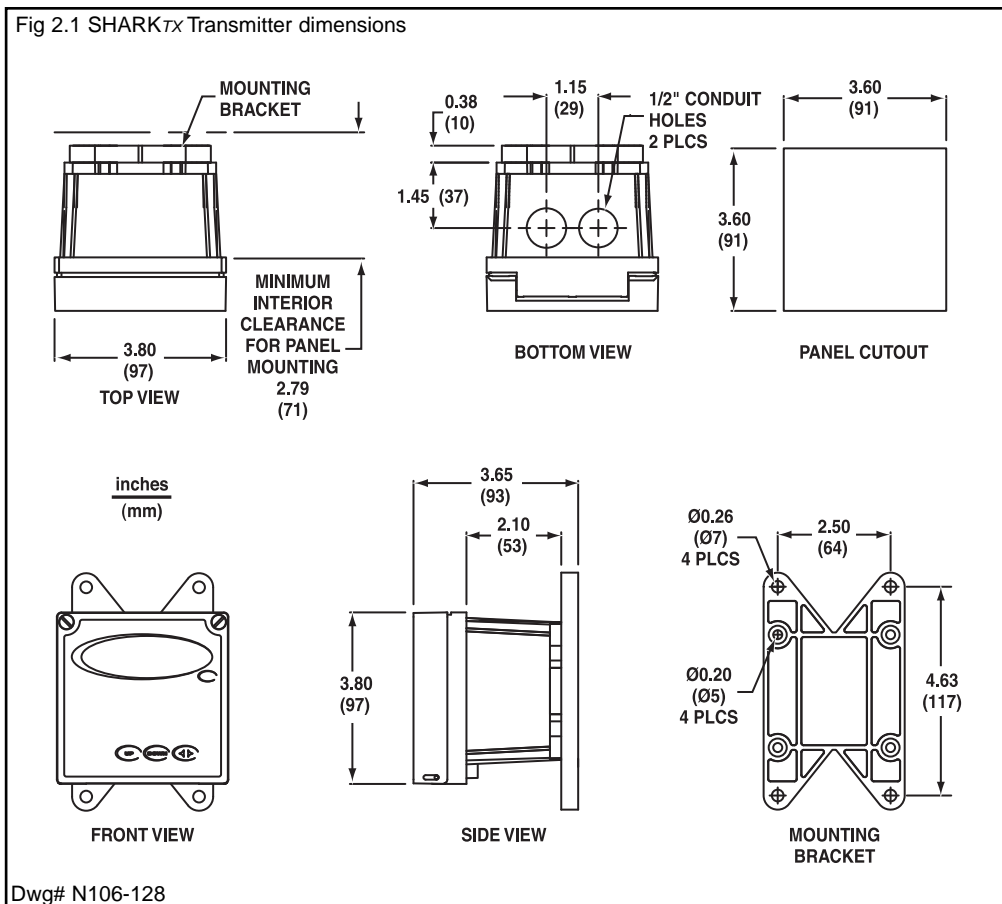
Save the shipping carton and packing material in case the instrument needs to be stored or returned. Inspect the instrument and packing material for shipping damage and report any problems immediately.

2.2 Location

Locate the transmitter close to the sensor. The list below gives typical maximum distances for various sensors. Refer to the sensor specifications for exact information.

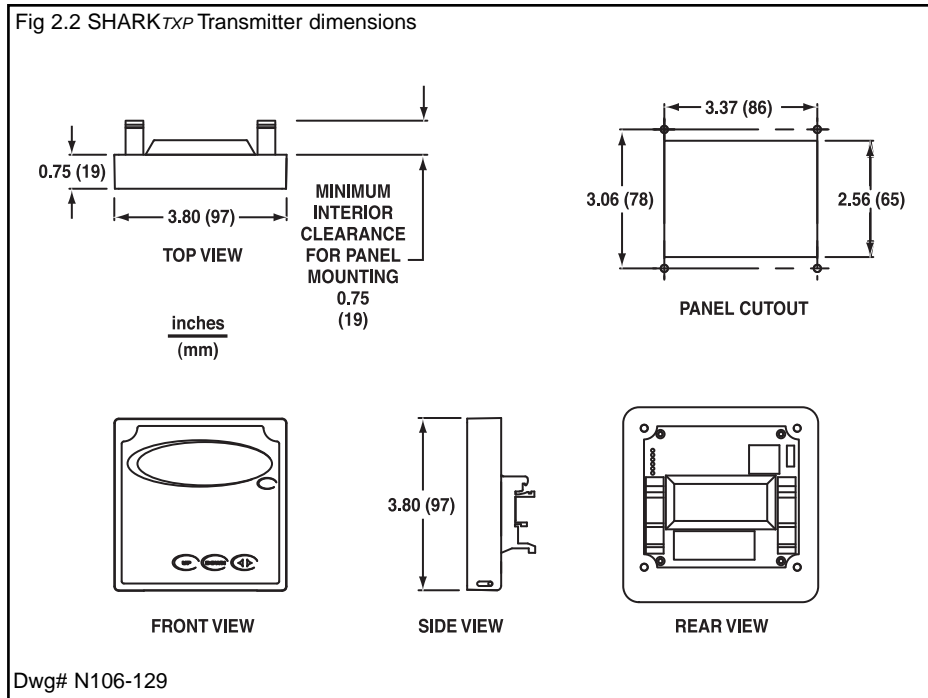
- Aquamatrix Differential PH Probe 3000 ft (914 meters)
- Aquamatrix Combination PH Probe 10 ft (3 meters)
- Aquamatrix Conductivity Probe 300 ft (91 meters)
- Aquamatrix Flow sensor 2000 ft (610 meters)

2.3 Mounting

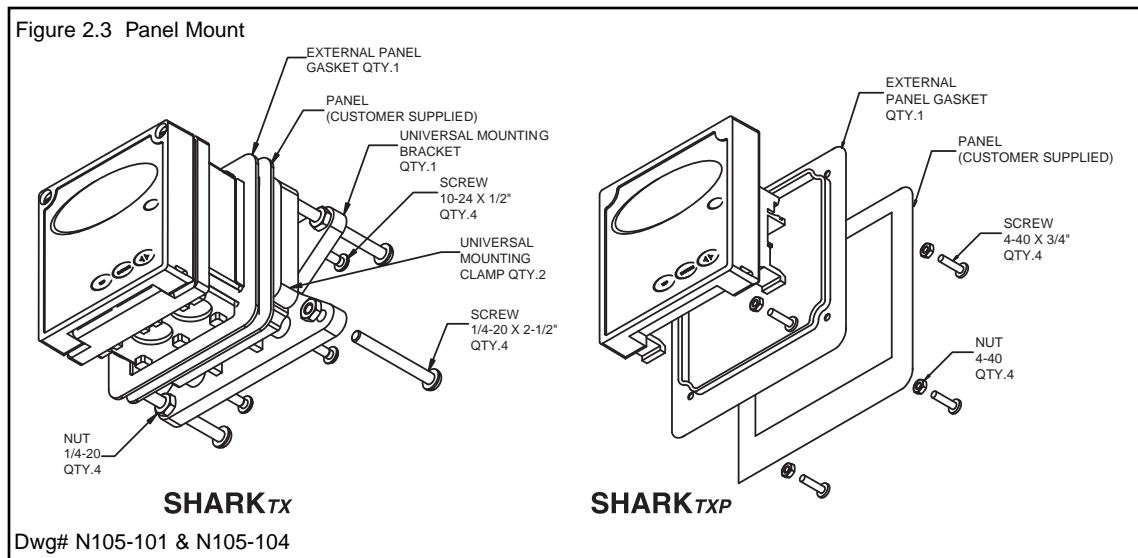




Section 2 - Installation



Panel Mount – The transmitters can be panel mounted to a panel using the hardware kit provided. The panel cutout dimensions are shown in fig. 2.1 and 2.2.





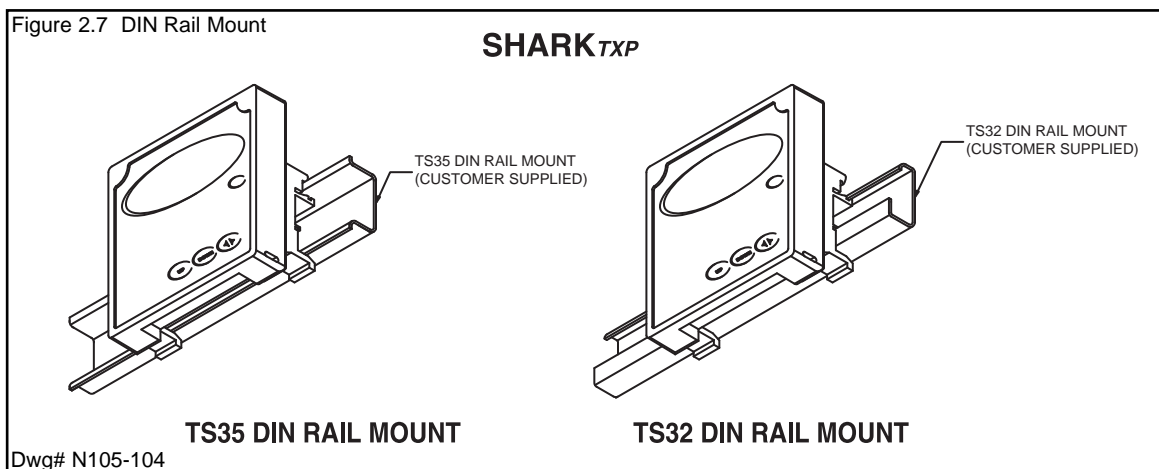
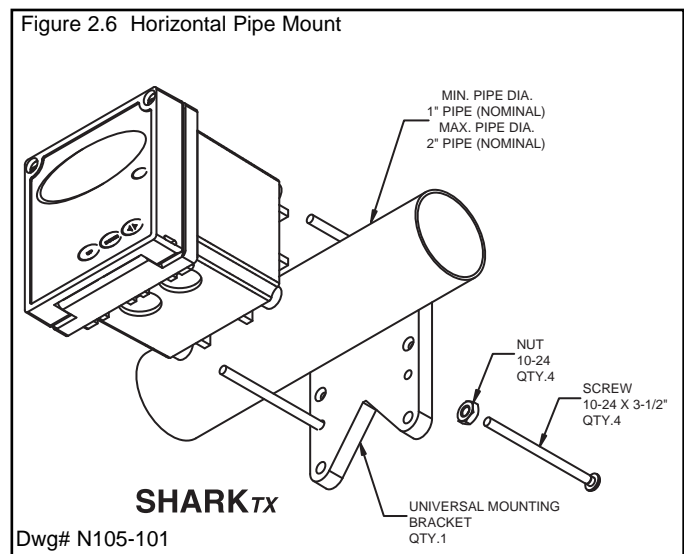
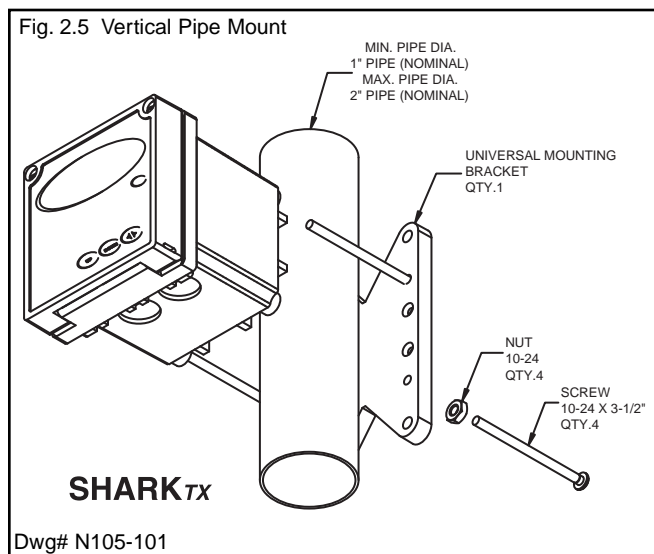
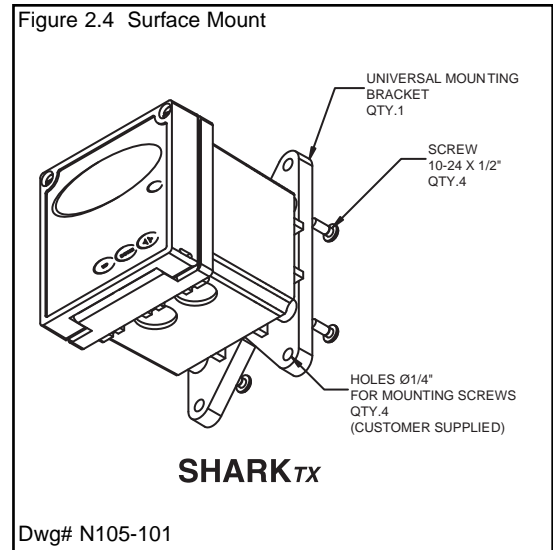
Section 2 - Installation

Surface Mount – The SHARK_{TX} can be surface mounted using the hardware kit provided with the unit.

Pipe Mount – The SHARK_{TX} can be mounted to a horizontal or vertical pipe with:

- a minimum outside diameter of 1.30" (33mm) (for example 1" CPVC pipe)
- and a maximum of 2.375" (60mm) (for example 2" CPVC pipe)

DIN Rail Mount – The SHARK_{TXP} can be DIN rail mounted or panel mounted. See figure 2.3 & figure 2.7.





Section 3 - Electrical Connections and Setup

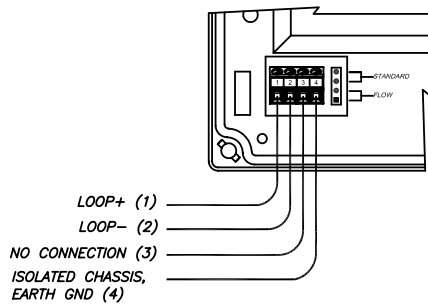
3.1 Conduit Connections

The SHARK_{TX} has two 1/2" conduit holes at the bottom of the enclosure as shown on fig. 2.1. The unit is shipped with these holes plugged with liquid tight conduit seals. These must be left in unused holes to maintain the NEMA 4X integrity. Use approved conduit hubs to connect the conduit, connect these to the conduit before connecting to the enclosure.

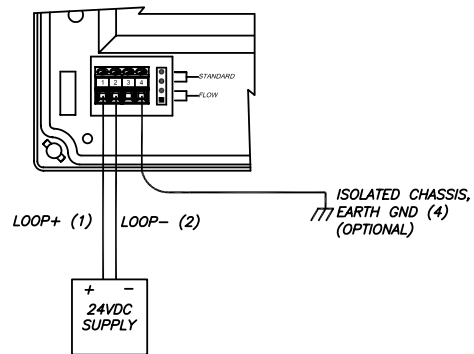
3.2 Power Connections

Figure 3.1 Connections

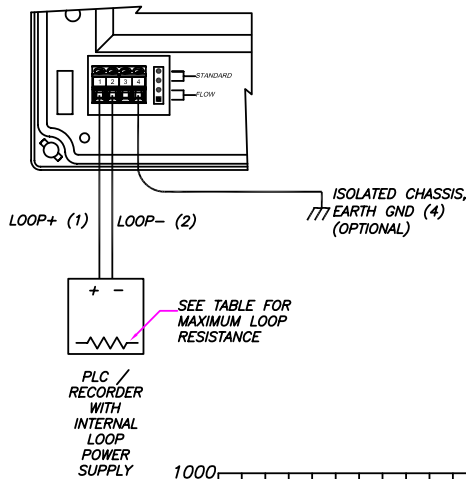
SHARK TX LOOP POWER CONNECTIONS



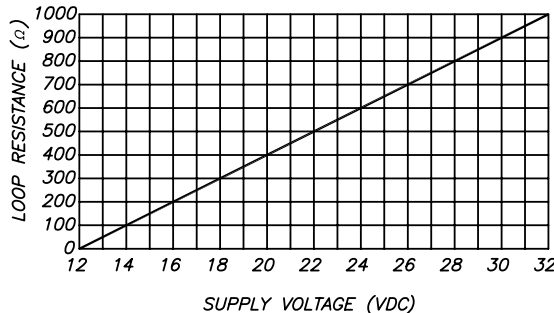
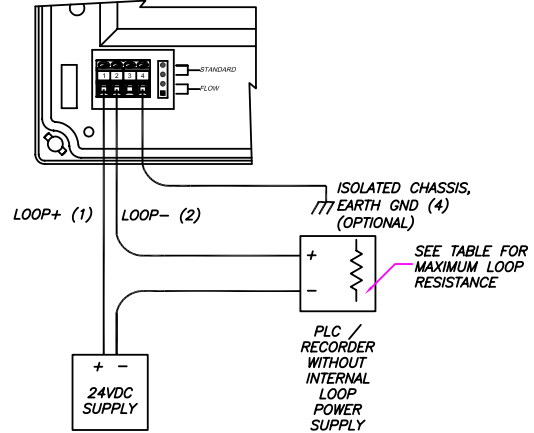
SHARK TX WIRING INDICATOR ONLY, NO OUTPUT



SHARK TX WIRING DEVICE WITH INTERNAL LOOP POWER



SHARK TX WIRING DEVICE WITHOUT INTERNAL LOOP POWER



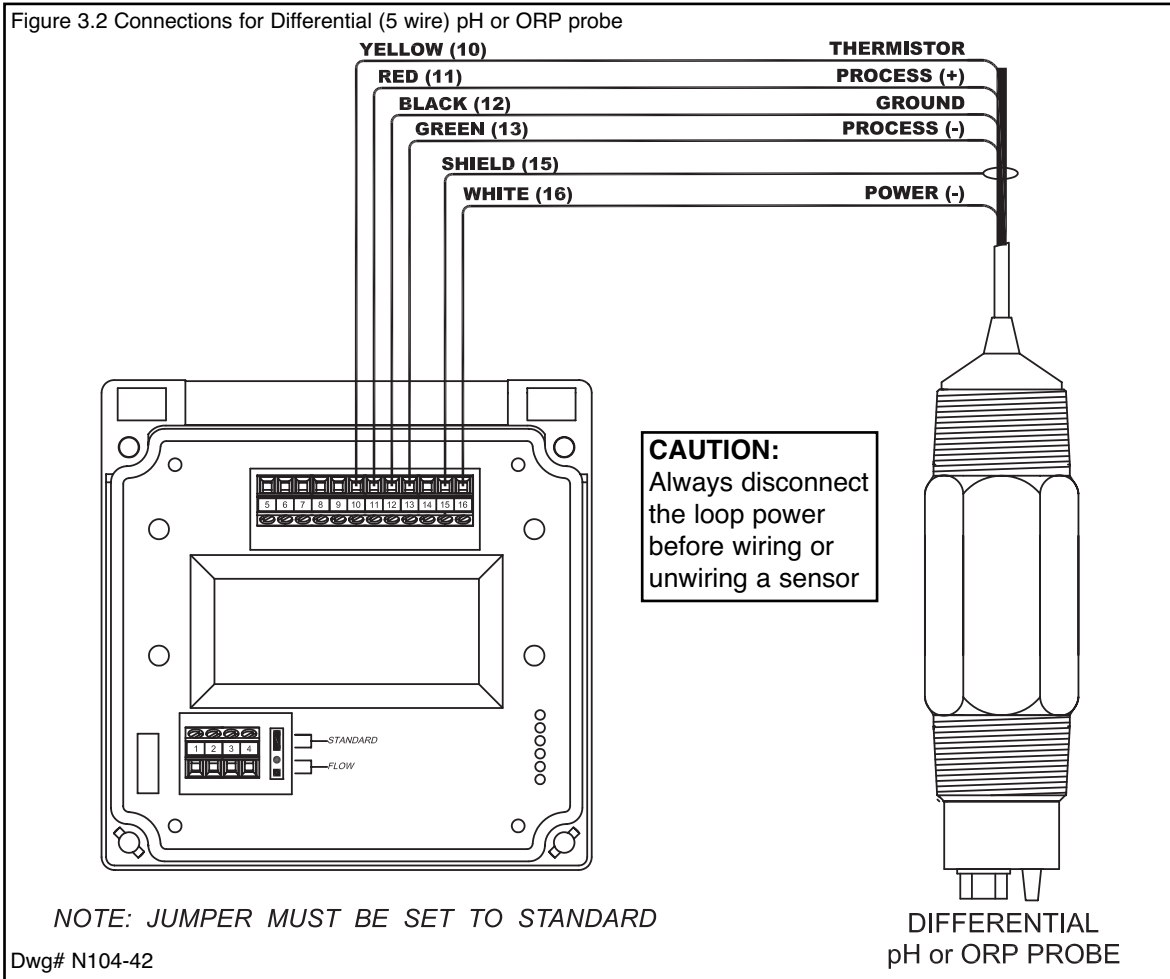
Dwg# N104-41



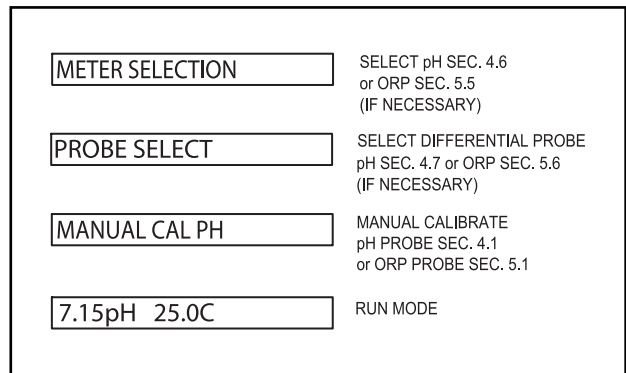
Section 3 - Electrical Connections and Setup

3.3 pH and ORP Differential Probe connections and setup

The drawing shows the connections for the Aquamatrix Differential (5 wire) probe. The cable should be run in a conduit separate from AC power wires, and via a separate conduit hole.



Once connected, step through the LCD menus to select the probe in the order shown. The first two steps may be skipped if the meter is already configured for pH or ORP and a Differential Probe. When using a pH probe, it is important to ensure that the transmitter is reading the probe temperature correctly for accurate temperature compensation. The ORP probe does not require temperature compensation, although the transmitter can display process temperature measured by the probe. The factory temperature calibration is usually accurate enough that no adjustments are necessary.





Section 3 - Electrical Connections and Setup

3.4 pH or ORP Combination Probe connections and setup

The drawing shows the connections for the Aquamatrix Combination probe. The cable should be run in a conduit separate from AC power wires, and via a separate conduit hole. The cable length should not exceed 10 feet (3 meters).

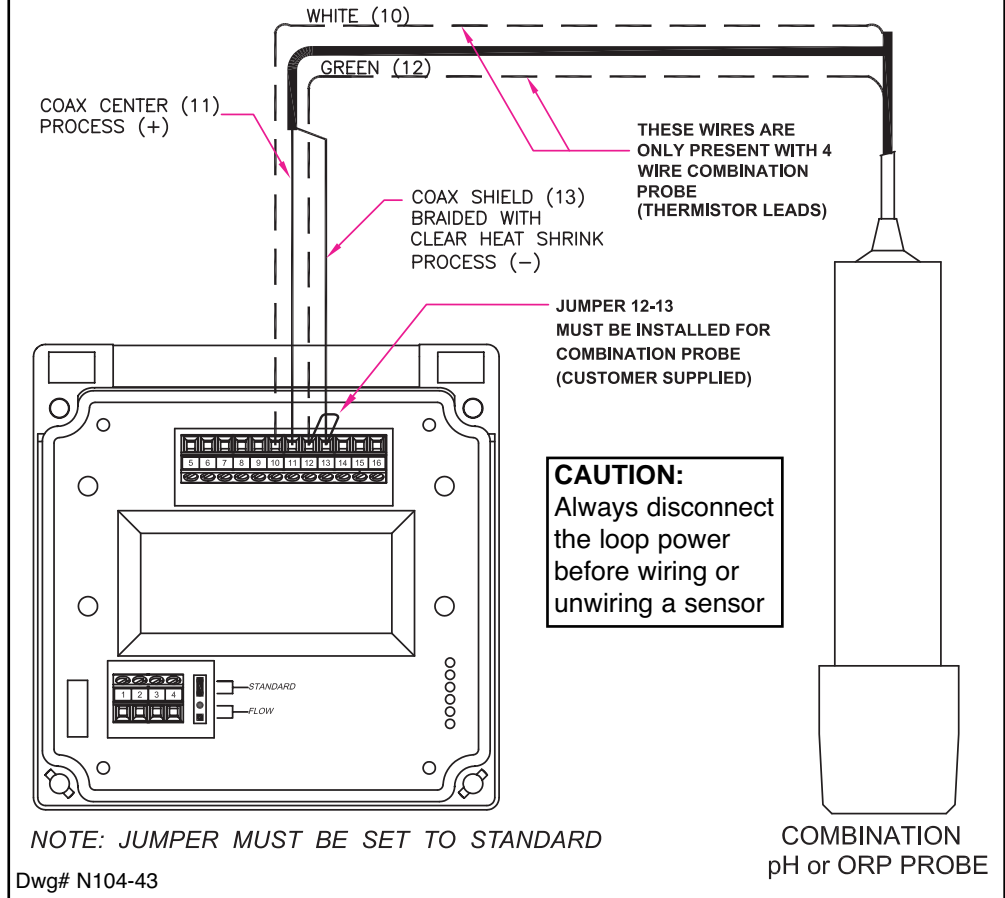
The **2 wire** version has no temperature sensor and is connected via a coaxial wire.

In a **pH meter**, the user should set the **T COMP OVERRIDE** menu to **ON** (Section 4.10) and adjust the temperature setting to the actual probe temperature.

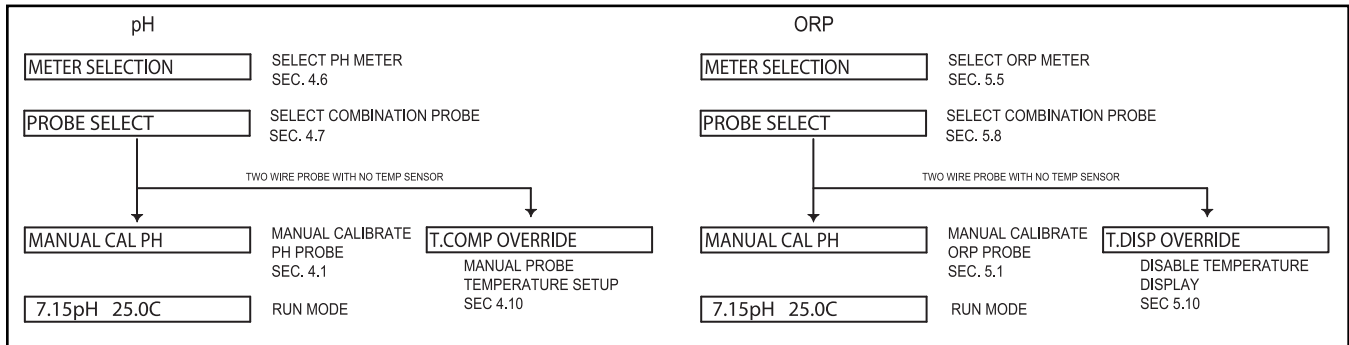
In an **ORP meter**, the user should set the **T.DISP OVERRIDE** to **ON** (Section 5.9) to blank the temperature reading on the display.

The **4 wire** version has two additional wires for the probe internal temperature sensor. Ensure that the **T COMP OVERRIDE** or **T.DISP OVERRIDE** is **OFF**.

Fig. 3.3 Connections for the 2 and 4 wire Combination Probe



Once connected, step through the LCD menus to select the probe in the order shown. The first two steps may be skipped if the meter is already configured for a Combination Probe. If a two wire pH probe is used, which has no temperature sensor, ensure that the Temp. Comp. Override is set to same temperature as the buffer before calibrating. If a two wire ORP probe is used, you can blank the Temp display with the T DISP OVERRIDE menu.

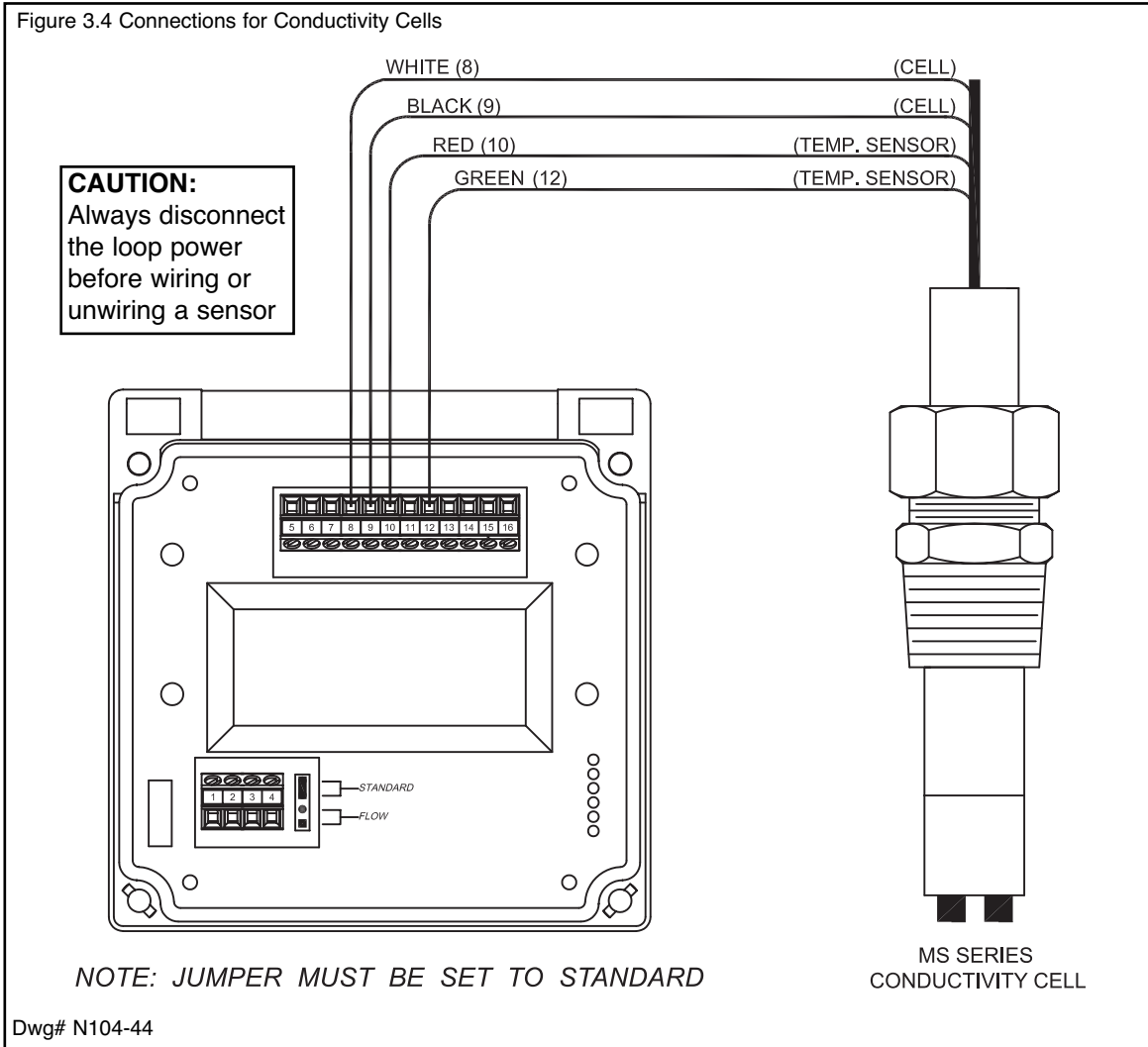




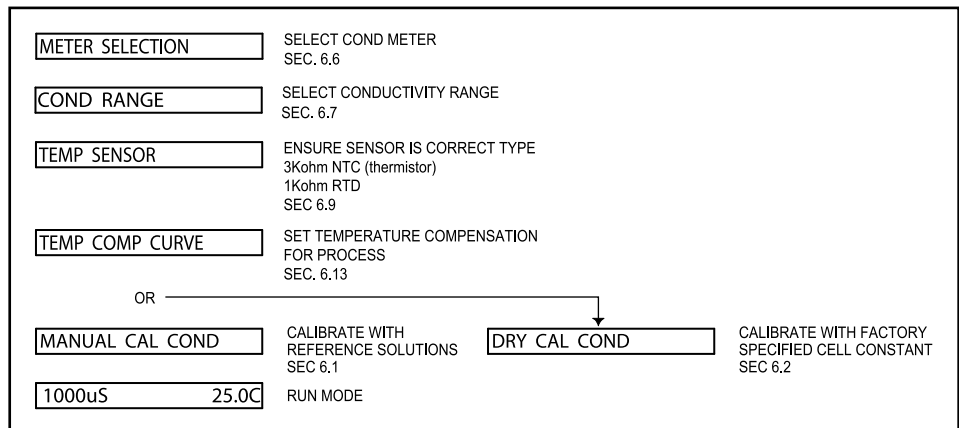
Section 3 - Electrical Connections and Setup

3.5 Conductivity Cell (Contacting style) connections and setup

The drawing shows the connections for the Aquamatrix Conductivity Cells (Contacting style). The cable should be run in a conduit separate from the AC power wires, and via a separate conduit hole. The cell cable length should not exceed 300ft. (91 meters).



Once connected, step through the LCD menus to select the cell in the order shown. The TEMP COMP CURVE setup default is 1.8%/deg C. This is acceptable for most process applications. If your process is significantly different from this, change the setting in the TEMP COMP CURVE menu.

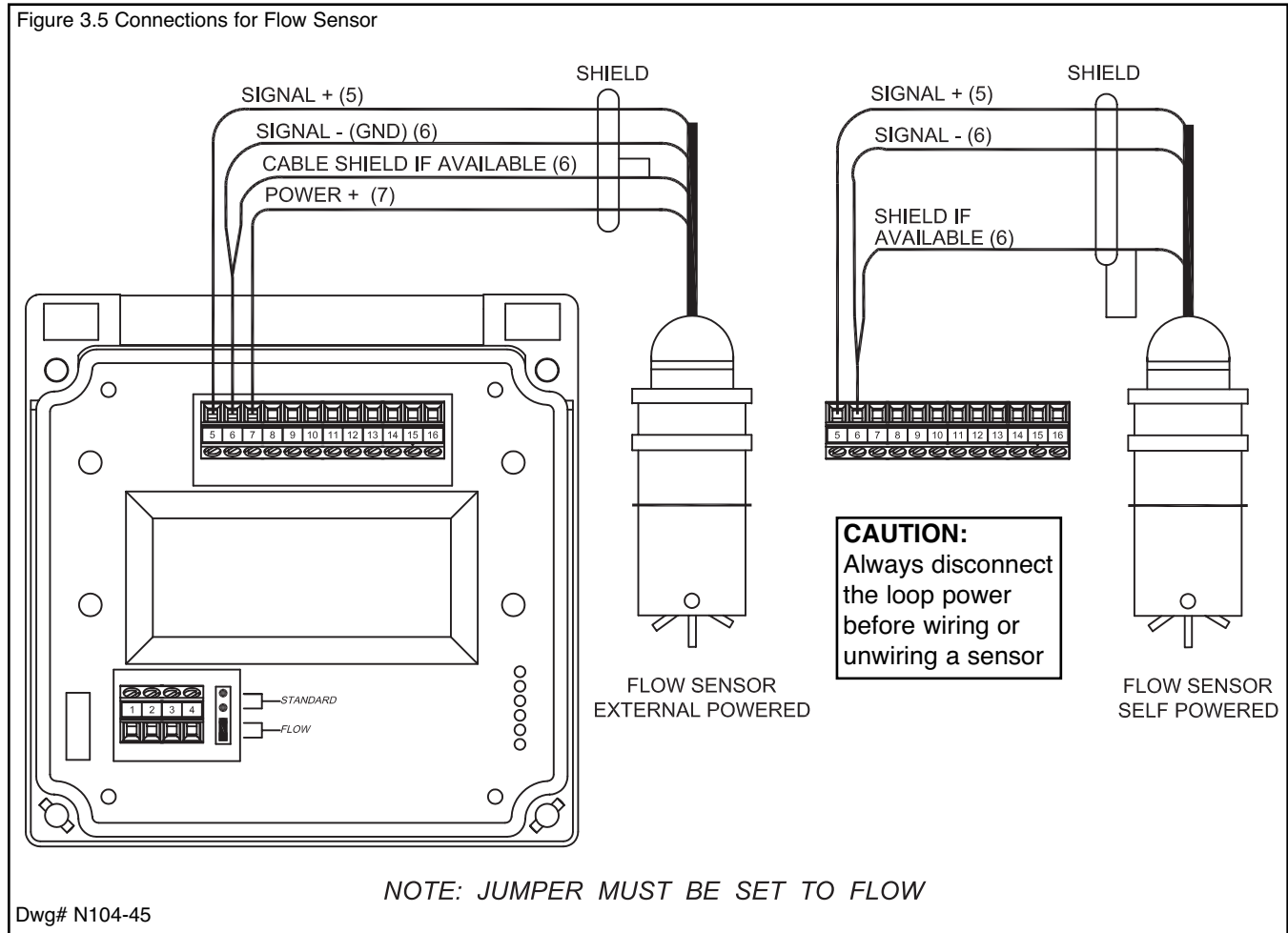




Section 3 - Electrical Connections and Setup

3.6 Paddle Wheel Flow Sensor connections and setup

The drawing shows the connections for a typical paddle wheel flow sensor. The cable to the sensor should not exceed 2000' (600 meters).



Once connected, step through the LCD menus to select the sensor in the order shown. The Sensor K factor (pulses per U.S. Gallon) is usually printed on the side of the sensor or on a label attached to the sensor cable.

METER SELECTION	SELECT FLOW METER SEC. 7.4
K FACTOR	ENTER FLOW SENSOR CALIBRATION FACTOR SEC. 7.1
UNITS OF VOLUME	SETUP OF UNITS OF VOLUME SEC. 7.5
UNITS OF TIME	SETUP OF UNITS OF TIME SEC. 7.6
TOTALIZER RESET	RESET TOTALIZER TO ZERO SEC. 7.0
TOTAL 0	RUN MODE



3.10 MANUAL TEST MODE

(LCD MENU SECTIONS - pH: 4.4, ORP: 5.3, Conductivity: 6.4, Flow: 7.2)

The setup can be tested using Manual Test Mode to simulate process changes.

MANUAL TEST MODE is used to simulate a process reading in order to verify the correct response of the output.

3.11 4-20 mA Isolated Output

(LCD MENU SECTIONS - pH: 4.15, ORP: 5.14, Conductivity: 6.16, Flow: 7.14)

The Transmitter has a single 4 to 20mA output, electrically isolated from the ground. The output can source current into a resistive load. Maximum resistance depends on supply voltage. Drawing on page 6 (Fig. 3.1)

The output is dedicated to track the process and has fully independent and fully adjustable 4 & 20 mA output setpoints. This will enable the operator to span the output over the desired range.

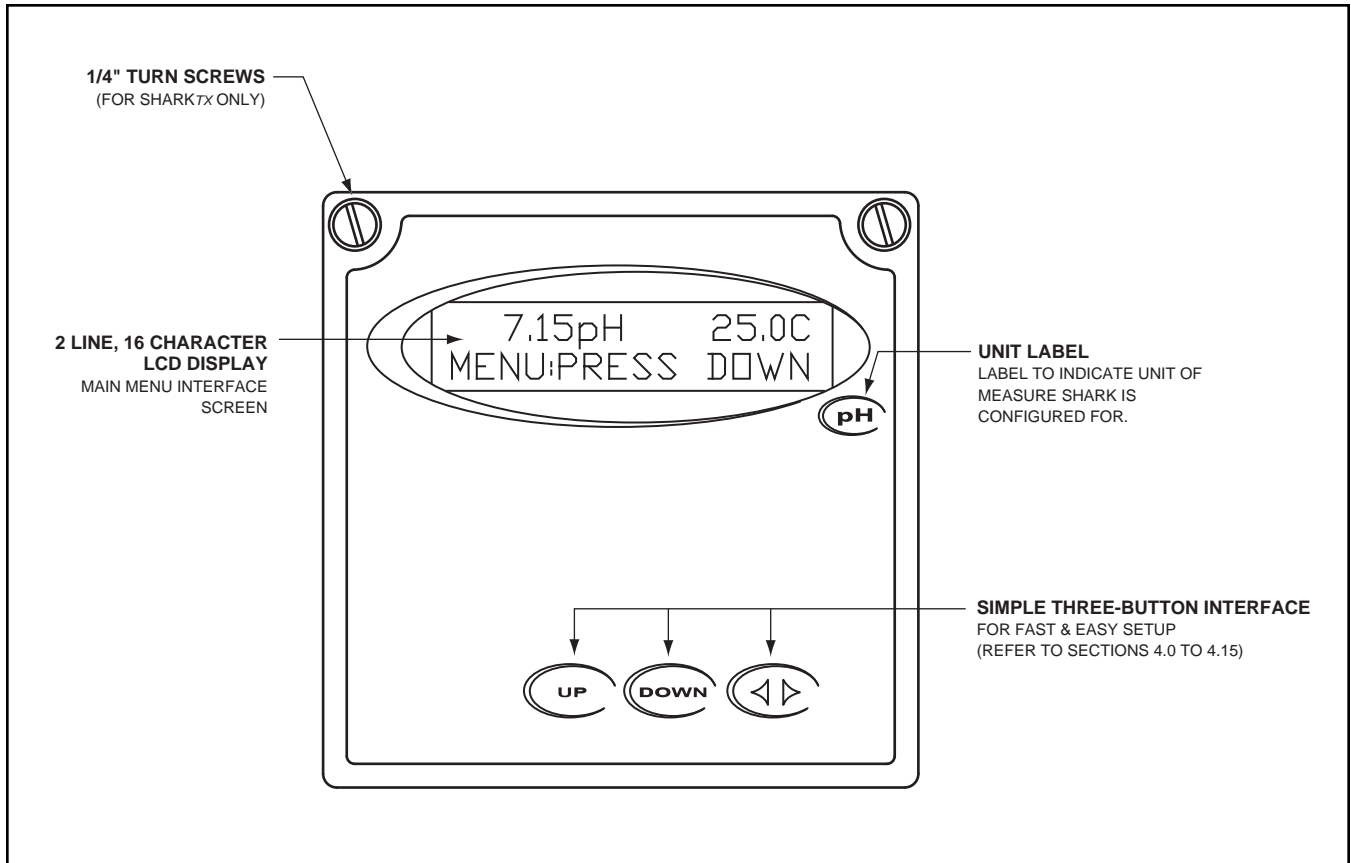
The output can be precisely trimmed through the LCD menu for precision applications.

The drawing on page 6 (Fig. 3.1) shows the connections for the output.

Wire Specification: 22 AWG 7/30, insulation 0.010"

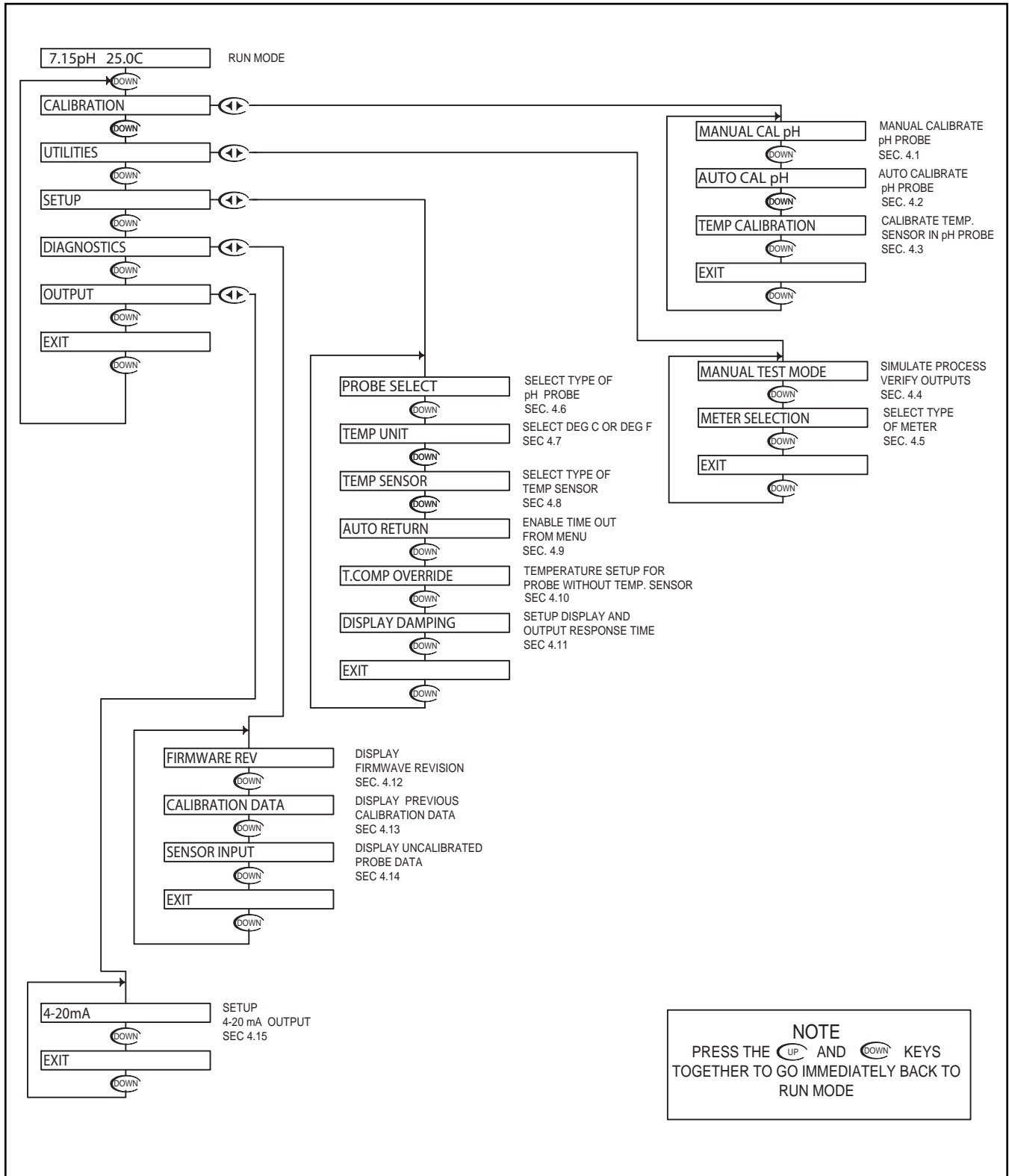


Section 4 - Using the Transmitter in pH Mode





pH - Menu Overview 4.0



NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



pH - Calibration Menu - Manual Calibrate 4.1

7.15pH 25.0C RUN MODE

CALIBRATION

MANUAL CAL pH

IF BUFFER1 READY
PRESS 'DOWN'

Place the probe in the first buffer solution, be sure to clean and rinse the Probe first with D.I. water and then insert it in the 7.00 buffer.

Press **DOWN**

RUNNING MANU CAL
BUFFER1 WAIT...

The controller will read the pH value, averaging a number of results to get a stable calibration value.

Please wait for the controller to complete the measurement

MANUAL CAL pH
BUFFER1 7.35>

When complete, the controller will report the measured value

Use the **UP** and **DOWN** keys to adjust the reading until it agrees with the actual buffer pH value

MANUAL CAL pH
BUFFER1 7.00>

Then press **LEFT** to move the cursor to the RH position

MANUAL CAL pH
BUFFER1 7.00>

Then press **DOWN** to store the value and move to BUFFER2

IF BUFFER2 READY
PRESS 'DOWN'

Place the probe in the second buffer.

Be sure to clean and rinse the Probe first with D.I. water and then insert it in the 4.00 buffer.

Press **DOWN**

RUNNING MANU CAL
BUFFER2 WAIT...

The controller will read the pH value, averaging a number of results to get a stable calibration value.

Please wait for the controller to complete the measurement

MANUAL CAL pH
BUFFER2 4.40>

When complete, the controller will report the measured value

Use the **UP** and **DOWN** keys to adjust the reading until it agrees with the actual buffer pH value

MANUAL CAL pH
BUFFER2 4.00>

Then press **LEFT** to move the cursor to the RH position

MANUAL CAL pH
BUFFER2 4.00>

Then press **DOWN** to store the value and complete the Manual Calibration

SLOPE 61.22MV/pH
EFF 95% 24.8C

After 5 seconds, the controller will compute the slope of the calibration, the estimated probe efficiency and the probe temperature.

If the calibration is OK, use the **LEFT** key to move the cursor over the Y text and press the down key.

MANUAL CAL pH
STORE? Y N

If the calibration did not appear to be correct, press the **DOWN** key which will return back to the Manual Cal menu.

MANUAL CAL pH
STORE? Y N

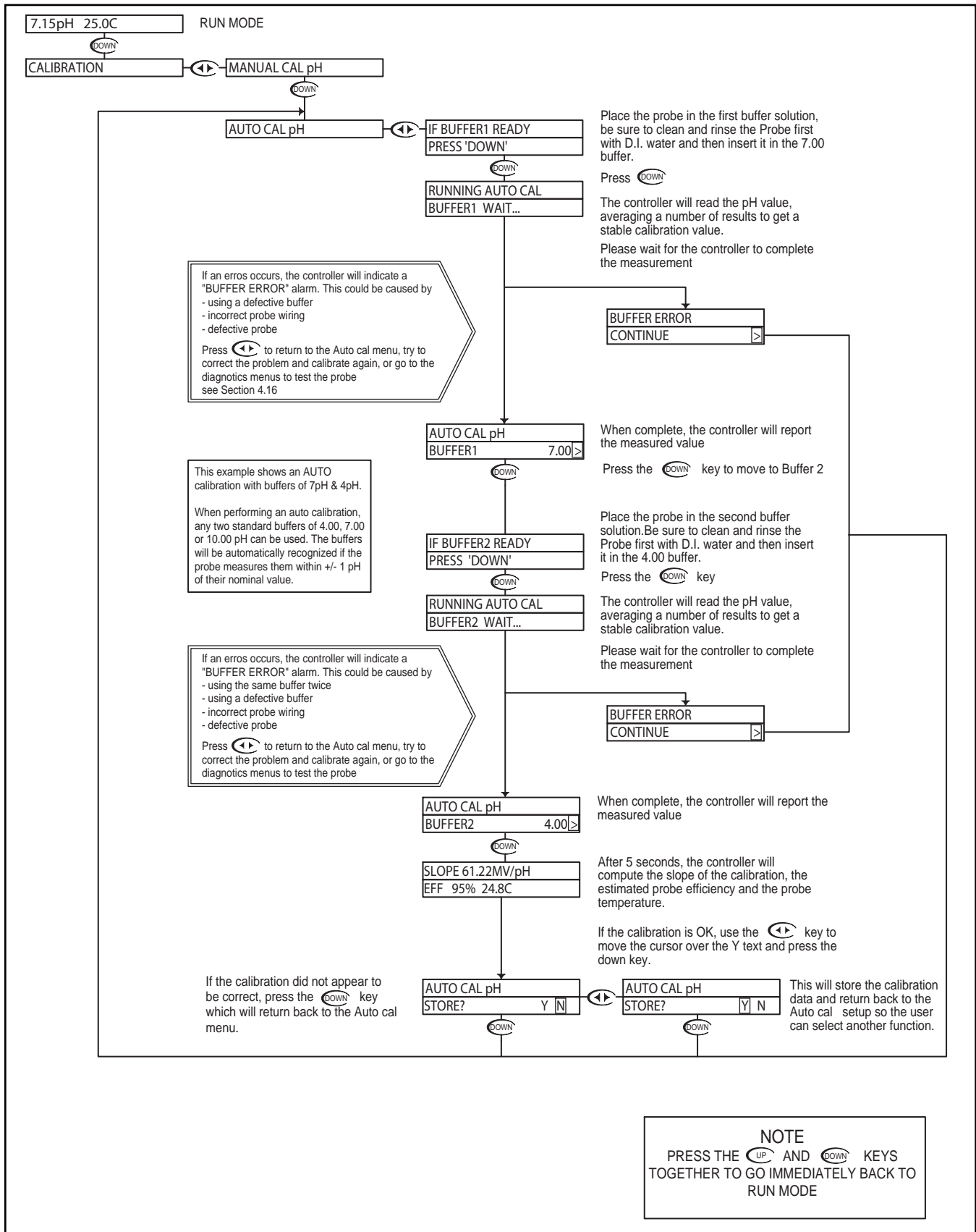
Press **DOWN** to store the calibration data and return back to the Manual Cal menu so the user can select another function.

This example shows a MANUAL calibration with buffers of 7pH & 4pH. When performing a manual calibration, any two known buffer solutions can be used.

NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



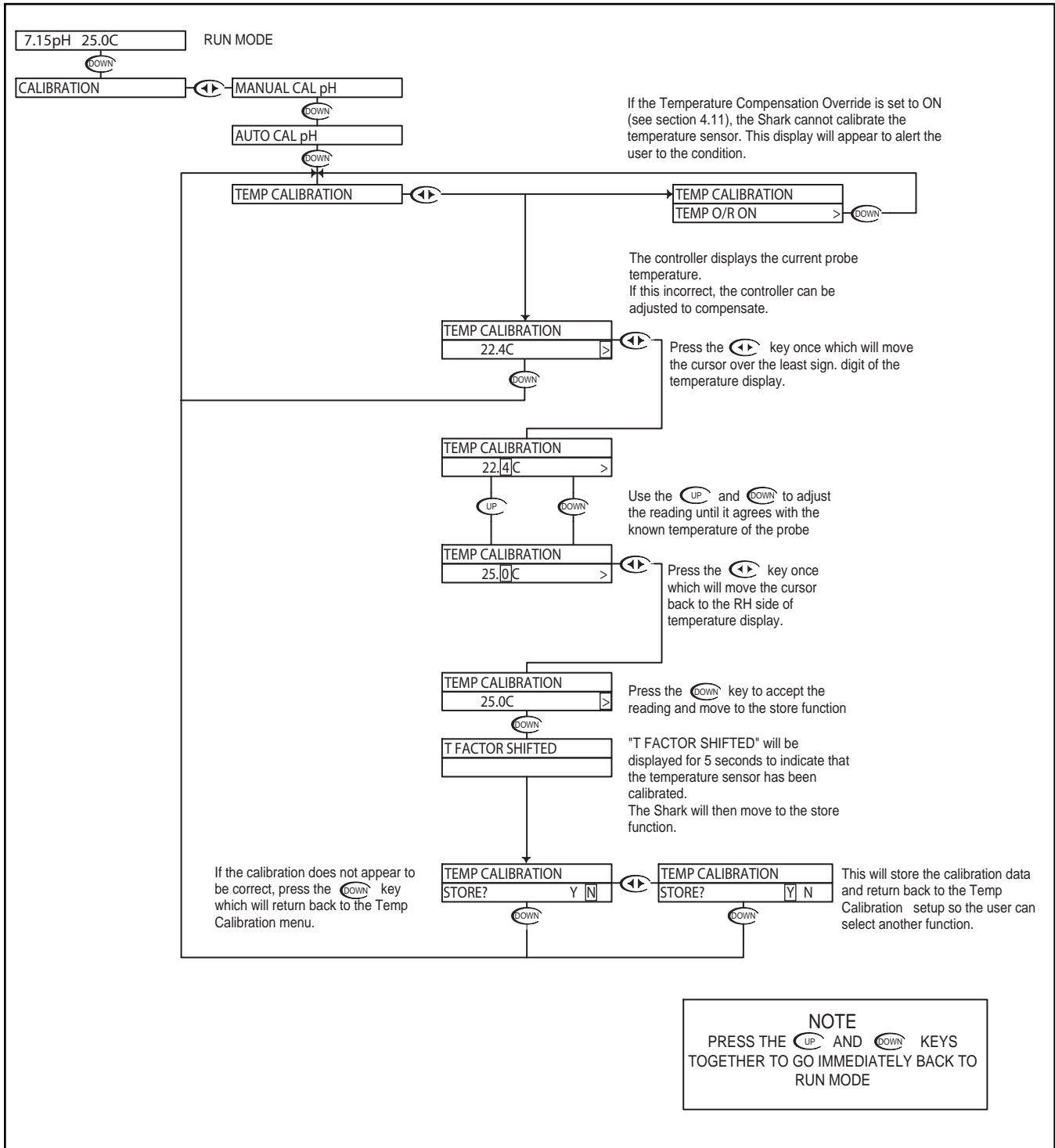
pH - Calibration Menu - Auto Calibrate 4.2

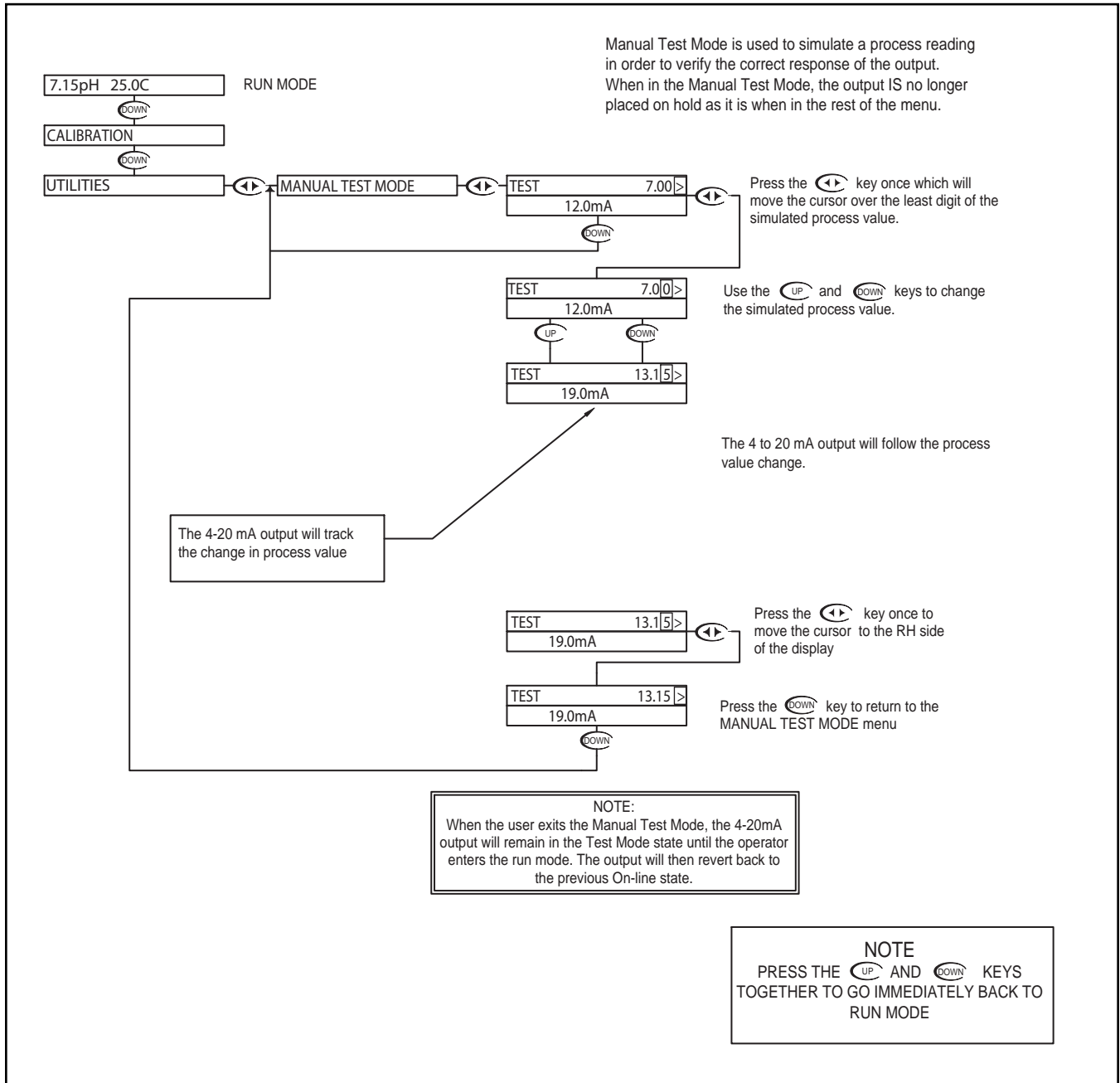


NOTE
 PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



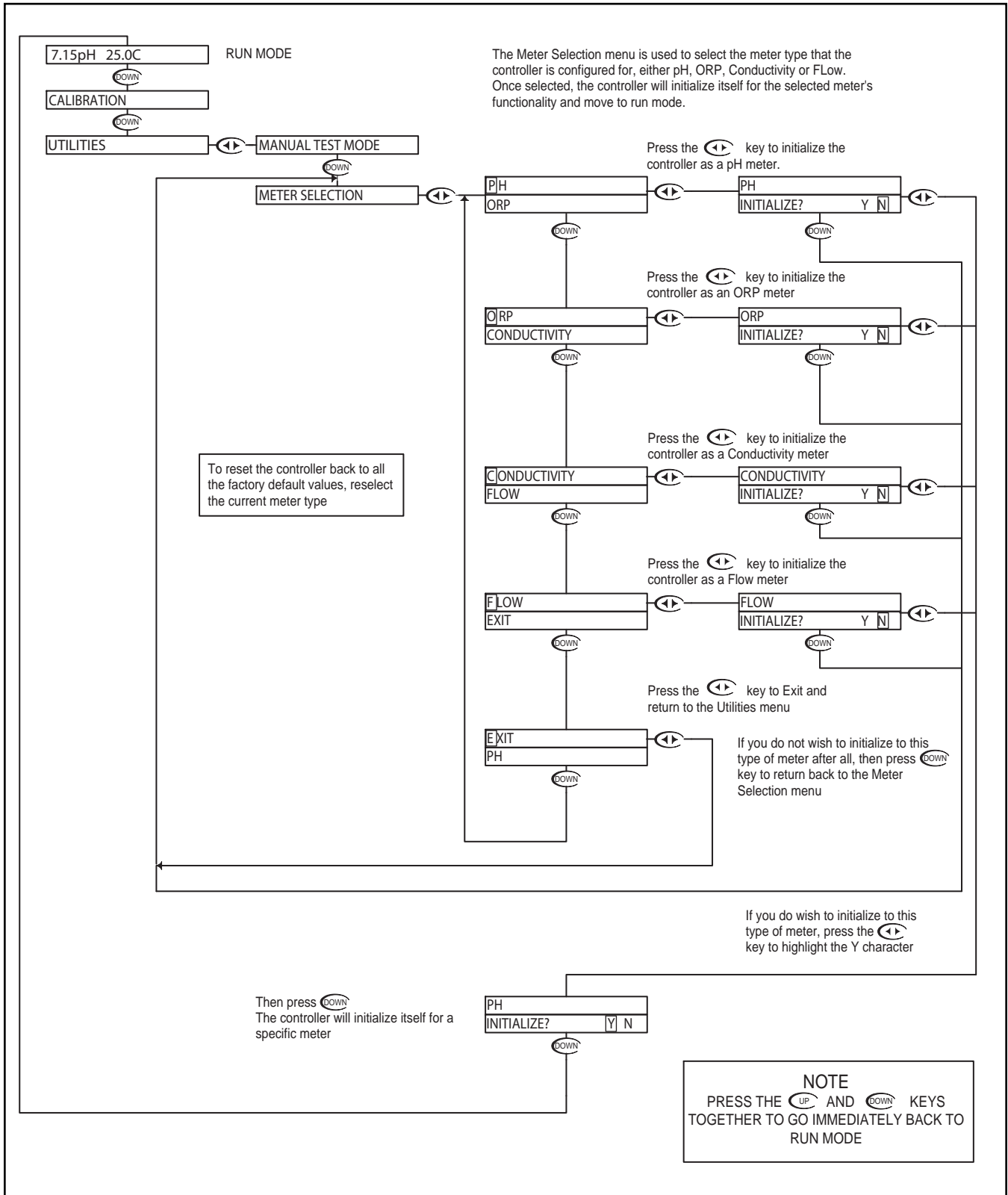
pH - Calibration Menu - Temperature Calibration 4.3





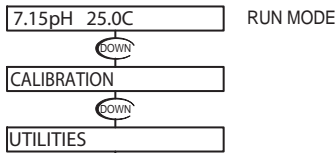


pH - Utilities Menu - Meter Selection 4.5

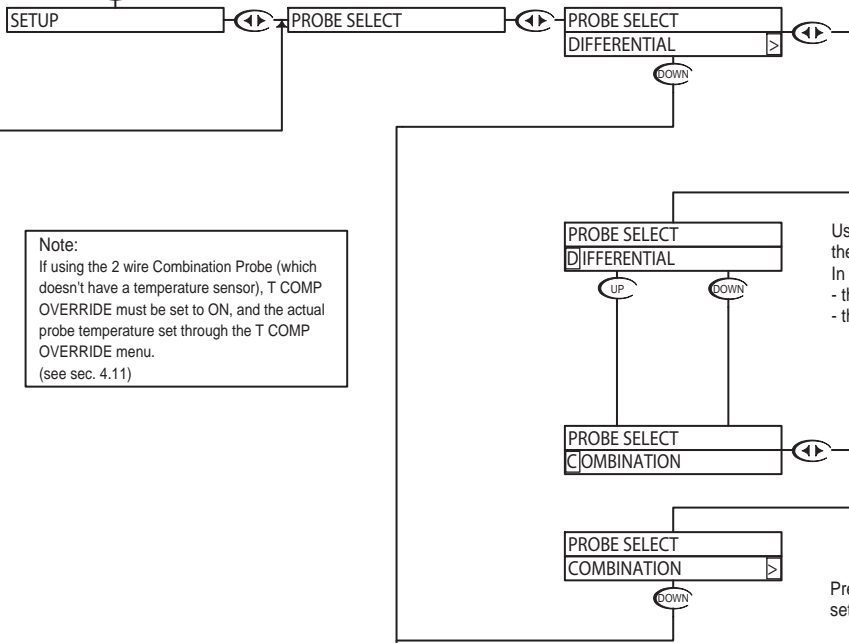




pH - Setup Menu - Probe Select 4.6



PROBE SELECT will allow the user to select whether the probe is a 2 or 4 wire combination probe, or a 5 wire differential probe.



Press the **←→** key once which will move the cursor over the first character of the probe type.

Use the **↑** or **↓** keys to scroll through the probe types available. In this case, the user can select - the 2 or 4 wire combination probe - the 5 wire differential probe

Once the correct probe type is selected, move to the store function to save the selection

Press the **←→** key once which will move the cursor back to the RH side of the display.

Press the **↓** key to accept the setting and move to the store function

Note:
If using the 2 wire Combination Probe (which doesn't have a temperature sensor), T COMP OVERRIDE must be set to ON, and the actual probe temperature set through the T COMP OVERRIDE menu. (see sec. 4.11)

With "N" selected, pressing the **↓** key will NOT store the selection, but simply return to the PROBE SELECT Menu. This function is useful if you wish to view the current selection without making any changes.

Or press the **←→** key to highlight the Y character.

Not stored

Stored

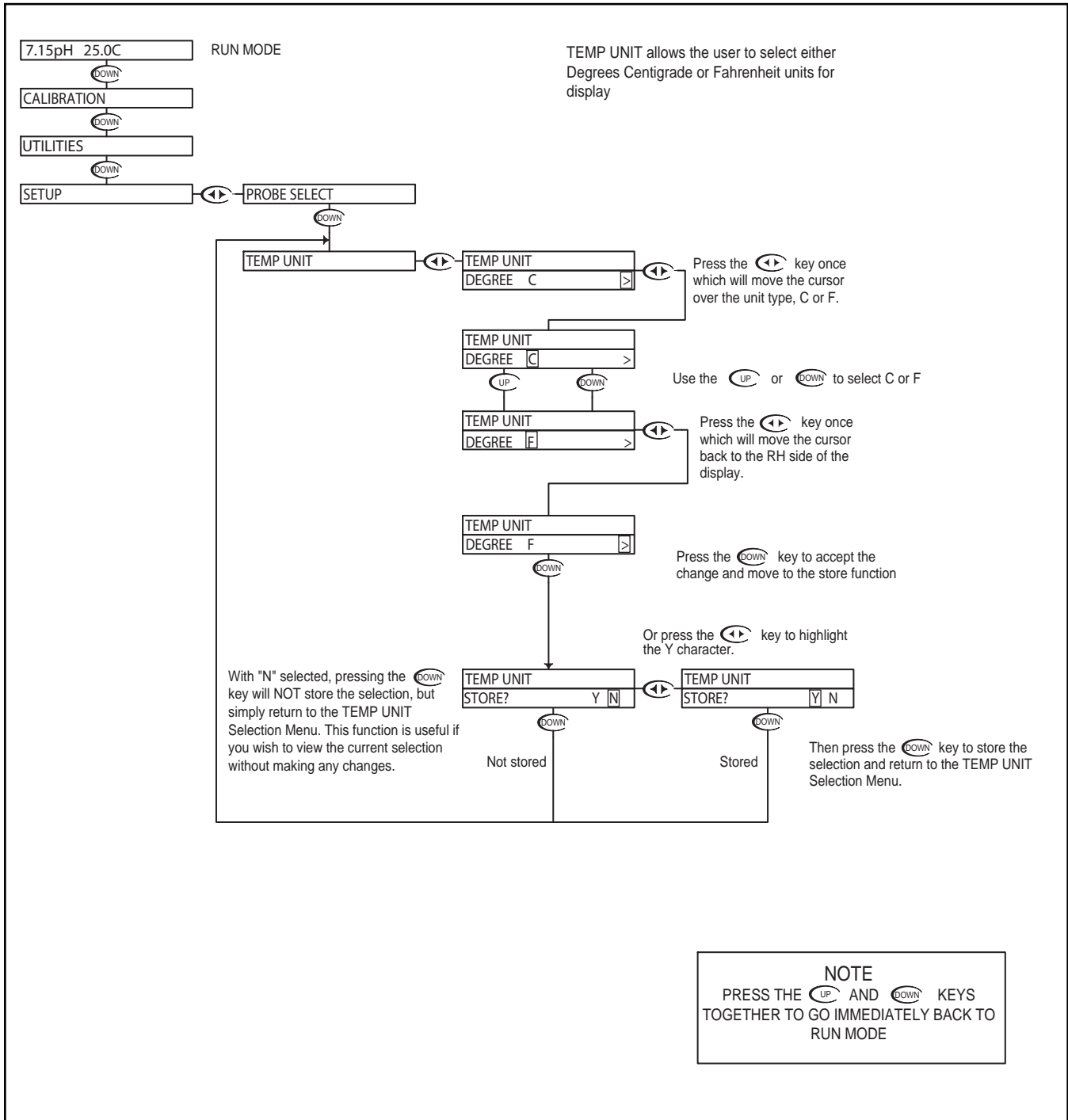
Then press the **↓** key to store the selection and return to the PROBE SELECT Menu.

Note: Refer to Appendix A - Probe Configuration Table

NOTE
PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



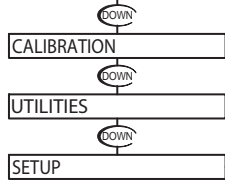
pH - Setup Menu -Temp Unit 4.7





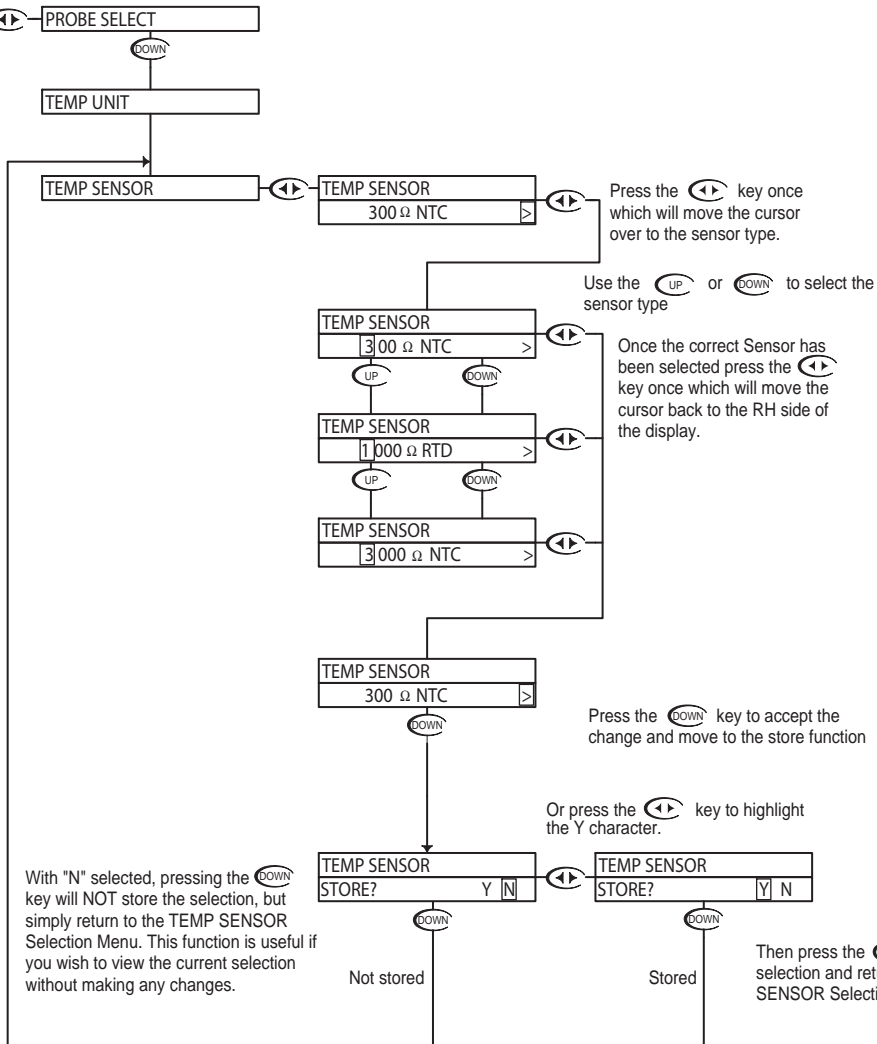
pH - Setup Menu - Temp. Sensor 4.8

7.15pH 25.0C RUN MODE



TEMP SENSOR allows the user to select the type of temperature sensor used in the probe.

The factory default for pH is a 300Ω NTC Thermistor. The user can also select a 3000Ω NTC Thermistor or a 1000 RTD.

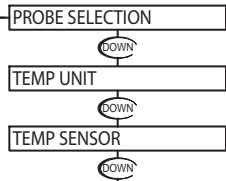
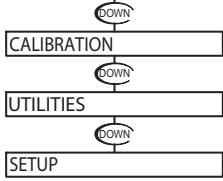


NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



pH - Setup Menu - Auto Return 4.9

7.15pH 25.0C RUN MODE



AUTO RETURN

AUTO RETURN MENU ON

AUTO RETURN is used to select what conditions will cause the controller to time-out of the operations menu

MENU ON will cause the controller to exit the menu and revert back to the online run mode after 10 minutes with no buttons pressed. This feature ensures that if a user forgets to return back to run mode, the controller will not be left in an offline state. If for some reason, the user would like to remain in the menu mode for extended periods of time, the AUTO RETURN function can be set to "OFF".

To change the MENU RETURN setting, Press the **←** key once which will move the cursor to the ON or OFF text

AUTO RETURN MENU ON

Use the **↑** or **↓** keys to select either ON or OFF.

AUTO RETURN MENU OFF

Press the **←** key once which will move the cursor back to the RH side of the display.

AUTO RETURN MENU OFF

Press the **↓** key to accept the change and move to the STORE function

Or press the **←** key to highlight the Y character.

AUTO RETURN STORE? Y N

AUTO RETURN STORE? Y N

Then press the **↓** key to store the selection and return to the Auto Return Selection Menu.

With "N" selected, pressing the **↓** key will NOT store the selection, but simply return to the AUTO RETURN Selection Menu. This function is useful if you wish to view the current selection without making any changes.

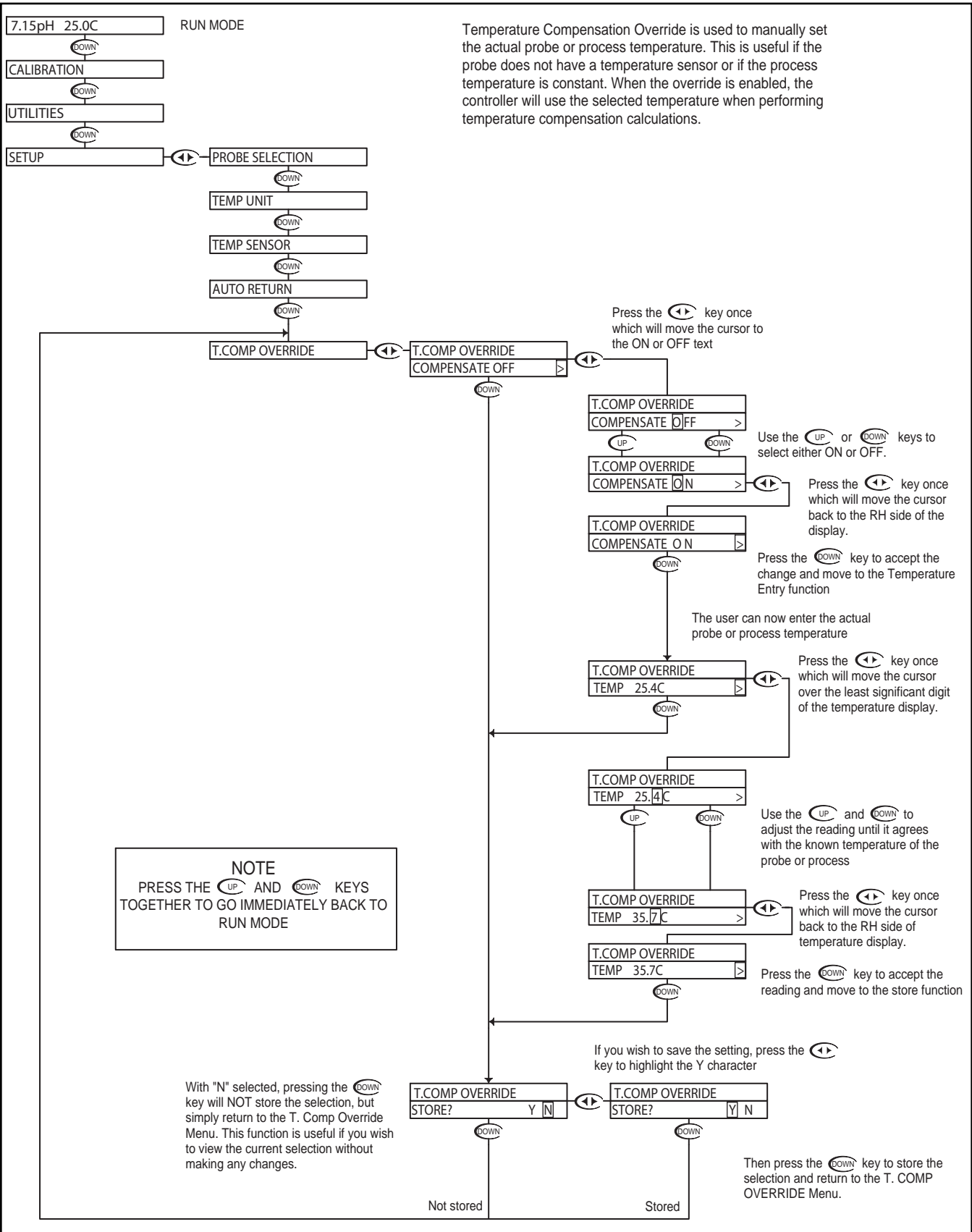
Not stored

Stored

NOTE
PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



pH - Setup Menu - T.Comp Override 4.10





pH - Setup Menu - Display Damping 4.11

7.15pH 25.0C RUN MODE

DOWN
CALIBRATION

DOWN
UTILITIES

DOWN
SETUP

PROBE SELECTION

DOWN
TEMP UNIT

DOWN
TEMP SENSOR

DOWN
AUTO RETURN

DOWN
T.COMP OVERRIDE

DOWN
DISPLAY DAMPING

DISPLAY DAMPING
UPDATE 0SEC

The Display Damping menu allows the user to adjust the rate at which the display and the output is updated. This allows the user to dampen out unstable process readings. The damping can be set from 0 seconds to 10 seconds. (default value is 0 sec.)

Press the **←→** key once which will move the cursor over the seconds digit

DISPLAY DAMPING
UPDATE 0SEC

Use the **↑** and **↓** to adjust the damping time, the default setting is 0 seconds. The setting can be adjusted from 0 to 10 seconds.

Press the **←→** key once which will move the cursor back to the RH side of the display.

DISPLAY DAMPING
UPDATE 10SEC

Press the **↓** key to accept the setting and move to the store function

DISPLAY DAMPING
STORE? Y N

If you wish to save the setting, press the **←→** key to highlight the Y character

DISPLAY DAMPING
STORE? Y N

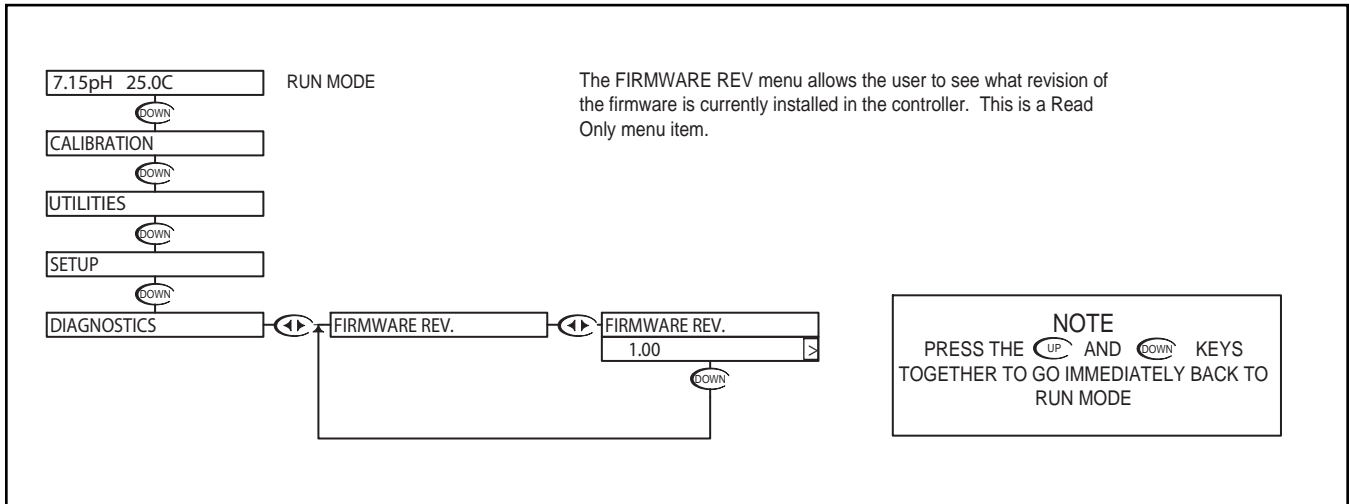
Then press the **↓** key to store the selection and return to the Display Damping Menu.

With "N" selected, pressing the **↓** key will NOT store the selection, but simply return to the Display Damping Menu. This function is useful if you wish to view the current selection without making any changes.

Not stored

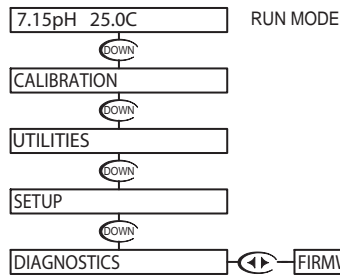
Stored

NOTE
PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

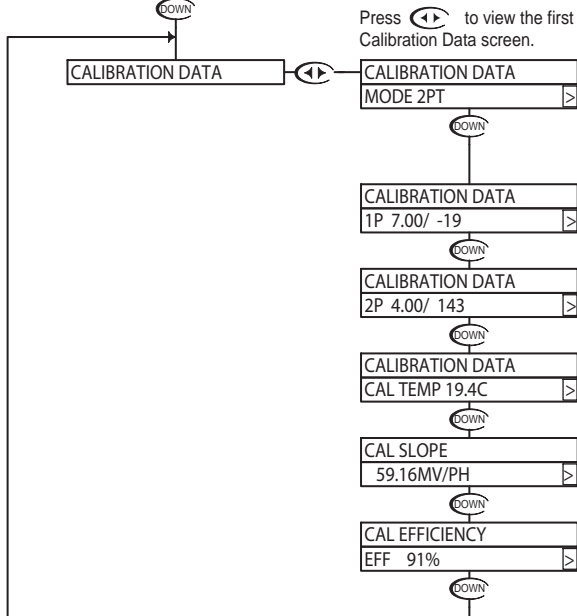




pH - Diagnostics Menu - Calibration Data 4.13



The Calibration Data menu is a series of read only screens which allow the user to view the data collected during the last calibration.



Calibration Mode
2 point calibration

Press **DOWN** to view the next
Calibration Data screen.

1st POINT PH = 7.00
INPUT FROM PROBE = - 19 mV

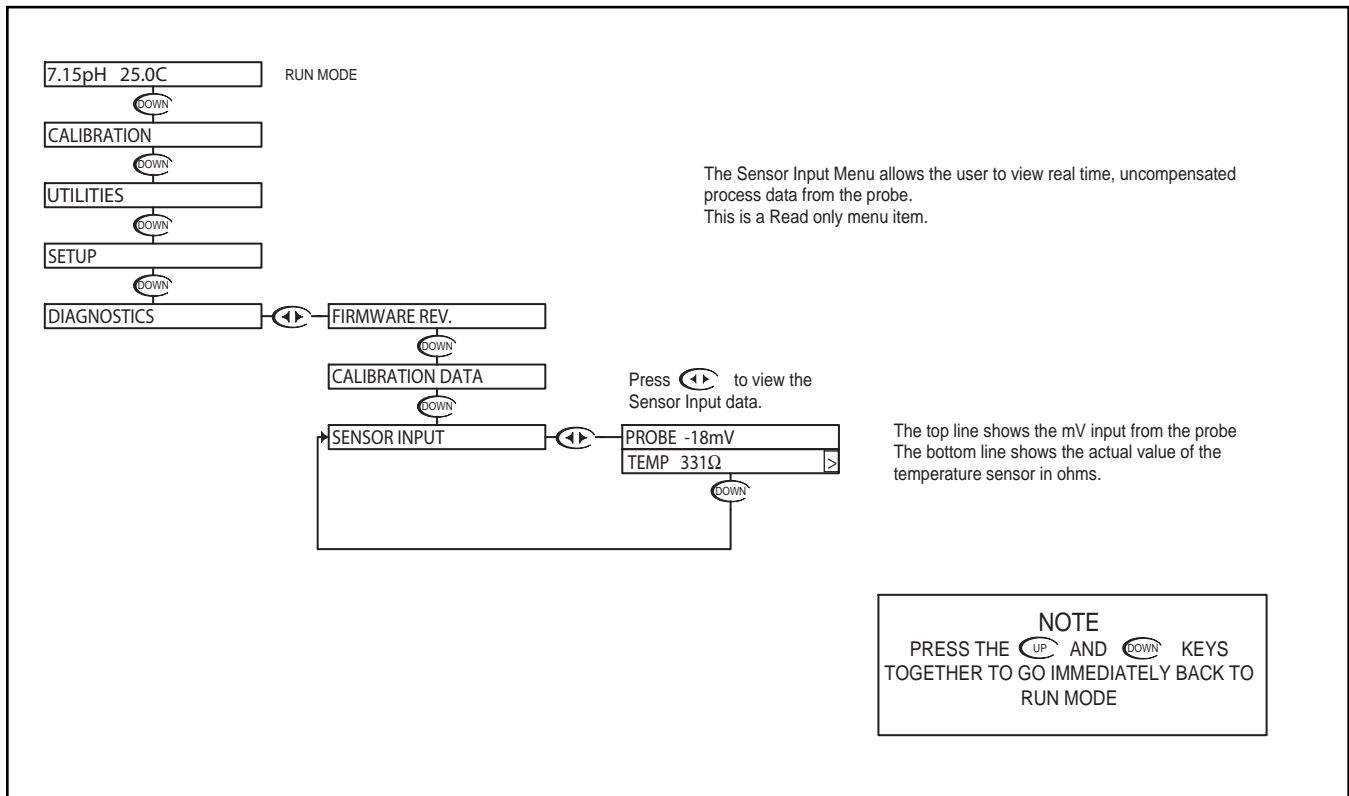
2nd POINT PH = 4.00
INPUT FROM PROBE = + 143 mV

Probe Temperature at which
calibration was performed = 19.4°C

Calculated slope based on 2
point calibration = 59.16 mV/pH

Calculated efficiency based on 2
point calibration = 91 %

NOTE
PRESS THE **UP** AND **DOWN** KEYS
TOGETHER TO GO IMMEDIATELY BACK TO
RUN MODE



Troubleshooting a pH probe using the sensor input

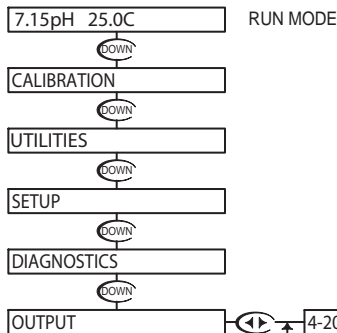
Sensor input displays the uncompensated sensor input data. The pH probe values are displayed in mV (millivolts). The temperature sensor value is displayed in Ω (ohm).

Connect the pH probe as per Probe Configuration Table in Appendix A.

1. Place the probe in buffer 7pH (allow temperature to stabilize)
 - Probe should read 0mV [±50mV]
 - Temperature should read 300Ω [±50Ω] @ 25°C
 - Record both of these numbers.
2. Place the probe in buffer 4pH
 - Probe should read +160mV more than probe value at 7pH
 - Temperature should read the same as in 7pH
3. Place the probe in buffer 10pH
 - Probe should read -160mV less than probe value at 7pH
 - Temperature should read the same as in 7pH



pH - Output Menu - 4-20mA Output 4.15



The Transmitter has a single 4-20mA output, electrically isolated from the ground. The output can source current into a maximum of 800 ohms. See Section 3.9 for wiring diagram. The channel has a fully adjustable 4 & 20 mA output adjustments. This will enable the operator to span the output over the desired range.

The example below shows the 4-20 mA set to 4mA = 7.00pH and 20mA = 14pH. The output would then span 4 to 20 mA for a pH swing of 7.0 to 14.0. Note that the span can be reversed, in that 4 mA can be set to a high pH value, and 20 mA can be set to a low pH value, effectively reversing the control direction.

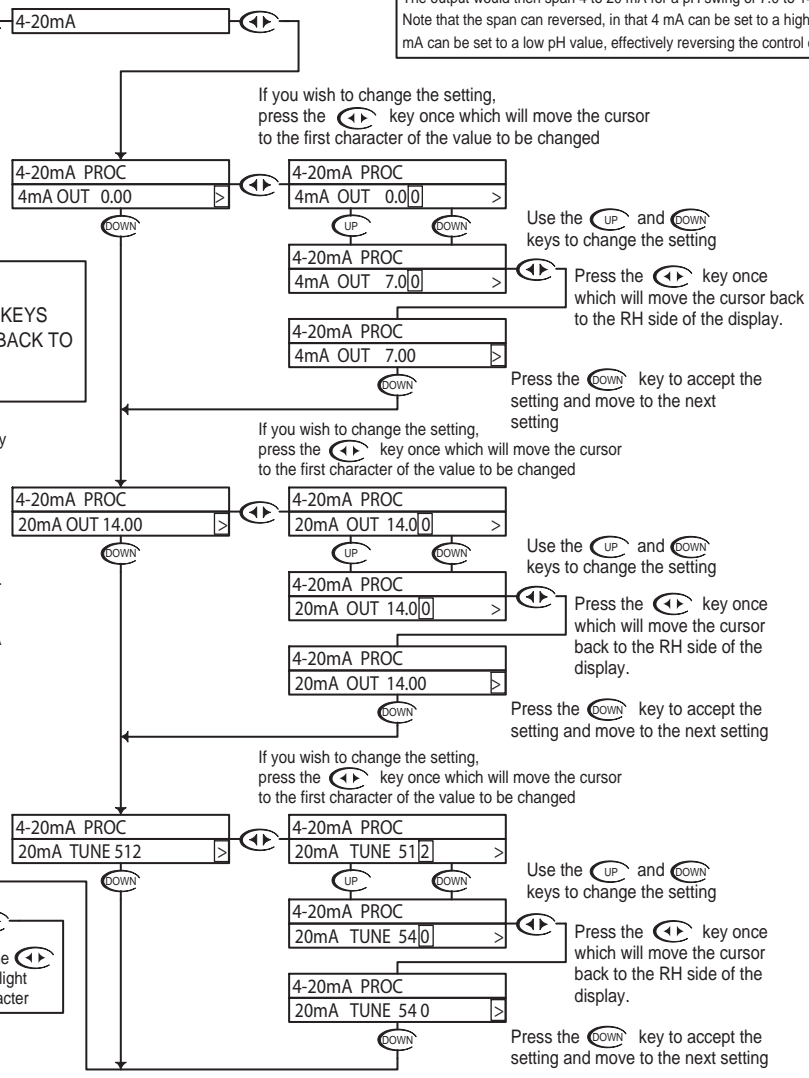
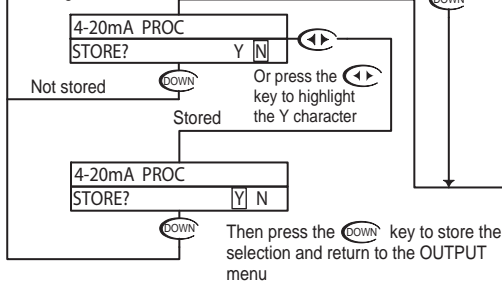
NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

The TUNE function allows the user to precisely adjust the 4-20 ma output to compensate for any errors in the output circuitry. Normally, fine tuning the 4-20mA output is not necessary.

To make the adjustment, place an accurate current meter in series with the 4-20 mA output, with the appropriate loads connected. When the TUNE menu is selected, the controller puts 20 mA out the terminals. Use the **UP** or **DOWN** keys to adjust the 20mA output to get exactly 20.

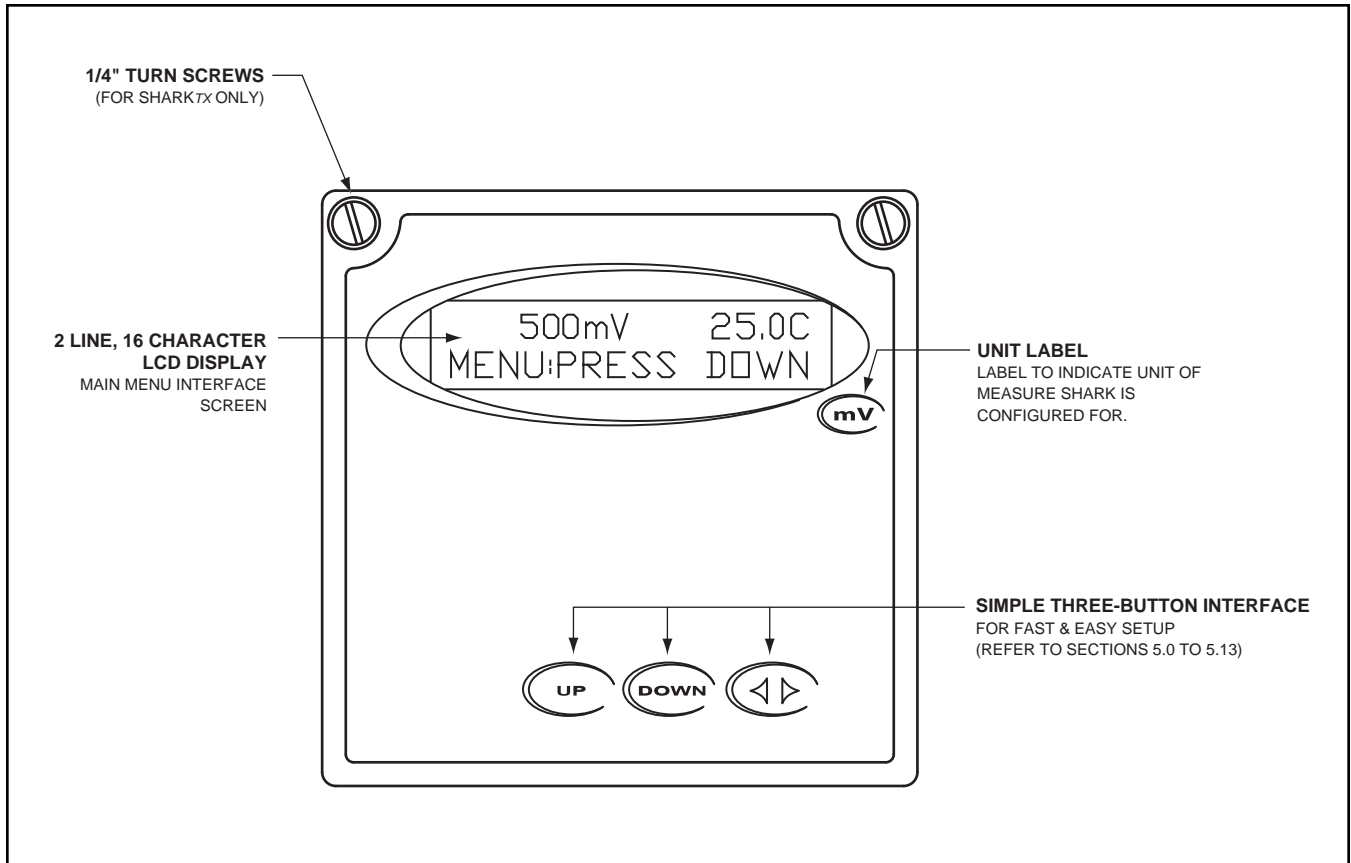
The TUNE value can be adjusted over the range from 0 to 1000, these are unitless numbers used for tuning purposes only.

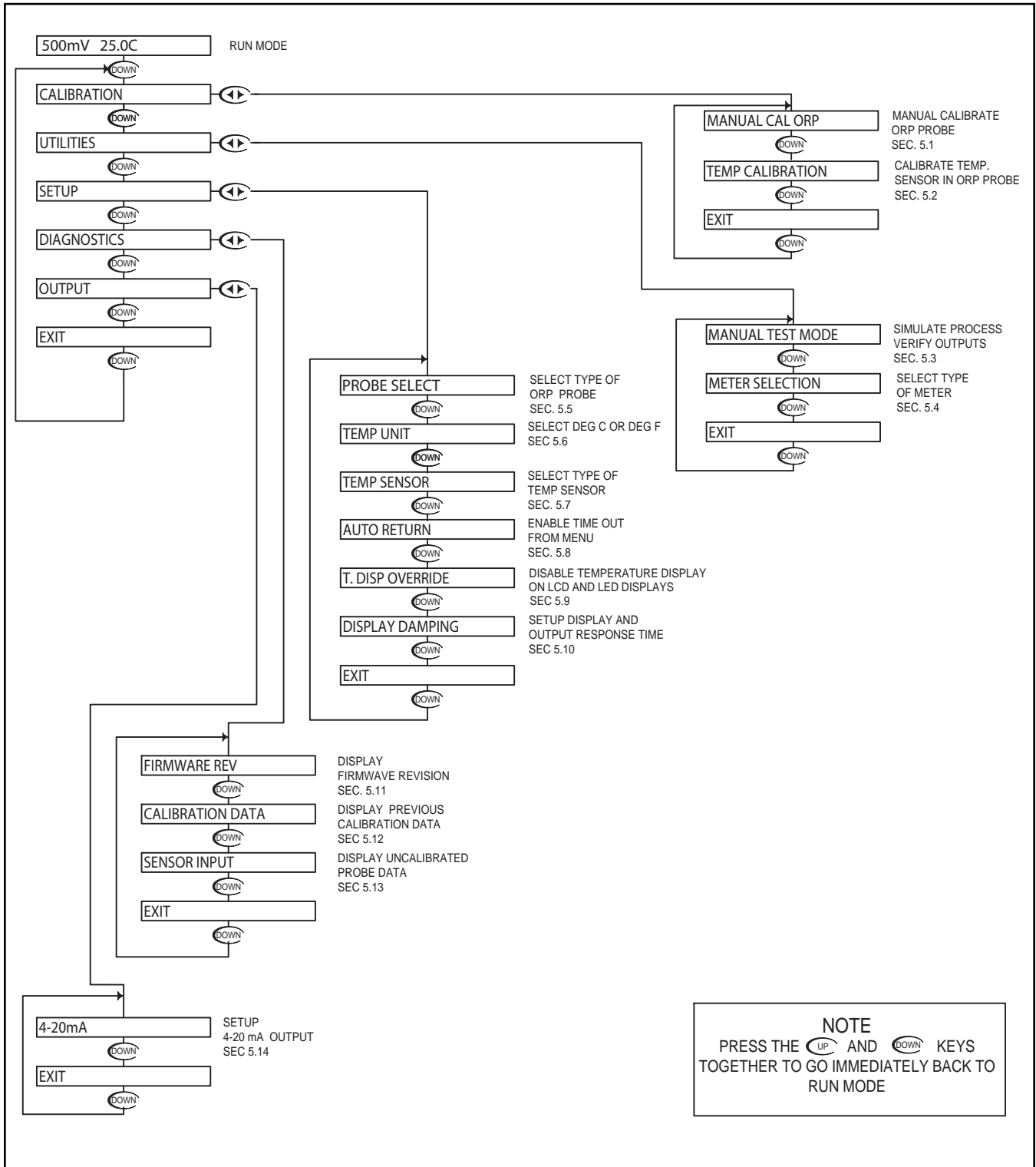
With "N" selected, pressing the **DOWN** key will NOT store the selection, but simply return to the OUTPUT Menu. This function is useful if you wish to view the current selection without making any changes.





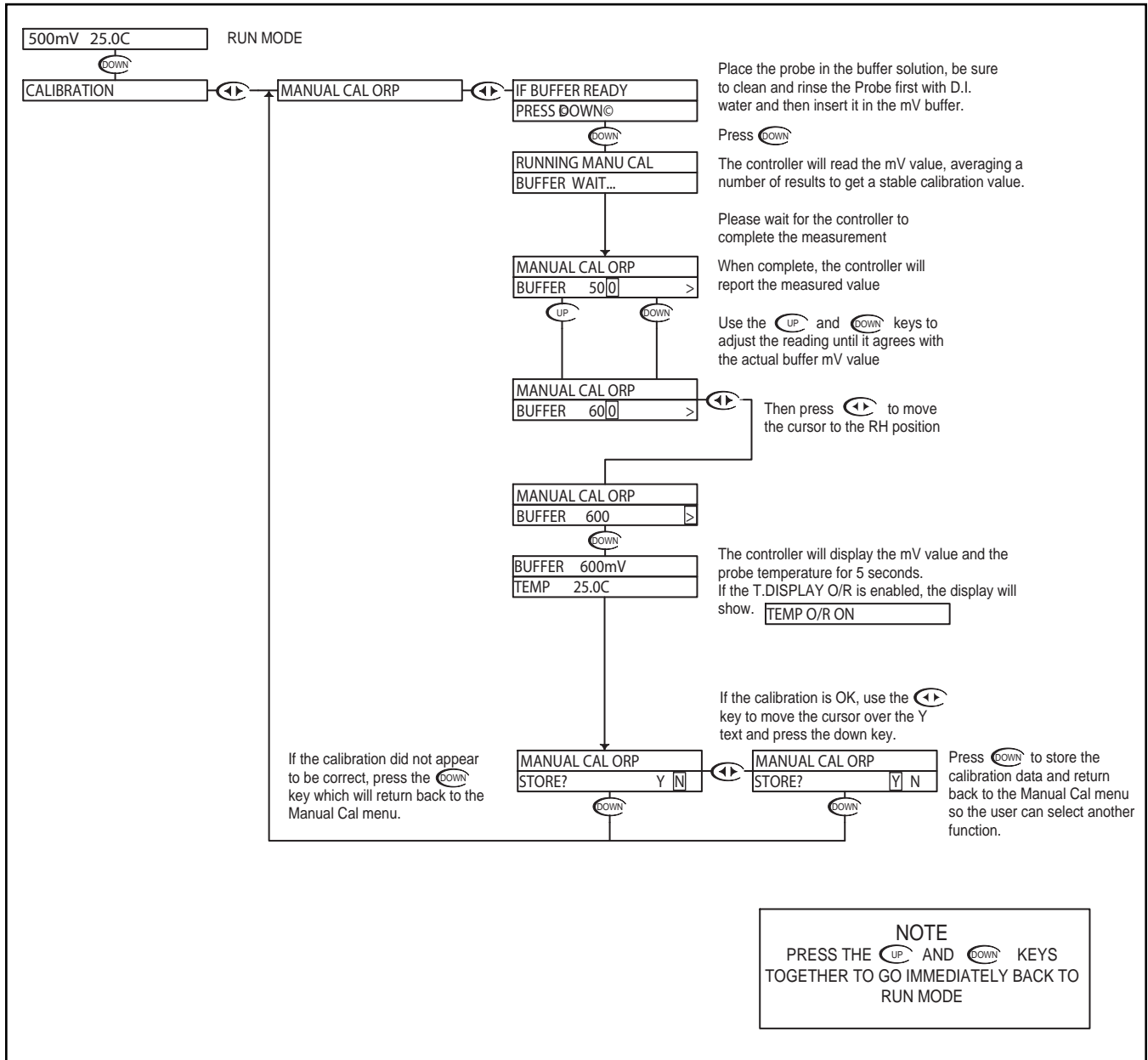
Section 5 - Using the Transmitter in ORP Mode





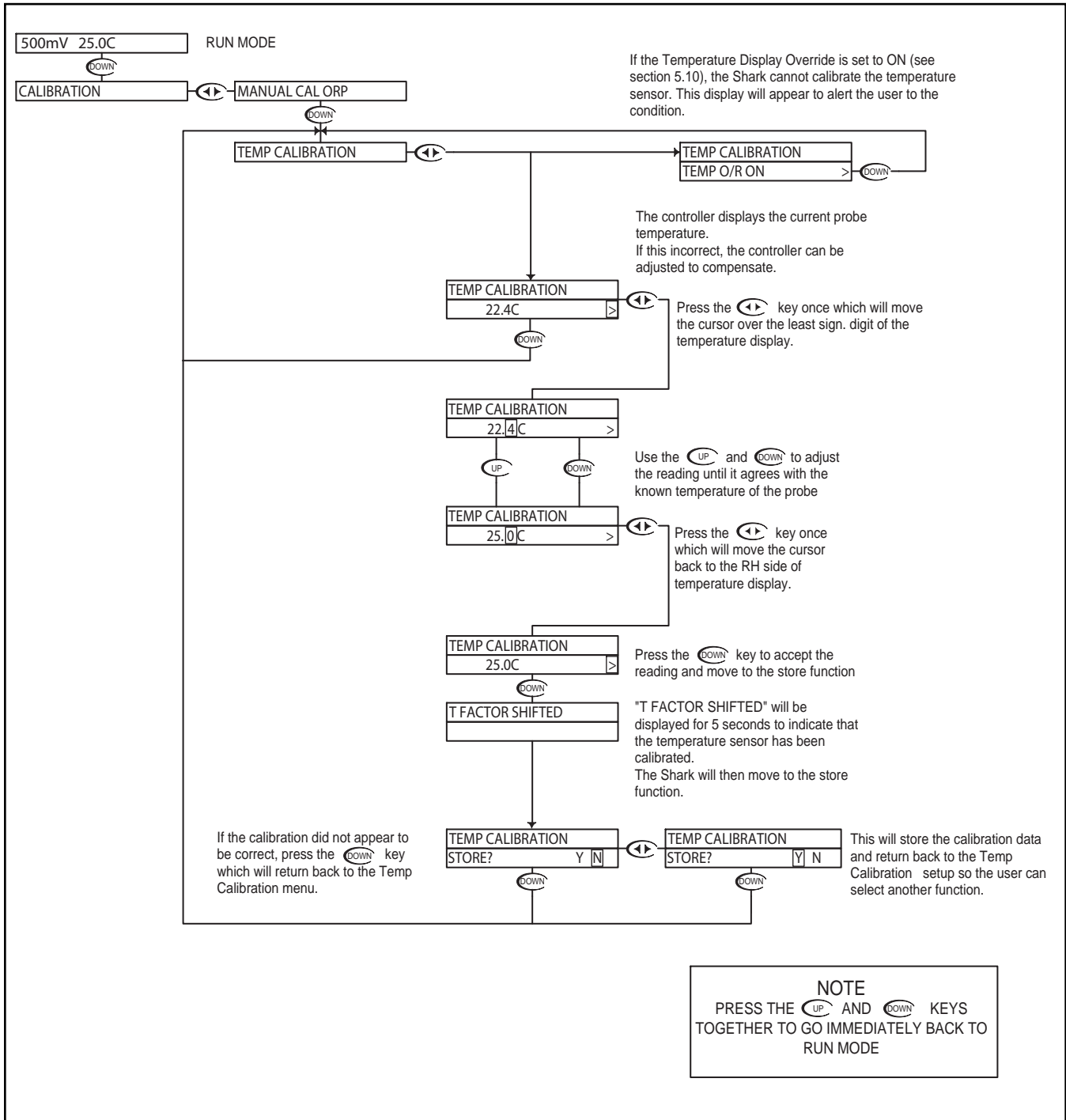


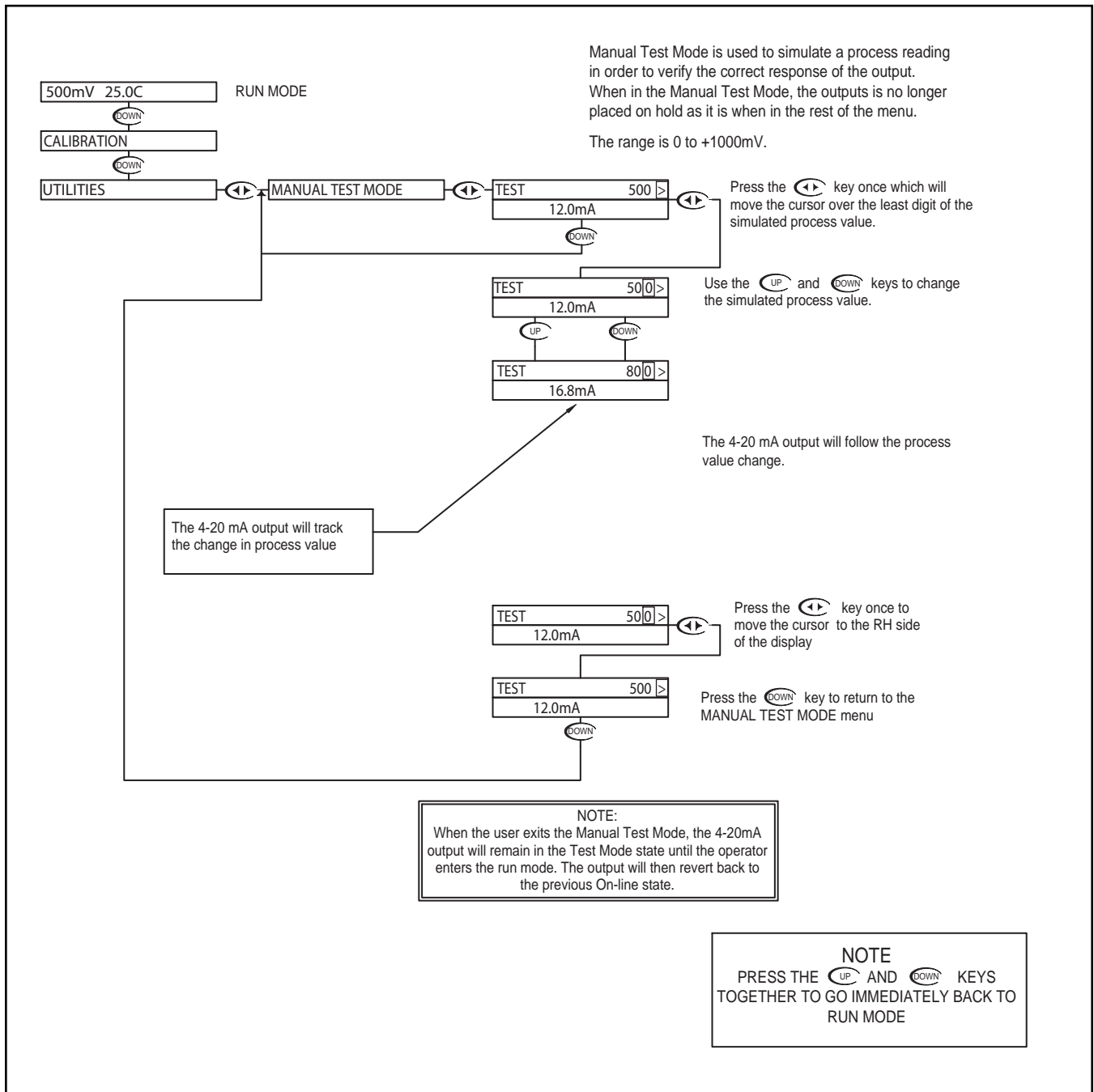
ORP - Calibration Menu - Manual Calibrate 5.1





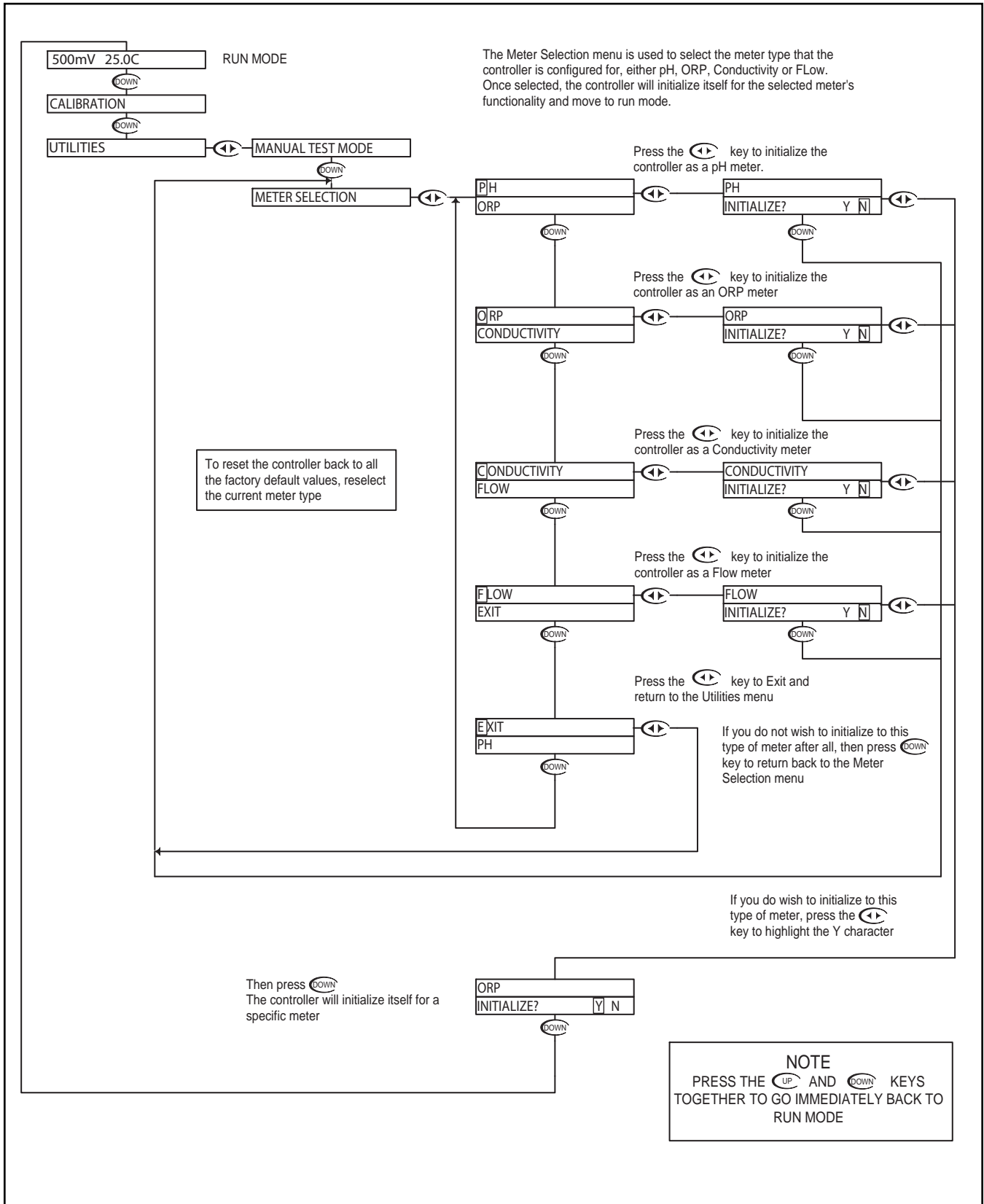
ORP - Calibration Menu - Temp. Calibration 5.2





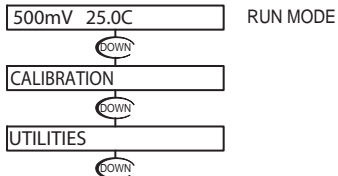


ORP - Utilities Menu - Meter Selection 5.4





ORP - Setup Menu - Probe Select 5.5

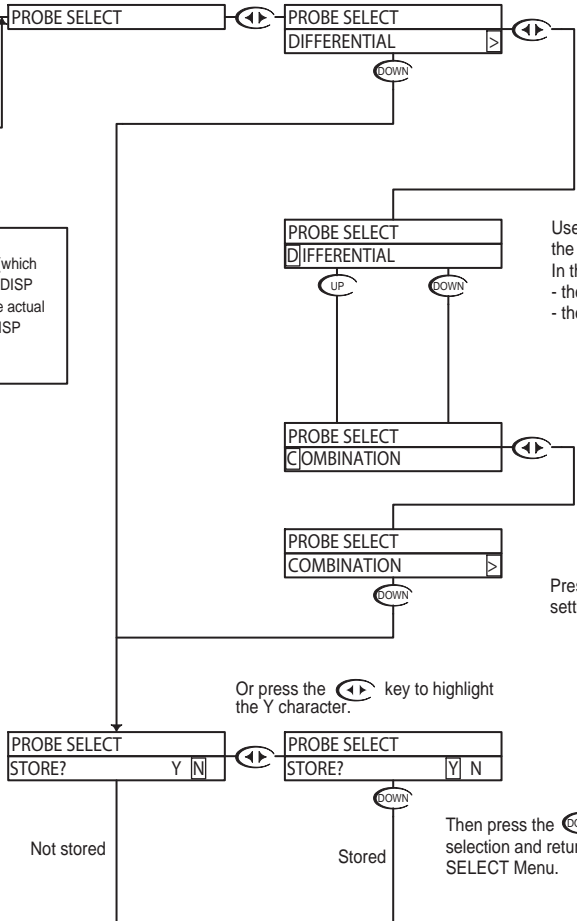


PROBE SELECT will allow the user to select whether the probe is a 2 or 4 wire combination probe, or a 5 wire differential probe.

Note:
 If using the 2 wire Combination Probe (which doesn't have a temperature sensor), T DISP OVERRIDE must be set to ON, and the actual probe temperature set through the T DISP OVERRIDE menu.
 (see sec. 5.10)

With "N" selected, pressing the DOWN key will NOT store the selection, but simply return to the PROBE SELECT Menu. This function is useful if you wish to view the current selection without making any changes.

Note: Refer to Appendix A - Probe Configuration Table



Press the LEFT key once which will move the cursor over the first character of the probe type.

Use the UP or DOWN keys to scroll through the probe styles available. In this case, the user can select - the 2 or 4 wire combination probe - the 5 wire differential probe

Once the correct style probe is selected, move to the store function to save the selection

Press the LEFT key once which will move the cursor back to the RH side of the display.

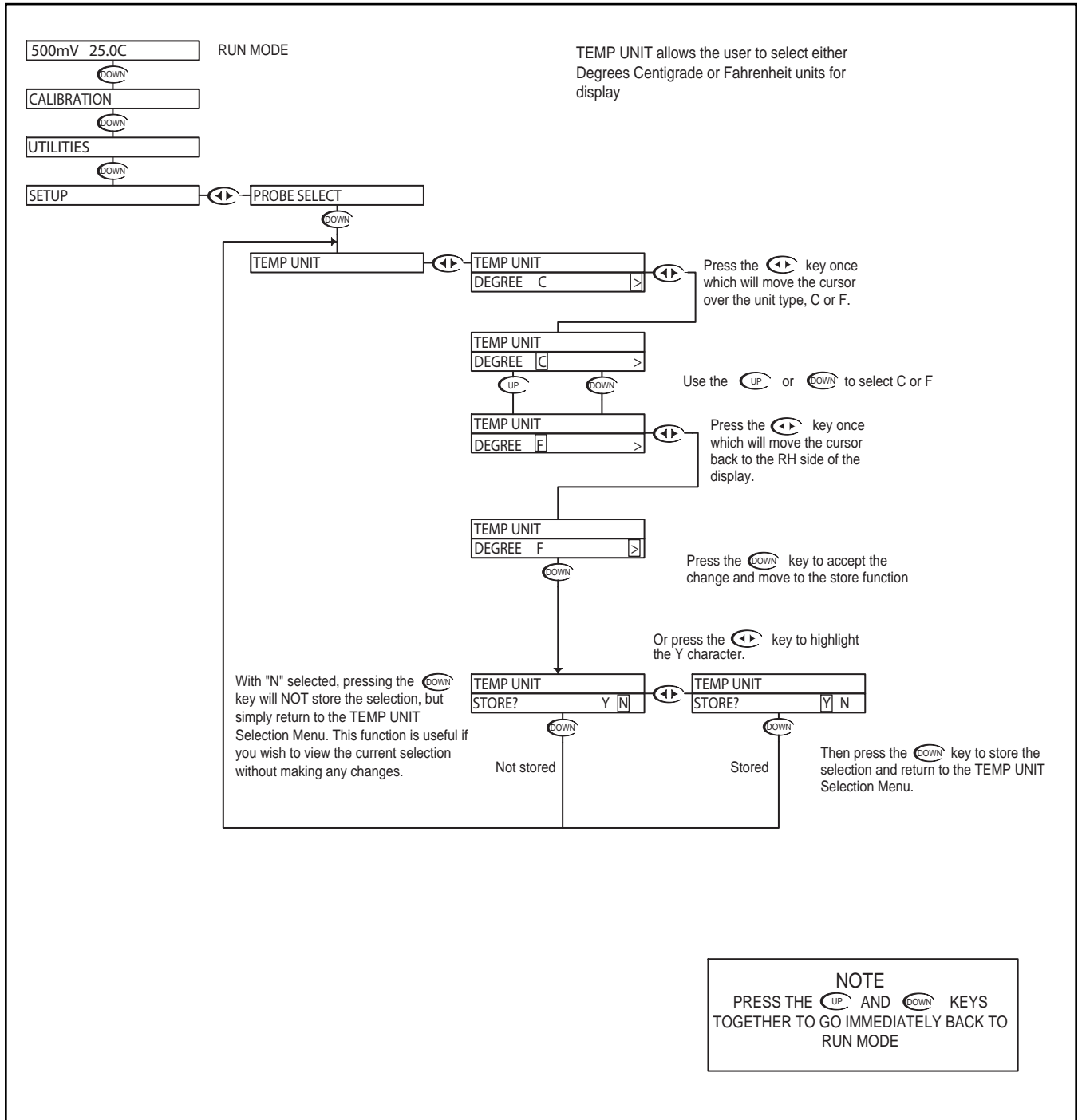
Press the DOWN key to accept the setting and move to the store function

Then press the DOWN key to store the selection and return to the PROBE SELECT Menu.

NOTE
 PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

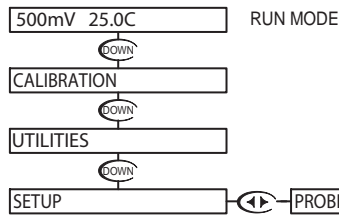


ORP - Setup Menu - Temp. Unit 5.6



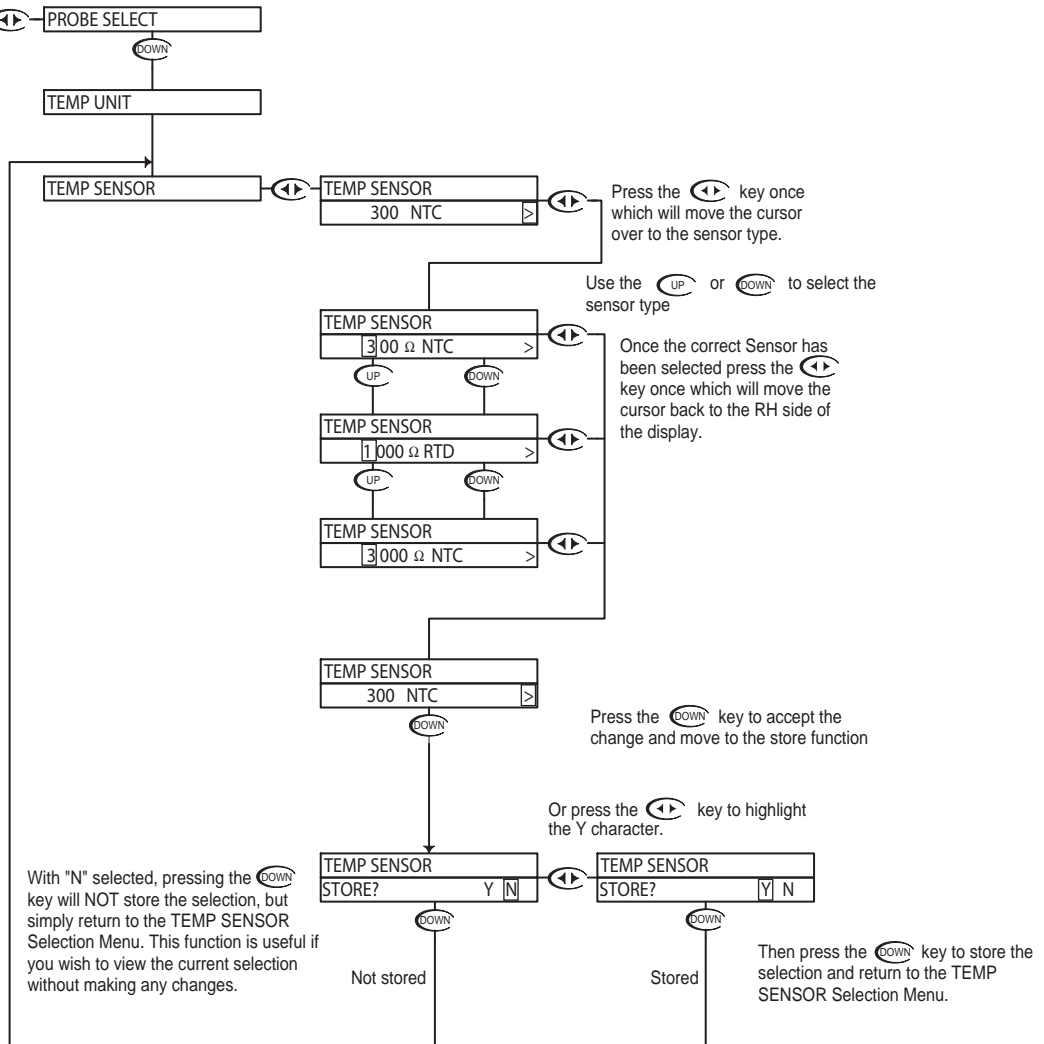


ORP - Setup Menu - Temp. Sensor 5.7



TEMP SENSOR allows the user to select the type of temperature sensor used in the probe.

The factory default for ORP is a 300 NTC Thermistor. The user can also select a 3000 NTC Thermistor or a 1000 RTD.

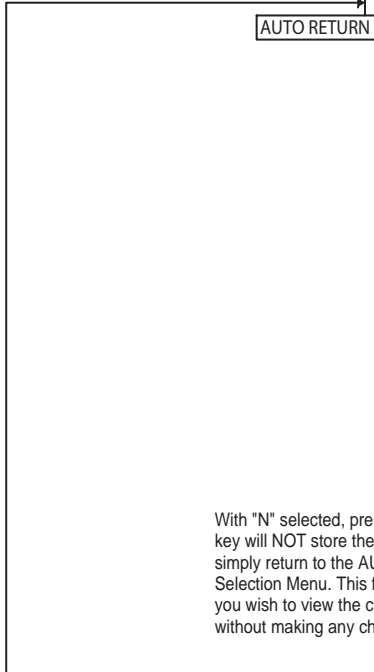
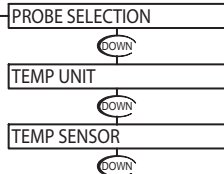
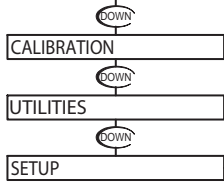


NOTE
PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



ORP - Setup Menu - Auto Return 5.8

500mV 25.0C RUN MODE



With "N" selected, pressing the **DOWN** key will NOT store the selection, but simply return to the AUTO RETURN Selection Menu. This function is useful if you wish to view the current selection without making any changes.

AUTO RETURN is used to select what conditions will cause the controller to time-out of the operations menu

MENU ON will cause the controller to exit the menu and revert back to the online run mode after 10 minutes with no buttons pressed. This feature ensures that if a user forgets to return back to run mode, the controller will not be left in an offline state. If for some reason, the user would like to remain in the menu mode for extended periods of time, the AUTO RETURN function can be set to "OFF".

To change the MENU RETURN setting, Press the **LEFT** key once which will move the cursor to the ON or OFF text

Use the **UP** or **DOWN** keys to select either ON or OFF.

Press the **LEFT** key once which will move the cursor back to the RH side of the display.

Press the **DOWN** key to accept the change and move to the STORE function

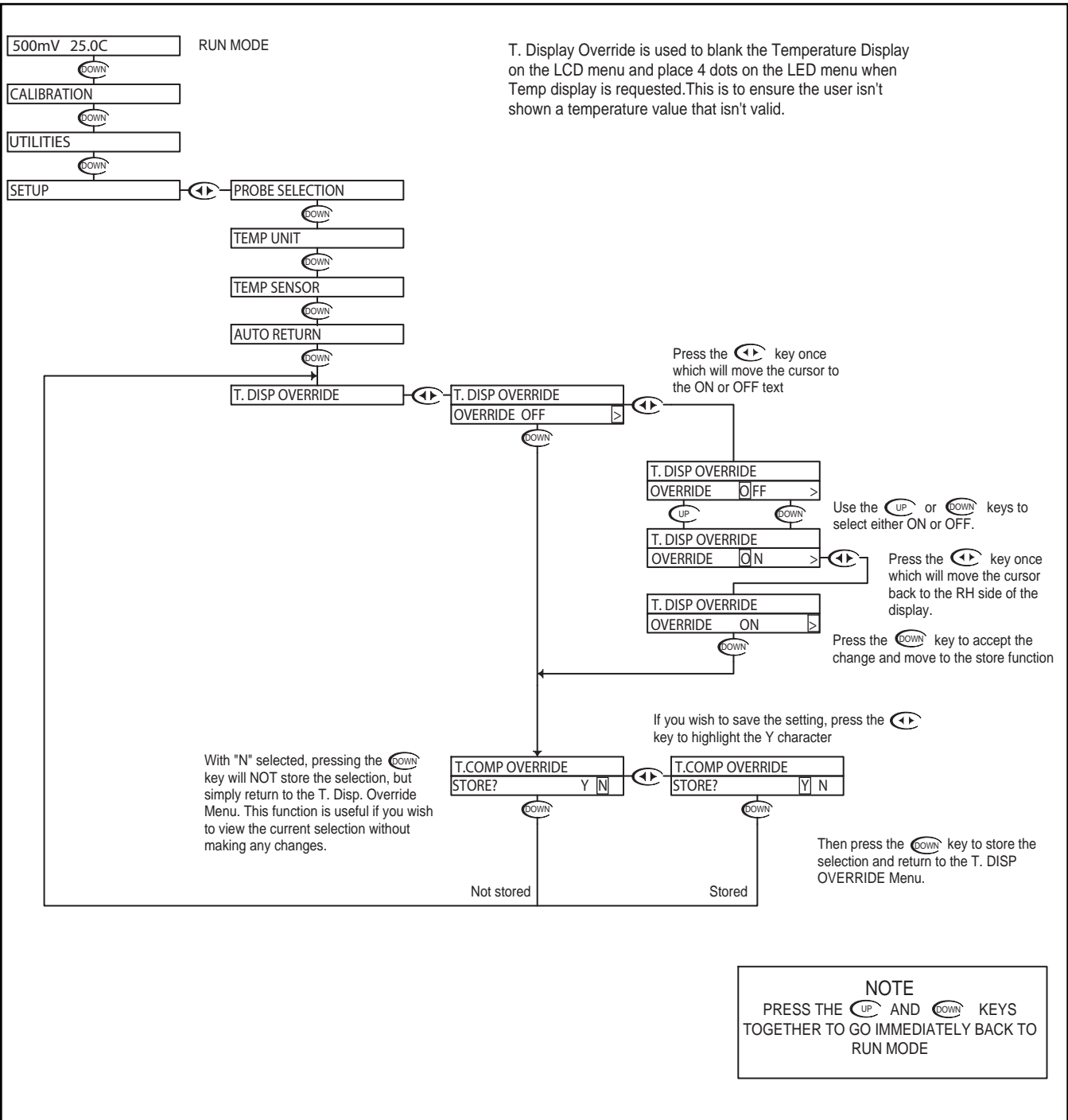
Or press the **LEFT** key to highlight the Y character.

Then press the **DOWN** key to store the selection and return to the Auto Return Selection Menu.

NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

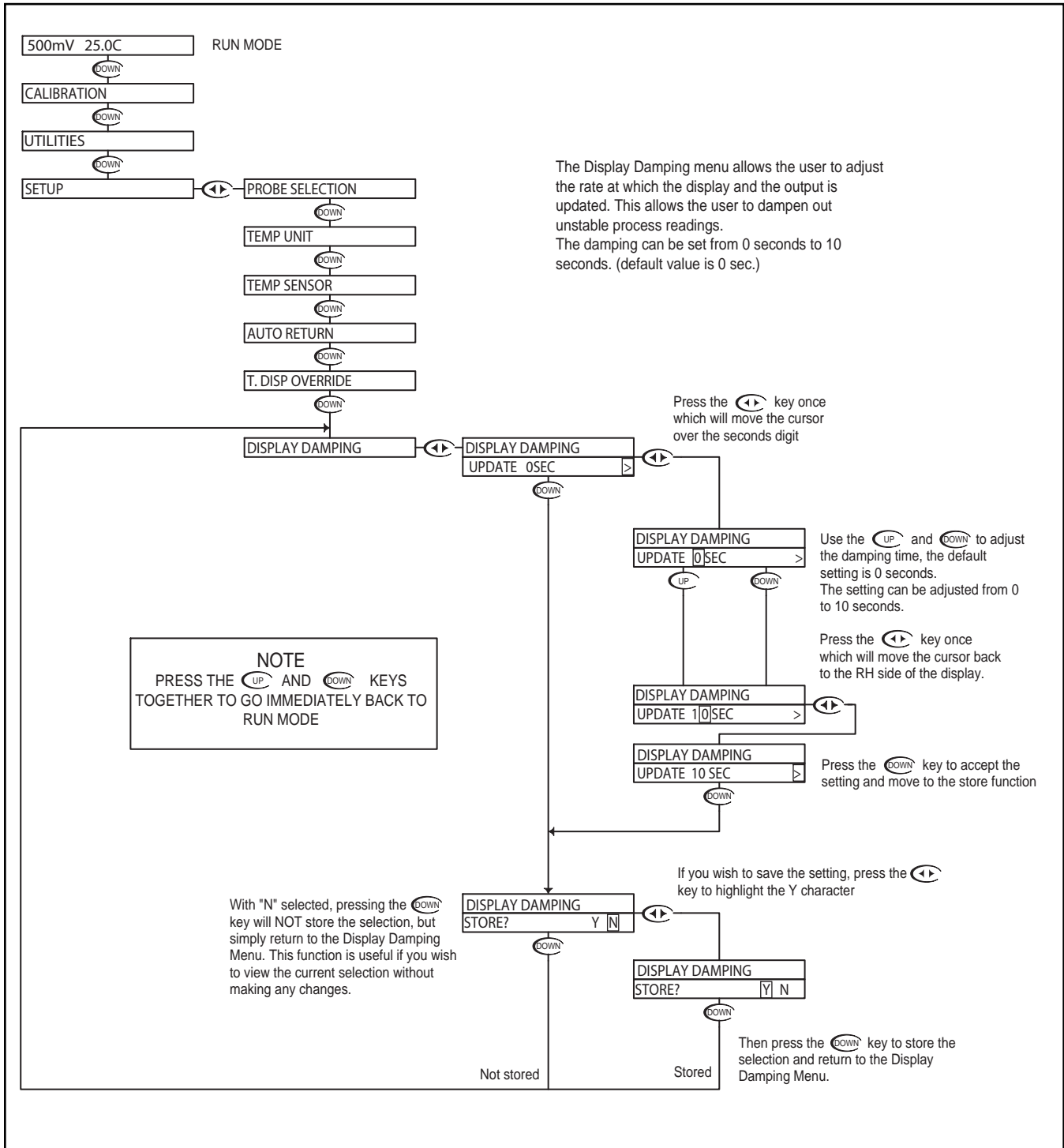


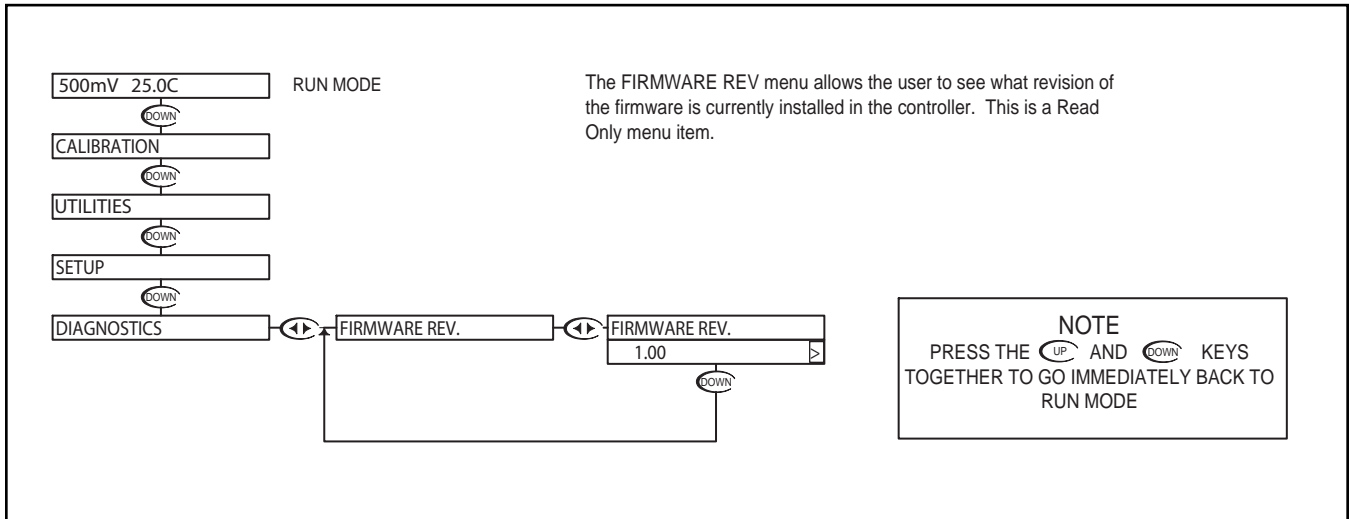
ORP - Setup Menu - Temp. Display Override 5.9

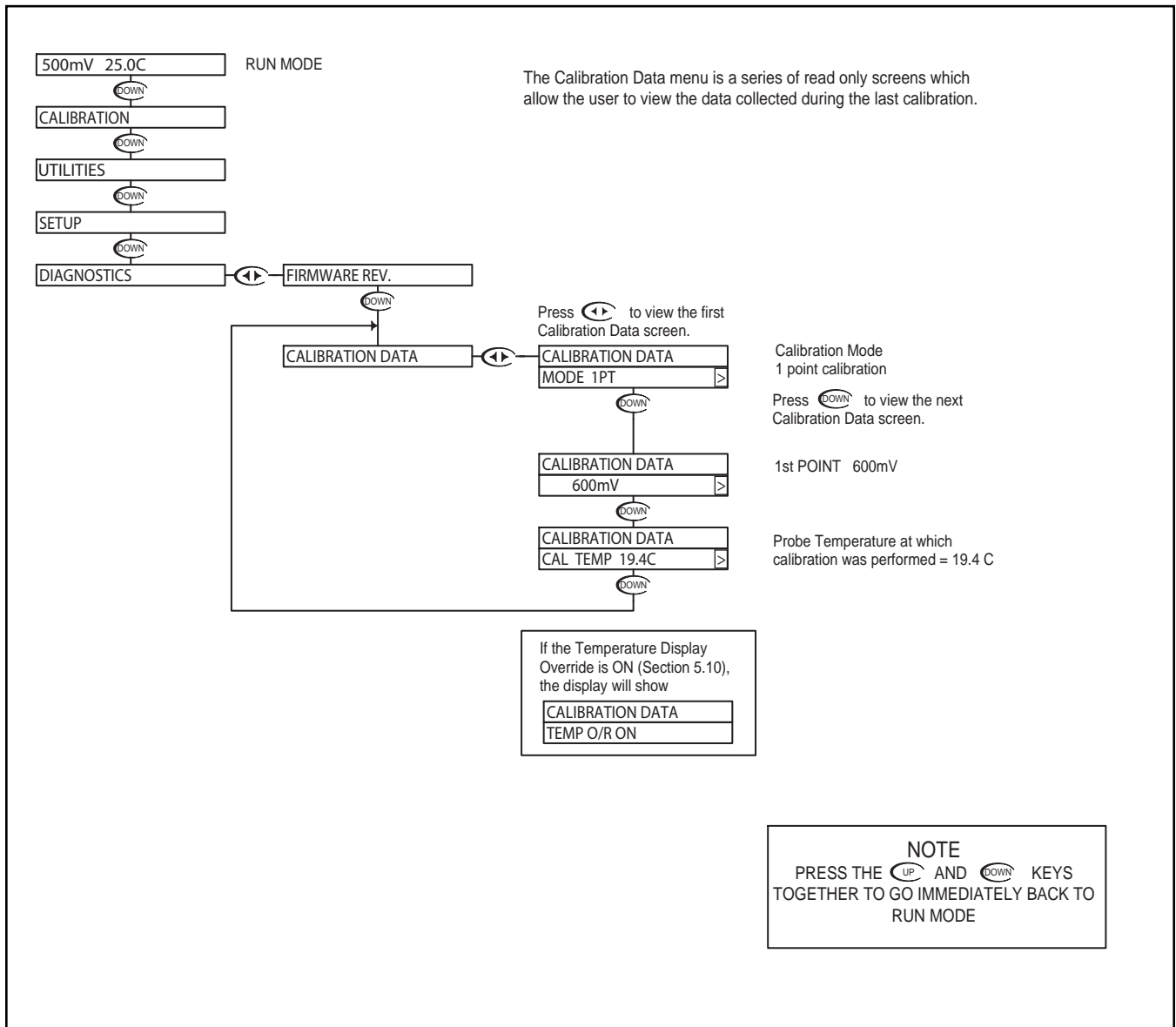




ORP - Setup Menu - Display Damping 5.10









ORP - Diagnostics Menu - Sensor Input 5.13

500mV 25.0C RUN MODE



CALIBRATION



UTILITIES



SETUP



DIAGNOSTICS



FIRMWARE REV.



CALIBRATION DATA



SENSOR INPUT



PROBE 500mV

TEMP 331Ω



The Sensor Input Menu allows the user to view real time, uncompensated process data from the probe. This is a Read only menu item.

Press to view the Sensor Input data.

The top line shows the mV input from the probe
The bottom line shows the actual value of the temperature sensor in ohms.

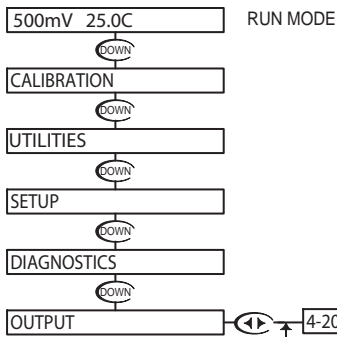
If the Probe is not equipped with a Temperature Sensing Device, and Temperature Display Override is ON (Section 5.10), the display will show

PROBE 500mV
TEMP O/R ON

NOTE
PRESS THE AND KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



ORP - Output Menu - 4-20mA Output 5.14



The Transmitter has a single 4-20mA output, electrically isolated from the ground. The output can source current into a maximum of 800 ohms. See Section 3.9 for wiring diagram. The channel has a fully adjustable 4 & 20 mA output adjustments. This will enable the operator to span the output over the desired range.

The example below shows the 4-20 mA set to 4mA =200mV and 20mA = 800mV. The output would then span 4 to 20 mA for a mV swing of 200mV to 800mV. Note that the span can be reversed, in that 4 mA can be set to a high mV value, and 20 mA can be set to a low mV value, effectively reversing the control direction.

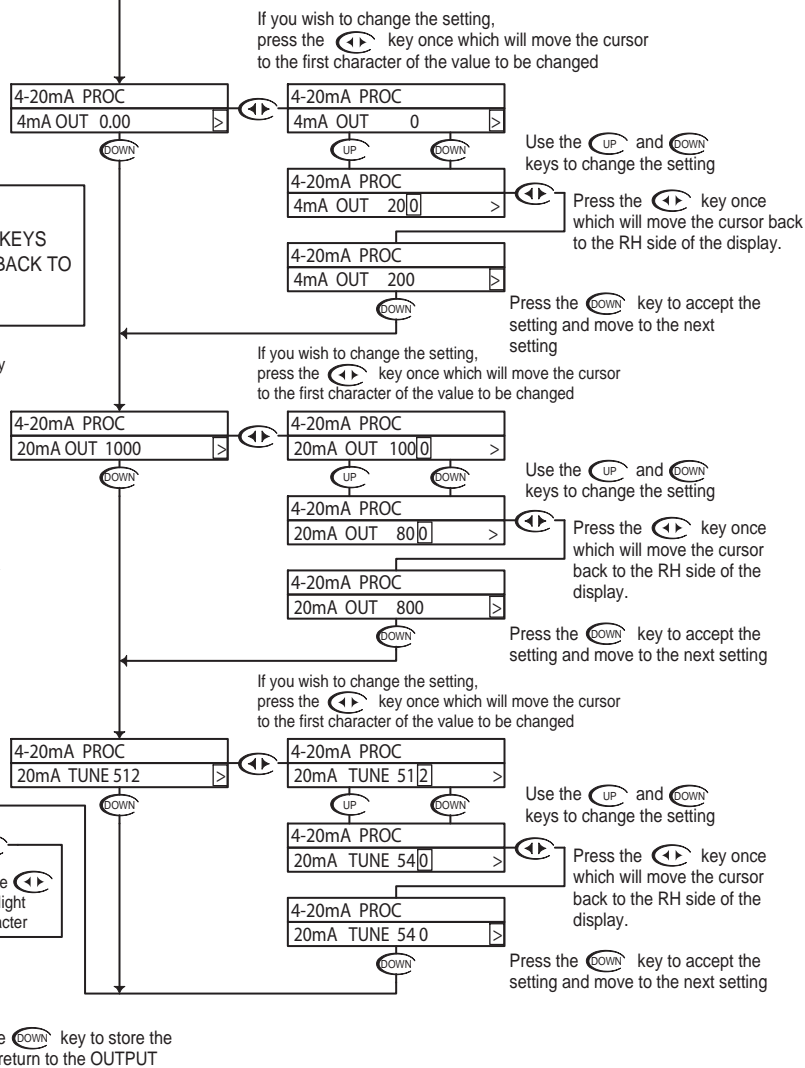
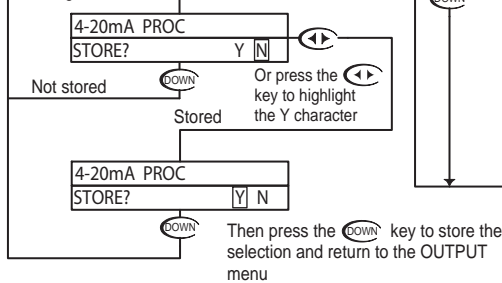
NOTE
PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

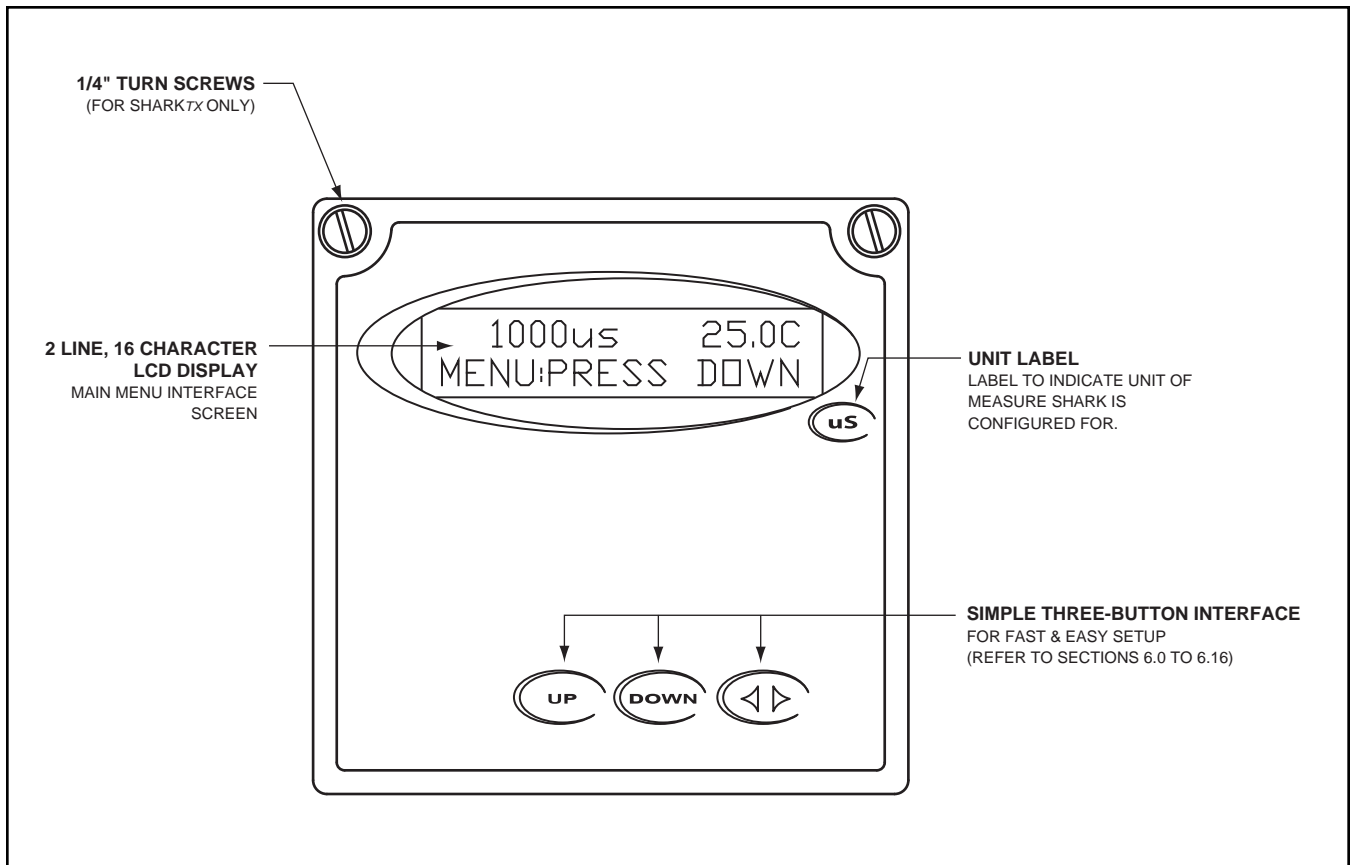
The TUNE function allows the user to precisely adjust the 4-20 ma output to compensate for any errors in the output circuitry. Normally, fine tuning the 4-20mA output is not necessary.

To make the adjustment, place an accurate current meter in series with the 4-20 mA output, with the appropriate loads connected. When the TUNE menu is selected, the controller puts 20 mA out the terminals. Use the UP or DOWN keys to adjust the 20mA output to get exactly 20.

The TUNE value can be adjusted over the range from 0 to 1000, these are unitless numbers used for tuning purposes only.

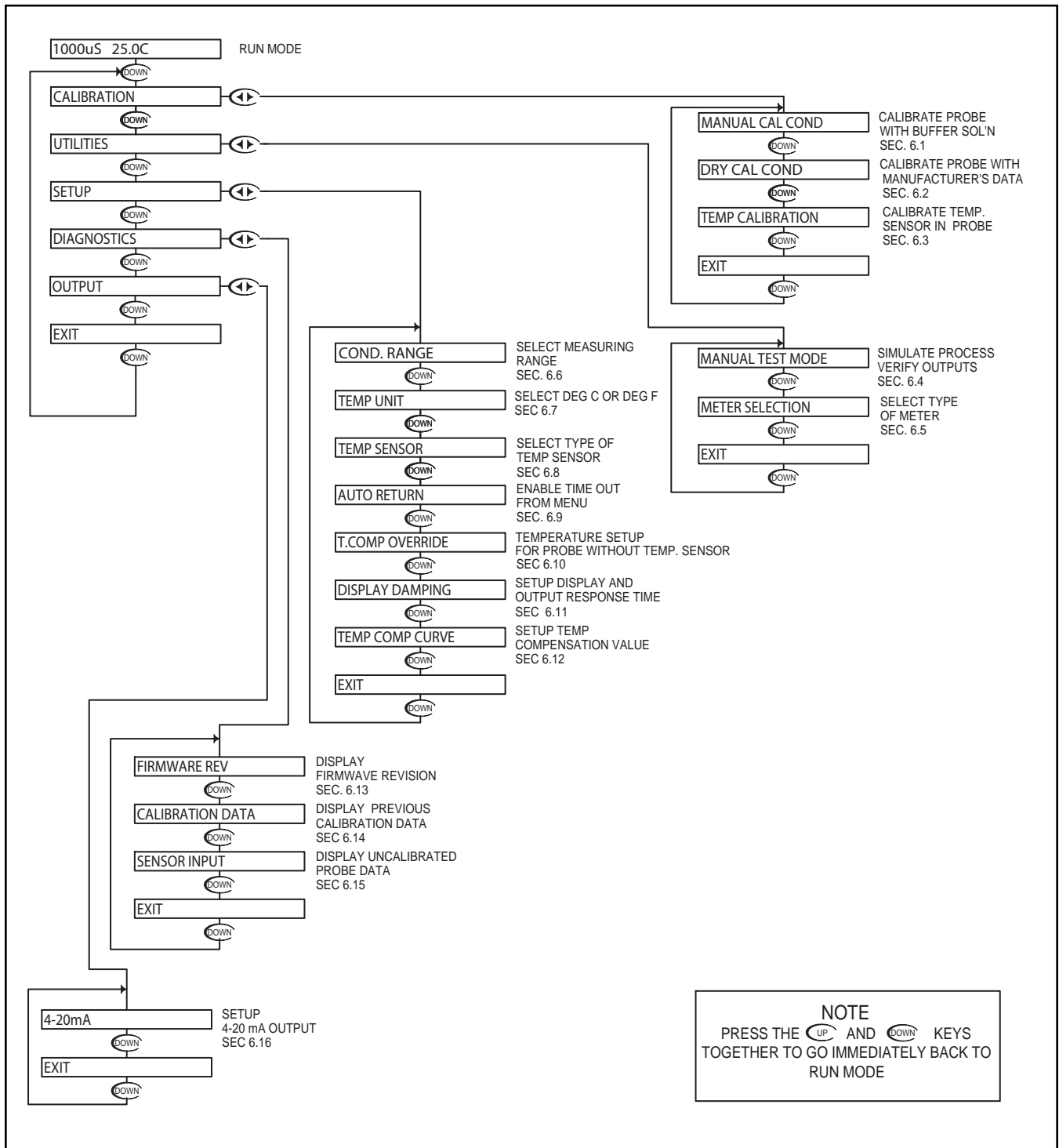
With "N" selected, pressing the DOWN key will NOT store the selection, but simply return to the OUTPUT Menu. This function is useful if you wish to view the current selection without making any changes.







Conductivity - Menu Overview 6.0



NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Conductivity - Calibration Menu - Manual Calibrate 6.1

Manual Calibration is used to "wet calibrate the cell". This can be done with the cell installed in the process, or with the cell suspended in a known buffer solution.
When calibrated "In Process", the actual conductivity is determined with a grab sample or a hand held meter, and the value entered in the display.
When calibrated with buffers, the cell is placed in a known buffer solution, and the value of the buffer entered on the display.
In both cases, make sure the cell has time to stabilize both in temperature and conductivity before entering any data.

1000uS 25.0C RUN MODE

CALIBRATION

MANUAL CAL COND

MANUAL CAL COND
967 uS

MANUAL CAL COND
967 uS

MANUAL CAL COND
1000 uS

MANUAL CAL COND
1000 uS

If the calibration did not appear to be correct, press the DOWN key which will return back to the Manual Cal Cond menu.

MANUAL CAL COND
STORE? Y N

MANUAL CAL COND
STORE? Y N

Press DOWN to store the calibration data and return back to the Manual Cal Cond menu so the user can select another function.

Place the cell in the buffer solution
The controller will read the Conductivity value, averaging a number of results to get a stable calibration value.

Press the key once which will move the cursor over the least sign. digit of the display.

Use the UP and DOWN keys to adjust the reading until it agrees with the actual buffer conductivity value

Then press to move the cursor to the RH position

If the calibration is OK, use the key to move the cursor over the Y text and press the down key.

NOTE
PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Conductivity - Calibration Menu - Dry Cal Cond 6.2

1000uS 25.0C RUN MODE

CALIBRATION (DOWN) MANUAL CAL COND (LEFT/RIGHT)

DRY CAL COND (DOWN)

Dry Calibration eliminates the need for conductivity reference solutions, the user inputs the Cell K factor supplied by the factory.

If the conductivity cell has a tag attached to it, specifying the exact cell constant, the user is prompted to enter this value.

NOTE:
ACCELERATOR KEYS
Pressing the UP or DOWN key once will change the value by the smallest digit. Holding the key down will cause the value to change at an increasing rate until the key is released. Pressing the key again will cause the value to start changing at it's slowest rate again. This allows the user to get to the new multiplier value quickly.

DRY CALIBRATION K FACTOR 1.0000 (LEFT/RIGHT)

Press the LEFT/RIGHT key once which will move the cursor over the least sign. digit of the display.

DRY CALIBRATION K FACTOR 1.0000 (UP/DOWN)

Use the UP and DOWN keys to adjust the value to the K factor specified on the probe tag

DRY CALIBRATION K FACTOR 10.000 (LEFT/RIGHT)

Then press LEFT/RIGHT to move the cursor to the RH position

DRY CALIBRATION K FACTOR 10.000

If the setting is OK, use the LEFT/RIGHT key to move the cursor over the Y text and press the down key.

If the calibration did not appear to be correct, press the DOWN key which will return back to the Manual Cal Cond menu.

DRY CALIBRATION STORE? Y N (DOWN)

DRY CALIBRATION STORE? Y N (DOWN)

Press DOWN to store the calibration data and return back to the Dry Cal Cond menu so the user can select another function.

NOTE
PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Temperature Calibration

In most cases, the factory temperature calibration is accurate enough to ensure correct temperature readings. However, in some circumstances, the user may wish to ensure the temperature sensor is calibrated accurately, especially when operating at the extreme end of the conductivity cell temperature operating range, or where the temperature compensation is critical to correct process readings.

This menu allows the user to calibrate the temperature anywhere within its range.

Be aware, that the conductivity reading is affected by the temperature reading (due to the temperature compensation) so accurate temperature calibration is vital to obtaining accurate conductivity readings. If the user is unsure of the calibration test fixture, then it would be best to leave the temperature calibration at its factory setting.

Be sure to allow the temperature of the cell to stabilize before attempting to calibrate the temperature sensor, this may take a significant amount of time as the sensor is buried behind a protective layer of epoxy which will cause some delay.

1000uS 25.0C RUN MODE

DOWN

CALIBRATION



MANUAL CAL COND



DRY CAL COND



TEMP CALIBRATION



If the Temperature Compensation Override is set to ON (see section 6.11), the Shark cannot calibrate the temperature sensor. This display will appear to alert the user to the condition.

The controller displays the current probe temperature. If this incorrect, the controller can be adjusted to compensate.

Press the key once which will move the cursor over the least significant digit of the temperature display.

Use the and to adjust the reading until it agrees with the known temperature of the probe

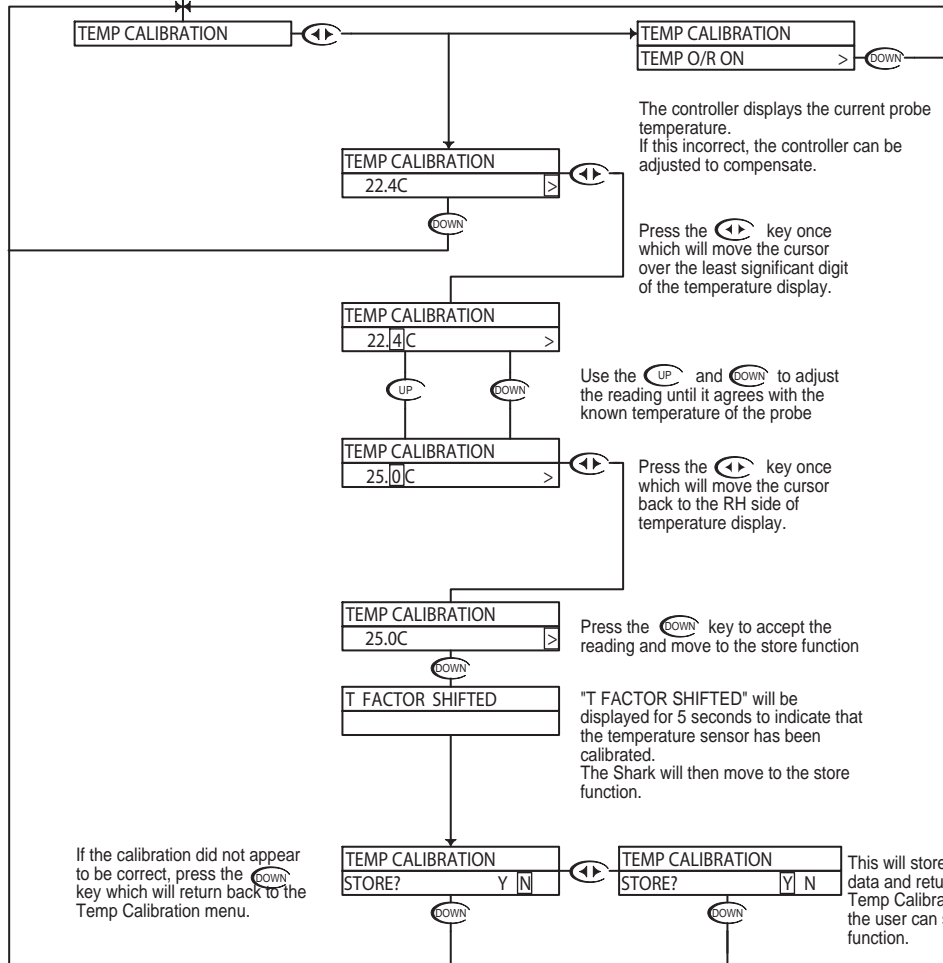
Press the key once which will move the cursor back to the RH side of temperature display.

Press the key to accept the reading and move to the store function

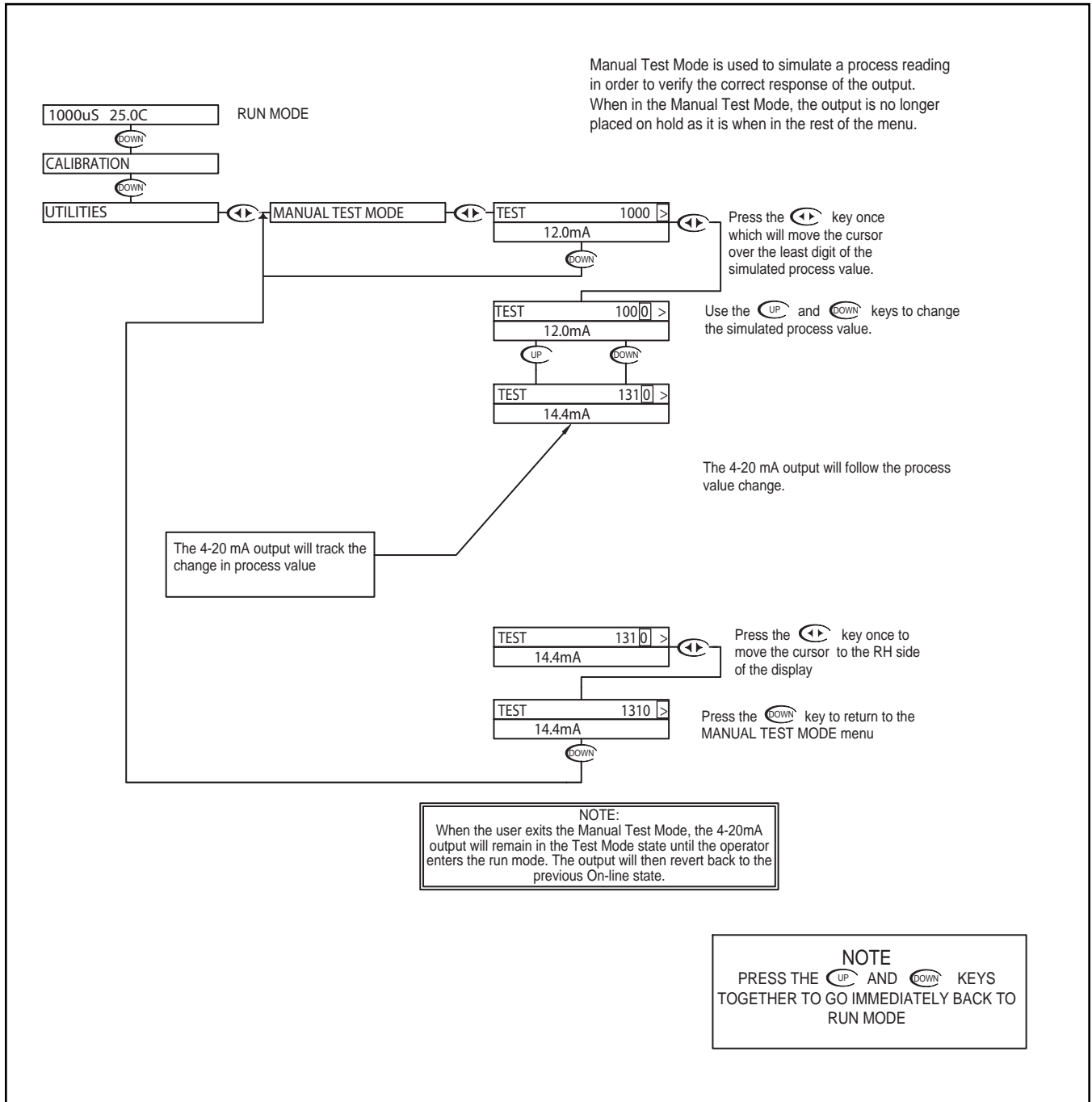
"T FACTOR SHIFTED" will be displayed for 5 seconds to indicate that the temperature sensor has been calibrated. The Shark will then move to the store function.

If the calibration did not appear to be correct, press the key which will return back to the Temp Calibration menu.

This will store the calibration data and return back to the Temp Calibration setup so the user can select another function.

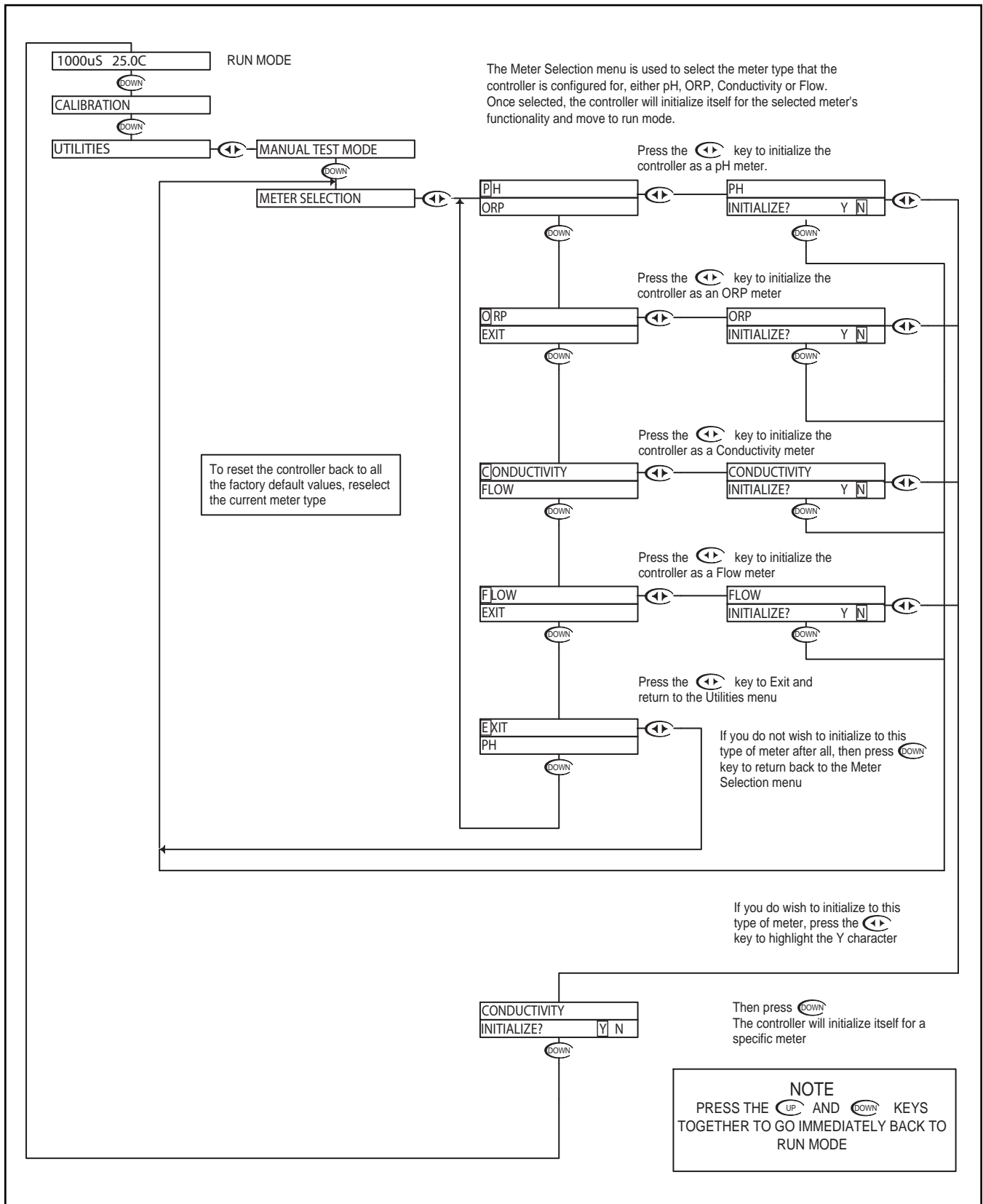


NOTE
PRESS THE AND KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



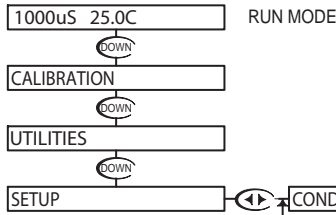


Conductivity - Utilities Menu - Meter Selection 6.5





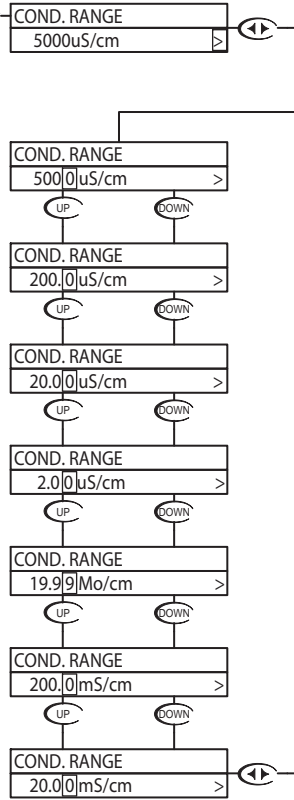
Conductivity - Setup Menu - Conductivity Range 6.6



Conductivity Range will allow the user to select the measuring range of the instrument.
 The ranges can be selected from any of the following:
 200 mS/cm - cell constant 50
 20 mS/cm - cell constant 10
 5000 uS/cm - cell constant 1
 200 uS/cm - cell constant 0.1
 20 uS/cm - cell constant 0.1
 2 uS/cm - cell constant 0.01
 19.99 MΩ - cell constant 0.01

Press the **←** key once which will move the cursor over the last character of the range.

Use the **↑** or **↓** keys to scroll through the available ranges



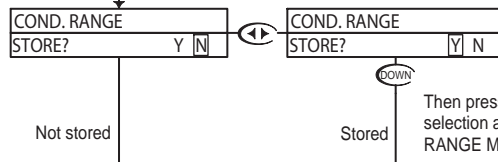
Once the correct range is selected, move to the store function to save the selection

Press the **→** key once which will move the cursor back to the RH side of the display.

Press the **↓** key to accept the setting and move to the store function

With "N" selected, pressing the **↓** key will NOT store the selection, but simply return to the COND RANGE Menu. This function is useful if you wish to view the current selection without making any changes.

Or press the **←** key to highlight the Y character.



Then press the **↓** key to store the selection and return to the COND RANGE Menu.

NOTE
 PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Conductivity - Setup Menu - Temp. Unit 6.7

1000uS 25.0C RUN MODE

CALIBRATION

UTILITIES

SETUP

COND RANGE

TEMP UNIT

TEMP UNIT
DEG C

TEMP UNIT
DEG C

TEMP UNIT
DEG F

TEMP UNIT
DEG F

TEMP UNIT
STORE? Y N

Press the **←→** key once which will move the cursor over the unit type, C or F.

Use the **↑** or **↓** to select C or F

Press the **←→** key once which will move the cursor back to the RH side of the display.

Press the **↓** key to accept the change and move to the store function

Or press the **←→** key to highlight the Y character.

With "N" selected, pressing the **↓** key will NOT store the selection, but simply return to the TEMP UNIT Selection Menu. This function is useful if you wish to view the current selection without making any changes.

Not stored

Stored

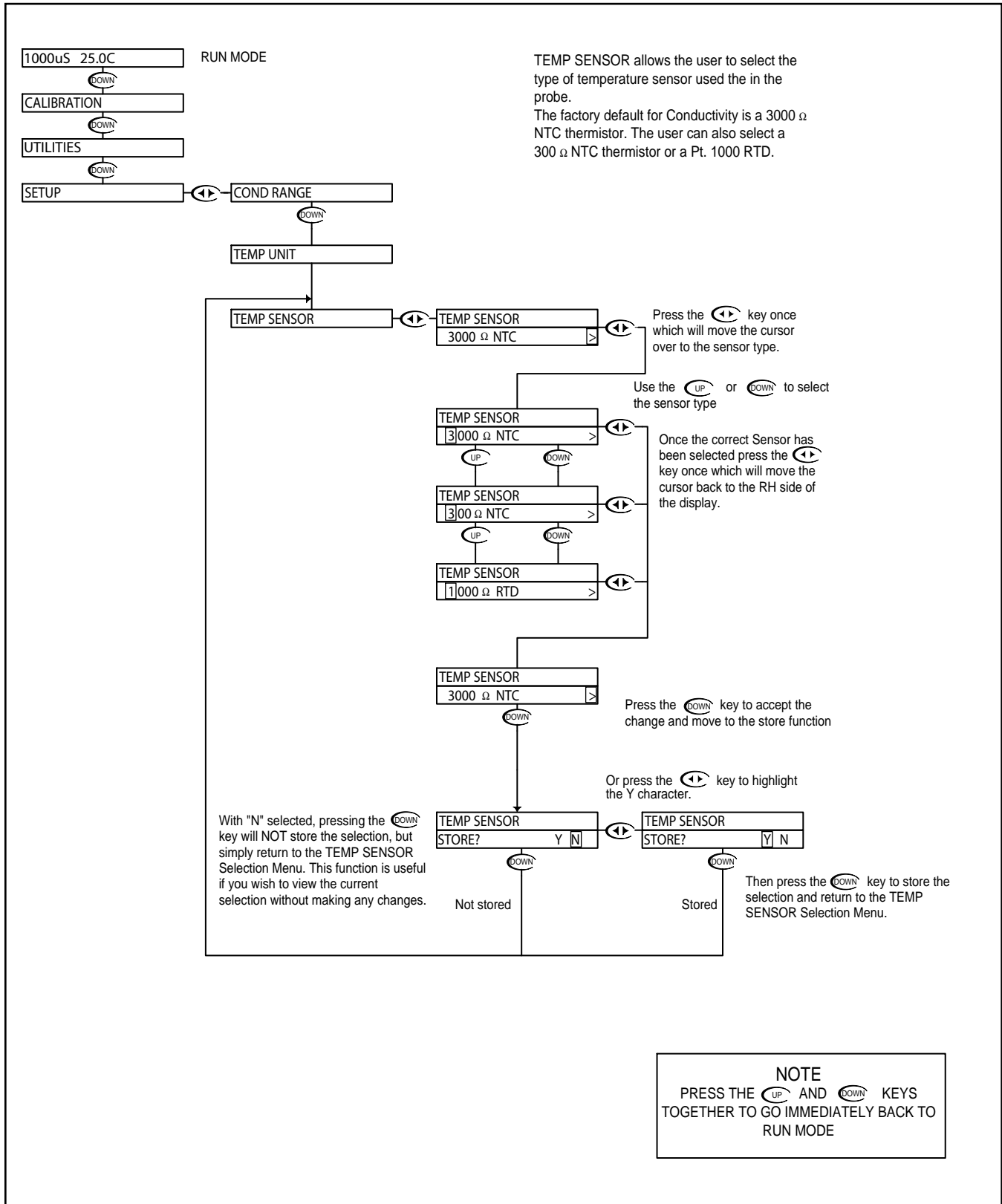
Then press the **↓** key to store the selection and return to the TEMP UNIT Selection Menu.

TEMP UNIT allows the user to select either Degrees Centigrade or Fahrenheit units for display

NOTE
PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Conductivity - Setup Menu - Temp. Sensor 6.8





Conductivity - Setup Menu - Auto Return 6.9

1000uS 25.0C RUN MODE

DOWN
CALIBRATION

DOWN
UTILITIES

DOWN
SETUP

←→ COND RANGE

DOWN
TEMP UNIT

DOWN
TEMP SENSOR

DOWN
AUTO RETURN

←→ AUTO RETURN
MENU ON >

AUTO RETURN is used to select what conditions will cause the controller to time-out of the operations menu

MENU ON will cause the controller to exit the menu and revert back to the online run mode after 10 minutes with no buttons pressed. This feature ensures that if a user forgets to return back to run mode, the controller will not be left in an offline state. If for some reason, the user would like to remain in the menu mode for extended periods of time, the AUTO RETURN function can be set to "OFF".

To change the MENU RETURN setting, Press the ←→ key once which will move the cursor to the ON or OFF text

Use the UP or DOWN keys to select either ON or OFF.

Press the ←→ key once which will move the cursor back to the RH side of the display.

Press the DOWN key to accept the change and move to the STORE function

Or press the ←→ key to highlight the Y character.

Then press the DOWN key to store the selection and return to the Auto Return Selection Menu.

With "N" selected, pressing the DOWN key will NOT store the selection, but simply return to the AUTO RETURN Selection Menu. This function is useful if you wish to view the current selection without making any changes.

DOWN
AUTO RETURN
STORE? Y N

Not stored

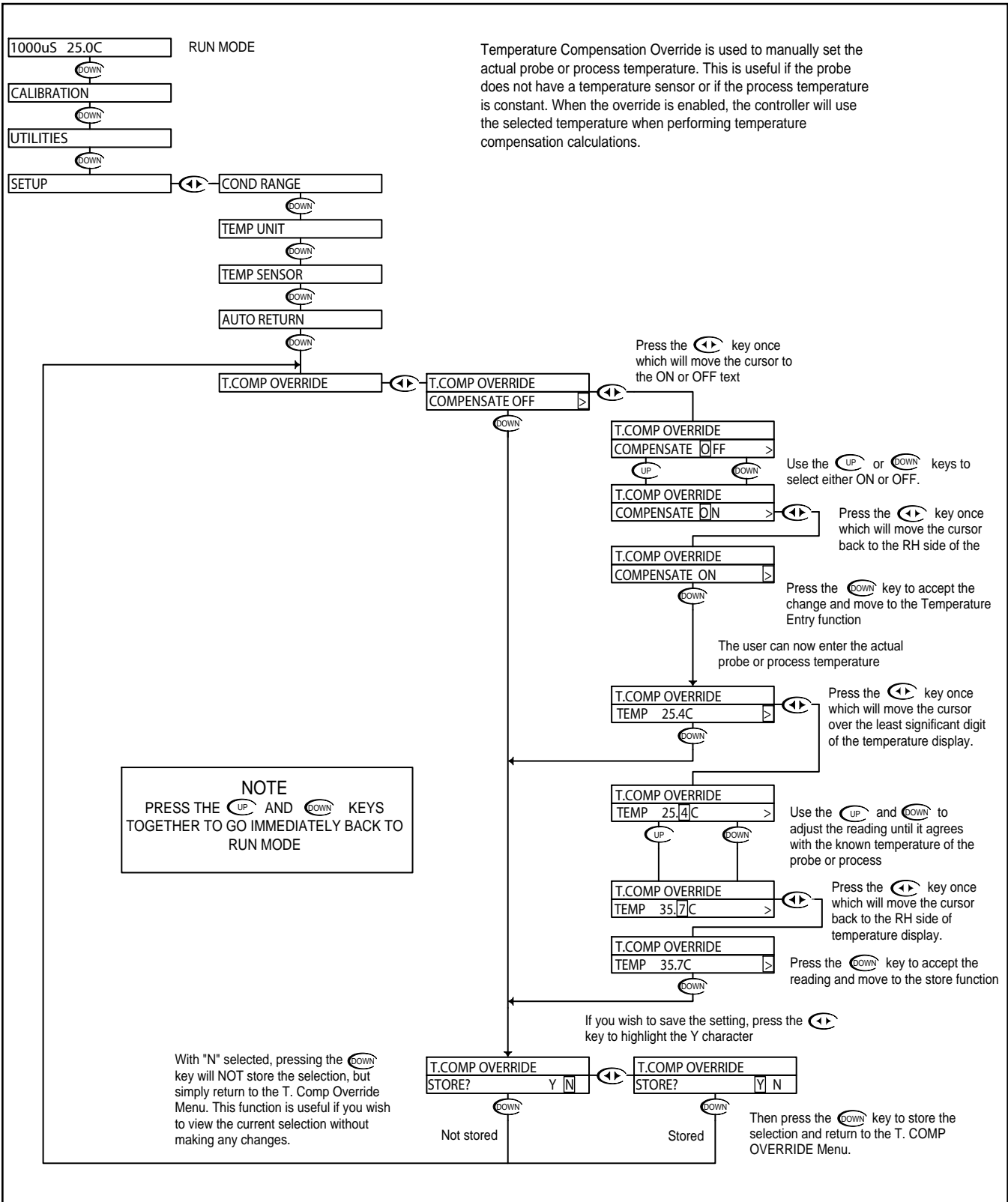
DOWN
AUTO RETURN
STORE? Y N

Stored

NOTE
PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

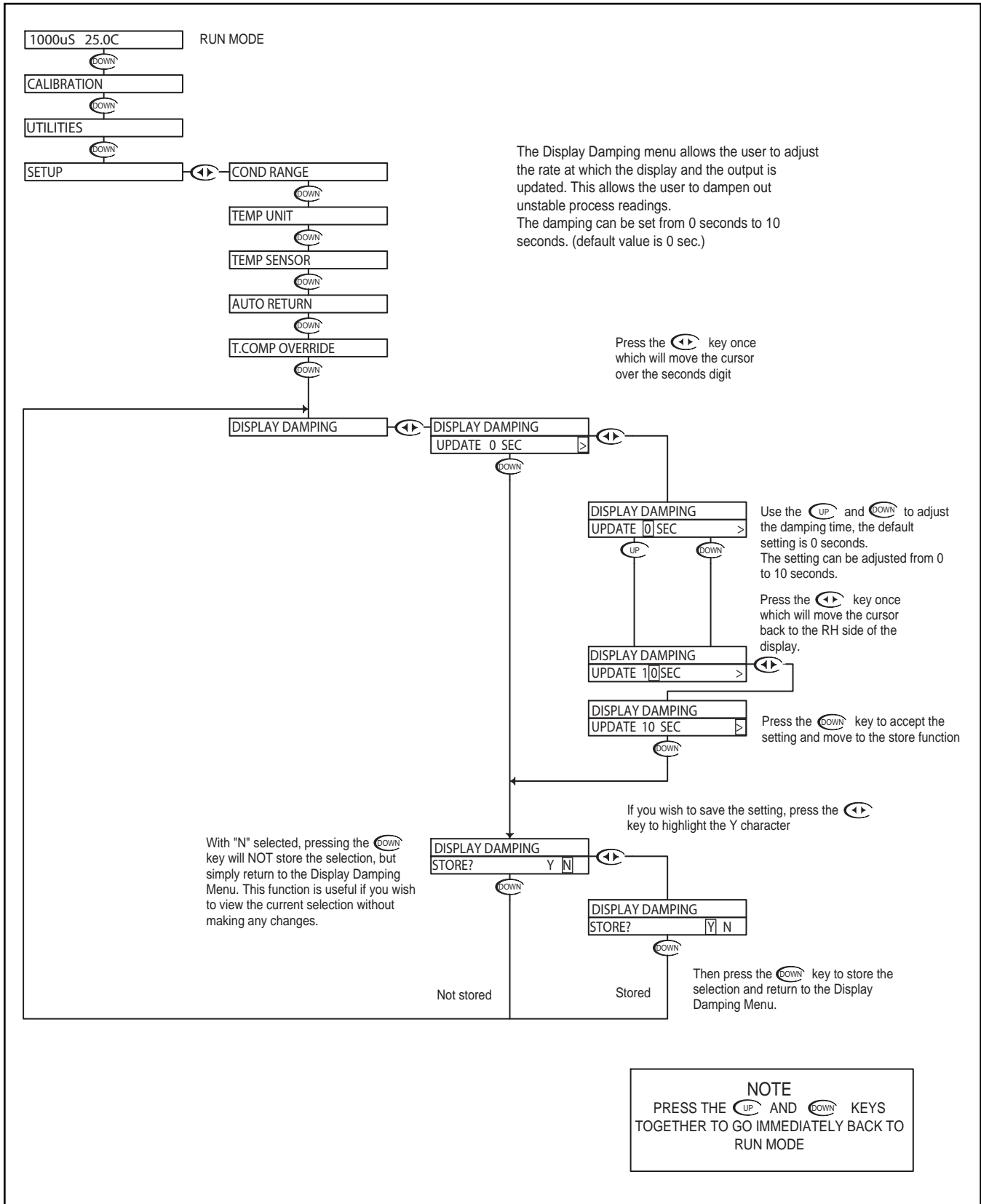


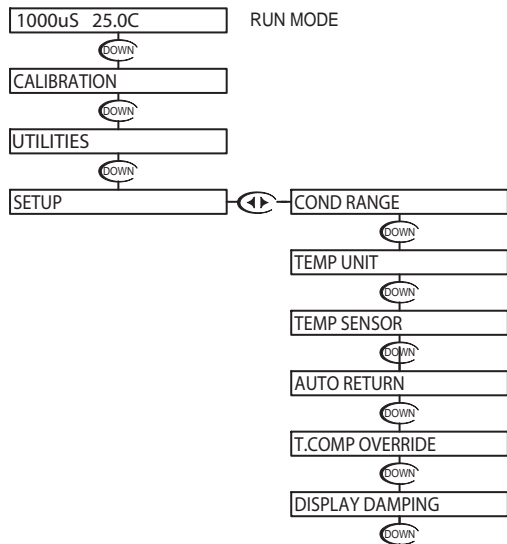
Conductivity - Setup Menu - T. Comp Override 6.10



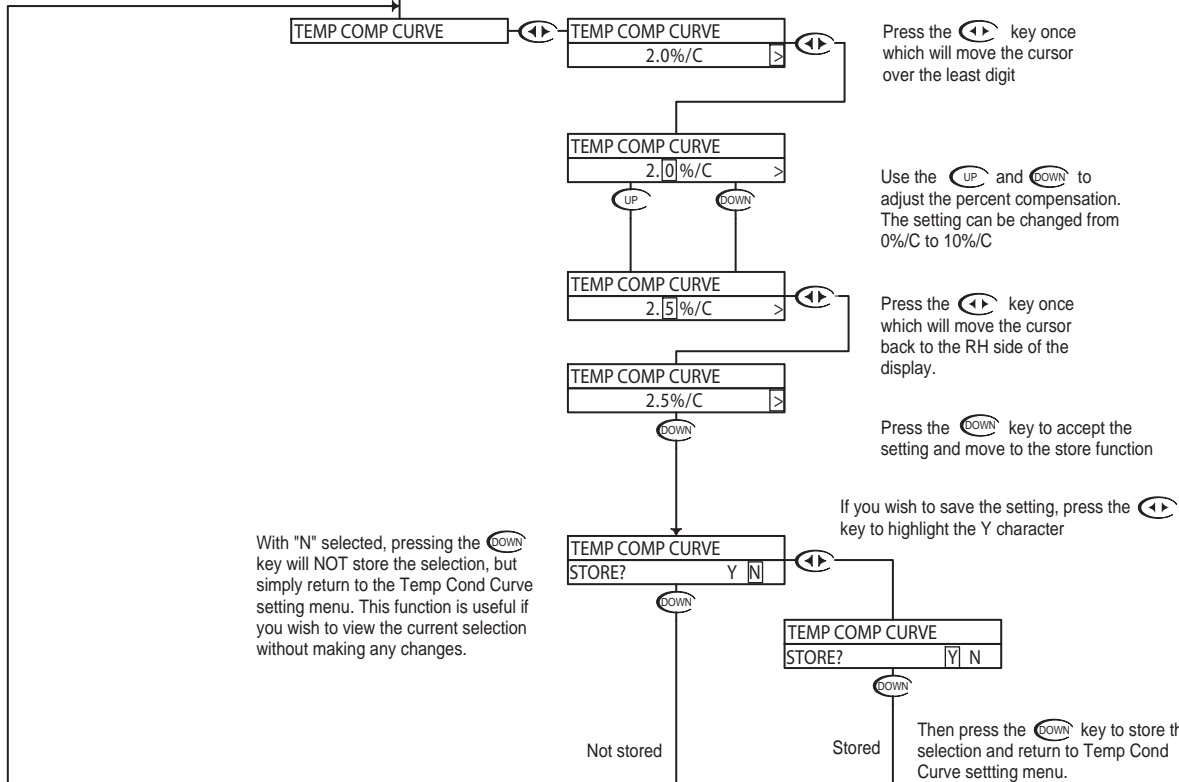


Conductivity - Setup Menu - Display Damping 6.11

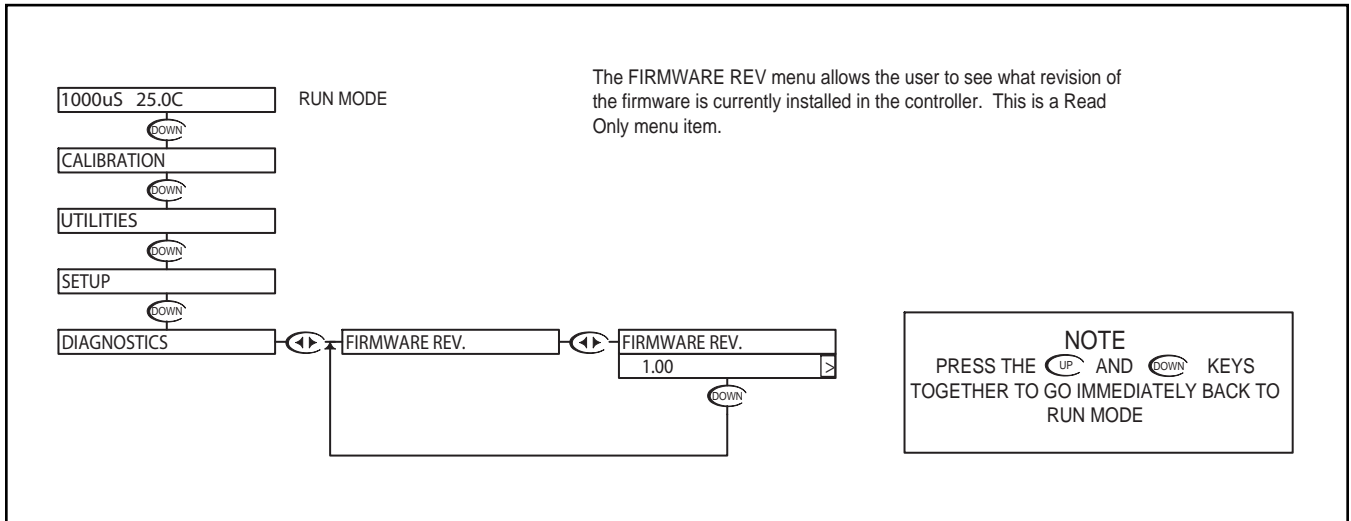




The Temperature Compensation Curve setting allows the user to select the temperature compensation to match a specific process. The variation of Conductivity versus Temperature is dependent on the type of solids and liquids in water, so no fixed compensation value will accurately compensate every process. This setting allows the user to fine tune the compensation to their specific process. Estimates of the correct compensation for certain chemicals are available and can be preset via this menu, otherwise the user will need to set the compensation to 0%/C, measure the effect of temperature for a specific process, calculate the actual compensation required and enter it through this menu. The Compensation can be varied from 0%/C to 10%/C.

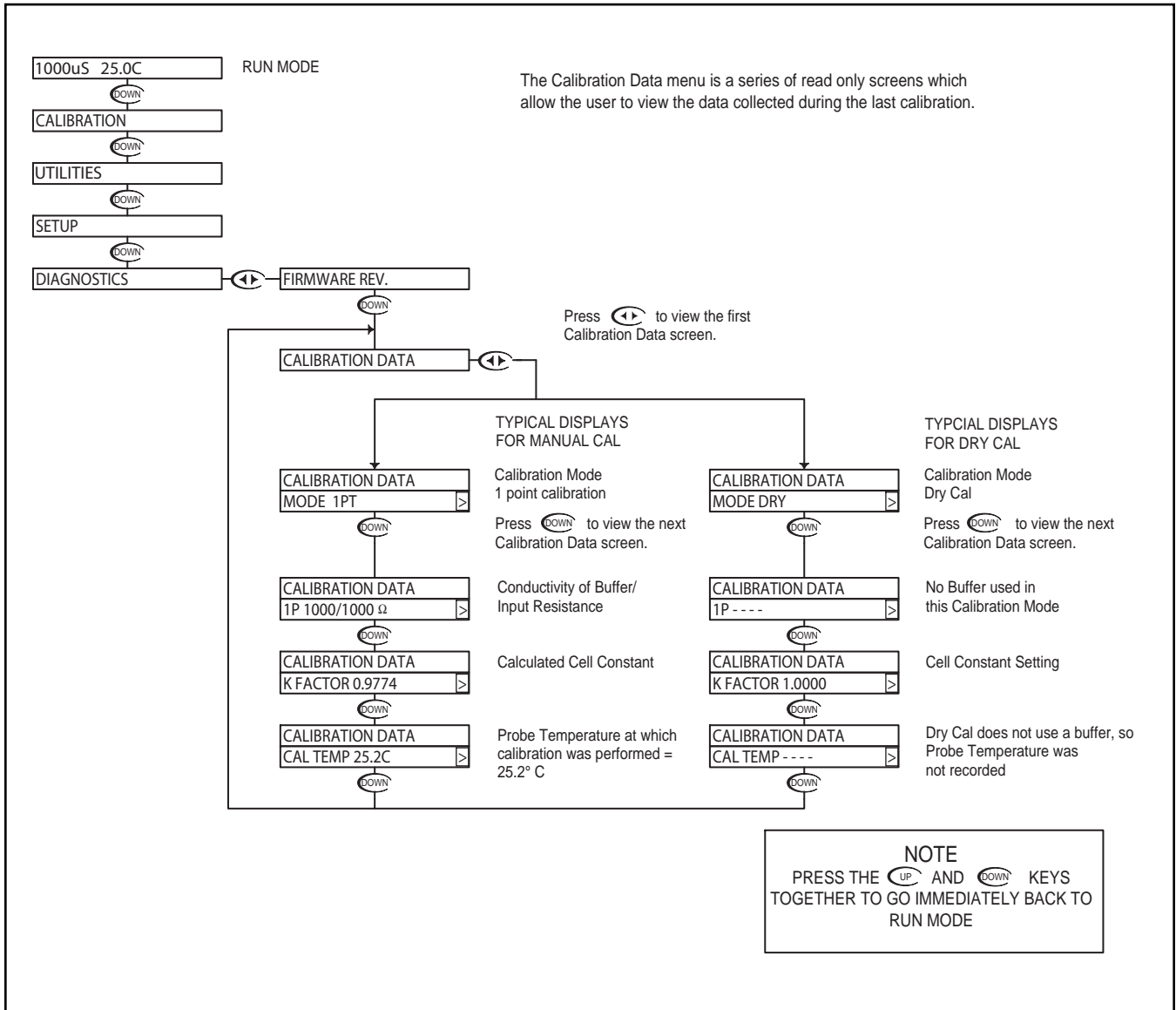


NOTE
PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



The FIRMWARE REV menu allows the user to see what revision of the firmware is currently installed in the controller. This is a Read Only menu item.

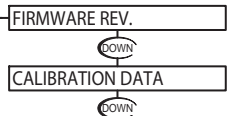
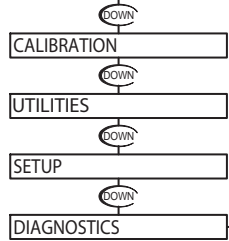
NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



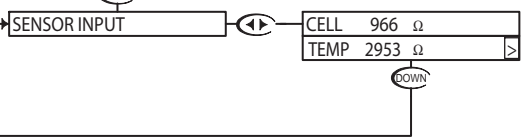


Conductivity - Diagnostics Menu - Sensor Input 6.15

1000uS 25.0C RUN MODE



Press to view the Sensor Input data.



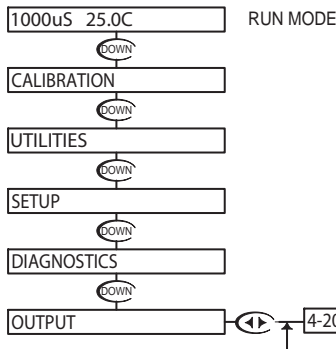
The Sensor Input Menu allows the user to view real time, uncompensated process data from the conductivity cell. This is a Read only menu item. This "Live Data" screen is useful for trouble shooting purposes when diagnosing cell or process problems.

The top line shows the resistance of the cell, The bottom line shows the actual value of the temperature sensor in ohms.

NOTE
PRESS THE AND KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

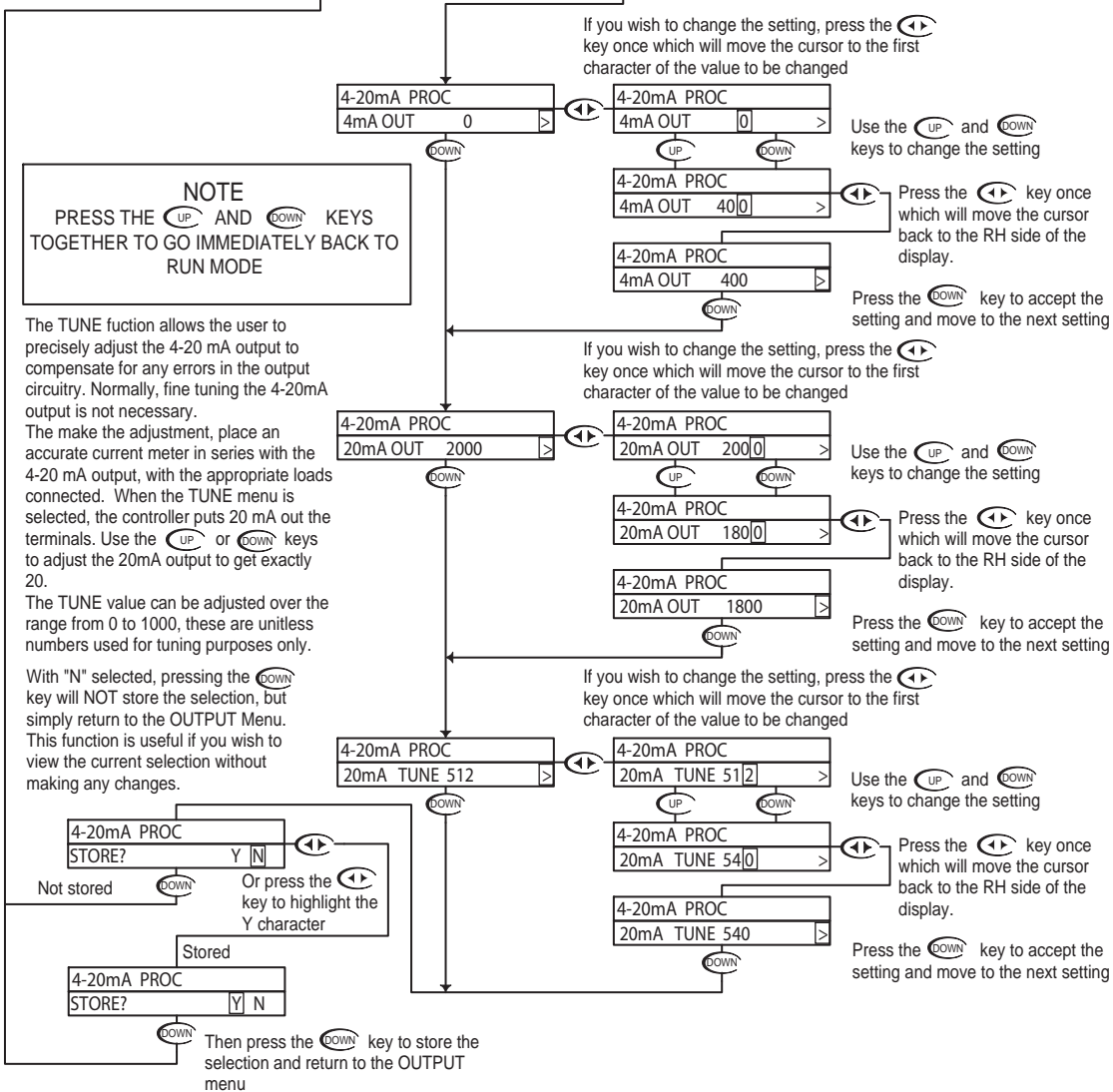


Conductivity - Output Menu - 4-20mA Output 6.16



The Transmitter has a single 4-20mA output, electrically isolated from the ground. The output can source current into a maximum of 800 ohms. See Section 3.9 for wiring diagram. The channel has a fully adjustable 4 & 20 mA output adjustments. This will enable the operator to span the output over the desired range.

The example below shows the 4-20 mA set to 4mA =400 uS and 20mA = 1800 uS. The output would then span 4 to 20 mA for a conductivity swing of 400 to 1800. Note that the span can be reversed, in that 4 mA can be set to a high conductivity value, and 20 mA can be set to a low conductivity value, effectively reversing the control direction.



NOTE
PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

The TUNE function allows the user to precisely adjust the 4-20 mA output to compensate for any errors in the output circuitry. Normally, fine tuning the 4-20mA output is not necessary. To make the adjustment, place an accurate current meter in series with the 4-20 mA output, with the appropriate loads connected. When the TUNE menu is selected, the controller puts 20 mA out the terminals. Use the UP or DOWN keys to adjust the 20mA output to get exactly 20. The TUNE value can be adjusted over the range from 0 to 1000, these are unitless numbers used for tuning purposes only. With "N" selected, pressing the DOWN key will NOT store the selection, but simply return to the OUTPUT Menu. This function is useful if you wish to view the current selection without making any changes.

If you wish to change the setting, press the left arrow key once which will move the cursor to the first character of the value to be changed

Use the UP and DOWN keys to change the setting

Press the right arrow key once which will move the cursor back to the RH side of the display.

Press the DOWN key to accept the setting and move to the next setting

If you wish to change the setting, press the left arrow key once which will move the cursor to the first character of the value to be changed

Use the UP and DOWN keys to change the setting

Press the right arrow key once which will move the cursor back to the RH side of the display.

Press the DOWN key to accept the setting and move to the next setting

If you wish to change the setting, press the left arrow key once which will move the cursor to the first character of the value to be changed

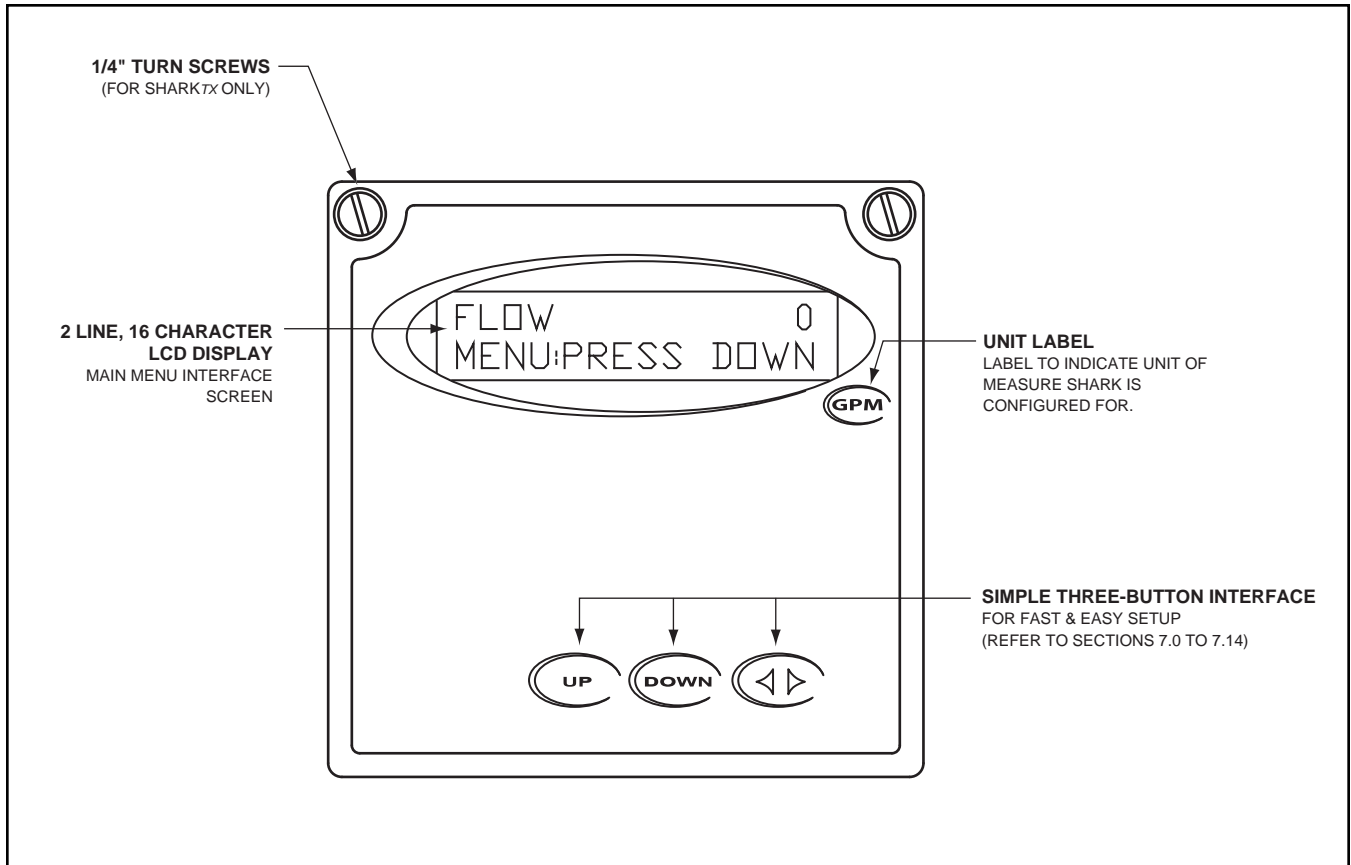
Use the UP and DOWN keys to change the setting

Press the right arrow key once which will move the cursor back to the RH side of the display.

Press the DOWN key to accept the setting and move to the next setting

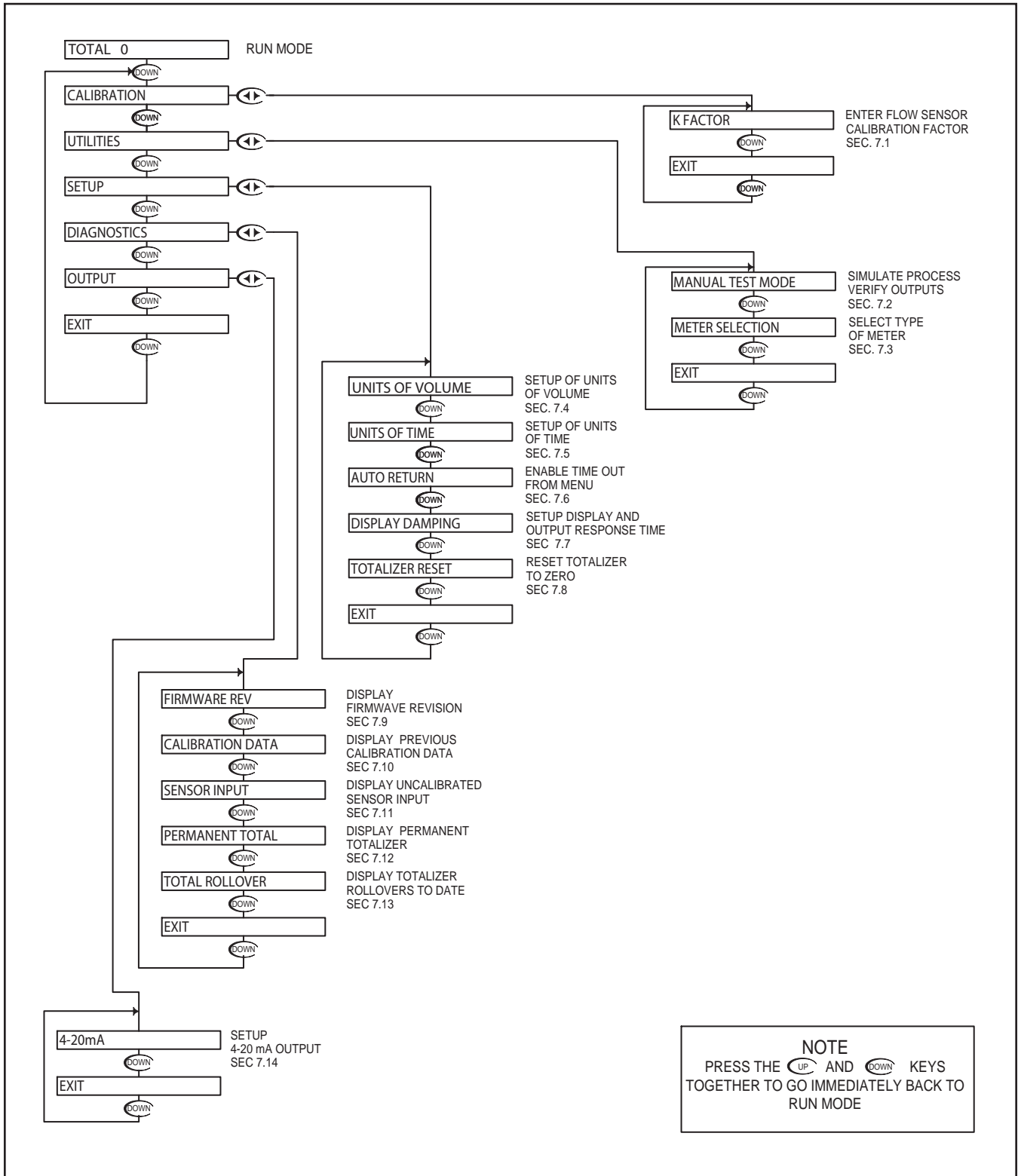


Section 7 - Using the Transmitter in Flow Mode





Flow - Menu Overview 7.0



NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Flow - Calibration Menu - K Factor 7.1

The K Factor menu is used to enter the flow sensor calibration factor. The K Factor represents the number of pulses per U.S. Gallon, generated by the combination of sensor and flow fitting. It is normally stamped on the flow fitting or attached to a tag on the cable. Typical K factors range between 0.5000 to 1500.0.

TOTAL 0

RUN MODE

CALIBRATION

K FACTOR

K FACTOR

100.00

If you just wish to view the current K Factor without changing it, press the DOWN key which will move to the store function

K FACTOR

100.00

K FACTOR

125.00

K FACTOR

125.00

K FACTOR

125.00

K FACTOR

STORE? Y N

K FACTOR

STORE? Y N

NOTE: ACCELERATOR KEYS Pressing the UP or DOWN key once will change the value by the smallest digit. Holding the key down will cause the to value change at an increasing rate until the key is released. Pressing the key again will cause the value to start changing at it's slowest rate again. This allows the user to get to the new K Factor value quickly. The K Factor can be set anywhere from 0.5000 pulses per U.S.Gallon to 1500.0 pulses per U.S.Gallon

To enter the K factor, use the DOWN key to enter the Calibration menu and then the LEFT key to select the K Factor menu.

Press the LEFT key once which will move the cursor over the least sign. digit of the display.

Use the UP and DOWN keys to adjust the reading until it agrees with the actual K Factor as specified on the sensor

Then press the RIGHT key to move the cursor to the RH position

Press the DOWN key to accept the change and move to the store function

If the K Factor setting is OK, use the LEFT key to move the cursor over the Y text and press the down key.

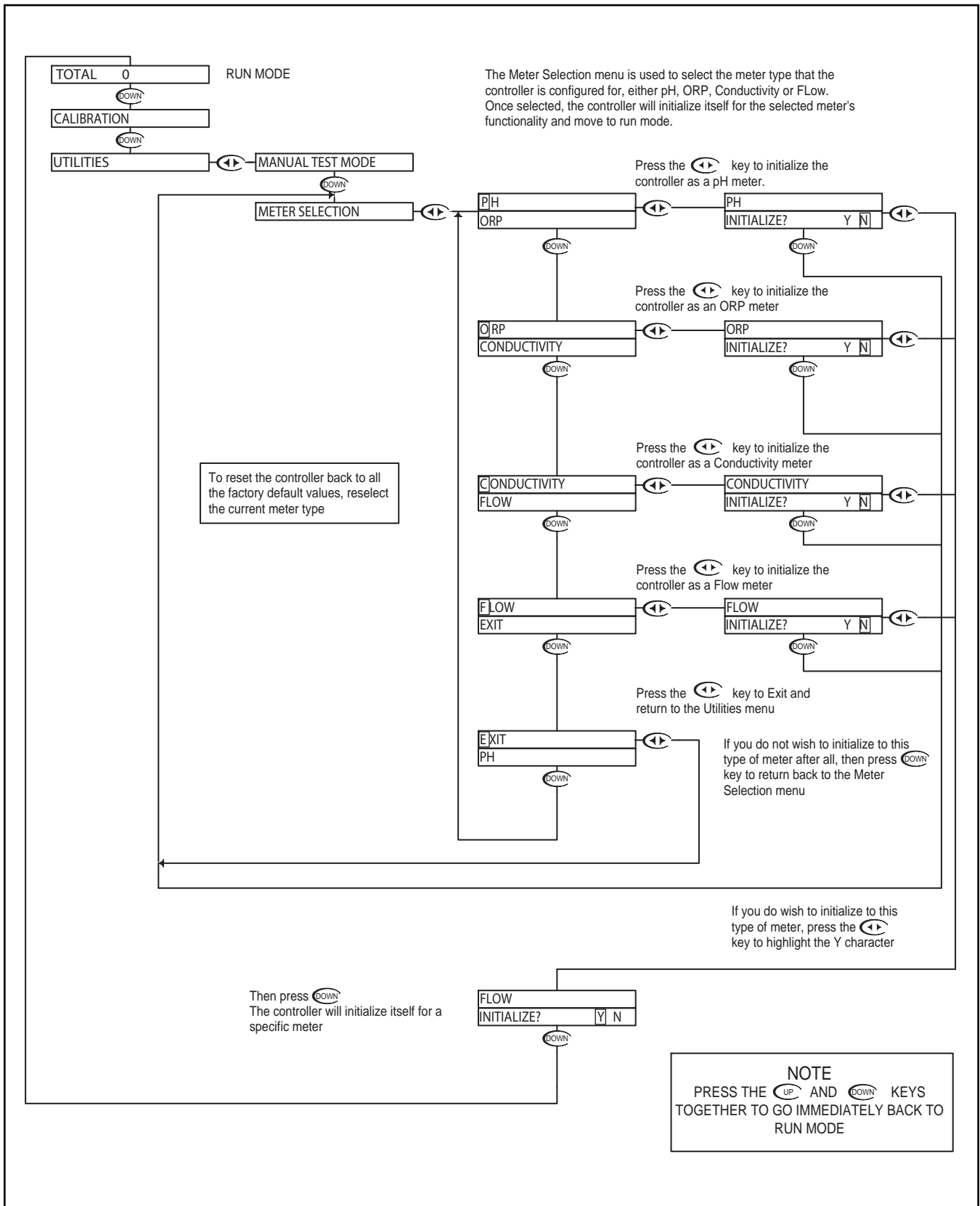
Press DOWN to store the calibration data and return back to the menu so the user can select another function.

If the calibration did not appear to be correct, press the DOWN key which will return back to the K Factor menu without storing the value.

NOTE PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Flow - Utilities Menu - Meter Selection 7.3





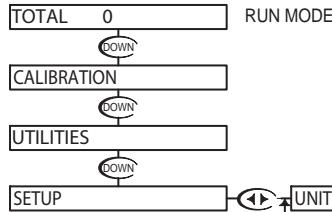
Flow - Setup Menu - Units of Volume 7.4

The Units of Measurement is broken into two variables, UNITS OF VOLUME and UNITS OF TIME. The two variables are then combined to display the desired units of measure. For example, if units of Volume is set Cubic Meters (CM) and Units of Time is set for Seconds (S), the controller will display flow as Cubic Meters per Second on the front LED display.

UNITS OF VOLUME

The user can select from four predefined units of Volume, or create their own custom value. The four predefined units are US Gallons GP, Cubic Feet CF, Liters LP, Cubic Meters CM.

The user can also select any two custom characters to represent units from AA to ZZ and an input multiplier which will numerically relate the custom unit of measure to US Gallons. The input multiplier can be set at any value between 0.0001 and 10000.



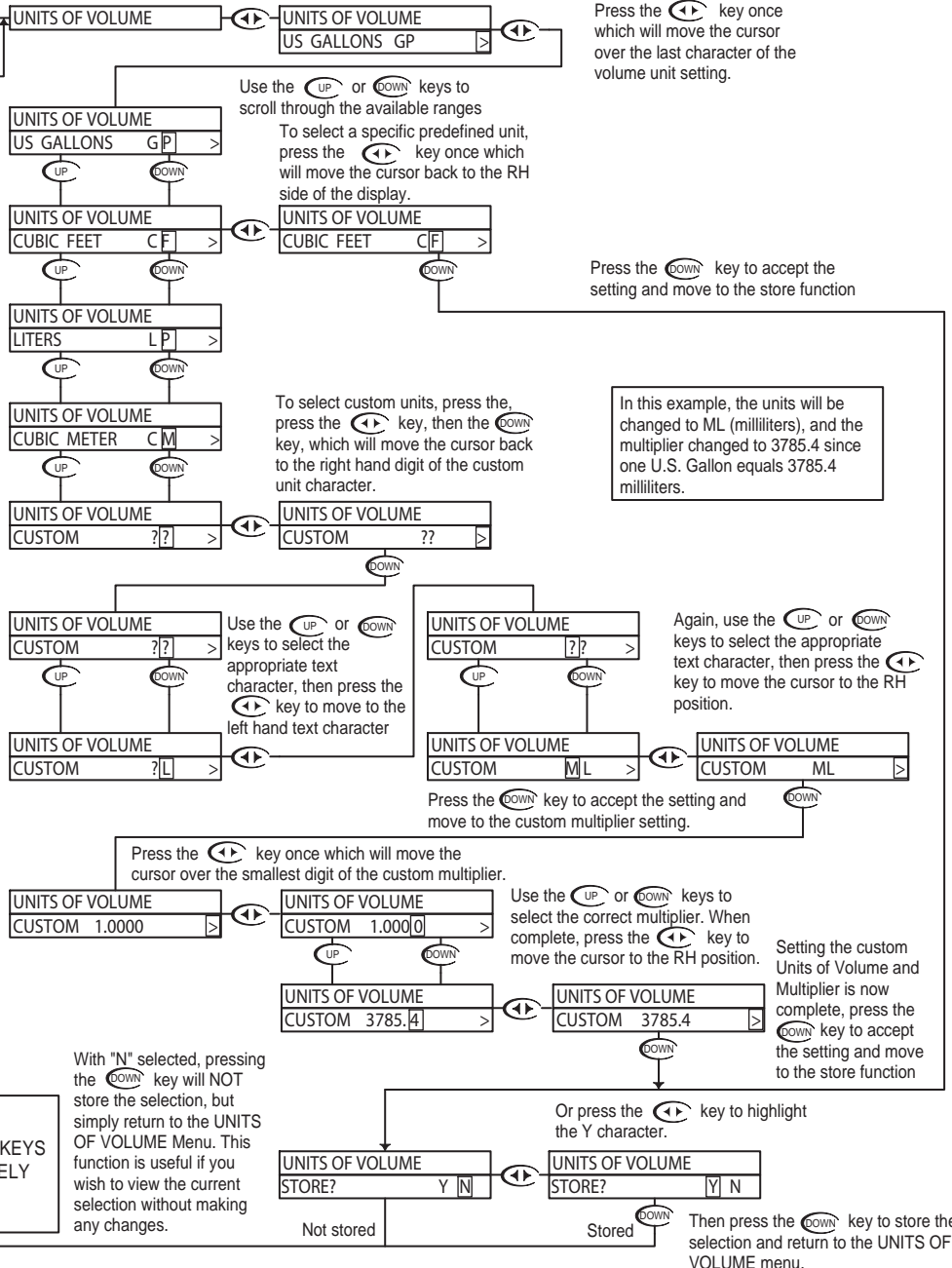
WARNING

Changing the units of Volume with an accumulated flow total will reset the flow total to zero.

Example: If the controller has been running in GPM mode and has a totalized flow, changing from GPM to another unit will reset the totalizer to zero.

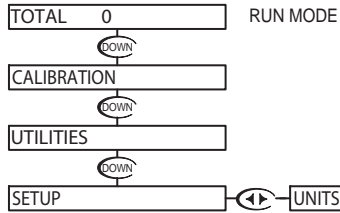
NOTE: ACCELERATOR KEYS
 Pressing the UP or DOWN key once will change the value by the smallest digit. Holding the key down will cause the value to change at an increasing rate until the key is released. Pressing the key again will cause the value to start changing at it's slowest rate again. This allows the user to get to the new multiplier value quickly.

NOTE
 PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



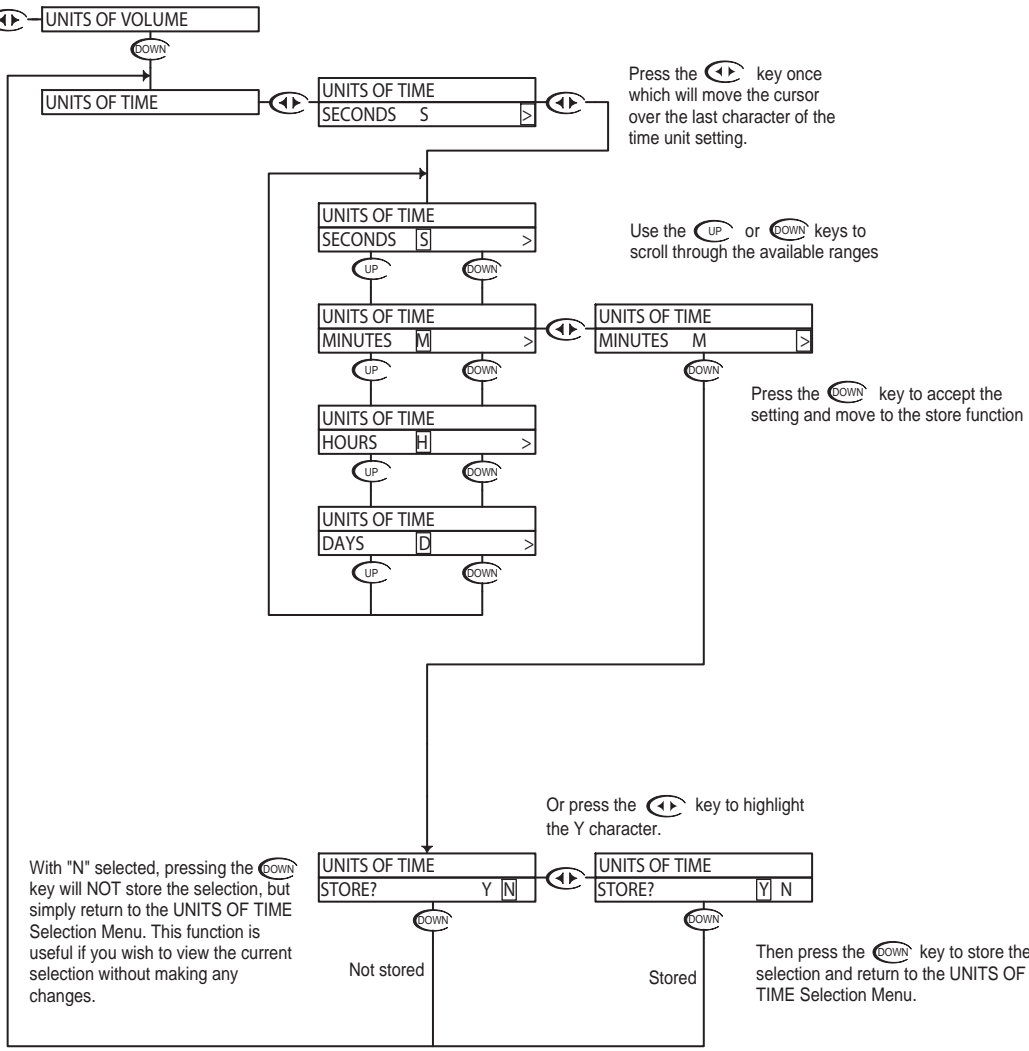


Flow - Setup Menu - Units of Time 7.5



The Units of Measurement is broken into two variables, UNITS OF VOLUME and UNITS OF TIME. The two variables are then combined to display the desired units of measure. For example, if units of Volume is to set Cubic Meters (CM) and Units of Time is set for Seconds (S), the controller will display flow as Cubic Meters per Second on the front LED display.

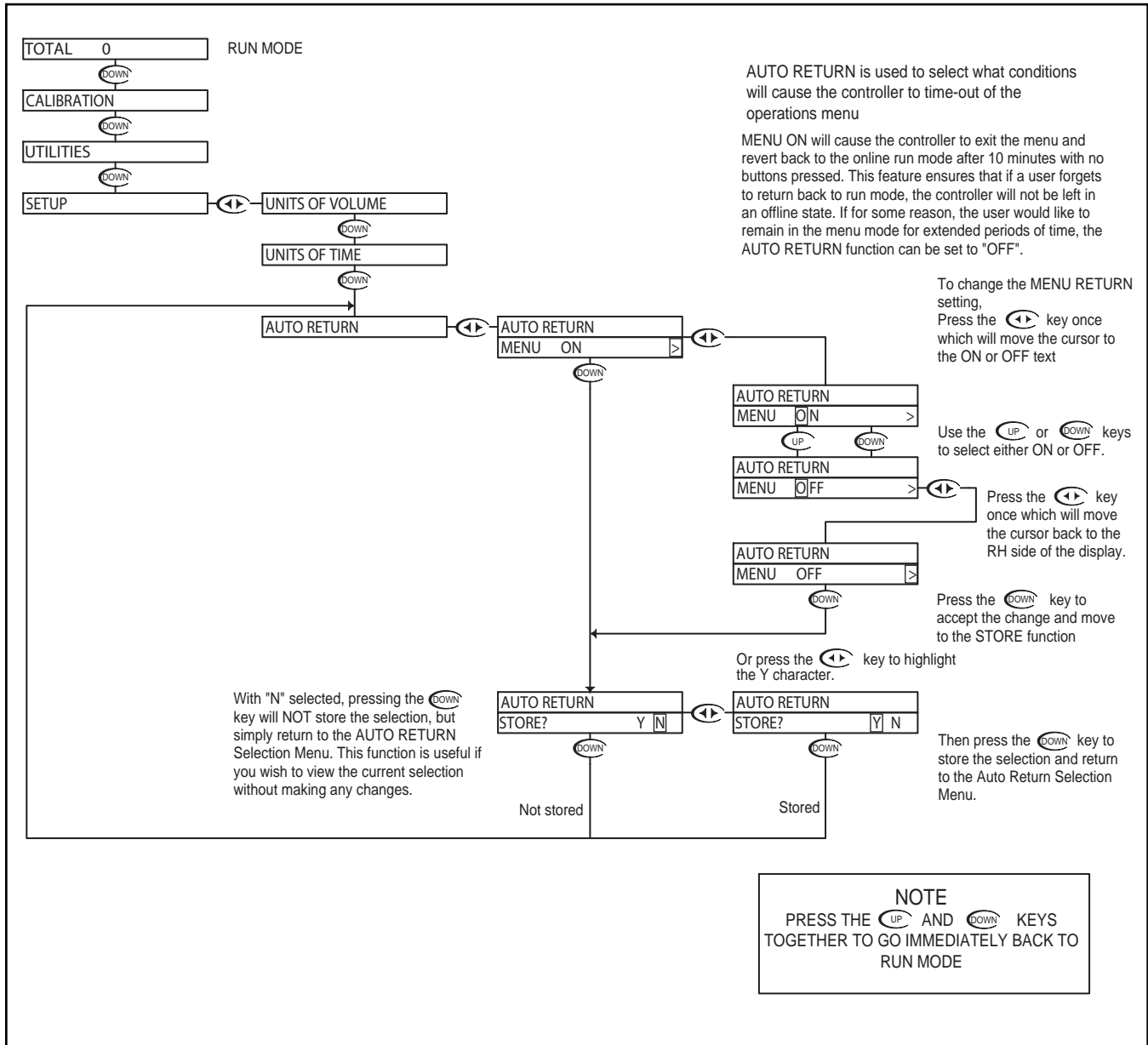
UNITS OF TIME
 The user can select from four predefined Units of Time, Seconds, Minutes, Hours, Days.



NOTE
 PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Flow - Setup Menu - Auto Return 7.6





Flow - Setup Menu - Display Damping 7.7

TOTAL 0 RUN MODE

CALIBRATION

UTILITIES

SETUP

UNITS OF VOLUME

UNITS OF TIME

AUTO RETURN

DISPLAY DAMPING

DISPLAY DAMPING
UPDATE 0 SEC

The Display Damping menu allows the user to adjust the rate at which the display and the output is updated. This allows the user to dampen out unstable process readings. The damping can be set from 0 seconds to 10 seconds. (default value is 0 sec.)

Press the **←** key once which will move the cursor over the seconds digit

DISPLAY DAMPING
UPDATE 0 SEC

Use the **↑** and **↓** to adjust the damping time, the default setting is 0 seconds. The setting can be adjusted from 0 to 10 seconds.

Press the **←** key once which will move the cursor back to the RH side of the display.

DISPLAY DAMPING
UPDATE 10 SEC

Press the **↓** key to accept the setting and move to the store function

DISPLAY DAMPING
UPDATE 10 SEC

With "N" selected, pressing the **↓** key will NOT store the selection, but simply return to the Display Damping Menu. This function is useful if you wish to view the current selection without making any changes.

DISPLAY DAMPING
STORE? Y N

If you wish to save the setting, press the **←** key to highlight the Y character

DISPLAY DAMPING
STORE? Y N

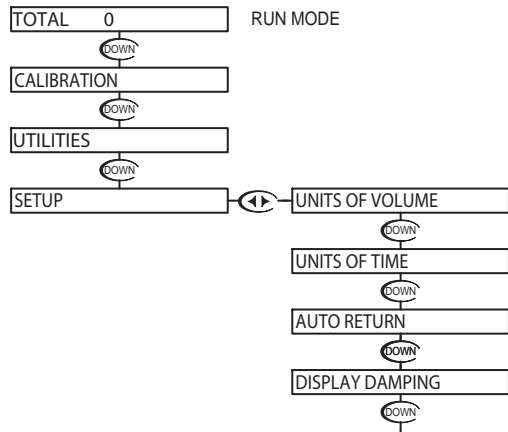
Not stored

Then press the **↓** key to store the selection and return to the Display Damping Menu.

NOTE
PRESS THE **↑** AND **↓** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE

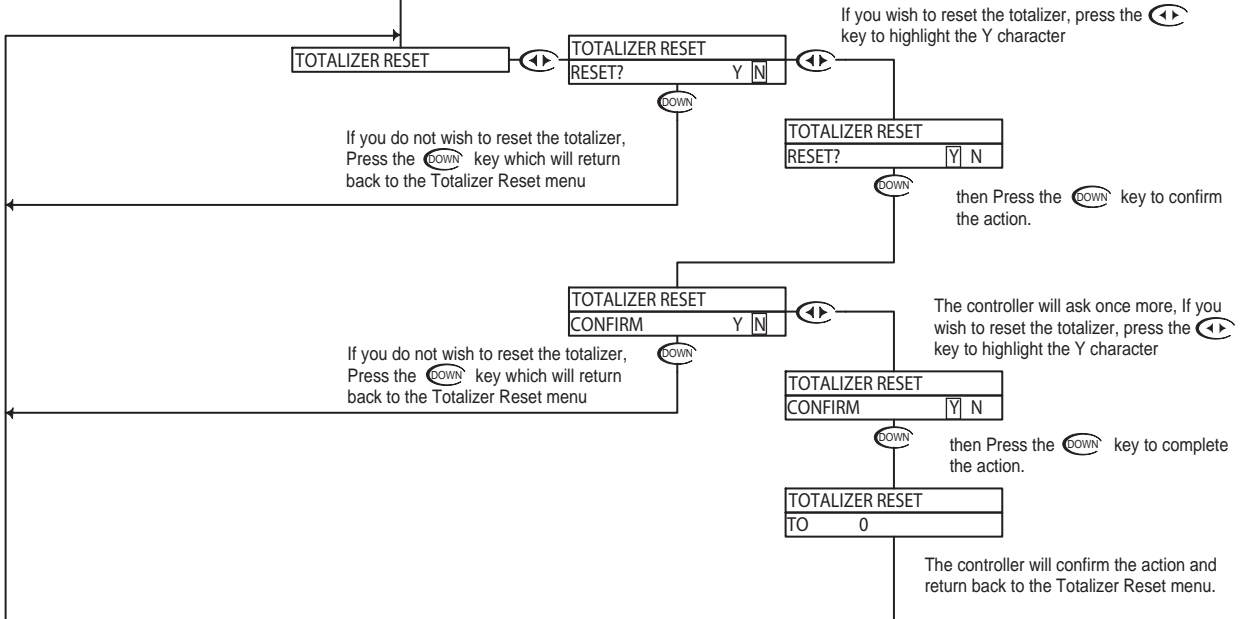


Flow - Setup Menu - Totalizer Reset 7.8

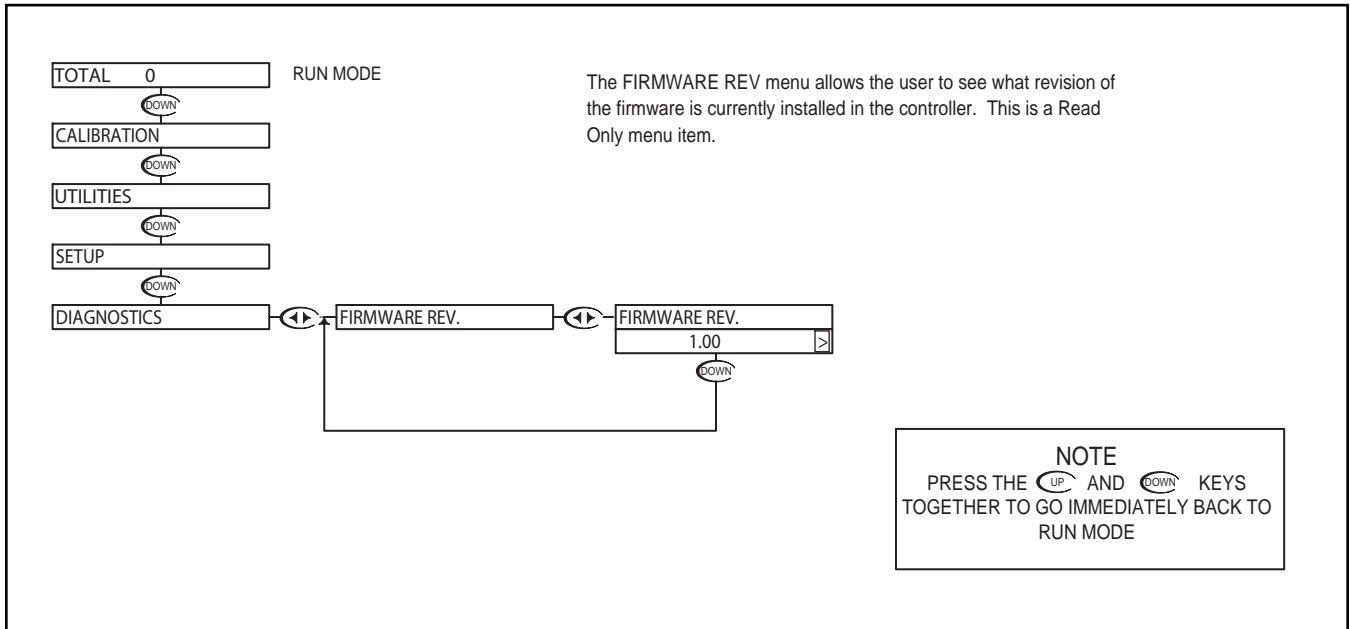


Totalizer Reset is used to reset the Flow totalizer to zero.

Note that once complete, this action cannot be reversed. The accumulated total will be erased permanently.



NOTE
PRESS THE **UP** AND **DOWN** KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE





TOTAL 0 RUN MODE

DOWN
CALIBRATION

DOWN
UTILITIES

DOWN
SETUP

DOWN
DIAGNOSTICS

←→ FIRMWARE REV.

DOWN
CALIBRATION DATA

←→ CALIBRATION DATA

K FACTOR 125.00

DOWN

The Calibration Data menu is a read only screen which allow the user to view the K factor entered during the last calibration.

Press ←→ to view the first Calibration Data screen.

This screen shows the K factor entered during calibration.

Press DOWN to return to the Calibration Data menu.

NOTE
PRESS THE UP AND DOWN KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Flow - Diagnostics Menu - Sensor Input 7.11

TOTAL 0 RUN MODE



CALIBRATION



UTILITIES



SETUP



DIAGNOSTICS



FIRMWARE REV.



CALIBRATION DATA



SENSOR INPUT



FREQ 101 Hz



The Sensor Input Menu allows the user to view real time signals from the probe. The display will show the current input pulse rate in Hz (pulses per second).

Press to view the Sensor Input data.

Press to return to the menu.

NOTE
PRESS THE AND KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



Flow - Diagnostics Menu - Permanent Total 7.12

TOTAL 0 RUN MODE



CALIBRATION



UTILITIES



SETUP



DIAGNOSTICS



FIRMWARE REV.



CALIBRATION DATA



SENSOR INPUT



PERMANENT TOTAL



TOTAL LIFE FLOW



7421413

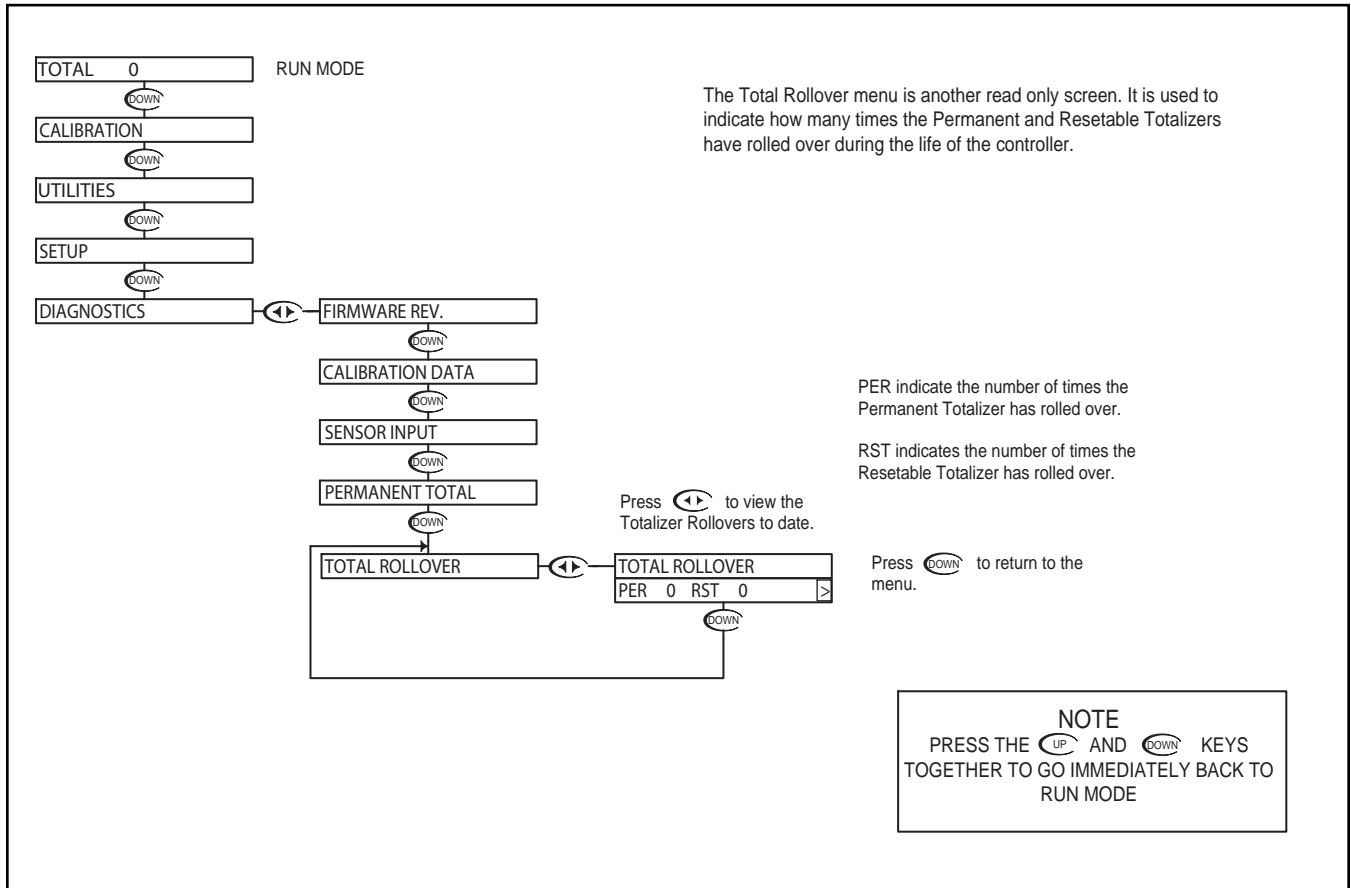
The Permanent Total is a running total of all the volume units that have been accumulated by the controller. It starts at zero when new, and can only be set to zero at the factory.

This is a read only screen.

Press to view the Total Life Flow to date.

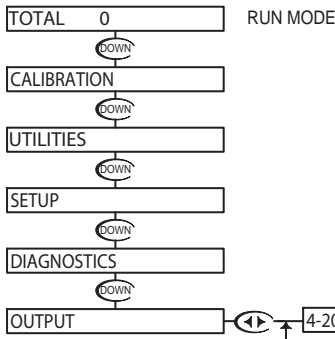
Press to return to the menu.

NOTE
PRESS THE AND KEYS TOGETHER TO GO IMMEDIATELY BACK TO RUN MODE



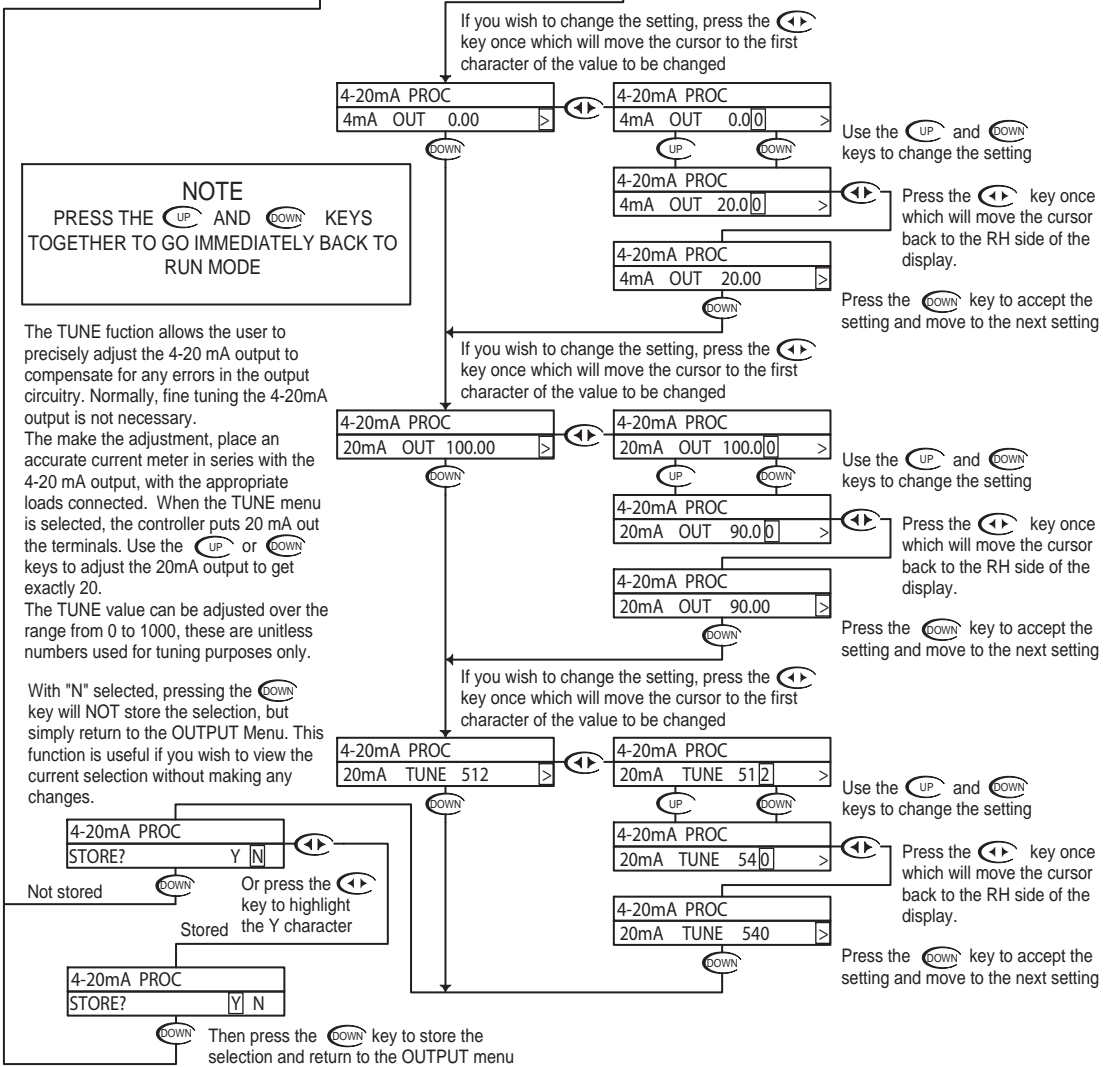


Flow - Output Menu - 4-20mA Output 7.14



The Transmitter has a single 4-20mA output, electrically isolated from the ground. The output can source current into a maximum of 800 ohms. See Section 3.9 for wiring diagram. The channel has a fully adjustable 4 & 20 mA output adjustments. This will enable the operator to span the output over the desired range.

The example below shows the 4-20 mA set to 4mA = 20 and 20mA = 90. The output would then span 4 to 20 mA for a flow swing of 20 to 90. Note that the span can be reversed, in that 4 mA can be set to a high flow value and 20 mA can be set to a low flow value, effectively reversing the control direction.





Appendix A - Probe Configuration Table

Model#	Probe Select	Temp. Sensor	Model#	Probe Select	Temp. Sensor
P60C-4	DIFFERENTIAL	300Ω	R60C-4	DIFFERENTIAL	300Ω
P60C-4-A	DIFFERENTIAL	300Ω	R60C-4-H	DIFFERENTIAL	300Ω
P60C-4-H	DIFFERENTIAL	300Ω	R60C-4-G	DIFFERENTIAL	300Ω
P60C-6	DIFFERENTIAL	300Ω	R60C-6	DIFFERENTIAL	300Ω
P60C-6-H	DIFFERENTIAL	300Ω	R60C-6-H	DIFFERENTIAL	300Ω
P60C-6-F	DIFFERENTIAL	300Ω	R60C-6-G	DIFFERENTIAL	300Ω
P60C-7	DIFFERENTIAL	300Ω	R60C-7	DIFFERENTIAL	300Ω
P60C-7-H	DIFFERENTIAL	300Ω	R60C-7-H	DIFFERENTIAL	300Ω
P60C-7-F	DIFFERENTIAL	300Ω	R60C-7-G	DIFFERENTIAL	300Ω
P60C-8	DIFFERENTIAL	300Ω	R60C-8	DIFFERENTIAL	300Ω
P60C-8-A	DIFFERENTIAL	300Ω	R60C-8-H	DIFFERENTIAL	300Ω
P60C-8-H	DIFFERENTIAL	300Ω	R60C-8-G	DIFFERENTIAL	300Ω
P60C-S	DIFFERENTIAL	300Ω	R60C-S	DIFFERENTIAL	300Ω
P60C-S-F	DIFFERENTIAL	300Ω	R60C-S-F	DIFFERENTIAL	300Ω
AM6010-PO	DIFFERENTIAL	300Ω	AM2010-RO	DIFFERENTIAL	300Ω
AM6070-PO	DIFFERENTIAL	300Ω	AM2070-RO	DIFFERENTIAL	300Ω
P525	COMBINATION	no. temp. sensor	AM2010-R1	DIFFERENTIAL	300Ω
P525-BNC	COMBINATION	no. temp. sensor	AM2070-R1	DIFFERENTIAL	300Ω
P575	COMBINATION	no. temp. sensor	R525	COMBINATION	no. temp. sensor
P575K-1	COMBINATION	Pt. 1000 RTD	R525-BNC	COMBINATION	no. temp. sensor
P575K-2	COMBINATION	300Ω	R575	COMBINATION	no. temp. sensor
P575-BNC	COMBINATION	no. temp. sensor	R575-BNC	COMBINATION	no. temp. sensor
P585	COMBINATION	no. temp. sensor	R585	COMBINATION	no. temp. sensor
P585K-1	COMBINATION	Pt. 1000 RTD	R585-BNC	COMBINATION	no. temp. sensor
P585K-2	COMBINATION	300Ω	R565	COMBINATION	no. temp. sensor
P585-BNC	COMBINATION	no. temp. sensor	R565L	COMBINATION	no. temp. sensor
P565	COMBINATION	no. temp. sensor			
P565L	COMBINATION	no. temp. sensor			



Return Policy & Warranty Plan

AQUAMETRIX, INC. RETURN POLICY

1. Contact Aquametrix for a "Return Material Authorization" (RMA) form & number. This RMA number is required for all returns or they will not be accepted.
2. The RMA number must be written on the outside of the box for proper identification.
3. A copy of the RMA form along with a description of the problem, model & serial number must be attached with the returning item(s).
4. All C.O.D. & freight collect shipments will be refused unless authorized by AquaMetrix.
5. Shipping documents must indicate "RETURNING FOR REPAIR ONLY, NO COMMERCIAL VALUE".

12-MONTH AQUAMETRIX WARRANTY REPLACEMENT PLAN

AquaMetrix, Inc. will replace or repair any AquaMetrix SHARK_{TX} or SHARK_{TXP} transmitter that fails due to defects in material or workmanship for a period of up to 12 months from the date of shipment from our facility.

A warranty claim will not be honored if defects are not reported within the warranty period, or if AquaMetrix determines that defects or damages are due to normal wear, misapplication, lack of maintenance, abuse, improper installation, alteration, or abnormal conditions. AquaMetrix's obligation under this warranty shall be limited to, at its option, replacement or repair of this product. The product must be returned to AquaMetrix Inc, freight prepaid, for examination. The product must be accompanied with an MSDS for all the process chemicals used, must be thoroughly cleaned and any process chemicals removed before it will be accepted for replacement or repair. AquaMetrix liability shall not exceed the cost of the product. Under no circumstances will AquaMetrix be liable for any incidental or consequential damages, whether to person or property. AquaMetrix will not be liable for any other loss, damage or expense of any kind, including loss of profits, resulting from the installation, use, or inability to use this product.