Waltron AQUALERT® Division

Water Chemistry Measurement & Control

Aqualyzer® 9061C Compact Dissolved Oxygen Analyzer Instruction Manual

Revision 2.11

WALTRON CUSTOMER COMMITMENT

This instruction manual is a technical guide to aid the customer in the set-up and maintenance of their new Waltron measuring system. Waltron provides continuous product improvement and reserves the right to make any modifications to the information contained herein without notice.

Technical questions concerning this product should be addressed to:

Waltron Technical Service Department

Whitehouse, New Jersey
Phone: (800)-242-7353 **Fax**: (908)-534-5546
www.waltron.net

Please be ready to provide the following information:

- Date analyzer was purchased.
- Analyzer model and serial number.
- Recent maintenance history.
- Calibration values and detailed description of problem.

Waltron's technical expertise and extensive experience provides personalized solutions to the water quality industry. It is Waltron's commitment to provide the customer with timely and accurate technical service and support.

Waltron fully expects the customer to be satisfied with the quality, performance, and cost of this product. If there are any questions or concerns regarding this product, please feel free to contact Waltron at 1-(800)-242-7353.

Thank you for choosing Waltron!

Please note Waltron mailing and UPS shipping addresses:

DIRECT ALL CORRESPONDENCE TO:
Waltron Bull & Roberts, LLC
P.O. Box 70, 50 Tannery Rd.
Whitehouse, NJ 08888

DIRECT ALL UPS SHIPMENTS TO:
Waltron Bull & Roberts, LLC
50 Tannery Rd.
Somerville, NJ 08876

Safety:

Please observe proper safety and handling precautions when installing, operating, maintaining, and servicing this product. The following should be noted and adhered to:

- √ Read and understand manual before working with analyzer.
- √ Pay special attention to warning labels on enclosures, containers, packages and chemicals.
- √ Only qualified personnel should be involved in the installation, operation, and servicing of the analyzer.
- √ Follow safety precautions when operating analyzer in conditions of high pressure and/or temperature.
- √ Keep analyzer chemicals away from heat and extreme temperatures. Reagent powders must be kept dry.
- √ Follow all regulations and warning labels when disposing of chemicals. Do not mix chemicals.

*To obtain analyzer safety information or **Material Safety Data Sheets (MSDS)**, please contact Waltron or logon to www.waltron.net.*

Warranty Agreement

If, within one year from the date of shipment, the customer experiences any equipment defects or is not satisfied with the analyzer manufacturing, Waltron will repair, or at its option, replace any defective part(s) free of charge. This warranty requires that the defective part(s) be returned to Waltron in Whitehouse, NJ with shipping charges prepaid.

At Waltron discretion, a Technical Service Specialist may be sent out to repair or replace the defective part(s) on location. Traveling time and expenses of the Technical Service Specialist is at the customer's expense.

Equipment sent to Waltron must be appropriately packaged and the following information must be provided prior to returning to Waltron:

- √ The Return Authorization (RA) number assigned to the customer by the Waltron Technical Service Department.
- √ Customer name, address and department.
- √ Name and telephone number of the individual responsible for returning items for repair.
- √ Brief problem description.

Ship to Waltron Service Center:

-Via Mail:
Waltron Bull & Roberts, LLC
P.O. Box 70, 50 Tannery Rd.
Whitehouse, NJ 08888

-Via UPS/FED-EX/Motor Carrier:
Waltron Bull & Roberts, LLC
50 Tannery Rd.
Somerville, NJ 08876

Checklist of Materials

In order to ensure customer satisfaction, Waltron does its best to provide adequate and timely packaging and shipping services. Please perform the following after receiving a shipment:

- √ Inspect all shipping containers upon receipt and record any visible damage. If there are any outward signs of damage, please retain all containers and packages for inspection by carrier. Please retain all packing material so that it can be used for future moving and shipping needs.

- √ Check all items received against those on the packing list. Chemicals are usually shipped in a separate package and will be itemized accordingly.

- √ Verify that the number of packages received agrees with the packing list and shipping papers.

- √ Notify both Waltron and the carrier if any problems occur.

Important Notice

- √ All monitors are inspected and tested prior to shipment.
- √ In normal use, the unit should require only minor maintenance and should operate correctly and without fault over a long period of time.
- √ Please note that if electronic components need to be replaced, it may be necessary to adjust and/or calibrate the monitor.
- √ Failure to carry out correct maintenance procedures may result in inaccurate monitor reading.

Table of Contents

1 INTRODUCTION

1.1 *GENERAL*

The Waltron Aqualyzer® 9061C Compact Dissolved Oxygen Analyzer is a microcontroller-based unit used for online measurement of dissolved oxygen content in various water chemistry/treatment applications. Sampling points for power generation include mixed bed outlets, extraction pump discharge, boiler feed, boiler drum and steam. The measurement range of the 9061C analyzer spans from 0.01ppb to 20 ppm.

1.2 *MAIN FEATURES*

Features of Aqualyzer® 9061C Compact Dissolved Oxygen analyzer unit includes:

1. Measurement of dissolved oxygen concentration
    - Wide range analysis - 0.01ppb to 20 ppm. Concentration and temperature are displayed continuously and analyzer adjusts automatically to user specified ranges.
    - Automatic temperature compensation
2. Calibration
    - Easy-to-perform single point calibration
    - Process calibration
    - Internal diagnostics used to show sensor status
3. User Interface
    - 128x64 pixel graphics LCD with backlight
    - Large easy-to-read graphic display
    - Tactile membrane keyboard (4 keys) on front panel
    - Lower 2 lines of display used for user interface messages. Menu driven software interface for various operations including diagnostics, configurations, calibrations, and dispatch modes.
4. Communication interface via RS-485 using MODBUS RTU protocol.
5. Analyzer Configuration:
    - User configurable system; OXYGENATED or DEAERATED
    - User configurable settings for recorder outputs and alarm set points.
    - Factory defaults can be easily reloaded to override user settings
6. Automatically stores last 10 calibration & alarm logs
7. Complete analyzer diagnostics - individual transmitter module can be tested independently
8. Dispatch mode facility
9. For OXYGENATED System - 3 Relay outputs are provided for High, Low and General Alarm. For DEAERATED System – these same relay outputs are used for High-High, High Warning and General Alarm.
10. One 4-20mA isolated current output
11. Wide range of input power supply 90VAC to 250VAC

1.3 *SYSTEM DESCRIPTION & ARCHITECTURE*

The 9061C Compact Dissolved Oxygen analyzer system is comprised of the following:

1. Transmitter (electronics) unit
2. Wet Section unit
    a. Flowcell block
    b. Dissolved oxygen sensor

9061C Wall-Mount Transmitter Section

9061C Panel-Mount Transmitter Section

9061C Wet Section

1.4 *WET SECTION: SENSOR UNIT*

The 9061C Compact Dissolved Oxygen system is capable of monitoring dissolved oxygen concentrations in sample feed. The sensor unit is comprised of an airtight flowcell that houses a disposable oxygen sensor which can be changed quickly and easily when exhausted.

In normal mode, the feed water flows from the sample inlet into the flowcell where it comes into contact with the dissolved oxygen sensor. The sensor transmits a current proportional to the dissolved oxygen in the sample. This output is then measured by the electrical system and converted into a ppb/ppm measurement. An internal thermistor (housed in flowcell) is used to monitor the water temperature for temperature compensation. If the sample temperature exceeds 131ºF then the system displays "HOT".

The user should note that oxygen partial pressure, and hence the sensor current in air during calibration, is a function of the atmospheric pressure. Before a calibration is initiated, the relevant atmospheric pressure should be programmed into the system through the user interface keyboard on the system's front panel. The user is asked to input the elevation (in feet) at analyzer site. This introduces a correction factor into the final calculation of dissolved oxygen concentration.

1.4.1 *TRANSMITTER UNIT*

The transmitter unit interprets the current output from dissolved oxygen sensor and displays the corresponding dissolved oxygen concentration (in ppb/ppm) and temperature. The transmitter unit controls all the operations of the analyzer system. The display is a graphics LCD with backlight.

2 INSTALLATION

2.1 *MOUNTING OF WET SECTION UNIT*

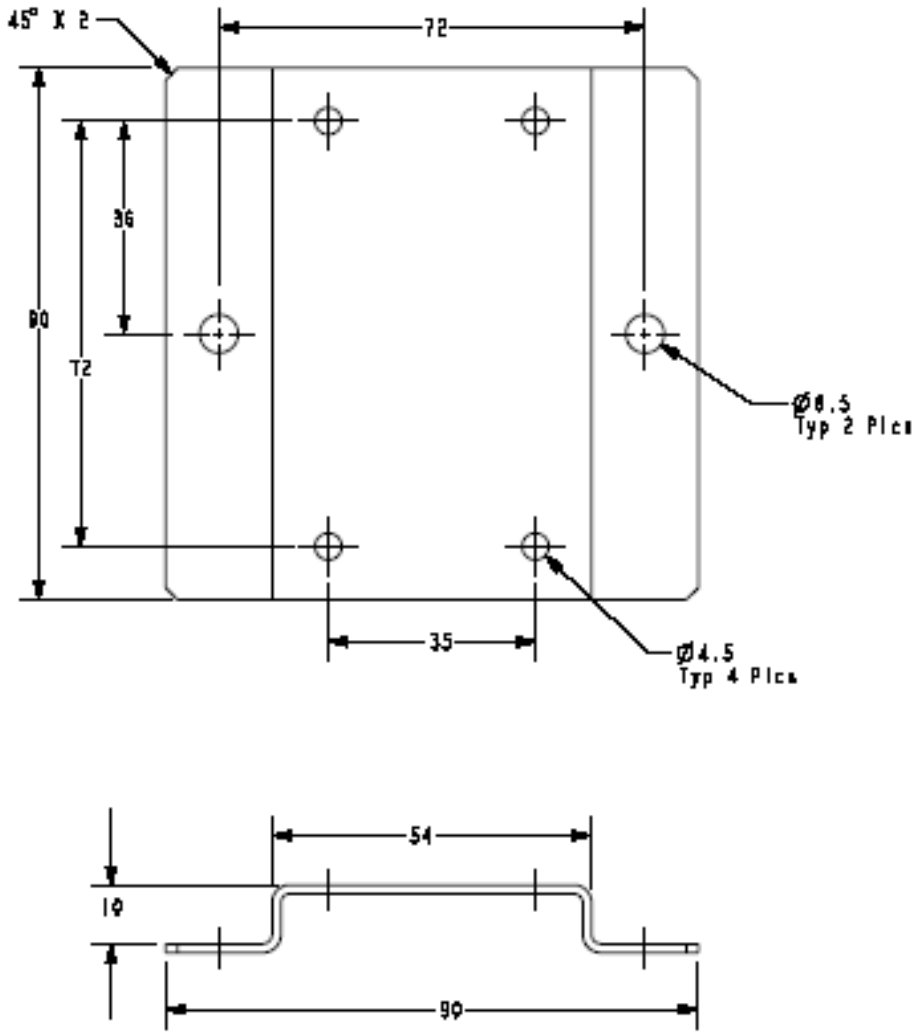


Figure 1. Dimensions for the Wet Section mounting bracket.

2.1.1 *LOCATION AND LAYOUT*

Mount the analyzer in a clean, vibration-free area avoiding direct radiant heat, sunlight and drafts. Avoid areas containing chlorinating equipment. The Sensor Unit should be mounted no more than 330 feet (100meters) from the Transmitter Unit.

There are two options for the wet section system set-up.

Wet Section Set-Up Option A: The simple system requires one valve before the wet section that turns sample flow on or off. Make sure flowcell drain is sent to atmosphere.

Wet Section Set-Up Option B: The recommended system requires two valves, the first having the same function and placement as before, and the second placed after the first in a position that will allow the sample to drain from the wet section unit when the sample flow is turned off. During calibration, the sensor must be exposed to air, and the second system will allow air to reach the sensor without removing the sensor from the wet section. Both systems are shown below in Figure 2. Make sure flowcell drain is sent to atmosphere.

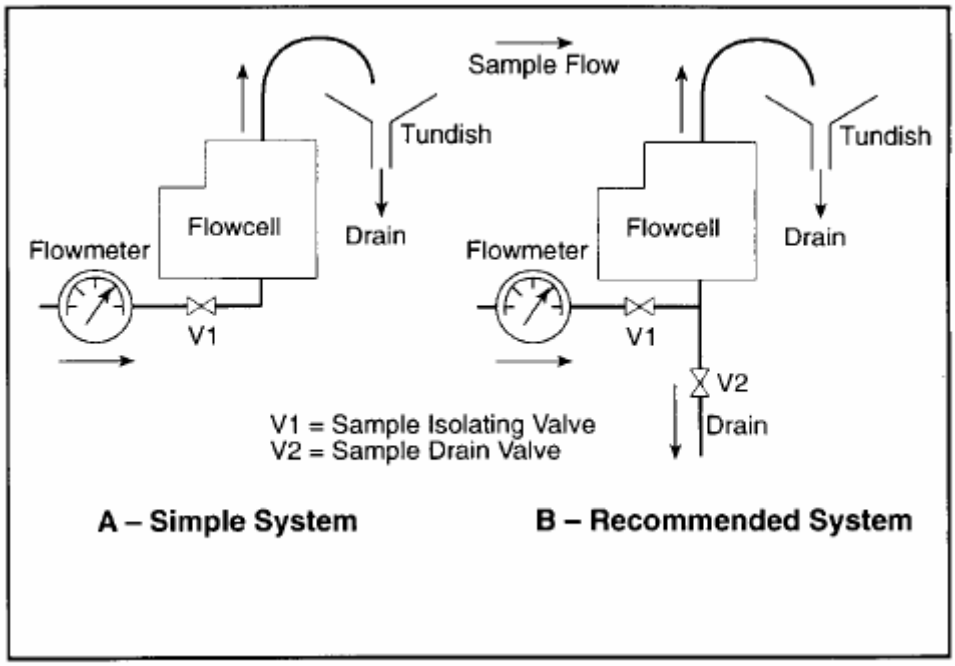


Figure 2. Visual depiction of both wet section system set-ups.

2.1.2 *MOUNTING OF WALL MOUNT TRANSMITTER UNIT*

The transmitter unit controls the operations of the analyzer. Power supply, CPU card, DIO card and input power terminal junction are housed in the transmitter enclosure. Transmitter unit is a NEMA 4X rated enclosure with cable glands for wiring. Size and layout of transmitter is shown below.

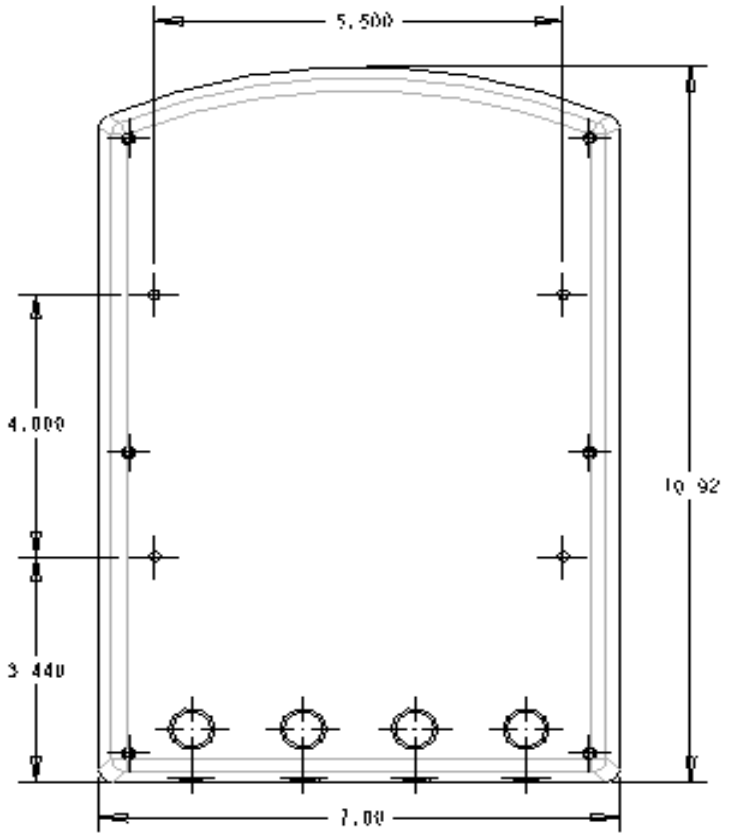


Figure 3. Dimensions of the wall mounted transmitter unit.

For ease of mounting, the wall-mount transmitter is attached to a sheet metal mounting bracket. The entire piece (transmitter on mounting bracket) can then be wall-mounted. Size and layout of mounting bracket is shown below.

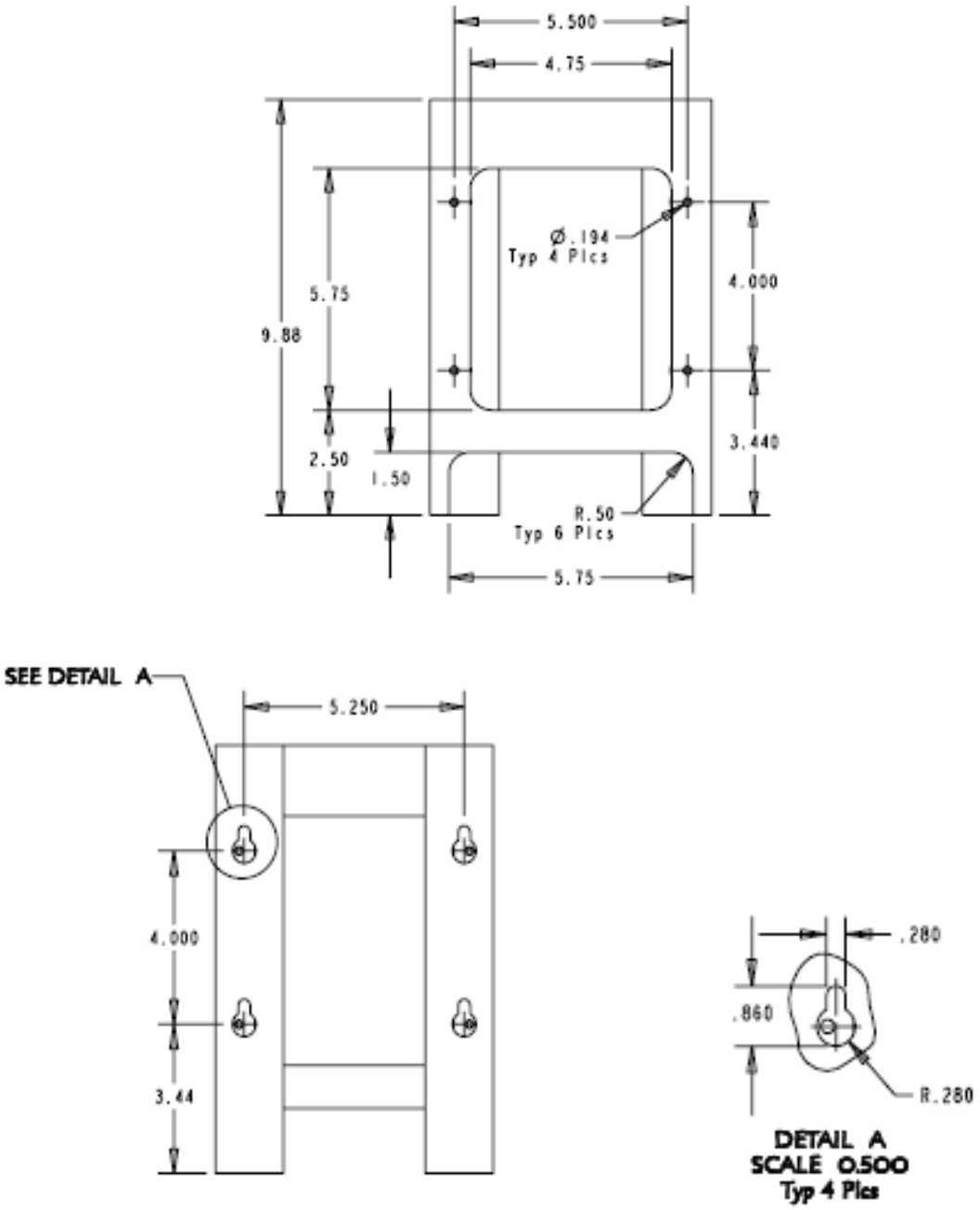


Figure 4. Dimensions for the wall mount transmitter mounting bracket.

2.1.3 *MOUNTING OF PANEL MOUNT TRANSMITTER UNIT*

The panel mount model allows the transmitter to be hidden behind the panel while allowing the user to access its controls and view the display. The transmitter display box slides through the front of the panel cut-out and the housing slides over it from behind the panel. The housing has screws on either side that tighten against the back of the panel, holding the transmitter in place.

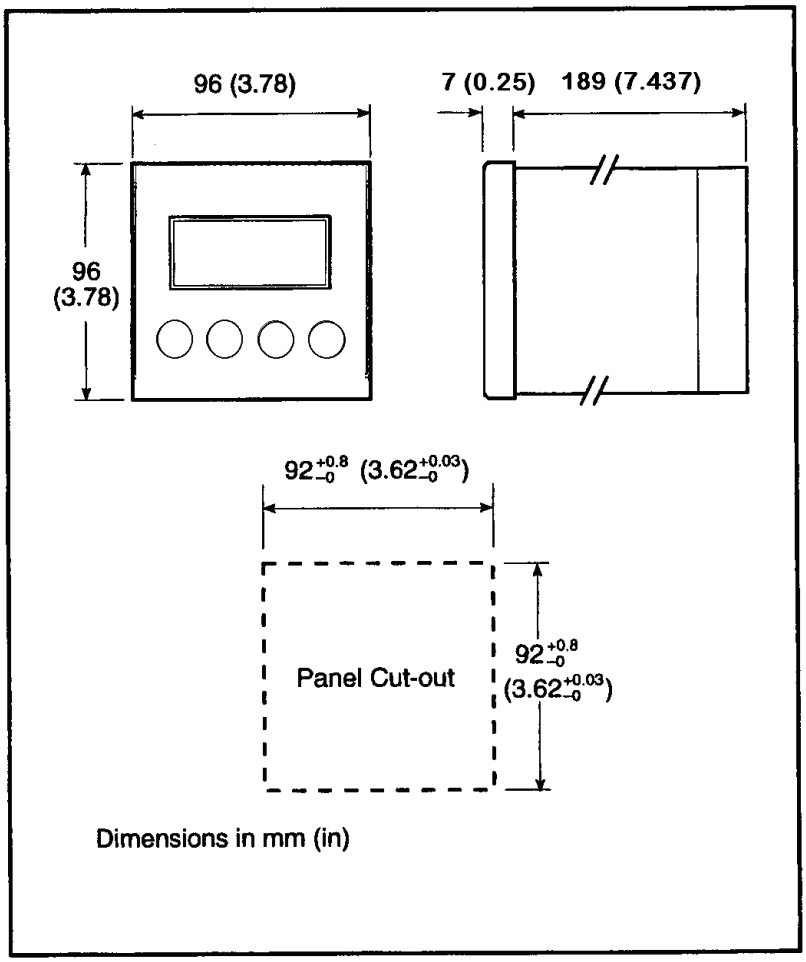


Figure 5. Dimensions of the panel mount transmitter and the required panel cut-out.

2.2 *SAMPLE REQUIREMENTS*

The maximum sample pressures and temperatures specified in the SPECIFICATION section should not be exceeded. The sample should be introduced to the system at a temperature and pressure suitable for measurement. If necessary, customer may choose to use sample cooling and pressure reducing equipment. Sample outlet needs to be sent to atmosphere.

Waltron strongly recommends that the customer install a rotometer (or flowrate measuring device) on the sample inlet to the flowcell in order to regulate and measure the sample flowrate. Changes in sample flowrate will directly affect concentration readings.

When pressure reducing equipment is being used, a pressure relief valve should be installed between the sample point and sample inlet to ensure maximum safety.

2.3 *EXTERNAL PIPING CONNECTIONS*

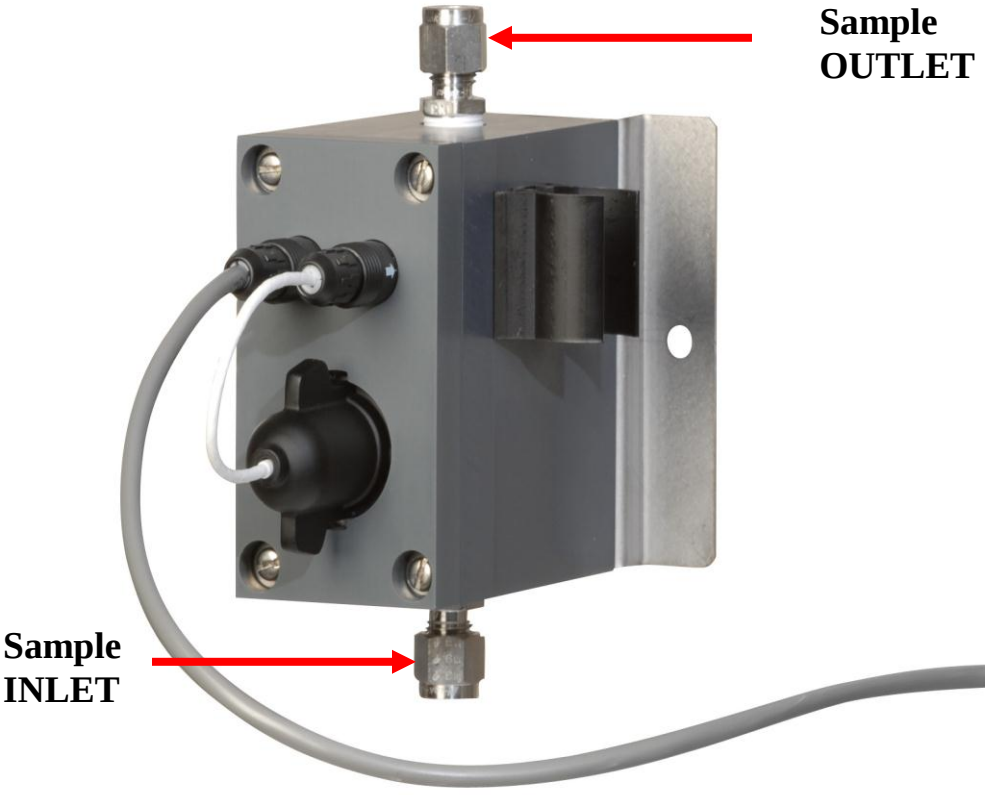


Figure 6. The wet section shown with Sample Inlet and Outlet connections.

2.4 *ELECTRICAL CONNECTIONS*

2.4.1 *WET SECTION UNIT*

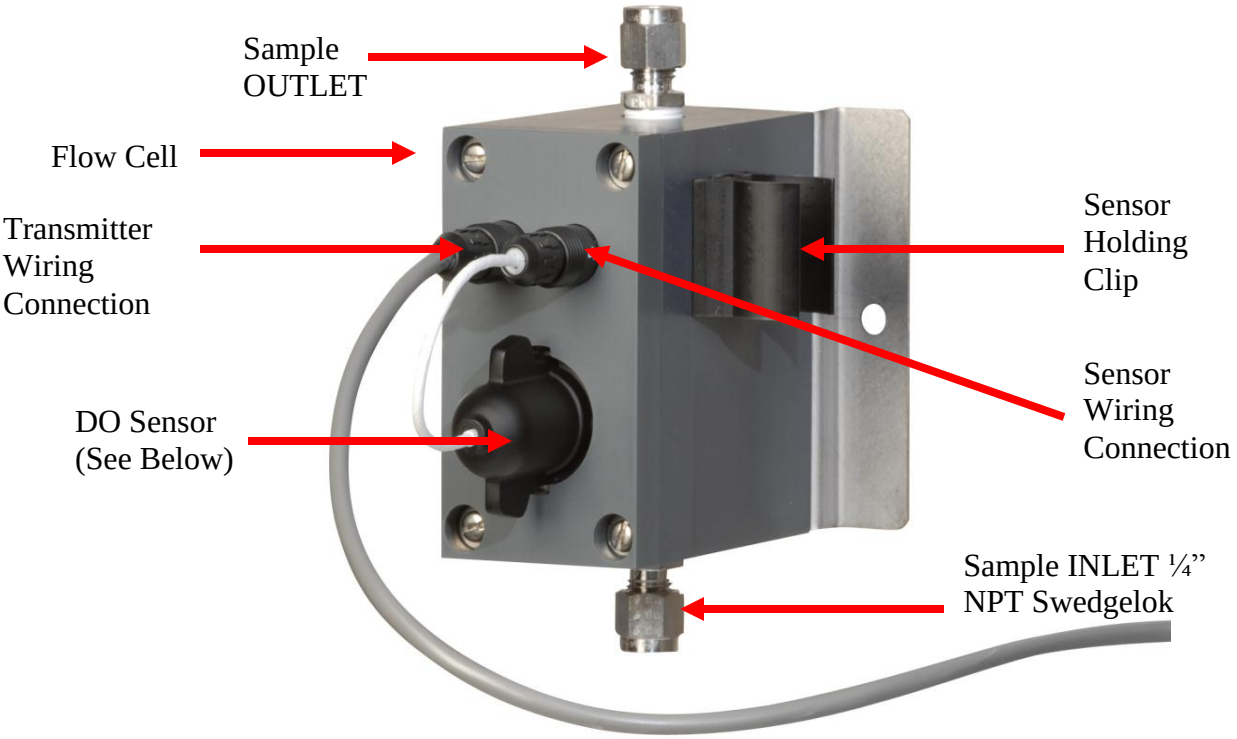


Figure 7. The connections from the wet section to the transmitter unit.

To lock the DO sensor in the flowcell place using the quarter-turn nut:

(A) Push the quarter-turn nut into place by lining up the tabs on the nut with the notches in the flowcell housing. The arms should be horizontal.

(B) While pressing in, turn the nut clockwise.

(C) The nut will lock into place once a quarter-turn is completed. The arms should be in the vertical position. DO NOT TURN THE NUT FURTHER AS IT MAY BREAK.

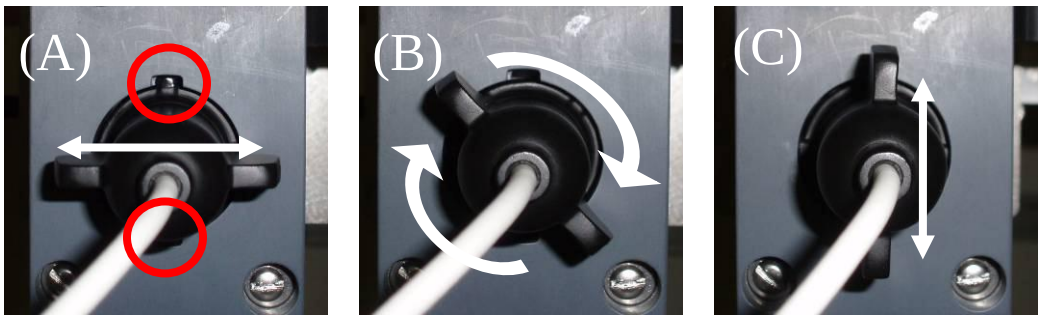


Figure 8. Locking the DO sensor into place.

2.4.2 *TRANSMITTER UNIT*

2.4.2.1 *WALL MOUNT LAYOUT*

Proceed as follows to gain access when making the necessary wiring connections:

Remove the six screws securing the top cover of the transmitter unit. Pass appropriate cables thru the 4 cable glands for the following connections:

- Power Supply
- Alarms
- 4-20mA Current Output and Communication Interface
- Sensor Wiring

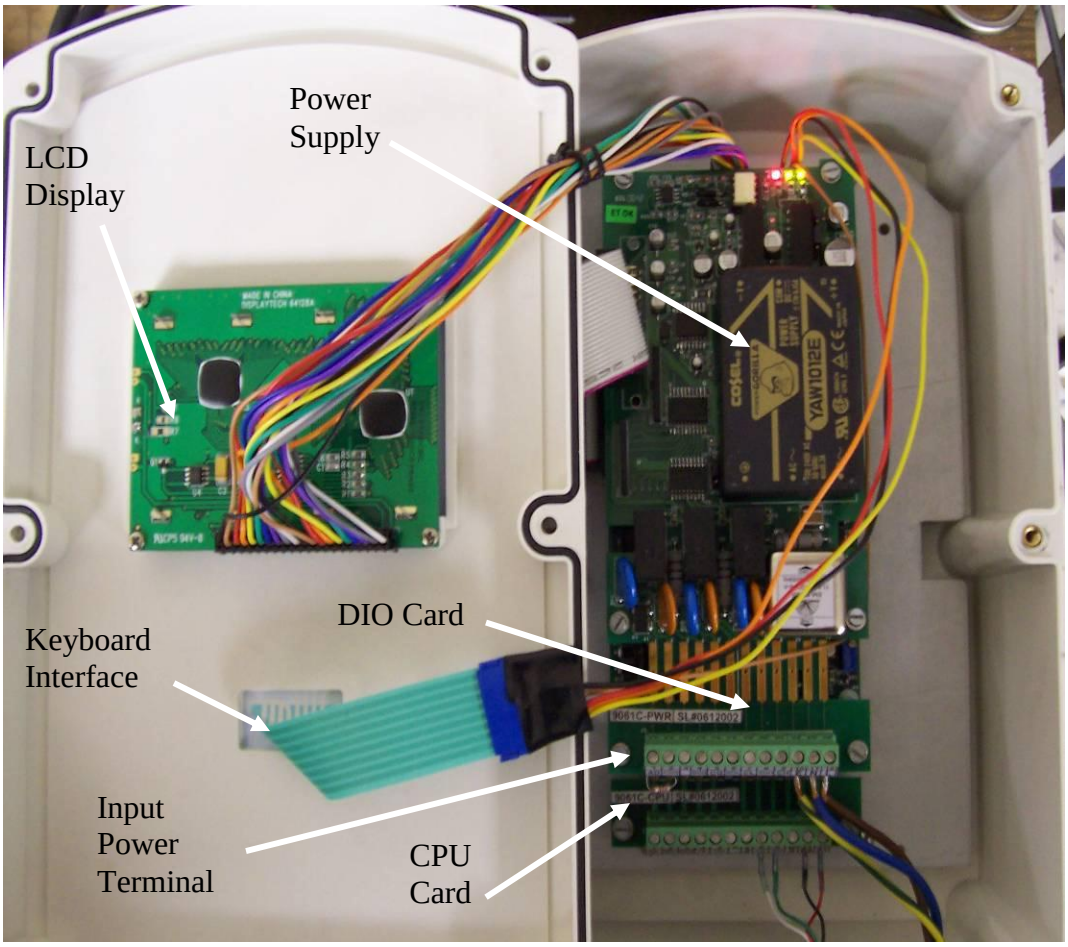


Figure 9. The components and layout of the wall mount transmitter case.

2.4.2.2 *PANEL MOUNT LAYOUT*

All of the connections to the panel mount transmitter should go through the back of the panel to the open terminal blocks on the back of the unit.

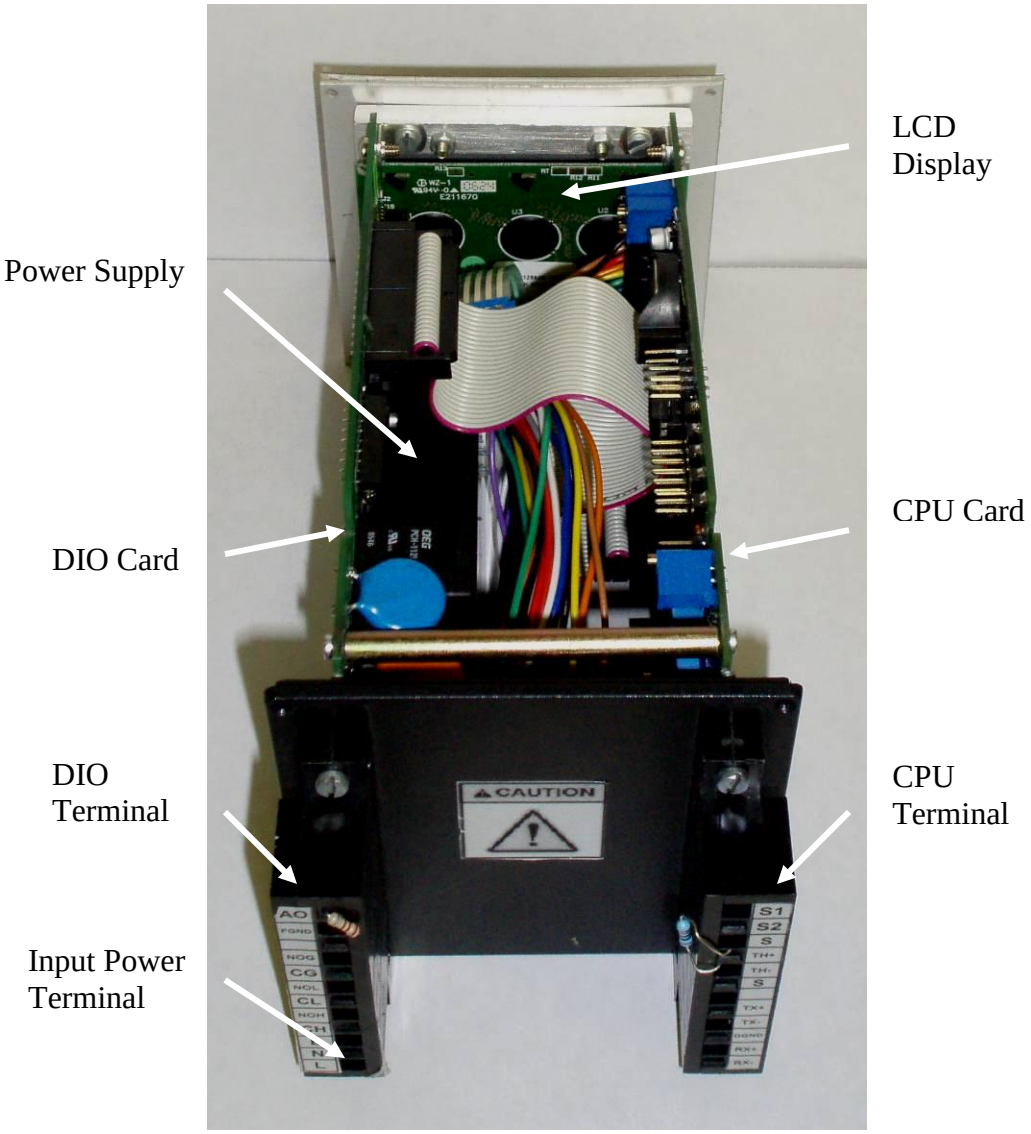


Figure 10. The components and layout of the panel mount transmitter unit.

Note. Before connecting the analyzer to the main power supply check that there is correct voltage at the mains.

2.4.2.3 *TRANSMITTER CONNECTIONS*

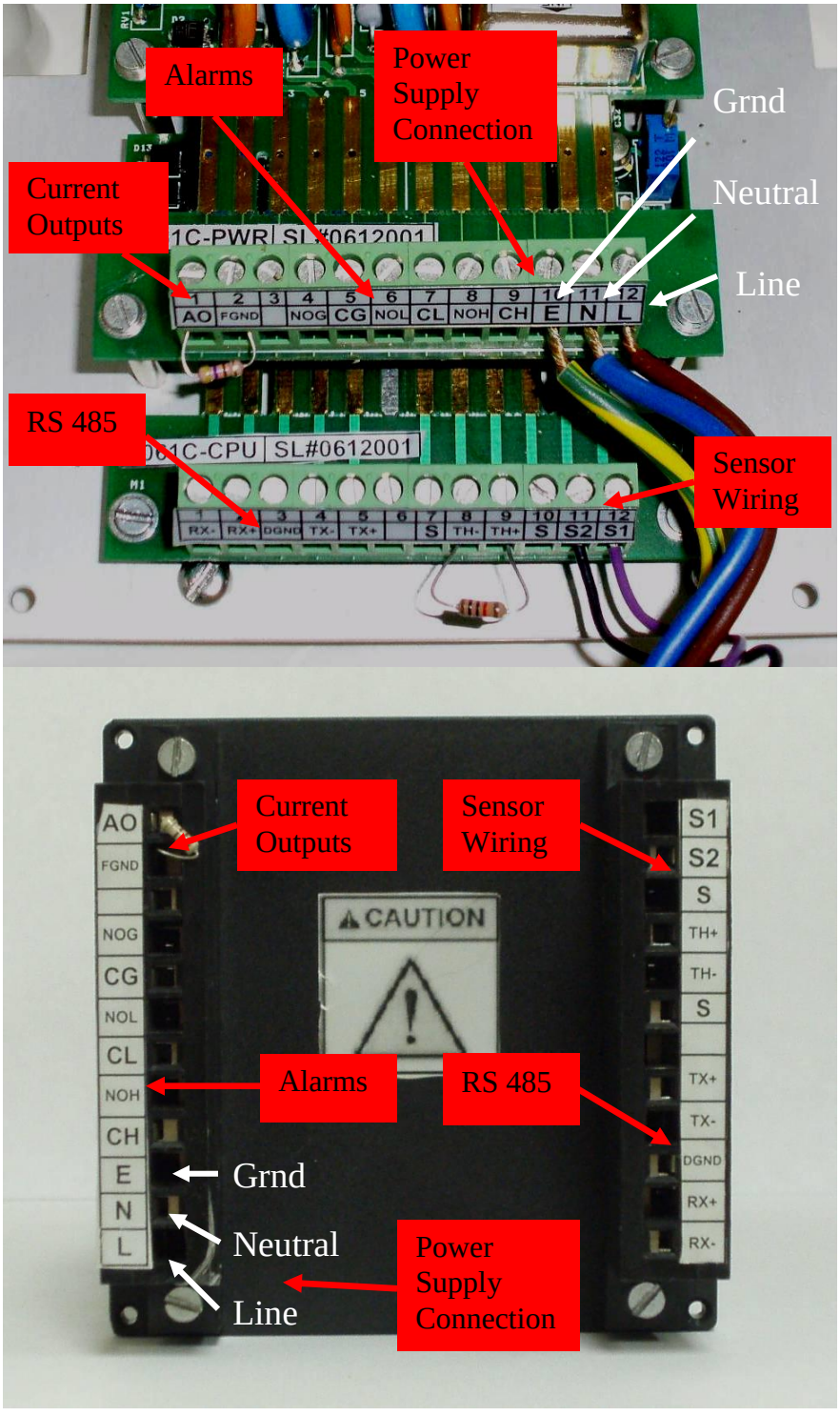


Figure 11. The location of the terminal block connectors for both the wall mount transmitter, top, and the panel mount transmitter, bottom.

⃠**WARNING**. Although this instrument has internal fuse protection, the operator must use a suitably rated external protection device such as a fuse or miniature circuit breaker (MCB).
Switch **OFF** the power supply and high voltage power-operated control circuits before making any connections. This equipment operates on alternating current (AC) electricity. Always take suitable safety precautions to avoid the possibility of an electric shock.

⃠**WARNING.** Connecting the power supply earth (ground) ensures the safety of assembly personnel, reduces the effects of Radio Frequency Interference (RFI), and ensures correct operation of the power supply interference filter.

2.4.3 *AC POWER TERMINAL BOX (OPTIONAL)*

If user wishes to hard wire the system they can use an optional AC Power Terminal Box (P/N P1000-059).

If the user requires CE certification this box is mandatory.

The user can turn ON/OFF power to the analyzer by pressing the GREEN button on the terminal box. When power is supplied to the analyzer the button will illuminate. The terminal box has IP66 rating and contains 3 AC power lines (LINE, GOUND, NEUTRAL) input and output. Picture of terminal box is shown below:

2.4.4 *WIRING TO TRANSMITTER*

Wall Mount:

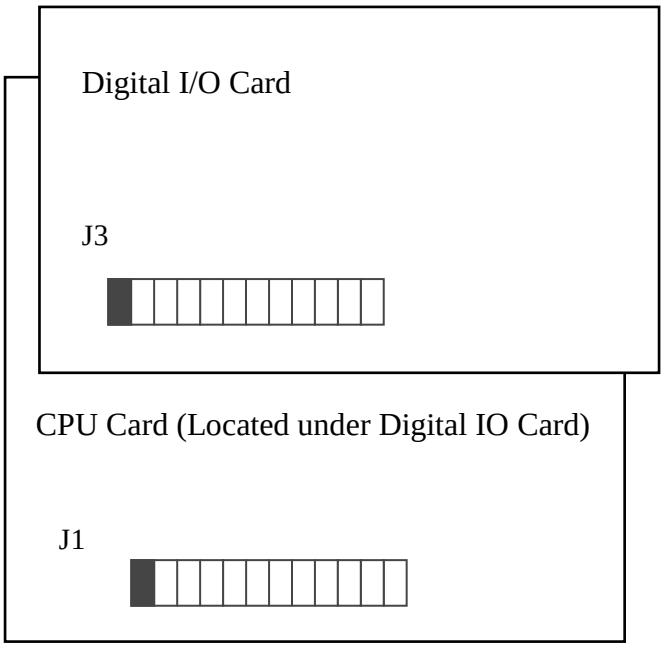


Figure 12. Pin locations for the Digital I/O and CPU Cards for the wall mounted transmitter layout. Pin 1 for both connectors is shown in black.

Panel Mount:

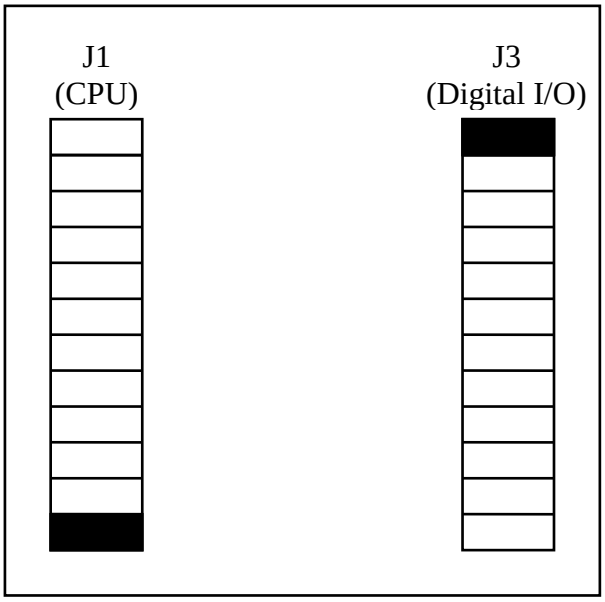


Figure 13. Pin locations for the Digital I/O and CPU Cards for the panel mounted transmitter layout. Pin 1 for both connectors is shown in black.

The CPU and DIO cards communicate with each other through a common flat ribbon cable and mating connectors. Power supply to the respective cards is routed through common cables and connectors. Note that the pin numbers for the connection blocks are different between the wall mounted and panel mounted transmitters.

The approximate dimensions of the subassemblies are as follows.

CPU card - 162 mm (L) x 86 mm (W)
Digital I/O card – 162 mm (L) x 86 mm (W)

All field I/Os are routed inside the instrument through cable glands. All field I/Os for the sensor inputs are terminated on PHOENIX connector terminals. The terminal receptacle is a "90 ° Block Header" with "socket to pin orientation" and the plug is 180° "wire to plug" orientation. The plug accepts a 30-14 AWG wire.

Wall Mount - Connecting the Wet Section to Transmitter:

The PVC shielded cables coming as an output from the sensor and thermistor are connected to J1 of the CPU Card as follows:

Card	Connector	Pin Number	Connection	Color
CPU	J1	8	Thermistor	White
CPU	J1	9	Thermistor	Green
CPU	J1	10	S	Black/Yellow
CPU	J1	11	DO Sensor -	Black
CPU	J1	12	DO Sensor +	Red

Connecting the Current Output to Transmitter:

One 4-20mA current output supplying analog output proportional to the dissolved oxygen concentration is provided on the J3 connector on the Digital I/O card. The pin locations from the connector are shown below:

Card	Connector	Pin Number	Connection
Digital	J3	1	AO
Digital	J3	2	FGnd

Note: In case no load is connected, it is advisable to connect a 470-ohm load resistor between Pin 1 & 2.

Connecting the Alarm outputs to Transmitter:

Potential free contacts for High Alarm/ High-High Alarm and Low Alarm/ High Warning Alarm are terminated on the J3 connector (provided on the Digital I/O card) as shown in Figure 7.
The pin locations from the connector are shown below:

Card	Connector	Alarm	Pin Number	Connection
Digital	J3	Low Alarm OR High Warning	6	NOL
Digital	J3		7	CL
Digital	J3	High Alarm OR High High Alarm	8	NOH
Digital	J3		9	CH

Similarly, potential free contacts for General Alarm are terminated on the J3 connector (provided on the Digital I/O card) as shown in the Figure 7.

Card	Connector	Alarm	Pin Number	Connection
Digital	J3	General Alarm	4	NOG
Digital	J3		5	CG

Connecting the Serial Communication Ports to Transmitter:

A serial port for RS-485 is provided on the CPU card. This port is located near connector J1.

The pin locations from the communication ports are shown below:

Card	Connection	Com	Pin Number	Connection
CPU	J1	RS-485	1	RX-
CPU	J1		2	RX+
CPU	J1		3	DGND
CPU	J1		4	TX-
CPU	J1		5	TX+
CPU	J1		6	

Panel Mount - Connecting the Wet Section to Transmitter:

The PVC shielded cables coming as an output from the sensor and thermistor are connected to J3 of the Digital Card as follows:

Card	Connector	Pin Number	Connection	Color
Digital	J3	1	DO Sensor +	Red
Digital	J3	2	DO Sensor -	Black
Digital	J3	3	S	Black/Yellow
Digital	J3	4	Thermistor	Green
Digital	J3	5	Thermistor	White
Digital	J3	6	S	N/C

Connecting the Current Output to Transmitter:

One 4-20mA current output supplying analog output proportional to the dissolved oxygen concentration is provided on the J1 connector on the CPU card. The pin locations from the connector are shown below:

Card	Connector	Pin Number	Connection
CPU	J1	12	AO
CPU	J1	11	FGnd

Note: In case no load is connected, it is advisable to connect a 470-ohm load resistor between Pin 1 & 2.

Connecting the Alarm outputs to Transmitter:

Potential free contacts for High Alarm/ High-High Alarm and Low Alarm/ High Warning Alarm are terminated on the J1 connector (provided on the CPU card) as shown in Figure 7.

The pin locations from the connector are shown below:

Card	Connector	Alarm	Pin Number	Connection
CPU	J1	Low Alarm OR High Warning	7	NOL
CPU	J1		6	CL
CPU	J1	High Alarm OR High High Alarm	5	NOH
CPU	J1		4	CH

Similarly, potential free contacts for General Alarm are terminated on the J1 connector (provided on the CPU card) as shown in the Figure 7.

Card	Connector	Alarm	Pin Number	Connection
CPU	J1	General	9	NOG
CPU	J1	Alarm	8	CG

Connecting the Serial Communication Ports to Transmitter:

A serial port for RS-485 is provided on the CPU card. This port is located near connector J1.

The pin locations from the communication ports are shown below:

Card	Connection	Com	Pin Number	Connection
Digital	J3	RS-485	12	RX-
Digital	J3		11	RX+
Digital	J3		10	DGND
Digital	J3		9	TX-
Digital	J3		8	TX+
Digital	J3		7	

3 OPERATING THE ANALYZER

3.1 *ANALYZER OPERATION*

The 9061C Compact Dissolved Oxygen analyzer wet section is comprised of a flowcell which houses the dissolved oxygen sensor along with all electrical connections. The entire flowcell assembly can be wall-mounted. Sample inlet piping should be connected at the bottom of the flowcell.

Sample flows through the flowcell in an upwards direction. After entering the system, the sample passes by the dissolved oxygen sensor and thermistor. The sample then exits the system at the top.

The oxygen sensor is a Teflon-membrane galvanic cell in the form of disposable capsule. The galvanic cell utilizes a silver cathode and a lead anode to generate a current output proportional to the amount of dissolved oxygen. The expected life of a sensor is 2 years in continuous operation. However certain factors such as high dissolved oxygen levels and increased temperatures have a direct affect on the life of the sensor.

The dissolved oxygen sensor fits onto the probe handle assembly which is consists of a connecting cable and 2 terminal-hole contacts. The probe handle assembly is attached to the flowcell by quarter-turn nut. A temperature sensor (thermistor) is located inside the flow cell and is used to detect the temperature of the sample. The thermistor is connected to the transmitter unit and compensates for changes in output from the sensor over a range of 41°F to 131°F (5 °C to 55°C).

Calibration of the analyzer is controlled by a micro-controller. After the user connects the transmitter unit to the flowcell, it is necessary to perform one successful calibration. See Section 3.6 for more details on calibration. Once a successful calibration is performed, the unit is now ready to measure the dissolved oxygen concentration in the sample. The display then shows the ppm/ppb concentration of the sample while the analyzer compensates for the variations in the sample temperature automatically.

3.2 *ALARMS*

DEAERATED WATER SYSTEM

When the 9061C dissolved oxygen system is in DEAERATED mode both alarms operate as 'high' alarms. Each alarm will be activated when the oxygen level increases beyond the set values. For example, the HIGH setting will act as a warning that the oxygen level has increased beyond a reasonable level, and the HIGH-HIGH setting may be used in a shut-down capacity. See Section 3.6.2.4 for details on setting the set points for the two alarms. The two dissolved oxygen alarms control the relays provided, each relay has one pair of changeover contacts rated at 2A, 250VAC (non-inductive).

The terminal connections are at J3 on the Digital Card - see Section 2.4 for more detail.

DEAERATED WATER SYSTEM		
Symbol	ALARM	DESCRIPTION
A1	High Warning	Activates when DO in sample feed is higher than "Low Set Point".
A2	High-High Alarm	Activates when DO in sample feed is higher than "High Set Point".

OXYGENATED WATER TREATMENT SYSTEM

When the 9061C dissolved oxygen system is in OXYGENATED mode one alarm operates as a "low" alarm and the other operates as a 'high' alarm. Alarm 1 (A1) operates as a LOW alarm when the oxygen level decreases below the set value. Alarm 2 (A2) operates as a HIGH alarm when the oxygen level increases above the set value. The two dissolved oxygen alarms control the relays provided, each relay has one pair of changeover contacts rated at 2A, 250VAC (non-inductive).

OXYGENATED WATER TREATMENT SYSTEM		
Symbol	ALARM	DESCRIPTION
A1	Low Alarm	Activates when DO in sample feed is lower than "Low Set Point".
A2	High Alarm	Activates when DO in sample feed is higher than "High Set Point".

Various Alarm Descriptions

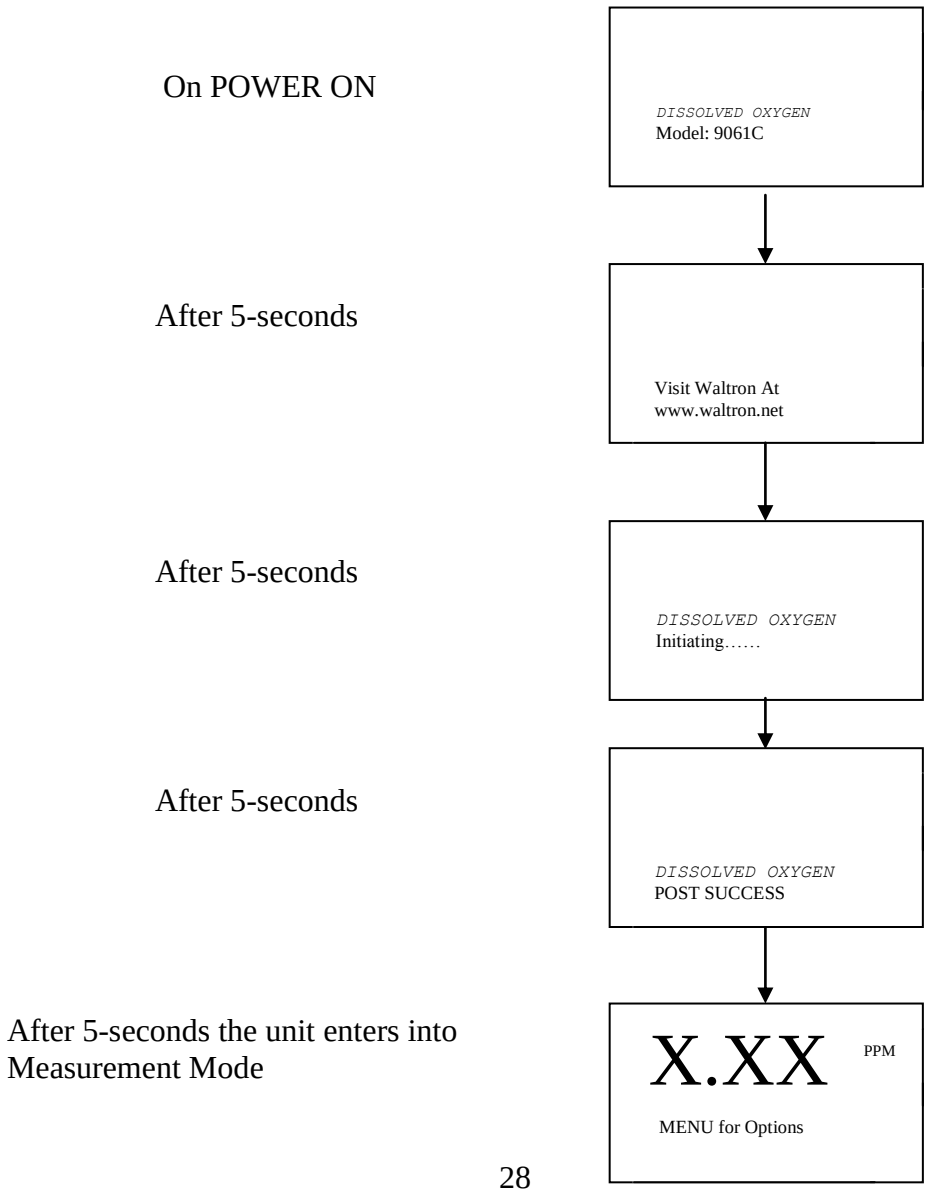
ALARM	DESCRIPTION
CF	Calibration Fail
HOT	Sample temperature over range (131F)
TEMP	No thermistor response
Output 1 Out	Concentration is outside O/PmA 1 set range
Conc. Low	Concentration is below Low Alarm set point
Conc. High	Concentration is above High Alarm set point
OVR	Concentration is above limits of analyzer (>10ppm)

3.3 *GETTING STARTED*

- Insert the power cord into the terminal connector housed inside the electronics section and switch ON the system. The power up sequence should be as mentioned in Section 3.4. After power up, the analyzer enters into Measurement Mode.
- The analyzer automatically displays the concentration of dissolved oxygen read by the sensor. Units of measurement (ppb/ppm) are displayed on the right hand side of the LCD.
- If the analyzer is being started up for the first time, or if it was not in operation for a long time, the user should perform a calibration as detailed in Section 3.7.1.

3.4 *POWER UP SEQUENCE*

- After switching ON the analyzer the following start up sequence is displayed:



3.5 *KEY-BOARD FUNCTIONS*

Figure 14. The front panel for both the wall mount transmitter, left, and the panel mount transmitter, right.

There are four keys on front panel (Figure 13, above) which are used to navigate/view/edit the various menus/parameters. The functionality of the keys is described below:

- **MENU**: The MENU key can be used at anytime to return to the Main Menu. When the MENU key is pressed the Main Menu options are displayed. There are 6 Main Menu options and only 2 sub menus are displayed at a time, on two separate lines.

- **DOWN ARROW**: By pressing this key the user can navigate through the various menu and sub-menu options. This same key also functions as an increment key during numerical entry**.**

- **RIGHT ARROW**: This key is used to position the cursor at the desired place; the cursor moves in a left to right direction.

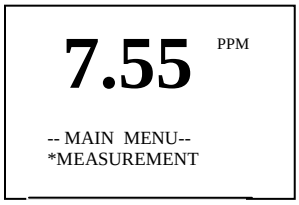
- **ENTER**: This key is used to enter into a selected menu. It is also used to confirm/store entered values.

3.6 *ANALYZER MODES*

There are 6 Main Menu options; each is listed below:

1. **MEASUREMENT** – Displays information during normal operation
2. **CONFIGURATION** – Used to configure analyzer settings
3. **MANUAL CALIB** – Perform manual calibration
4. **FAIL SAFE** – Used to shut-down/power off analyzer
5. **DIAGNOSTICS** – Stores data logs and aids in troubleshooting
6. **DISPATCH MODE** – Used to troubleshoot/calibrate electronics

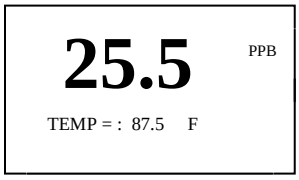
To enter the Main Menu press the MENU Key. The following screen is displayed:



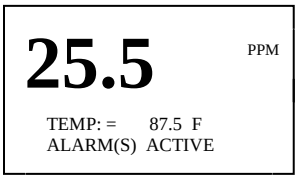
Note: The '*' indicates the selected item of that particular menu item/sub-menu:

3.6.1 *MEASUREMENT*

Press the ENTER key to go to MEASUREMENT screen. The display shows:



Or

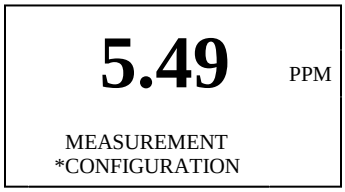


Use the DOWN arrow key to view any Active Alarms.

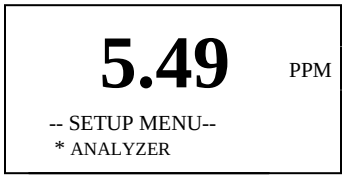
Note:	The system loops backs to the MEASUREMENT mode and displays the measurement screen if there is no keypad activity for 60 seconds.

3.6.2 *CONFIGURATION*

To go to the CONFIGURATION menu press the DOWN arrow key once to display the following screen.



Press the ENTER key to enter CONFIGURATION menu; the following sub-menu is displayed:



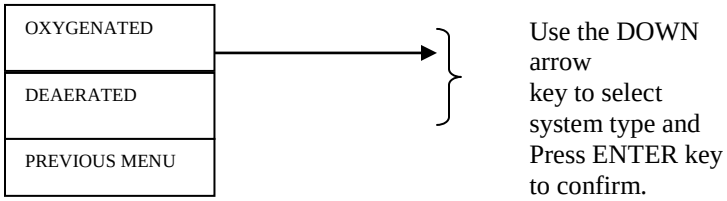
Press the DOWN arrow key to scroll down the remaining sub-menus. The CONFIGURATION menu has the following sub-menus:

1. **ANALYZER** – Used to select Oxygenated or Deaerated modes
2. **CALIB SETUP** – View/change frequency and settings for manual calibration
3. **O/P mA SETUP** – View/change settings for current output (4-20mA) alarm
4. **ALARM SET PTS** – View/change settings for High/Low/General Alarm
5. **DATE & TIME** – View/change date and time settings
6. **SERVICE PARAMS** – Password protected; controls valve timing during CAL
7. **SERIAL PORT** – View/change settings used for remote interface communication
8. **PREVIOUS MENU** – Reverts back to previous menu (Main Menu)

To navigate through the sub-menus press the DOWN arrow key. To select an item from the menu press the ENTER key whenever that sub-menu item is highlighted (‘* ‘). The logical flow is shown below. For simplicity all the sub-menus are shown at once.

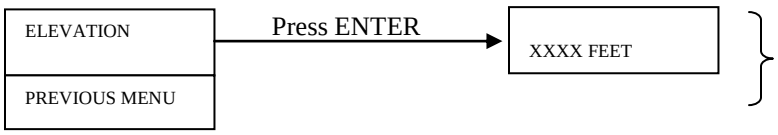
3.6.2.1 ANALYZER SYSTEM

The sub-menus for ANALYZER SYSTEM are as follows:



3.6.2.2 CALIB SETUP (Calibration Set-Up)

The sub-menus for CALIB SETUP are as follows:

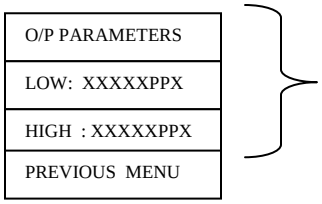


- Press RIGHT arrow key
  Once: To select the first ‘X’.
  Twice: To select the 2nd ‘X’
  Thrice: To select the 3rd ‘X’
  Four times: To select the 4th ‘X’
- After selecting any of the ‘X’s use the DOWN arrow key to increment and Press ENTER key to confirm.
- Pressing the ENTER key when the PREVIOUS MENU is displayed, loops back the display to the previous menu.

Note. To convert an elevation of meters into feet, refer to the table in the Appendix.

3.6.2.3 *O/P mA SETUP*

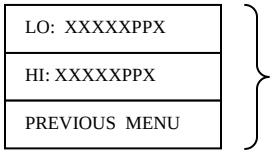
Press the ENTER key when O/P mA menu is displayed. The following sub-menus are displayed:



- XXX.XX and the last character of PPX all editable parameters.
- Press RIGHT arrow key
  Once: To select the first 'X'.
  Twice: To select the 2nd 'X'
  Thrice: To select the 3rd 'X'
  Four times: To select the 4th 'X'
  Five times: To select the 5th 'X'
- After selecting any of the 'X's use the DOWN arrow key to increment and Press ENTER key to confirm.
- Pressing the ENTER key when the PREVIOUS MENU is displayed loops back the display to the previous menu. . i.e, O/P mA SETUP

3.6.2.4 *ALARM SET PTS*

Press the ENTER key when ALARM SET PTS menu is displayed. The following sub-menus are displayed:



- XXX.XX and the last character of PPX all editable parameters.
- Press RIGHT arrow key
  Once: To select the first 'X'.
  Twice: To select the 2nd 'X'
  Thrice: To select the 3rd 'X'
  Four times: To select the 4th 'X'
  Five times: To select the 5th 'X'
- After selecting any of the 'X's use the DOWN arrow key to increment and press ENTER key to confirm.
- Pressing the ENTER key when the PREVIOUS MENU is displayed loops back the display to the previous menu.i.e, ALARM SET PTS

3.6.2.5 *DATE & TIME*

Press the ENTER key when DATE & TIME menu is displayed. The following sub-menus are displayed:

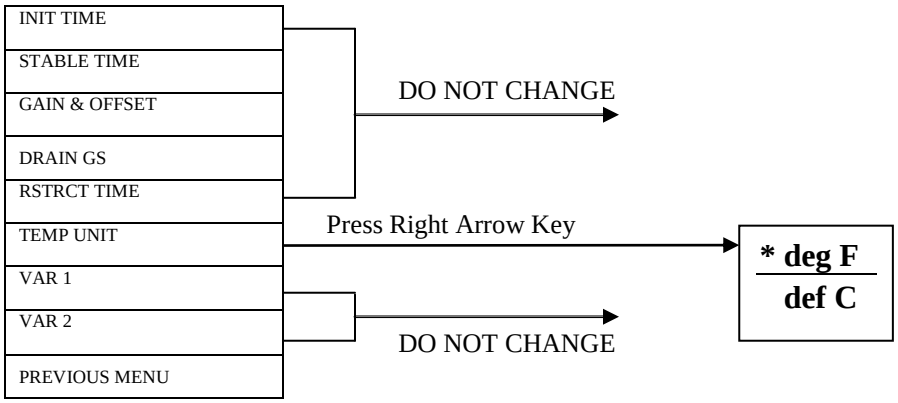
SET DATE & TIME
DATE: DD/ MM/ YY
TIME: HH:MM:SS
PREVIOUS MENU

- DD, MM, SS, HH MM, SS are all editable parameters where DD is the Day, MM the Month, YY the Year, HH the Hours, MM the Minutes and SS the Seconds.
- Press RIGHT arrow key
  Once: To select 'DD'.
  Twice: To select 'MM'
  Thrice: To select 'YY'
- The highlighted value may be changed using the DOWN arrow key to increment and followed by ENTER key to confirm
- Pressing the ENTER key when the PREVIOUS MENU is displayed loops back the display to the previous menu (DATE & TIME)

The above explanation is valid while editing TIME also.

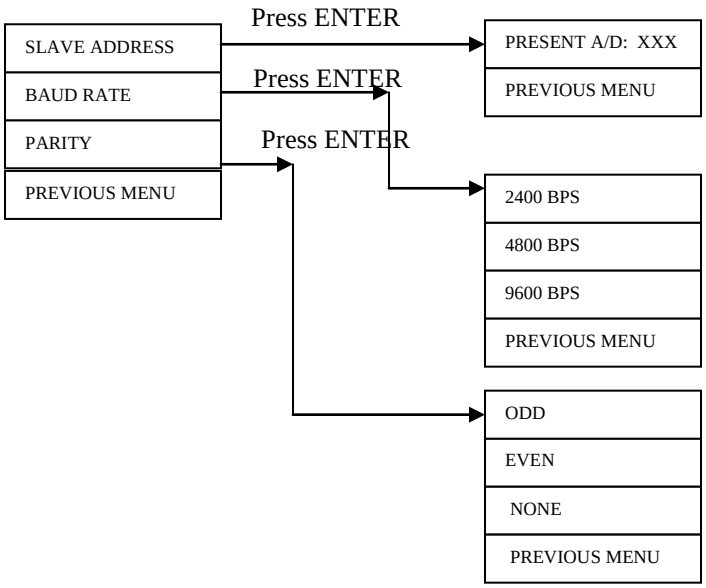
3.6.2.6 SERVICE PARAMATERS

1. Press ENTER key when Service Params menu is displayed. This menu is password protected and these default settings should not be changed.
2. Enter password by pressing menu key, down arrow key, right arrow key, enter key.
3. Use down arrow key to select degree display unit and press ENTER key to confirm.
4. Do NOT change the other default menu settings.
5. Pressing the ENTER key when the PREVIOUS MENU is displayed loops back the display to the previous menu.



3.6.2.7 *SERIAL PORT*

Press the ENTER key when SERIAL PORT menu is displayed. The following sub-menus are displayed:



- "XXX" are all editable parameters.
- Press RIGHT arrow key
  Once: To select the first 'X'.
  Twice: To select the 2nd 'X'
  Thrice: To select the 3rd 'X'
- After selecting any of the 'X's use the DOWN arrow key to increment and Press ENTER key to confirm
- Use DOWN arrow key to select and highlight baud rate /parity.
- Pressing the ENTER key when the PREVIOUS MENU is displayed loops back the display to the previous menu.

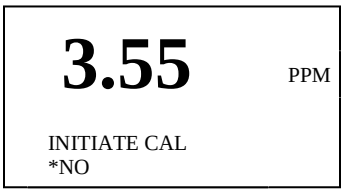
3.6.2.8 *PREVIOUS MENU*

Pressing the ENTER key when the PREVIOUS MENU is displayed reverts back to the previous menu.

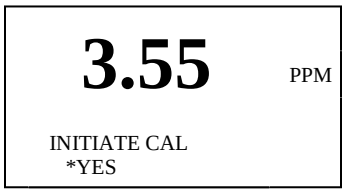
3.6.3 *MANUAL CALIBRATION*

Go to the MANUAL CALIB menu and press ENTER; the following screens will appear:

Press ENTER key



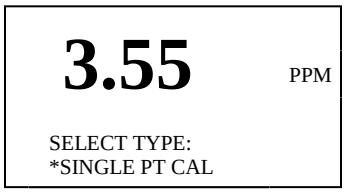
Else, press DOWN arrow key



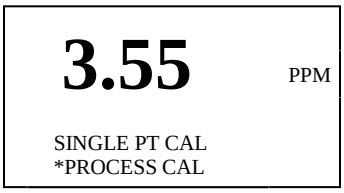
If NO is selected – system will go back to Main Menu.

If YES, system will ask what type of CALIBRATION user wishes to perform (Single Point or Process Calibration):

Press ENTER key



Else press DOWN arrow key



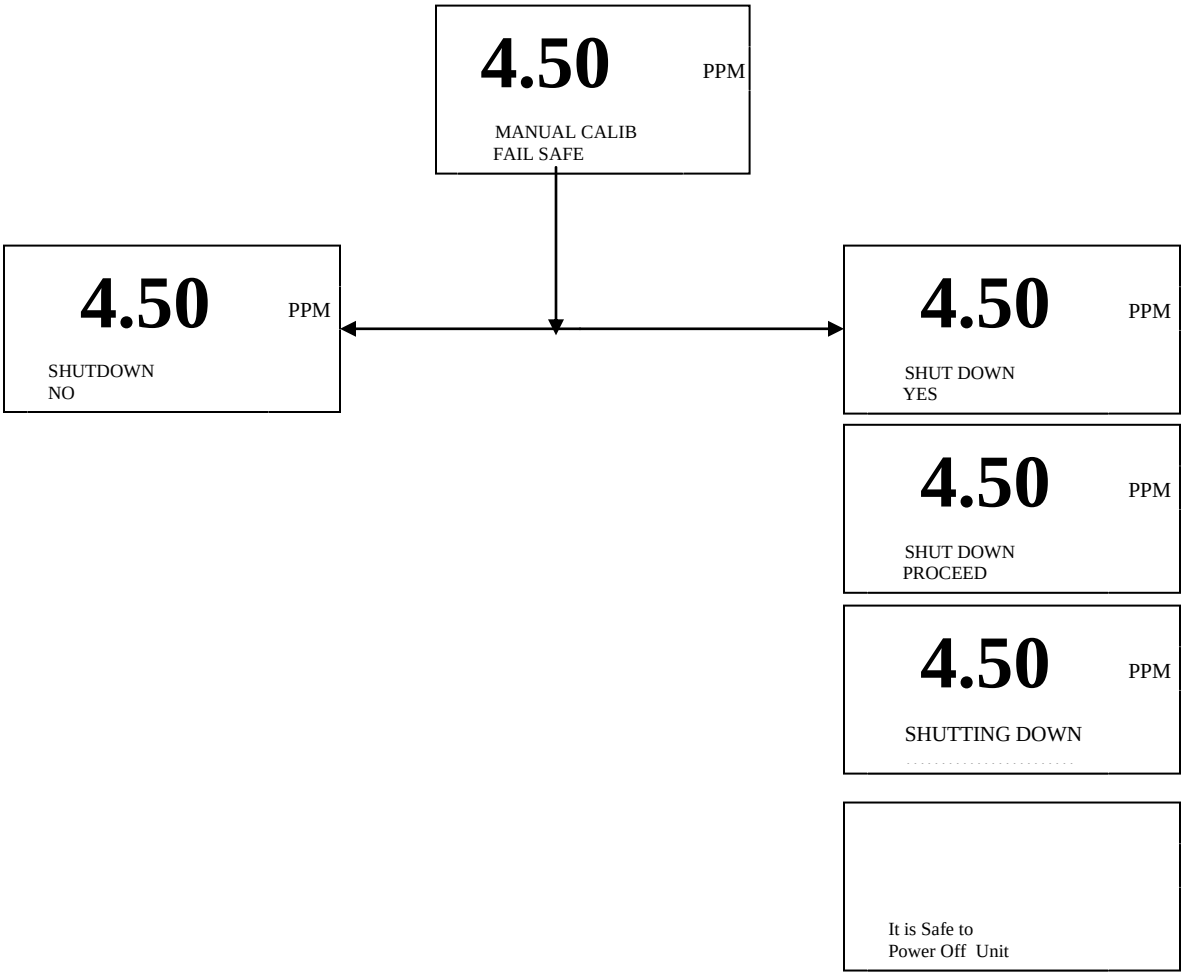
Once Calibration begins the following screen will appear:

If the ENTER key is pressed at this point the Calibration cycle ends. The menu guides you through the abort process.

3.6.4 *FAIL SAFE*

This mode is used to perform a safe shut down so that the necessary parameters and changed default values are properly saved. To perform a safe shutdown go to the FAIL SAFE menu and press ENTER.

To go to the FAIL SAFE menu press the MENU key to get to MAIN MENU. Press DOWN arrow key to FAIL SAFE and press ENTER. The display will show the following screen during shutdown:



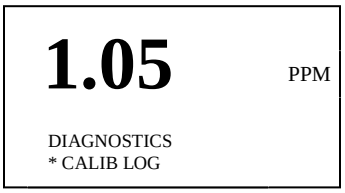
NOTE: Switching off the system abruptly, without going into FAIL SAFE mode may result in malfunctioning of the system after next power ON.

3.6.5 *DIAGNOSTICS*

A complete set of system diagnostics is provided so that various system parameters and diagnostic tasks such as switching relays ON/OFF, activating/de-activating the alarm and viewing logs may be carried out quickly and easily.

To access diagnostic parameters press the MENU key to get to MAIN MENU and go into the DIAGNOSTICS menu and press ENTER to display the following screen:

Press the ENTER key to display the sub-menus. The display shows:



The DIAGNOSTICS menu has the following sub-menus:

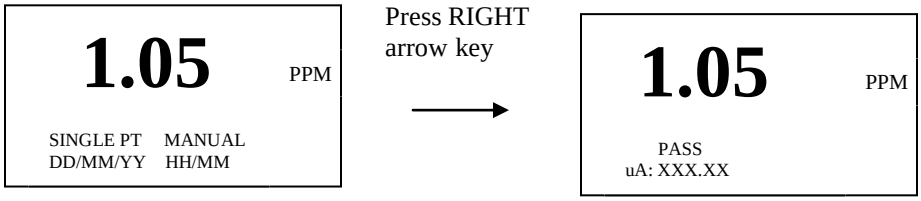
1. **CALIB LOG** – Stores data for the last 10 calibrations
2. **ALARM LOG** – Stores data for the last 10 alarms
3. **SENSOR DETAILS** – Input probe data for historical record
4. **THERM CHECK** – Checks real-time output from thermistor
5. **SENSOR CHECK** – Check real-time output from probes
6. **RELAY CHECK** – Checks status of relays
7. **O/P mA CHECK** – Manually sends 4-20mA outputs
8. **DIGITAL I/PS** – Checks status of digital I/Ps
9. **SERIAL CHECK** – Checks communication of serial port
10. **S/W VERSION** – Shows current version of software
11. **PREVIOUS MEN**U – Returns to previous menu (Main Menu)

To navigate through the sub-menus, press ENTER key whenever the sub-menu is highlighted (‘* ‘).

3.6.5.1 *CALIBRATION LOG*

The Calibration Log (CALIB LOG) stores the relevant data taken during a calibration. The data for each CALIB LOG is stored on 2 separate pages (press the RIGHT arrow key to toggle between pages).

Select CALIB LOG in DIAGNOSTICS menu and press the ENTER key. The following screen is displayed:



The **first** page of the CALIB LOG shows:
Calibration---→Single PT, Process CAL
Type----------→ Manual
Date---------- → Date of Calibration
Time--------- → Time of Calibration

The **second** page of the CALIB LOG shows:
Strength---→Calibration performance
PASS/FAIL----------→Calibration result
uA---------- → uA seen during CAL sequence

To view the logs use the DOWN arrow key. A maximum of 10 logs are maintained in memory.

3.6.5.2 *ALARM LOG*

By pressing the ENTER key the following screen is displayed:

A log typically shows the:
Alarm Name→ Output Set, Conc. High Set etc.
Date---------- → Date of Alarm
Time--------- → Time of Alarm

To view the logs use the DOWN arrow key.
A maximum of 10 logs are maintained in memory.

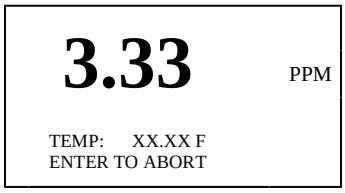
3.6.5.3 *SENSOR DETAILS*

Upon pressing the ENTER key a screen asking for a password is displayed.
After entering the correct password the following screen is displayed:

The MfgDT is the editable part of this menu. The editing procedure is same as explained in the DATE AND TIME section.

3.6.5.4 *THERM CHECK*

By pressing the ENTER key the following screen is displayed:



Press the ENTER key to abort. The system will then loop back to the Previous Menu.
If no key is pressed the system will loop back to the MEASUREMENT screen after 30 seconds.

3.6.5.5 *SENSOR CHECK*

By pressing the ENTER key the following screen is displayed:

Press ENTER key to abort and go to the previous menu.

3.6.5.6 *RELAY CHECK*

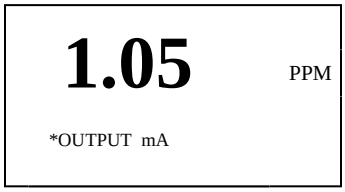
By pressing the ENTER key the following screen is displayed:

Press DOWN arrow key twice to get the following display:

This menu is used to test the Alarms. Select the sub-menu by pressing the DOWN arrow key and pressing ENTER. Use the RIGHT arrow key to select the relay and DOWN arrow key followed by ENTER key to activate or de-activate the alarms.
Pressing the ENTER key when PREVIOUS MENU is highlighted loops the system to previous menu.

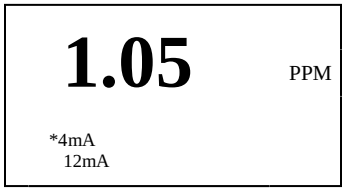
3.6.5.7 *OUTPUT mA CHECK*

By pressing the ENTER key the following screen is displayed:



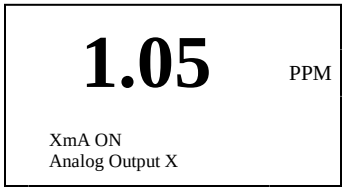
By default OUTPUT mA is highlighted. Use the DOWN arrow key to select PREVIOUS MENU.

Press ENTER to display the following:



Press the DOWN arrow key to display the next option:

Press ENTER key to display the following:



Selecting PREVIOUS MENU loops the system back to the previous menu.

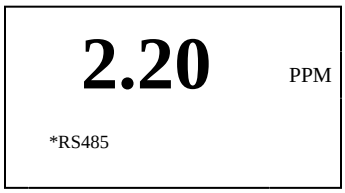
3.6.5.8 *DIGITAL* I/PS

By pressing the ENTER key the following screen is displayed:

The line "XXXXX…" corresponds to status of digital I/Ps. Press any of the four keypad keys to see a change in state. This screen can be aborted only by leaving the keyboard idle for at least 60 seconds.

3.6.5.9 *SERIAL CHECK*

By pressing the ENTER key the following screen is displayed:

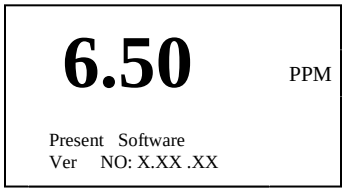


Select the type of communication (RS485) by pressing the DOWN arrow key and press ENTER to check the serial outputs. User should get the following display:

Press the RIGHT arrow key or DOWN arrow key to go to the previous menu.

3.6.5.10 *S/W VERSION*

By pressing the ENTER key the following screen is displayed:



Press any key to go back to the previous menu.

3.6.6 *PREVIOUS MENU*

Selecting PREVIOUS MENU loops the system back to the previous menu.

3.6.7 *DISPATCH MODE*

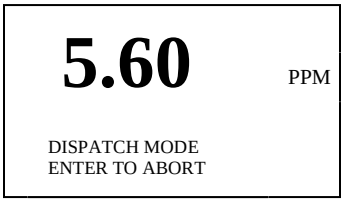
DISPATCH MODE is to be used for Waltron in-house testing only.

To go to the DISPATCH MODE menu press the MENU key and the DOWN arrow key six times and then press the ENTER key to display the following screen:

Enter the password.

The following is displayed:

After connecting the mA source and pressing ENTER key, or after 30 seconds, the following screen is displayed:



The system is now in DISPATCH MODE.
To abort press the ENTER key. The user-friendly menus guide you through the abort process.

3.7 *CALIBRATION PROCEDURE*

Frequency of calibrations depends on the operating conditions and sensor conditions. Waltron recommends calibrating the instrument at least once a month however more frequent calibrations may be performed to eliminate drift due to changing sensor response.

Please be sure the following tasks are performed before executing a CALIBRATION cycle:

1) Elevation height is entered correctly and is properly stored in Calibration Setup

Detailed Description of Calibration Process

Single-Point Calibration (Manual):

1. Prior to CAL being initiated, the membrane must be exposed to air, regardless of the system set-up (see Section 2.1.1). If the single valve system is in place, it is necessary to turn off the sample flow and the quarter-turn nut must be loosened and the sensor removed from the flowcell. A black sensor-holding clip is located on the side of the flowcell. If the two valve system is in place, turn off the sample flow with the first valve and open the second valve to let the flowcell drain. The sensor does not need to be removed from the flowcell in this case.
2. Dissolved oxygen sensor calibrates to air for approximately 5 minutes.
3. Calibration is complete. Results are shown on display for 1 minute and then stored into CAL LOG.
4. The sensor must then be placed back into flowcell and the quarter-turn nut must be retightened.

Process Calibration:

1. An independent bench-test must be performed on the sample so the user knows the exact sample concentration that must be entered into the analyzer. The sample concentration going to the analyzer must remain the same during the entire PROCESS CAL procedure.
2. The sample concentration must be entered into the analyzer. The dissolved oxygen sensor does not need to be removed from the system.
3. Calibration is complete. Results are shown on display for 1 minute and then stored into CAL LOG.

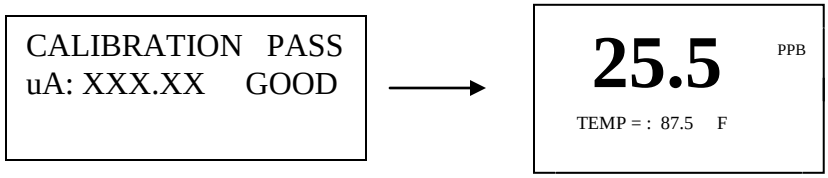
3.7.1 *SINGLE-POINT CALIBRATION*

During single-point calibration, the sensor must be exposed to air, either by removing it from the flowcell or draining the flowcell as described in Section 3.7.

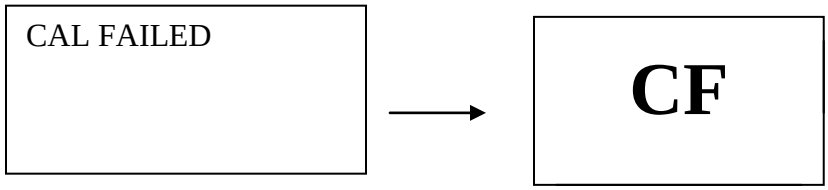
To perform Single-Point Calibration:

1) Press the MENU key.
2) Press the DOWN arrow key to scroll to MANUAL CALIB menu and press the ENTER key to select.
3) Press the DOWN arrow key to scroll to YES and press ENTER key to select
4) Select SINGLE PT and press ENTER key to select
5) After initiating a calibration the following message is displayed on the bottom 2 lines of the LCD.

6) After successfully completing calibration the following message is displayed and the system returns to the measurement mode.



In case of CAL FAIL the system displays the following message:



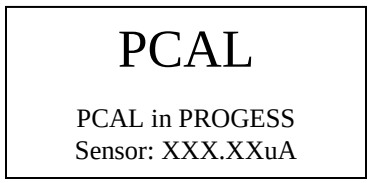
3.7.2 *PROCESS CALIBRATION*

During process calibration, the sensor does not have to be exposed to air – the system calibrates directly to sample. A process calibration should only be performed if the unit has successfully passed a single point calibration.

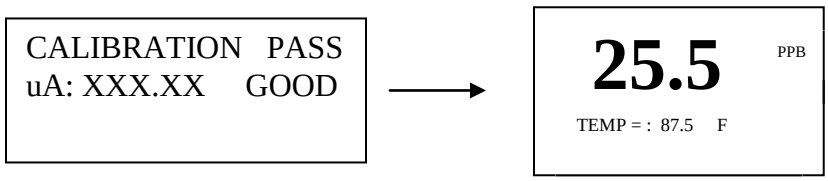
To perform Process Calibration:

1) Press the MENU key.
2) Press the DOWN arrow key to scroll to MANUAL CALIB menu and press the ENTER key to select.

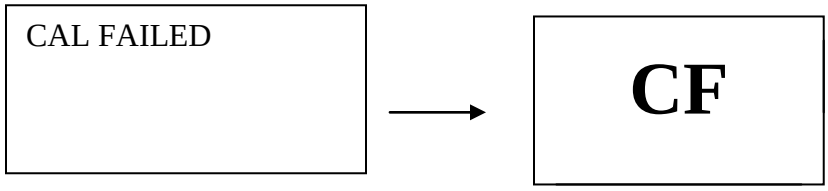
3) Press the DOWN arrow key to scroll to YES and press the ENTER key to proceed.
4) Select PROCESS and press the ENTER key to select.
5) Use the keypad to enter the process calibration set-point. Then press the ENTER key to proceed.
6) After initiating a process calibration the following message is displayed on the LCD.



7) After successfully completing calibration the following message is displayed and the system returns to the measurement mode.



In case of CAL FAIL the system displays the following message:



NOTE: A calibration cycle may be interrupted at any time by pressing the ENTER key. In order to avoid accidental key press, the calibration cycle is aborted only after confirmation from the user. Once the calibration process is aborted, the measurement screen is displayed.

3.7.3 *CALIBRATION FAILURE*

A Calibration Fail (CAL FAIL) condition will occur after a calibration if the sensor response does not meet requirements. This happens when the sensor's uA output is at or below 60% of expected level. This could be caused by a number of factors (See Troubleshooting Section).

4 MAINTENANCE

4.1 *SCHEDULED SERVICING*

No routine maintenance is required for this instrument other than periodically performing a calibration. Calibration may be performed manually or automatically.

4.2 *UNSCHEDULED SERVICING*

The monitor will indicate error/alarm conditions directly on the display.

4.2.1 *REPLACEMENT OF THE SENSOR*

- Turn off (or divert) sample flow to the analyzer.
- Unscrew the quarter-turn nut and remove the sensor assembly from the front of the flowcell. Remove and inspect the large o-ring located **inside** the flowcell.
- Inspect the existing sensor, large o-ring and smaller sealing o-ring. If the sensor membrane is stained or dirty attempt to remove deposits by gently wiping the membrane with a moist paper tissue. For oily and greasy deposits the tissue may be moistened with a mild detergent or isopropyl alcohol. After sensor is cleaned, dry the interior of the flowcell with a paper tissue or soft cloth and make sure that the larger o-ring is correctly positioned inside the flowcell up against the shoulder near the end of the cavity. Replace the smaller sealing o-ring on the probe handle assembly, reinstall the sensor and attempt another calibration. If original sensor continues to fail calibration replace with new sensor.
- **To replace sensor** unscrew the connector nut and remove and discard both the old sensor capsule and smaller sealing o-ring. Also remove and discard the large o-ring located inside the flowcell. Install new large o-ring in flowcell making sure it is correctly located on the shoulder near the end of the cavity.

- Remove the new sensor capsule from its container, unscrew the sensor from the sealing plug and carefully plug the sensor onto the connector body making sure that the new smaller sealing washer o-ring is also in place (**See Figure below – Probe Handle Assembly)**. Retain the sealing plug for any shut down procedure required in the future. Hand-tighten the connector nut onto the capsule.
- Carefully insert the Probe Handle Assembly into the flow cell and tighten the retaining nut firmly.
- Turn back on sample flow.
- Initiate a single-point calibration with the new sensor.

Caution

✓ Take special care to line up the two pins in the sensor capsule with their respective sockets on the connector before making the connection and tightening.

✓ Take care not to damage the delicate membrane on the end of the capsule.

✓ Make sure that the mating faces (carrying the electrical connection) of the sensor and connector body are clean and completely dry.

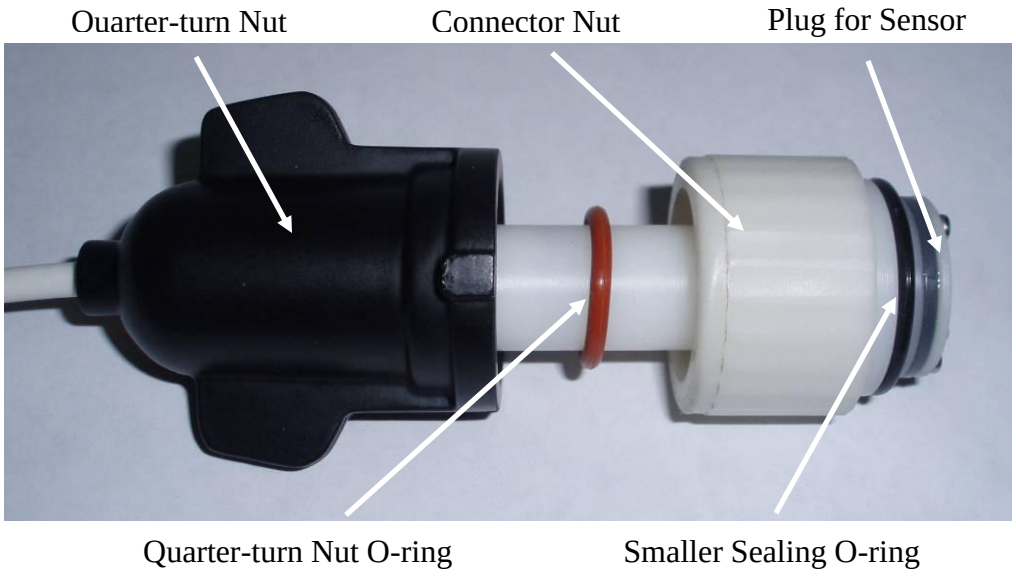


Figure 15. The Probe Handle Assembly.

4.3 *EXTENDED PERIOD (2+ weeks) SHUT DOWN PROCEDURE*

4.3.1 *SENSOR UNIT*

- Turn off sample flow to analyzer.
- Remove the sensor assembly from the flow cell.
- Loosen the connector nut and remove (pull) the sensor off the connector body. Replace sealing plug which came with sensor so that the 2 pins are not exposed to elements.
- Store the sensor capsule in its original canister making sure that membrane is kept moist. Make sure that sponge at the bottom of canister is wetted with DI water and that the membrane is in contact with the sponge pad. Store sensor in refrigerator until next use.
- Dry the connector assembly and the interior of the flow cell with a tissue or soft cloth.

> **Caution**. The connector body should not be replaced in the flow cell without a capsule attached.

4.3.2 *TRANSMITTER UNIT*

Isolate the electrical supply to the unit. In the case of power loss, the programmed data will be retained for up to 10 years.

4.4 *SENSOR ELECTRICAL CHECK*

A simple electrical check can be performed to check status of sensor. Current output (micro-amp) of dissolved oxygen probe must be greater then 15 µA. To test current output of sensor, connect digital multimeter to the two terminal leads on dissolved oxygen probe while membrane is exposed to air. Make sure temperature of sensor is around room temperature (25C). Measure current output in µA, replace sensor if output is less then 15 µA.

5 DISSOLVED OXYGEN SENSOR INFORMATION AND MAINTENANCE

Tips for Prolonging the Life of DO Sensors-

** Some Helpful Background Information on DO Sensor **

Think of the DO sensor as if it was the battery in your car, except that it does not have an alternator to recharge it. If you leave the lights on, the battery goes dead quickly. If you have a corroded wire to your starter, the battery voltage is reduced greatly before it gets to the starter and you can not start your car.

The DO sensor operates as a battery. It puts out more current when exposed to high concentrations of DO thus draining its charge. If the probe handle connection is corroded, the full micro-amp output from the sensor cannot reach the electronic section.

The following tips, if followed, will extend the life of your DO sensors:

- Avoid exposing DO sensors to high ambient and/or sample temperatures. Higher temperatures increase the rate of the chemical reaction that takes place at the sensor membrane thus reducing the life of the sensor. (For every 10C above 30C, sensor life is cut in half.)
    - Use a chiller to reduce sample temperature so it remains constant in the range 20-30C

- If DO sensor is used to monitor high (ppm) level sample concentrations the life of the sensor will be reduced. High sample concentrations increase the rate of the chemical reaction that takes place at the sensor membrane thus reducing the life of the sensor.

- Remove sensor if sample is shut off or disconnected for more than 3 days. When sensor is exposed to AIR or stagnant sample a more rapid chemical reaction takes place and the life of the sensor is reduced. If a sensor is left exposed to AIR for one or two days the life of the sensor will be reduced considerably. If flow is stopped sample will remain in the flow cell for some period of time but evaporation will occur and eventually the flow cell will be dry. NOTE: If the analyzer is set to perform an automatic calibration the solenoid will activate and drain the water in the flowcell thus exposing the sensor to AIR.

-

- Do not over-tighten clamping screw when installing probe handle assembly into the flowcell. Over-tightening of clamping screw will damage sensor pins. Only finger-tighten the clamping screw when installing into the flowcell.

- Do not touch sensor membrane with your hands.

Proper Storage of DO Sensors-

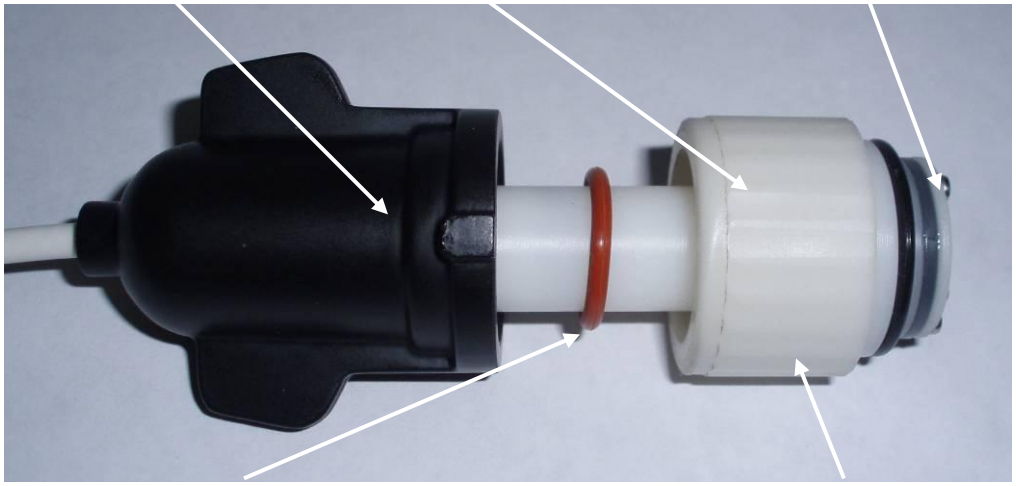
Please follow these steps for proper storage of DO sensors:

1. Store the sensor in its original canister making sure that membrane is kept moist. Make sure that sponge at the bottom of canister is wetted with DI water and that the membrane is in contact with the sponge pad. When storing the canister should be kept vertical so that the sensor pins are not exposed to fluid and more prone to corrosion.
2. Dry the probe handle assembly and the interior of the flow cell with a tissue or soft cloth.
3. Store sensor is a cool dry place such as a refrigerator.
4. If you do not have the original sensor container then store the sensor in a cool dry place making sure the membrane remains moist and the pins are not exposed to moisture.

Proper Replacement of DO Sensors-

Proper placement of o-rings is essential to the successful operation of dissolved oxygen analyzers. Please see the pictures below showing the proper location of both the small and large o-rings. Neither of these o-rings goes on the sensor.

Incorrect installation of o-rings will lead to analyzer problems such as failing calibration and/or incorrect sample readings. Misplacement of o-rings will cause corrosion of DO sensor pins and probe handle pin holes.



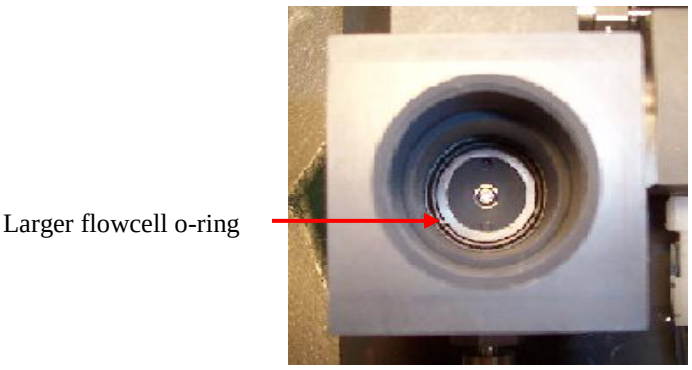


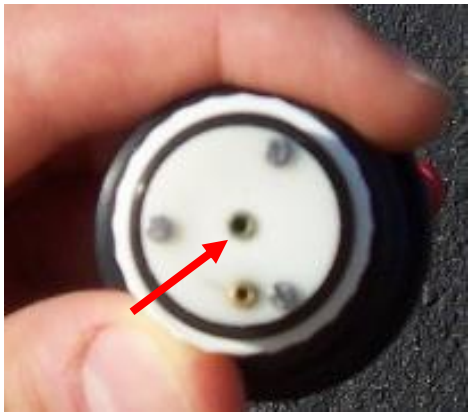
Figure – DO Analyzer Flowcell

Troubleshooting Tips for Frequent Replacement of DO Sensors-

** Important Note - A corroded probe handle assembly means frequent DO sensor replacement. Increased resistance due to corrosion causes increased drain on the sensor shortening its life. If the resistance is significant the micro amp output from the sensor will not reach the electronics.

1. Inspect probe handle assembly pins for corrosion. The pins on the probe handle should have a shiny gold color. (See pictures below)

GOOD



BAD

If you notice corrosion (discoloration) on the probe handle pins please contact Waltron to order a new probe handle assembly.

2. Do not allow probe handle pins or sensor pins to get wet or moist. Moisture will cause corrosion (see #1) and this will affect analyzer performance.

3. Higher temperature and/or higher DO sample concentrations significantly reduce the life of a DO sensor. Please monitor and know sample concentration and sample temperatures. (For every 10C above 30C, sensor life is cut in half.)

4. Check the temperature readout on the analyzer display. If displayed temperature is not within 3-4C of the true sample temperature then analyzer thermistor needs to be replaced. Please contact Waltron to order a new thermistor.

5. Check to make sure sample flowrate is steady and constant. Depending on severity of sample flowrate fluctuation – readings may change and sensor life may be affected.

As always, if you have any questions or concerns please feel free to contact Waltron Technical Service at 800-242-7353 (option #2) or email us at technicalsupport@waltron.net.

6 SPARE PARTS

Recommended Spare Parts

PART NUMBER	DESCRIPTION
K3010 -161A	Sensor Replacement Kit
P2000-026	Flowcell, 9061C
P2000-027	Probe Handle Assembly, 9061C
K1048-604	Flowcell Sealing Washer
K1152-200	Nupro Filter, Stainless Steel, 60 micron
K1048-612	Dissolved Oxygen Sensor O-ring

Additional Spare Parts

PART NUMBER	DESCRIPTION
P2000-028	Interconnect Cable, 3m
P2000-029	Interconnect Cable, 5m
P2000-030	Interconnect Cable, 10m
P1000-059	AC Power Terminal Box, 9001 Series
P1000-091	CPU card, 9061C, Panel Mount
P1000-091A	CPU card, 9061C, Wall Mount
P1000-092	Power Supply Card, 9061C
P1000-093	26 Pin FRC Cable, Panel Mount
P1000-095	Relinate Cable, Panel Mount
P1000-096	Berg Strip, Panel Mount
P1000-099	Connector 12-pin card edge, Panel Mount
P1000-100	LCD display, Panel Mount
P1000-105	O-ring, 9061C, flowcell
P1000-106	Fitting, SS, 9061C flowcell
P1000-107	Clip, sensor, 9061C flowcell
P1000-117	O-ring, probe handle assembly, 9061C

7 TROUBLESHOOTING

Problem	Possible Cause(s)	Solution(s)
Calibration Fail (CF)	POOR (low) sensor output.	Check probe handle assembly connection and other connections to sensor.
Calibration Fail (CF)	Sensor not exposed to air.	Make sure sensor is either removed and exposed to air or the flowcell is drained to expose it to air during CAL.
Calibration Fail (CF)	POOR (high) sensor output.	New sensor – needs to rinse down. Let sensor run on sample for 1 hour – repeat calibration.
Calibration Fail (CF)	POOR (low) sensor output.	Old/bad sensor. Replace sensor.
Readings are not accurate – too low.	Poor sensor performance. Bad calibration. Bad thermistor.	Replace sensor. Check CAL log and run another CAL if last result is not good. Verify temperature as indicated on analyzer.
Readings are not accurate – too high.	Poor sensor performance. Bad calibration. Dissolved Oxygen leak in sample system. Bad thermistor.	Let sensor run on sample water for 1-2 hours; then run another CAL. Replace sensor. Check CAL log and run another CAL if results are not good. Bench test sample water. Check temperature.
Readings are not accurate – too high	Defective probe handle assembly. Moisture in probe handle assembly.	Measure resistance of probe handle assembly. Verify there is no voltage (mV) generated by a galvanic reaction in handle assembly.
Readings are not accurate – too low	Defective probe handle assembly. High resistance in assembly or corrosion on mating pins.	Replace probe handle assembly.
Current outputs (4-20mA) not functioning correctly.	Disconnected wiring at transmitter or along wire path. DCS/recording system not set up properly. Bad CPU board.	Check output set-up to make sure values are entered properly. Run Diagnostics – O/Pma Check cycle and check output coming from transmitter. Replace CPU board.

Alarms not functioning correctly.	Disconnected wiring at transmitter or along wire path. DCS/recording system not set up properly. Bad DIO board.	Check alarm set-up to make sure values are entered properly. Run Diagnostics – Relay Check cycle and check alarm output directly from transmitter. Replace DIO board if output is not correct.
Display read "HOT"	Sample temperature over specified range (>131F). Faulty thermistor.	Check sample temperature. Clean/replace thermistor.
Display read "TEMP"	No thermistor response.	Clean/replace thermistor. Check thermistor connection on card.
Display read "OVR"	Signal from sensor too high – sample concentration over maximum range (>20ppm)	Check sample concentration. Check sensor connections.

8 SPECIFICATIONS

Range:	0-1000ppb, 1-20ppm
Accuracy:	+/- 1ppb of reading
Stability:	+/- 5% of reading or +/- 2ppb per week (whichever is greater)
Response Time:	90% step change in less than 3 minutes
Precision:	+/- 0.5ppb of reading
Current Outputs:	One isolated 4-20mA current (analog) output
Alarms:	Three voltage-free contacts, alarm points set from transmitter rated at 2A, 250VAC (non-inductive)
Power:	Wide range of input power supply 90VAC – 250VAC
Sample:	Temperature: 41-131F (5-55C); Flow 150-400ml/min
Ambient Temp:	32-131F (0-55C)
Pressure:	5-30psig
Composition:	Sample should be filtered to 60 microns, free of film forming compounds

Power Consumption:	Less than 20VA
Sample Inlet Fitting:	¼" Swagelok
Sample Outlet Fitting:	¼" Swagelok (drain downhill)

9 APPENDIX 9061C

This appendix is to be used as a reference. The information provided here is approximate and theoretical.

Dissolved Oxygen Concentration	Theoretical Input (uA)
9.6ppm	25uA
5.7ppm	15uA
2.3ppm	6uA
155ppb	0.40uA
6.9ppb	0.018uA

Approximate conversion of meters into feet for use in the elevation input.

Meters	Feet
0	0
10	33
25	82
50	164
100	328
200	656
300	984
400	1312
500	1640
600	1968
700	2296
800	2624
900	2952
1000	3280
2000	6560
3000	9840