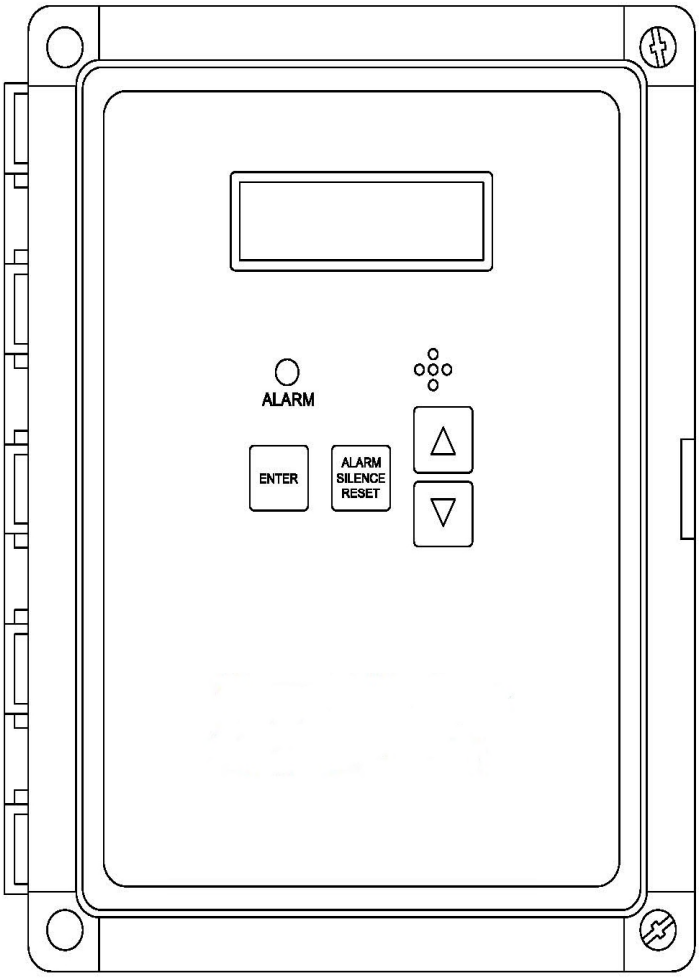
INSTALLATION & OPERATION MANUAL

ALARM PANEL, REMOTES

MODELS:

00850250, 00850251, 00850252, 00850253 & 00850256



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REV E

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CAUTION: When used as a medical device, Federal law restricts this device to sale by or on the order of a physician per 21CFR §801.109 (b)(1).

1.0 Theory of Operation

The alarm monitor package is designed to let technicians and nurses know when something is not functioning properly with the water equipment. This family of Alarm Panels will warn the user by illuminating an alarm light and sounding an audible alarm, indicating that some limit has been exceeded.

All of the Alarm Panels are provided with an LCD display that will indicate the status of the water system. The nurse's station remote will correspond to what is indicated on the alarm panel.

NOTE: **All inputs are dry contacts only. Applying power to any of these will damage the alarm panel and render it unsafe for use.**

The selection of possible water properties to be monitored has been chosen during the original purchase of this equipment. The properties that this system can monitor are:

1. Low Resistivity; this warns the user that the measured water resistivity after the DI tanks is outside of the AAMI standards (1 megohm). The Alarm Panel has two 24VAC outputs on P9 that can be used to power solenoid valves to divert the water flow to the drain when the resistivity is below the set-point.

WARNING: **When DI tanks are not in use, ensure that RES ENABLE is set to "0". When DI tanks are brought on line, set RES ENABLE to "1", ensuring that your bypass procedure is followed.**

2. High Conductivity (Usually the primary loop; this will warn the user that the measured water conductivity is higher than what has been pre-determined by the Facility Director. The Alarm Panel has two 24VAC outputs on P10 that can be used to power solenoid valves to divert the water flow to the drain when the conductivity is above the set-point.

3. R/O Alarm; this will warn the user that the measured conductivity of the water generated by the RO is higher than what has been determined to be appropriate by the Facility Director, and has been programmed into the RO controller. The dry contact input for this is labeled as IN1 on the main board.

NOTE: **All Low Resistivity and / or High Conductivity set-points should match the Set-Points of the device(s) that are in use with your particular system.**

4. Low Storage Tank; this will warn the user that the low water float switch has been activated in the storage tank, and that the RO is not producing water flow sufficient to stay above this low water level. The dry contact input for this is labeled as IN2 on the main board.

5. Low Bicarb Level; this will indicate when the Bicarb Distribution tank is low and may need to be re-filled if use is to continue. The dry contact input for this is labeled as IN3 on the main board.

6. Heatsan Active; this will indicate to the user that the Heatsan system is running and that hot water for disinfection is circulating in the loop. The good quality light on the remote will extinguish and the disinfection light will illuminate. The dry contact input for this is labeled as IN4 on the main board.

7. There are 4 additional dry contact inputs provided. They are labeled IN5 – 8. When one of these receives a closure from the external source, the LCD will indicate an alarm and display the appropriate AUX #. IN5 = AUX2, IN6 = AUX3, IN7 = AUX4 & IN8 = AUX5.

NOTE: **All inputs are dry contacts only. Applying power to any of these will damage the alarm panel and render it unsafe for use.**

8. Alarm Silence; the Nurse's Station Remote has a set of lights and audible alarm that will indicate with the main panel in the water room. There is no "Alarm Silence" on the Remote Panel. To silence alarm, it will require the user's attention, in the water room.

9. Using the "ALARM SILENCE" button on the main monitoring panel will "silence" the alarm for 3 minutes only. The alarm will re-indicate 3 minutes after each time it is silenced until the condition causing the alarm has been rectified.

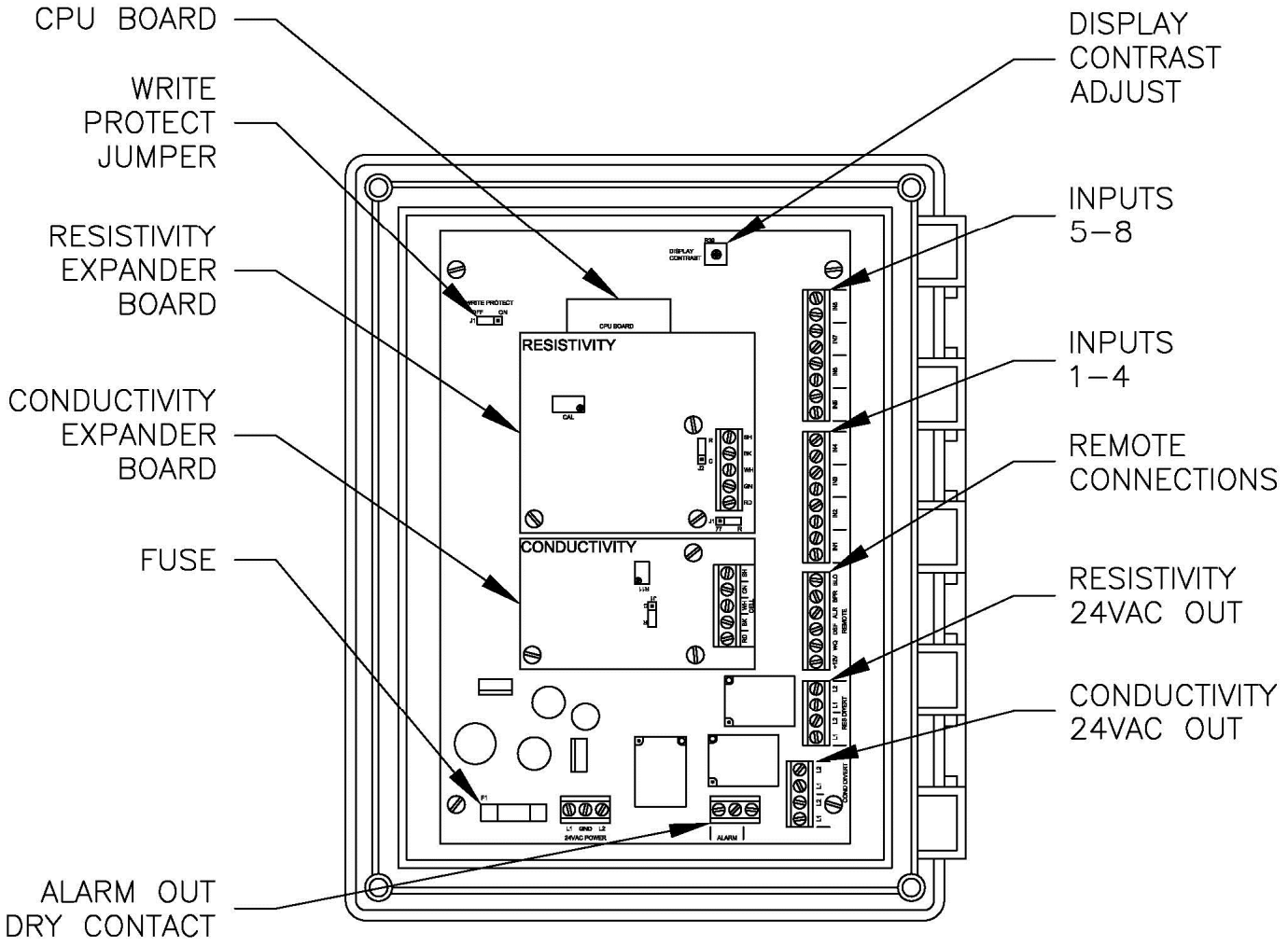
10. In the event that there are multiple alarms active at once, the display on the alarm panel will scroll through the alarms.

11. Table 1 below shows the features available on the model purchased.

Table 1: All Available Alarm Panels

Model #	Conductivity	Resistivity
00850250		
00850251	X	
00850252		X
00850253	X	X
00850256	X	X

2.0 Control Board Drawing



3.0 Installation

1. Locate the alarm panel in the water room at an easily accessible and highly visual position on the wall, near a 120-volt outlet. (Keep in mind the limited length of the wires from the float switches on the storage tank and the length of the wires on the resistivity or conductivity probe.)

CAUTION: **Disconnect ALL power supplies to the equipment, prior to wiring the alarm panel or electrical shock could result.**

WARNING: **Be sure jumpers on the auxiliary board on the RO's controller are jumpered between J3 & J4 ONLY. If not, damage to the alarm panel or RO controller will result.**

2. Bring in the alarm dry contact from the RO through one of the open strain reliefs on the bottom of the alarm panel. Route this wire to the terminal labeled IN1. Strip the insulation back about ¼" on each wire and secure into terminal IN1.

3. If you are going to monitor a low storage tank condition, bring in a dry contact from the storage tank low float into the alarm panel. Route this to the terminal labeled IN2. Strip the insulation back about ¼" on the wires and secure into terminal IN2.

4. To utilize the low bicarb alarm function, bring in a dry contact from the lower float on the bicarb distribution tank. This will need to be routed to the terminal labeled IN3. Strip the insulation and secure in terminal IN3.

5. If you have the Heatsan Disinfection System, you will need to bring the dry contact from this into the terminal labeled IN4. See the operators manual for the Heatsan for detailed instructions. Refer to IFU 98-9089 for instructions on adapting an alarm panel to the stainless steel conductivity cell used for heat.

6. If you purchased the optional conductivity monitoring function, you will need to place the cell as shown in figure 1. It is very important that the water crashes into the sensor. Install the wiring into the lower conductivity expander board as shown in figure 2.

   a. If you want to have the water automatically divert to the drain when there is a high conductivity condition, there are (2) 24VAC outputs that have been provided that will energize when the high conductivity alarm is active. These are located on terminals P10.

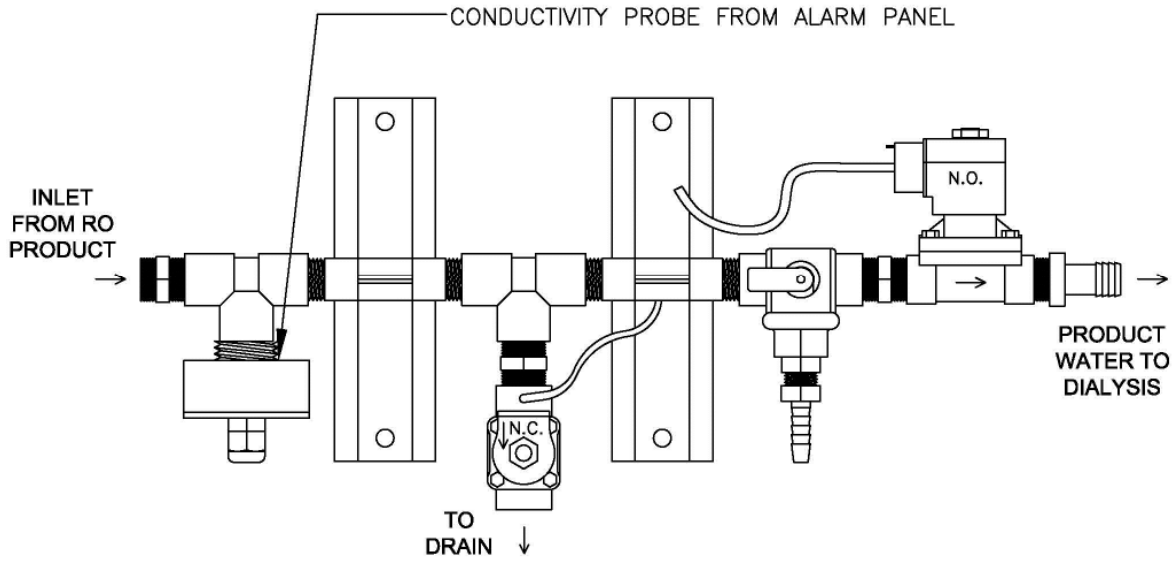


FIGURE 1

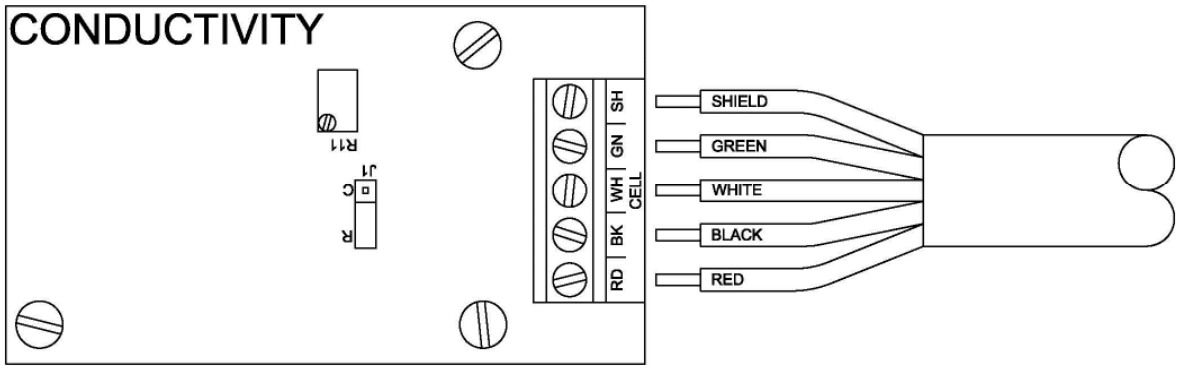


FIGURE 2

7. If you purchased the optional resistivity monitoring function, you will need to place the cell as shown in figure 3. It is very important that the water crashes into the sensor. Install the wiring into the upper resistivity expander board as shown in figure 4.

   a. If you wish to have the water automatically divert to the drain when there is a low resistivity condition, there are (2) 24VAC outputs that have been provided that will energize when the low resistivity alarm is active. These are located on terminals P9.

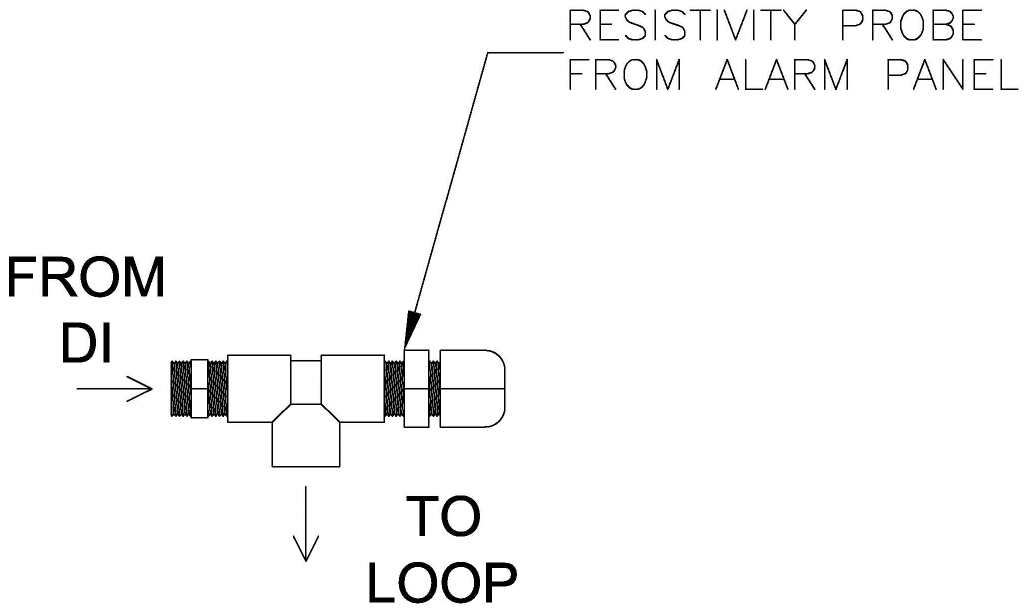


FIGURE 3

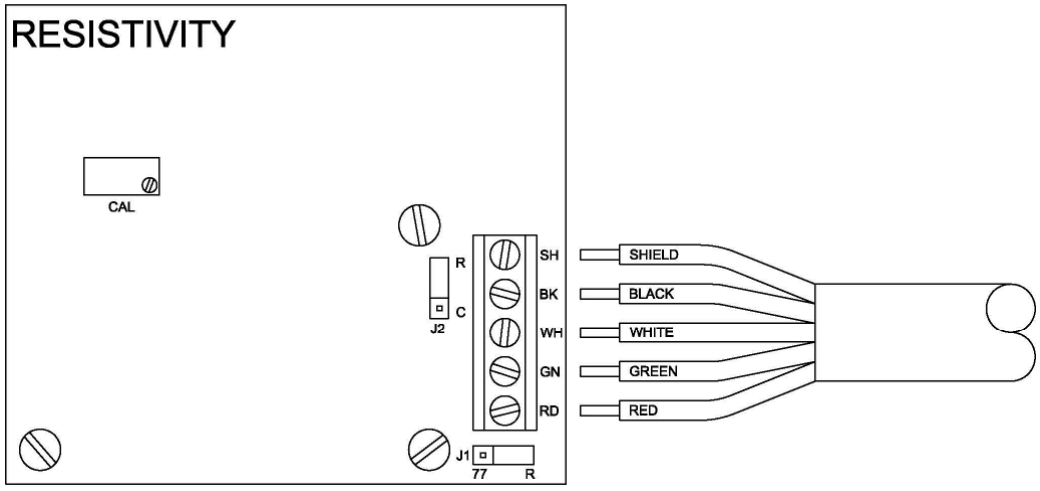


FIGURE 4

8. Install the Remote alarm near the nurse's station in a highly visible location and run low voltage wire from the alarm panel to the remote box location. Connect the alarm panel to the remote by connecting the wires as shown in figure 5 below:

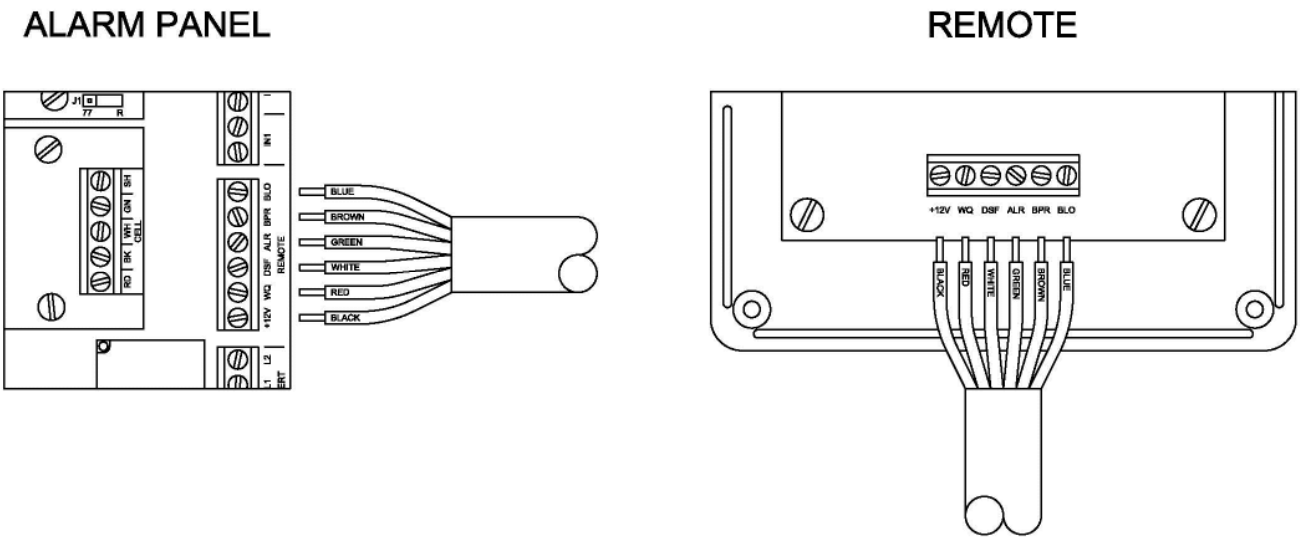


FIGURE 5

+12V	Black
WQ	Red
DSF	White
ALR	Green
BPR	Brown
BLO	Blue

Terminate the free end of the provided wire in the alarm panel in a like manner.

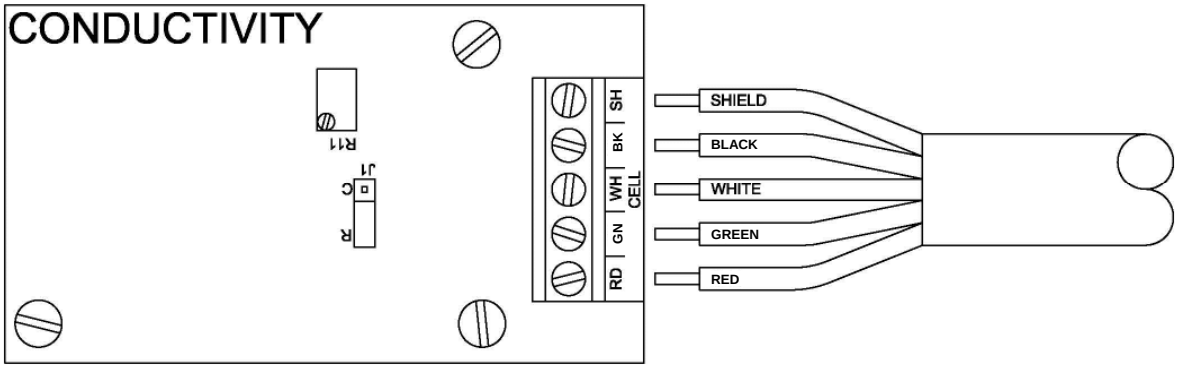
8. AmeriWater supplies all remote panels with 100' of connection cable for the remote. If distances between the remote and the alarm panel are greater than 100' up to 500', contact AmeriWater to order the exact length of cable you will need.

9. If you purchased an additional remote for use at a second nurses station, connect this to the same terminals on the alarm panel as indicated in step #7 above.

4.0 Heat System

Heat systems will utilize Alarm panel #00850256. This panel uses a stainless steel conductivity cell kit containing a new conductivity board and CPU v1.3 6/15 (P/N 69-0088). The newer CPU version allows for the conductivity cell to ignore reading over the setpoint as the temperature in the loop climbs to disinfection temperature. The stainless steel conductivity cell is installed in the loop with a sanitary fitting. This connection is the same as the rear of the Heatsan Disinfection System and is capable of withstanding the heat needed for disinfection. Refer to IFU 98-9089 for specifics on installing the components for the stainless steel conductivity cell.

- Heat system conductivity cell connection



5.0 Start-up

1. Plug the alarm panel into a 120-volt outlet, and then apply power to all other equipment.

2. When power is applied to the unit, the 1st line of the display will momentarily show the version number of the software. If no inputs are active, the display will then show **SYSTEM NORMAL**.

3. Make sure the alarm panel operates correctly by creating faults with the equipment connected to the alarm panel and then clearing them.

4. In order to be compliant with ANSI/AAMI standards and CMS conditions of coverage, resistivity meter alarm set points must be set at 1 Meg-ohm (reference Programming, Section 4).

6.0 Programming

This alarm panel has the ability to lock out changes by utilization of a write protect jumper (J1) on the main board. The alarm panels are, by default, shipped out with write protect jumper in the “OFF” position. This allows anyone to make changes to the programming without requiring the alarm panel to be opened and the jumper re-positioned. This jumper is shown in figure 6 below.

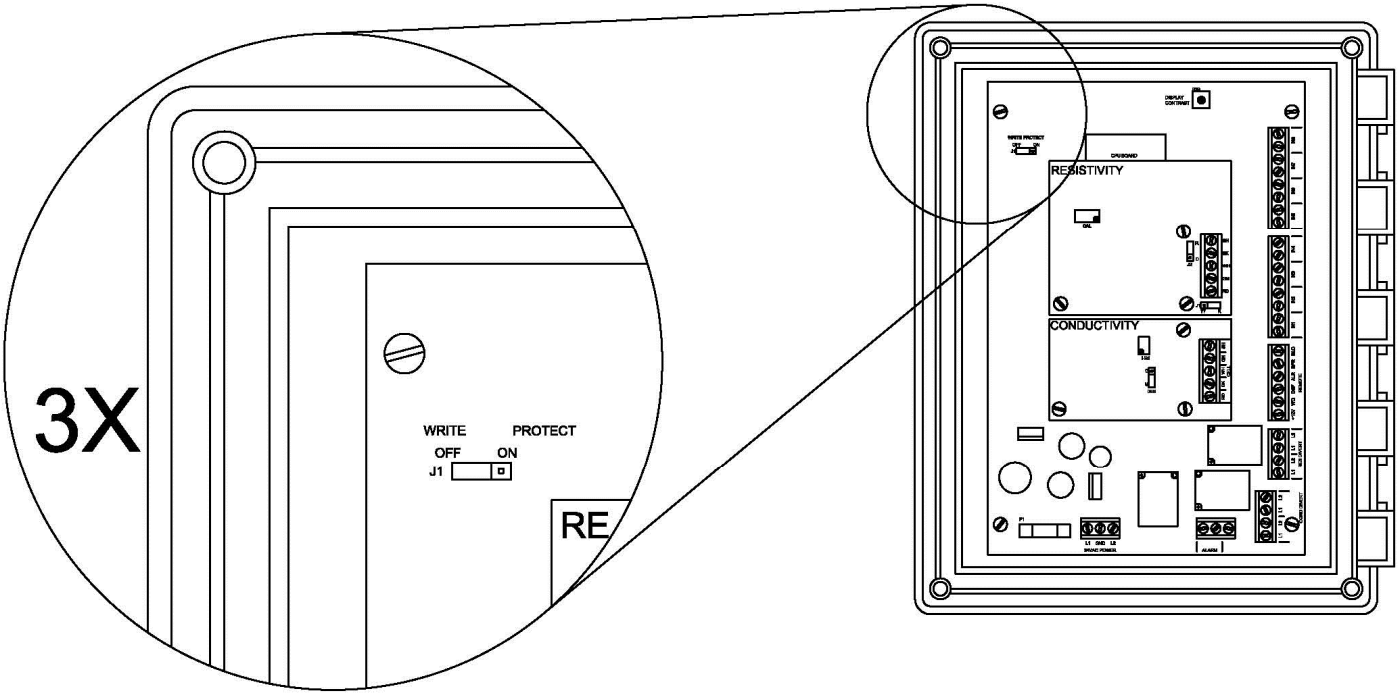


FIGURE 6

To prevent any changes after the set-points have been entered into the alarm panel, simply pull the write protect jumper off of the left “OFF” pins and place it onto the right “ON” pins. The middle pin is used with both settings.

Use the up and down arrow keys to browse through the possible settings.

When you arrive at the setting you wish to change, you will need to depress the UP arrow and ENTER buttons simultaneously. A “BEEP” will sound and the top line of the display will show **SETPOINT**. Use the UP and DOWN arrow keys to change the value of the set-point. Pressing UP and DOWN at the same time will reset the set-point to 0. To save the new value, you will need to press the ENTER key. If you wish to exit without saving the changes, simply depress the ALARM SILENCE RESET key.

CON LMT: This is the value that the water must be below in order to show **SYSTEM NORMAL**. When the cell indicates a value above this set-point, the alarm panel will begin to count down for the amount of time programmed into the **CON DELAY**. Once this time has elapsed, the audible and visual alarms on the alarm panel and remote will indicate, the good quality light on the remote will turn off and the alarm panel screen will indicate **HIGH CONDUCTIVITY**. The two 24VAC outputs labeled as COND DIVERT on the alarm panel (P10) will receive power.

CON DELAY: The setting that determines the amount of time between when high conductivity is detected and when the alarm indicates. This can be set from 0 – 999 seconds.

RES LMT: The value that the water must stay above in order to show the **SYSTEM NORMAL** message. When the cell indicates a value below this set-point, the alarm panel will begin to count down for the amount of time programmed into the RES **DELAY**. Once this time has elapsed, the audible and visual alarms on the alarm panel and remote will indicate, the good quality light on the remote will turn off and the alarm panel screen will indicate **LOW RESISTIVITY**. The two 24VAC outputs labeled as RES DIVERT on the alarm panel (P9) will receive power.

RES DELAY: This is the setting that determines the amount of time between when low resistivity is detected and when the alarm indicates. This can be set from 0 – 999 seconds.

COND RANGE: Will allow for changes to the range at which the conductivity sensor operates. By default, this is set to 1 (0-100 µS). This can be adjusted to 0 (0-50 µS), 2 (0-250 µS), 3 (0-500 µS), or 4 (0-1000 µS). Changes to this set-point **REQUIRE** a new resistor and calibration prior to use.

RES ENABLE: This is the setting that can enable (1) or disable (0) the resistivity expander board. When DI tanks are on line, this will need to be enabled. During normal operation, this should be disabled.

SW SELECT: This setpoint allows each input to be configured as normally open (N.O.) or normally closed (N.C.). All panels are set to normally open at the factory. See section 6 for details on making adjustments.

SAN SENSOR: This is the set point that allows the new conductivity board used in heat systems to account for temperature. (1) enables the temperature allowance. (0) disables this. (1) should be used when the alarm panel is in operation with a heat disinfect system.

7.0 Changing Input Type

The alarm panel is set to alarm on a normally open (N.O.) contact closure by default. The alarm panel can be configured to work with devices that provide a normally closed (N.C.) signal that opens on alarm.

NOTE: **MRO products will provide a normally open (N.O.) contact closure to the alarm panel. The MediQA and Heatsan products will provide a normally closed (N.C.) contact closure to the alarm panel.**

The table below lists the values used to configure the alarm panel for your installation. To configure the settings, select the type of software switch to be used for each input and enter the corresponding number in the value column. Add the values and enter the total for the 'SW SELECT' setpoint. Refer to section 5.0, "Programming" for details on accessing the 'SW SELECT' setpoint.

For example: If the RO ALARM and AUX 2 ALARM inputs are to be normally closed (N.C.) and the remainder of the inputs are normally open (N.O.), the 'SW SELECT' setpoint value would be 17 (1+16).

Software Switch	N.O	N.C.	Value
RO ALARM	0	1	
TANK LOW	0	2	
BICARB LOW	0	4	
HEATSAN ACTIVE	0	8	
AUX 2 ALARM	0	16	
AUX 3 ALARM	0	32	
AUX 4 ALARM	0	64	
AUX 5 ALARM	0	128	
		Total:	

8.0 Calibration

AmeriWater recommends that the values shown for conductivity and resistivity (when utilized) are verified against calibrated meter at least annually. This can be done by sampling the water in the loop and comparing it to what is displayed on the alarm panel. These values should be within 5% of each other.

To adjust the settings will require opening the alarm panel while it has power and making small adjustments with a small slotted screw-driver (not provided). The instructions for adjustment to the conductivity and resistivity values are very similar, but they will be addressed separately.

8.1 Conductivity Cell Calibration

Open the face of the Alarm Panel and locate the conductivity expander board as shown in figure 7.

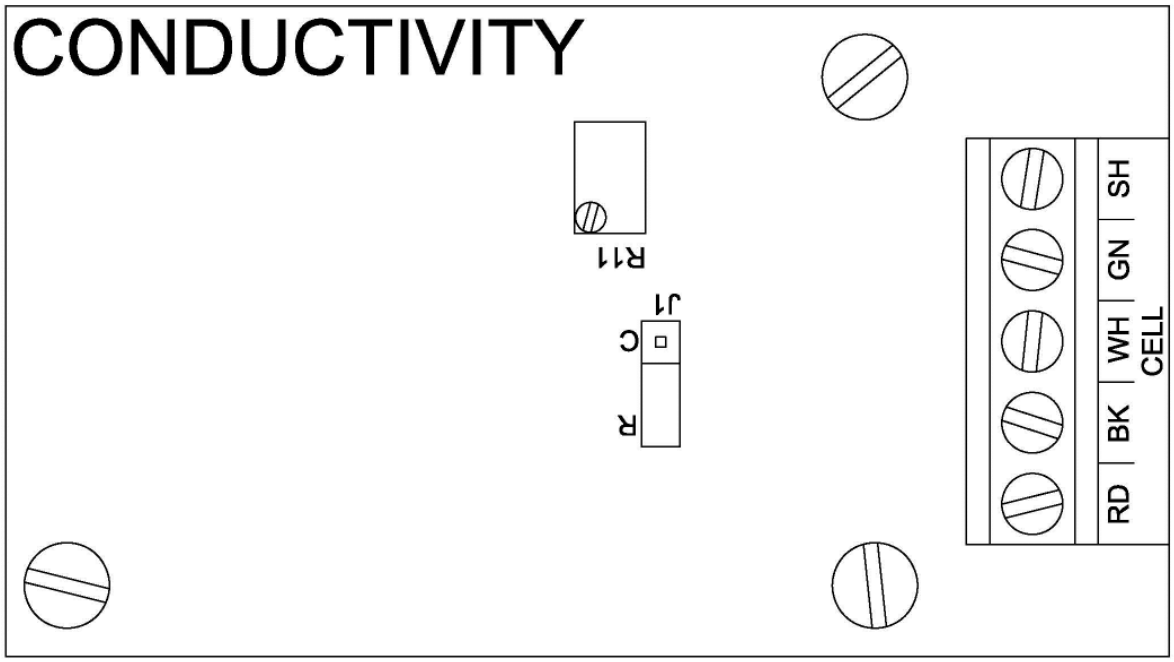


FIGURE 7

Using a small slotted screwdriver, adjust the set-screw on calibration adjustment R11 until the value displayed matches the calibrated hand held meter. It is recommended that small adjustments are made to prevent over travel of the set-screw.

8.2 Resistivity Cell Calibration

Open the face of the Alarm Panel and locate the resistivity expander board as shown in figure 8.

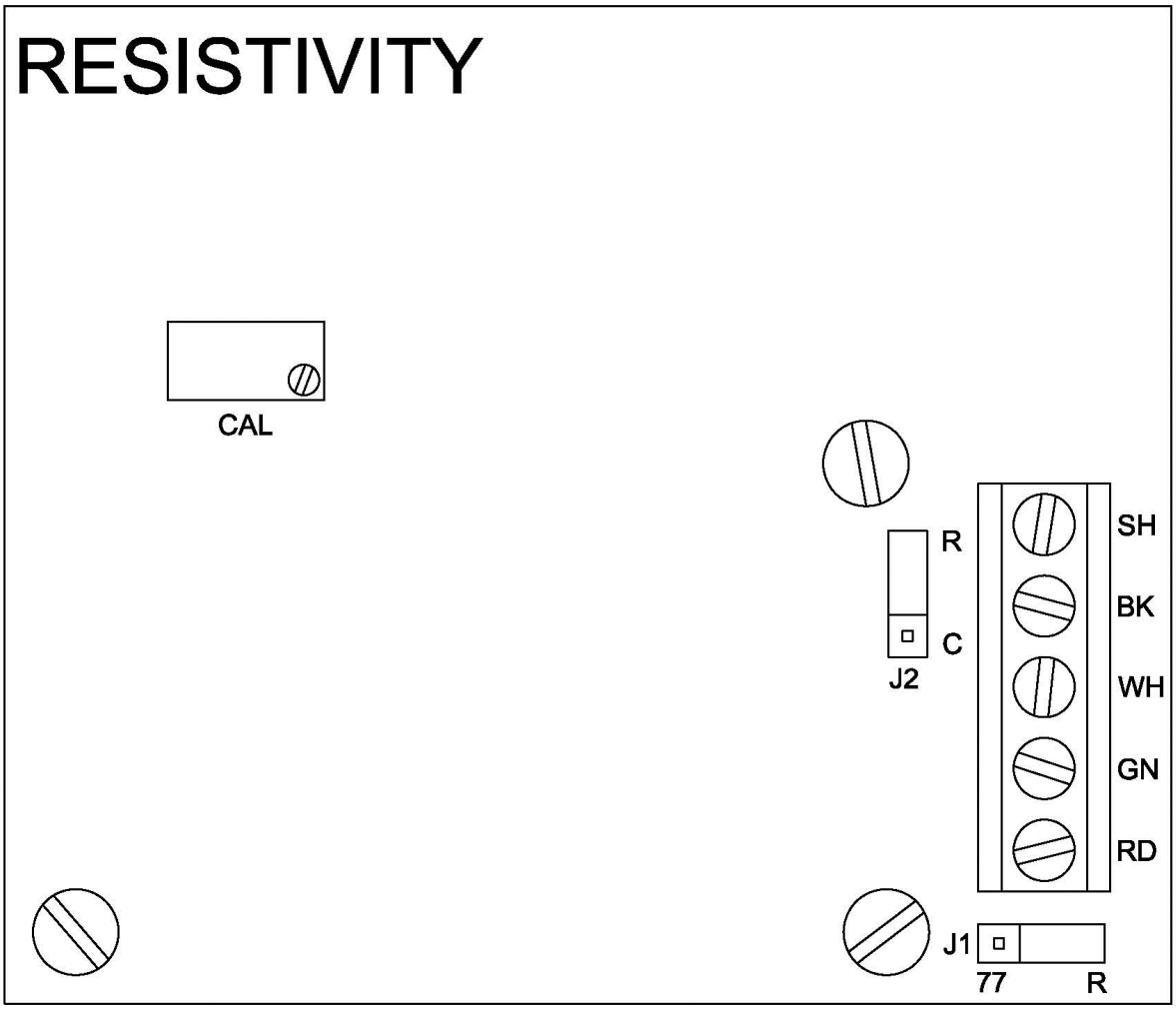


FIGURE 8

Using a small slotted screwdriver, adjust the set-screw on calibration adjustment R25 (CAL) until the value displayed matches the calibrated hand held meter. It is recommended that small adjustments are made to prevent over travel of the set-screw.

9.0 Display Contrast Adjust

The contrast of the LCD display can be adjusted on the alarm panel.

Begin by opening the alarm panel and locating the DISPLAY CONTRAST resistor R39 on the upper right hand side of the main board. Using a small Phillips head screwdriver, insert this into the set-screw and adjust the resistor R39. As the set-screw is turned, you will increase or decrease the contrast of the display. **It is recommended that small adjustments are made to prevent over travel of the set-screw.**

10.0 Disinfection

This alarm panel contains a method to bypass all alarms for use during a chemical disinfection of the loop. The alarm will display **DISINFECT** and the disinfect lamp on the remote will illuminate.

CAUTION: **No alarms will indicate when the alarm panel is placed into disinfection mode! Ensure that no patients are being treated prior to initiating your disinfection procedures.**

To enter disinfect mode, press and hold both the Enter and Alarm Silence/Reset keys together for approximately 4 seconds. When successfully done, the 1st line of the display will indicate **DISINFECT** and the disinfect lamp will illuminate on the remote.

To exit the disinfect mode, simply press the Alarm Silence/Reset key. This will return the alarm panel and remote to normal operation.

11.0 Standard Replacement Parts

Part #	Name
R59-0026	Solenoid Valve, 24VAC, NC
R59-0029	Solenoid Valve, 24VAC, NO
R62-0014	75VA Transformer, 120V to 24VAC
63760134	Fuse, 5A
R69-0025	Conductivity Sensor, with 25 Feet of Cable
R69-0026	Resistivity Sensor, with 25 Feet of Cable
R69-0027	Remote
R69-0028	Main Board, Replacement
R69-0031	Conductivity Adder, Board and Cell
R69-0032	Resistivity Adder, Board and Cell
69-0088	SST Conductivity Cell

12.0 Appendix A

Installation Instructions for Stainless Steel Conductivity Cell (Alarm Panel 256 has the unit preinstalled). If a unit needs to be modified in the field or a component needs replaced, read the entire procedure before installing new parts.

BACKGROUND:

The conductivity cell used in the loop is used to monitor conductivity levels in the loop while the RO is running. The cell is tethered to the alarm panel in order to monitor conductivity levels. The sanitary conductivity cell uses a stainless steel sanitary fitting to prevent leaks during heat disinfect. The following steps will describe the methods required to retrofit an alarm panel to accept this new sensor. The sensor has a different temperature sensor than the original conductivity cell. This requires a new CPU module and conductivity board to be used.

Warning: Conductivity cell must be placed inside the stream of water. Check the orientation of the cell to ensure flow is in the proper direction.

The ESD susceptibility symbol is used to indicate that an electrical or electronic device or assembly is susceptible to damage from an ESD event. Used to identify ESDS [ESD sensitive items] and that personnel should be grounding when unpackaging or handling that item.

REQUIRED ITEMS:

Kit Number

- 69-0088

Kit Contents

- 1 Sanitary Stainless Steel conductivity cell
- 1 V-band Tri-clover clamp
- 1 ¾" NPT Sanitary fitting
- 1 gasket
- 1 conductivity board for alarm panel
- 1 CPU module

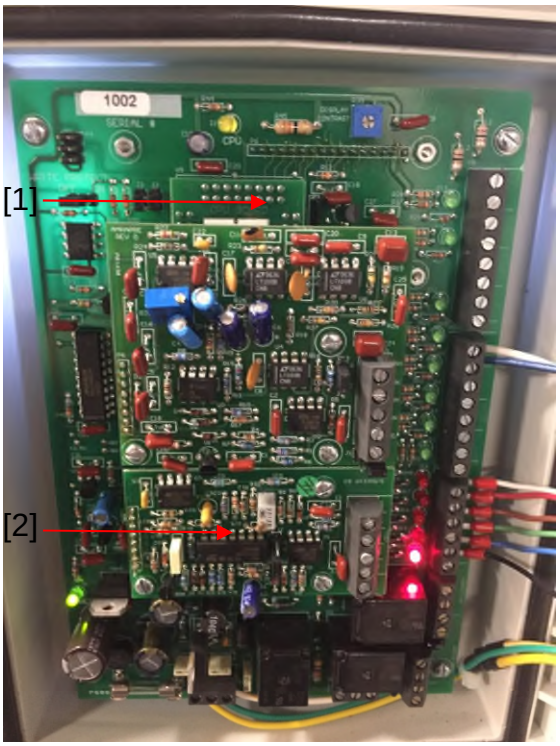
Tools:

- Wrist Grounding Strap (Not Provided)

- Chip Puller (Not Provided)

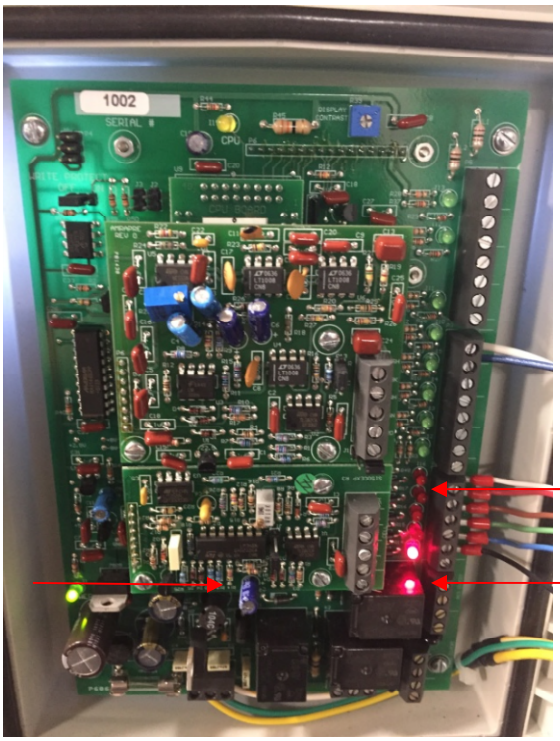
PROCEDURE FOR UPDATING:

1. Cycle through all existing settings on the Alarm Panel and record settings so they can be reentered once the new CPU is installed.
2. Power down the Alarm Panel by unplugging it from its power source.
3. Remove water from the loop by opening a test port before removing existing conductivity cell.
4. Open the door of the Alarm Panel
5. With the door open, locate the conductivity board and CPU module.

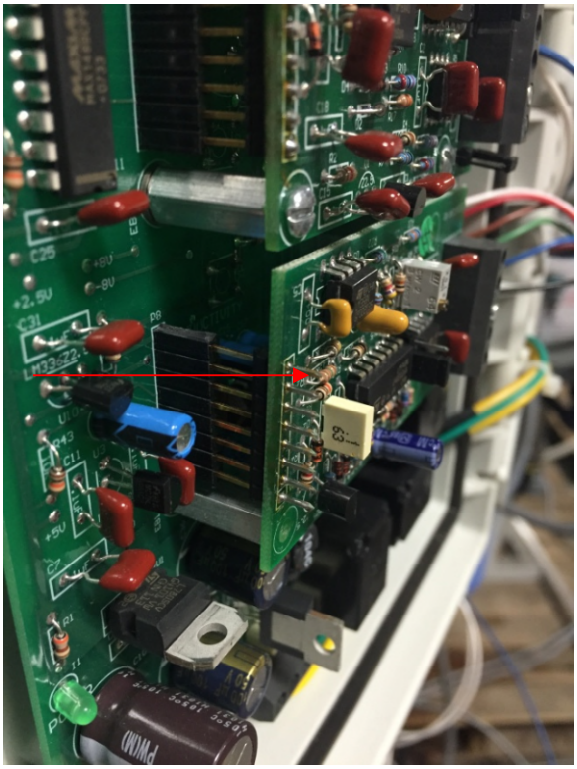


[1] CPU module
[2] Conductivity board

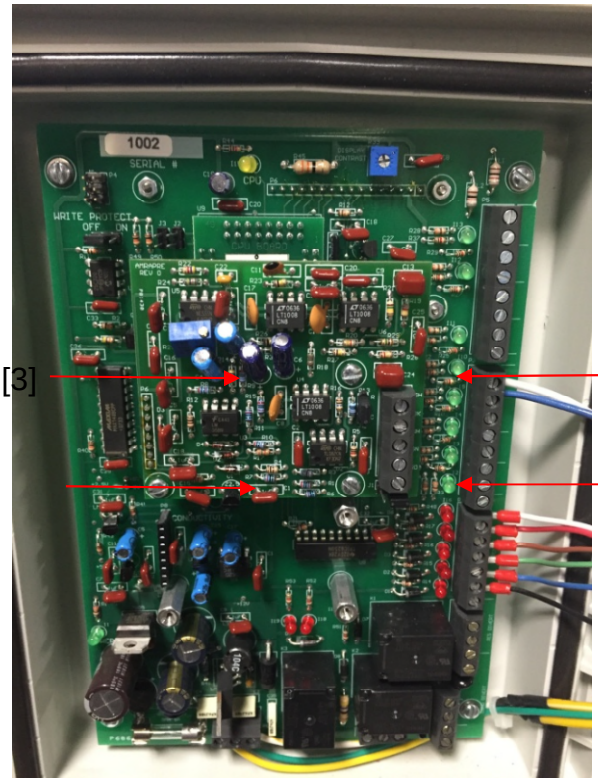
6. The kit for the sanitary conductivity cell contains a new CPU module and conductivity board for use with the new stainless steel conductivity cell.
7. In order to remove the conductivity board, remove the three pan head screws shown in the picture.



8. Remove the existing conductivity cell wires from the terminal on the right side of the board. These wires can be removed completely from the box as they will be replaced with the wires from the new cell.
9. With the screws removed, pull the board straight out, being careful not to damage the pins on the left side.



10. Next remove the Resistivity board located above the conductivity board to gain access to the CPU module.



[3] Resistivity Board

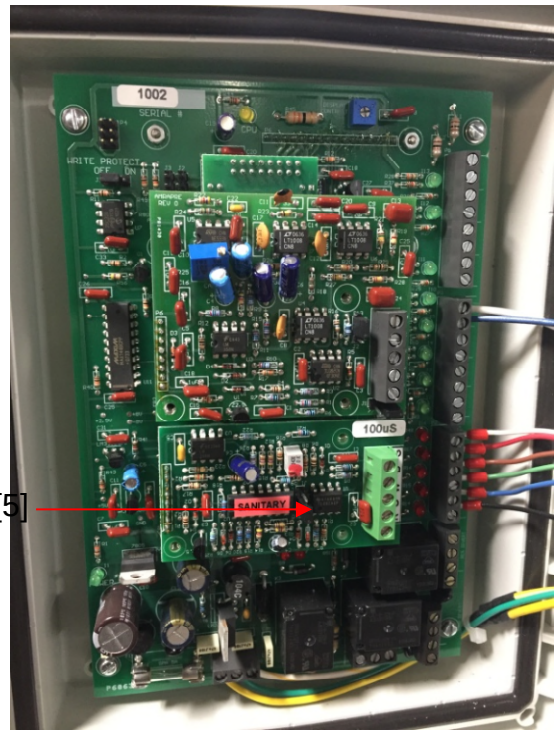
11. The Resistivity board is held by three screws shown in the above picture. Remove these screws and pull the board straight out. Use caution not to damage any of the pins on the left side.
12. With the conductivity and resistivity boards removed, the CPU can now be removed. To remove this, use an appropriate removal tool to remove the existing CPU.

[4] Small pry tool to remove CPU

13. With the existing CPU removed, unpack the new CPU marked v1.3 and insert it into the slot where the original was removed. Be sure all pins are seated before pushing CPU into place.

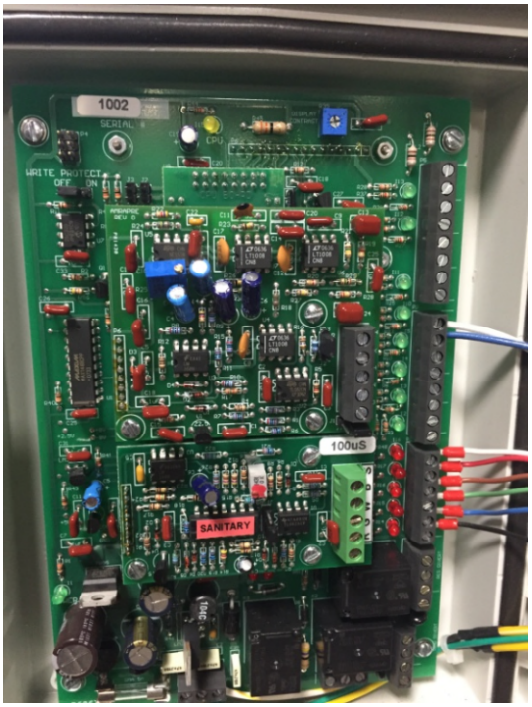
14. With the new CPU in place begin reassembling the unit.
15. Start by placing the existing resistivity board into place. Ensure all pins on the left side are seated, and then push into place.

16. Next install the new conductivity board. This board will have a red label marked “Sanitary” on it. Place this into its spot ensuring all pins are seated and then push into place.

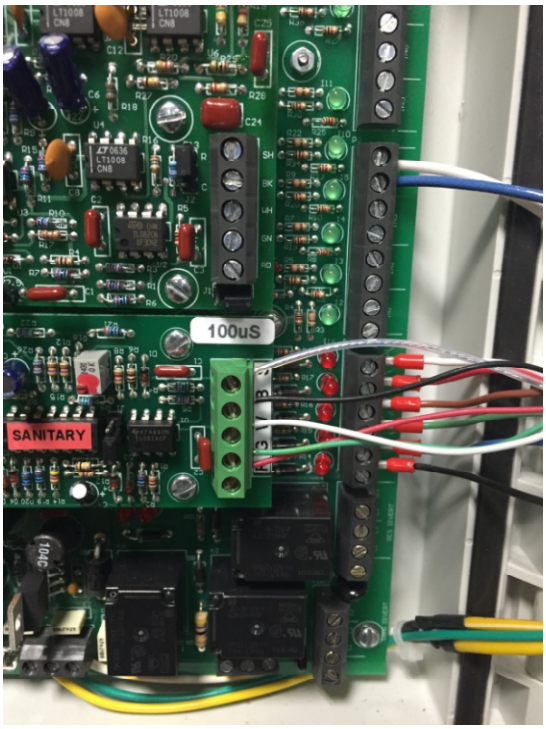


[5] New Conductivity board

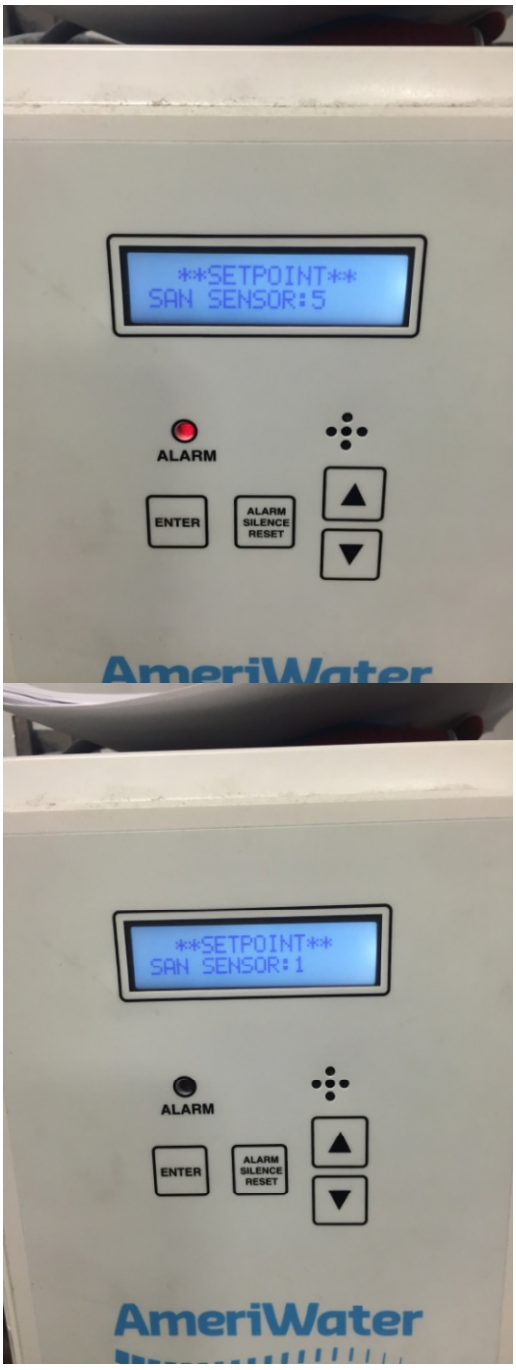
17. Reinstall all six pan head screws into the proper location.



18. Remove existing conductivity cell and replace with new sanitary fitting. Use Teflon tape on sanitary fitting threads to prevent leaks. Insert the conductivity cell into the sanitary fitting and secure with v-band clamp included in the kit.
19. Route the wire into the alarm panel through a strain relief at the bottom.
20. The conductivity board is labeled with the appropriate color wire for each terminal.
21. Insert the wires accordingly.



22. The new conductivity cell must be calibrated following the instructions in the Alarm Panel manual.
23. Power the unit back on. Ensure the software version v1.3 is displayed during startup.
24. On the Alarm Panel, the SAN SENSOR setpoint must be changed to 1 for the software to read the temperature correctly. This can be done following the steps in the Alarm Panel manual for programming of the unit. All of the settings must be reentered after installing the new CPU.



25. Once the calibration is correct, close the door on the panel.
26. Close the sample port and put water back in the loop.