



Catalog Number 6120018

Model 5740sc Galvanic Membrane Dissolved Oxygen Sensor

USER MANUAL

May 2005, Edition 2

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Section 1 Specifications

Specifications are subject to change without notice.

Components	Corrosion-resistant materials, fully-immersible probe with 10 m (30 ft) cable
Measuring Range (Dissolved Oxygen)	0 to 40 ppm (0 to 40 mg/L) or 200% saturation
Measuring Range (Temperature)	–5 to 50 °C (23–120 °F)
Probe Operating Temperature	–5 to 50 °C (23–120 °F)
Probe Storage Temperature	–5 to 70 °C (23–158 °F); 95% relative humidity, non-condensing
Response Time at 20 °C	120 seconds to 90% of value upon step change
Measurement Accuracy	±2% of span
Temperature Accuracy	±0.2 °C
Temperature Compensator	30K NTC Thermistor
Repeatability	±0.5% of span
Sensitivity	±0.5% of span
Calibration	Air/Sample
Maximum Pressure	10 bar (145 psi)
Sensor Interface	ModBUS; ProfiBus
Probe Cable Length	Integral 33 ft (10 m)
Probe Weight	0.26 kg (9.1 oz)
Probe Dimensions	See Figure 3 Probe Dimensions on page 11 .
Wetted Materials	Noryl, PVC, Viton, Polypropylene, Nylon
Electrode Materials	Nickel-chrome and lead
Minimum Flow Rate	0.5 cm/s (0.016 ft/s)
Measuring Principle	Galvanic

Section 2 General Information

2.1 Safety Information

Please read this entire manual before unpacking, setting up, or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Do not use or install this equipment in any manner other than that specified in this manual.

2.1.1 Use of Hazard Information

DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury.

Important Note: Information that requires special emphasis.

Note: Information that supplements points in the main text.

2.1.2 Precautionary Labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed

	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	This symbol, when noted on a product enclosure or barrier, indicates that a risk of electrical shock and/or electrocution exists.
	This symbol, if noted on the product, indicates the need for protective eye wear.
	This symbol, when noted on the product, identifies the location of the connection for Protective Earth (ground).
	This symbol, when noted on the product, identifies the location of a fuse or current limiting device.

2.2 General Sensor Information

The Galvanic Membrane Dissolved Oxygen Sensor allows aqueous samples to be easily and accurately analyzed for dissolved oxygen concentration. The system consists of a controller with an integrated display and a sensor for in-situ measurement.

The sensor can be using the sc100 ([Section 4 on page 13](#)) or sc1000 controller.

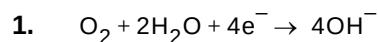
Optional equipment, such as mounting hardware for the probe, is supplied with instructions for all user installation tasks. Several mounting options are available, allowing the probe to be adapted for use in many different applications.

Typical applications include aeration basins, nutrient removal in equalization basins, aerobic and anaerobic digesters, effluent streams, rivers, lakes, and fish ponds.

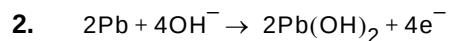
2.3 Theory of Operation

This galvanic oxygen sensor operates as a battery generating a voltage. The resulting voltage is directly proportional to the dissolved oxygen concentration. The cell is constructed with a fine wire coil cathode wrapped around a lead anode. A salt solution fills the void between the anode and cathode. The sensor is contained by a cylindrical membrane held in close proximity to the wire coil.

Oxygen from the solution to be tested enters the cell by diffusion through the membrane and then across the thin electrolyte layer to the cathode. The oxygen is reduced at the cathode as shown in reaction 1.



The cathode is at such a negative potential that it reduces all the oxygen that diffuses to its surface. The lead anode is oxidized to give an overall reaction that produces lead hydroxide as shown in reaction 2.



The overall result of this reaction is the consumption of the lead anode as current flows, yielding a very sensitive electrode that can detect changes at the microvolt level.

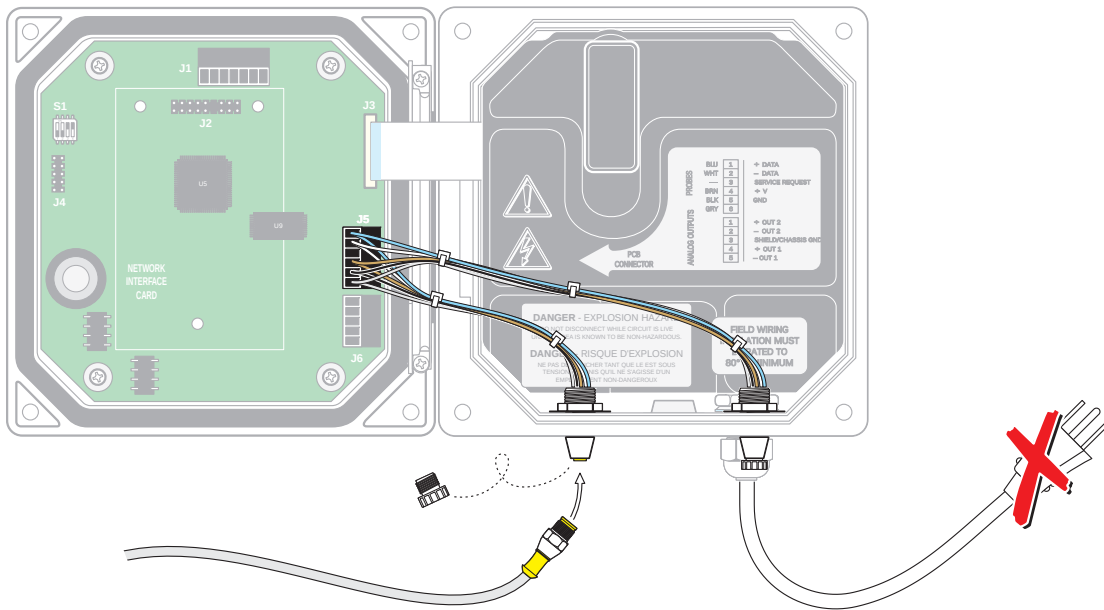
DANGER

Only qualified personnel should conduct the installation tasks described in this section of the manual.

3.1 Connecting/Wiring the Sensor to the sc100

The sensor cable is supplied with a keyed quick-connect fitting for easy attachment to the controller, see [Figure 1](#). Retain the connector cap to seal the connector opening in case the sensor must be removed. Optional extension cables may be purchased to extend the sensor cable length. If the total cable length exceeds 100 m (300 ft), a termination box must be installed. See [Replacement Parts](#) on [page 39](#).

Figure 1 Attaching the Sensor using the Quick-connect Fittings



3.1.1 Hard-wiring the Sensor to the sc100 Controller

1. Open the controller cover.
2. Disconnect and remove the existing wires between the quick connect and terminal strip J5, see [Figure 2](#).
3. Remove the quick-connect fitting and wires and install the threaded plug on the opening to maintain the environmental rating.
4. Cut the connector from the sensor cable.
5. Strip the insulation on the cable back 1-inch. Strip $\frac{1}{4}$ -inch of each individual wire end.
6. Pass the cable through conduit and a conduit hub or a strain relief fitting and an available access hole in the controller enclosure. Tighten the fitting.
7. Reinstall the plug on the sensor access opening to maintain the environmental rating.
8. Wire as shown in [Table 1](#).
9. Close and secure the controller cover.

Figure 2 Hard-wiring the Sensor

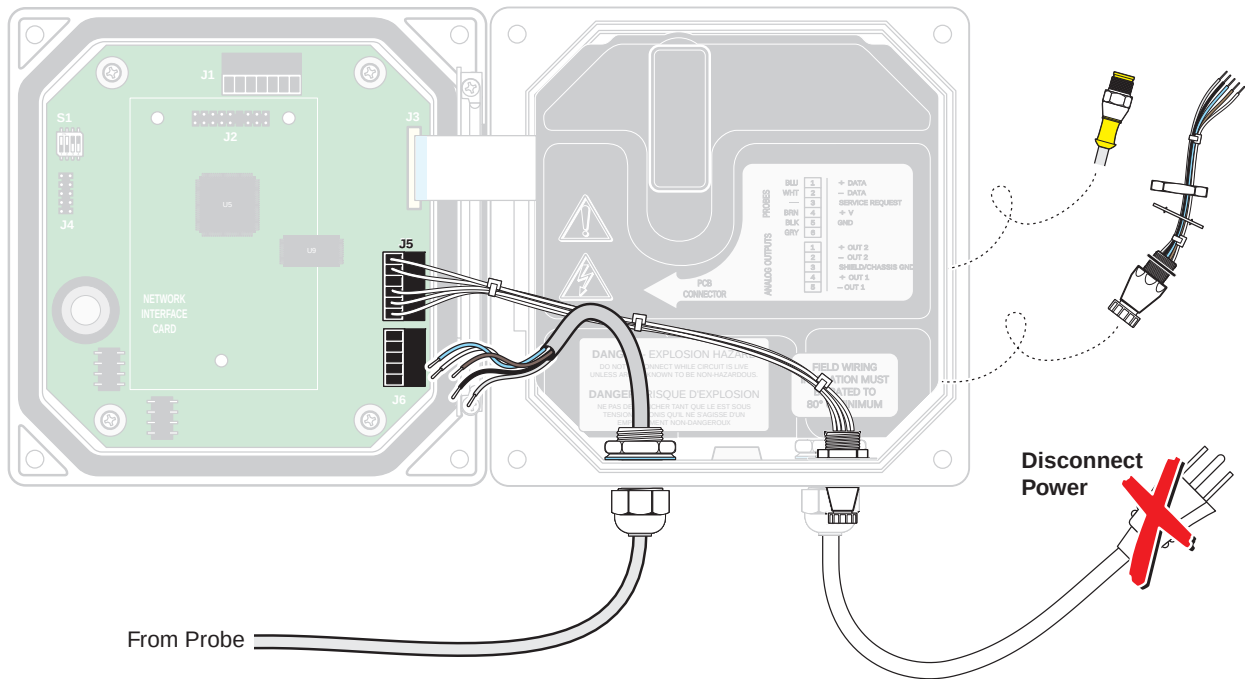


Table 1 Wiring the Sensor at Terminal Block J5

Terminal Number	Terminal Designation	Wire Color
J5-1	Data (+)	Blue
J5-2	Data (-)	White
J5-3	Service Request	No Connection
J5-4	+12 V dc	Brown
J5-5	Circuit Common	Black
J5-6	Shield	Shield (grey wire in existing quick-disconnect fitting)

3.2 Connecting the Sensor to the sc1000

1. Unscrew the protective cover on the controller socket. Retain the protective cover for the sensor. When the sensor is removed, re-fit the protective cover.
2. Push the connector into the socket. During this process pay attention to the lugs on the connector.
3. Hand-tighten the union nut.

Note: Do not use the middle connection for the sensors, which is reserved for the display module.

3.3 Installing the Sensor in the Sample Stream

Each sensor is supplied with a sensor locking for use with flow tee installations. Replace the sensor protector with the locking for those applications.

3.3.1 Sensor Installation Requirements

- Install the sensor so that the sample contacting it is representative of the entire process.
- Mount the sensor at least 508 mm (20 inches) from the aeration basin wall, and immerse it at least 508 mm (20 inches) into the process.
- Install the sensor so that its membrane will not be exposed to the atmosphere for more than 24 hours.
- Do not install the sensor directly over aerators or air diffusers when located in an aeration basin.
- Install the sensor near the outfall from an aeration basin for most effective aeration process monitoring and control.

Install the sensor using the instructions supplied with the installation apparatus.

See [Figure 3](#) for sensor dimensions and [Figure 4](#) for suggested mounting configurations.

Figure 3 Probe Dimensions

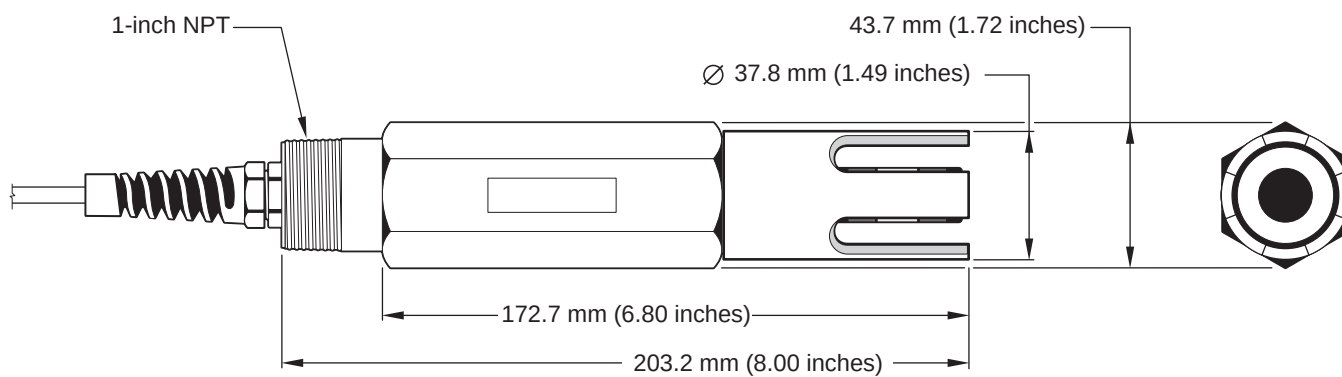
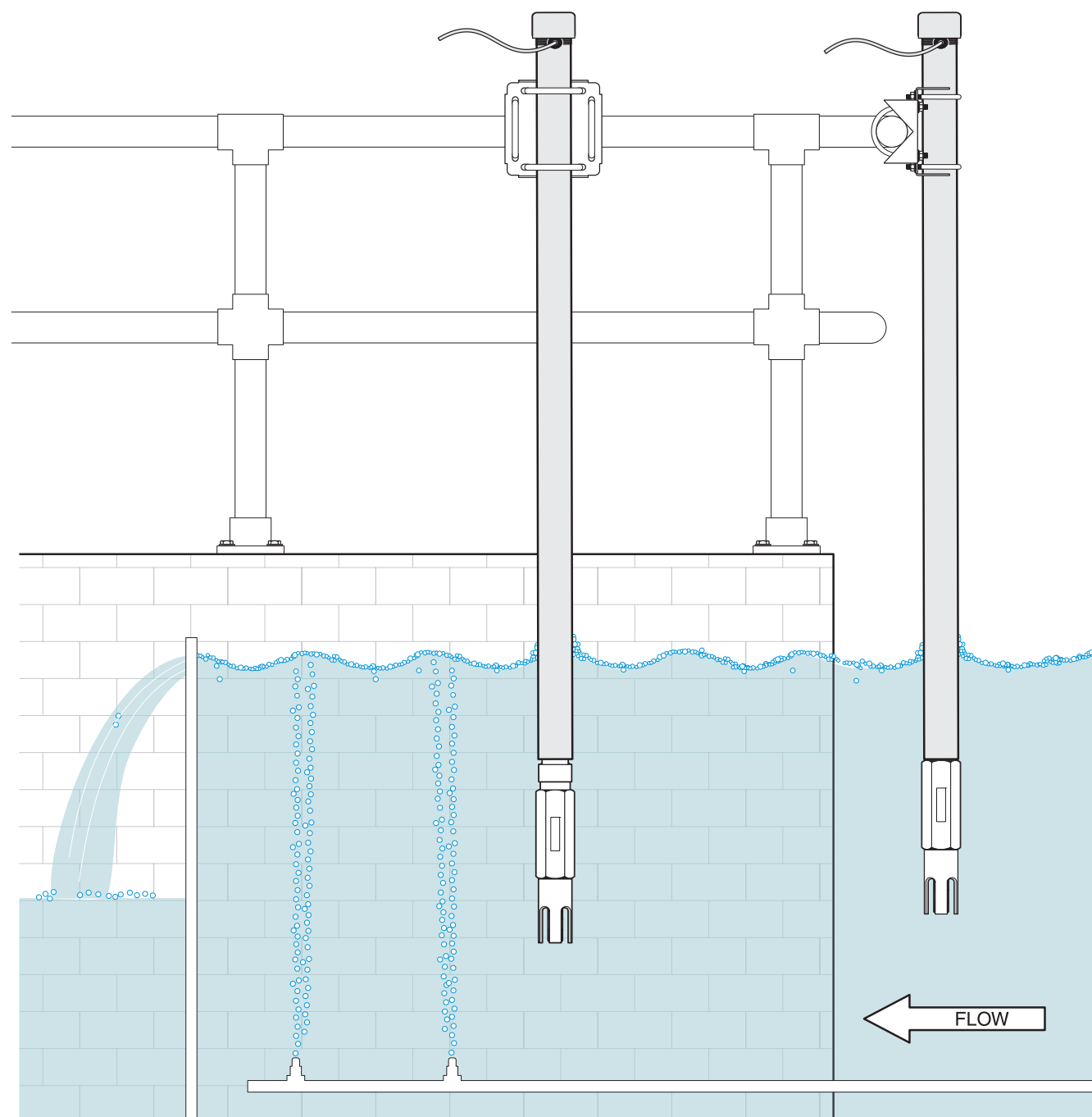


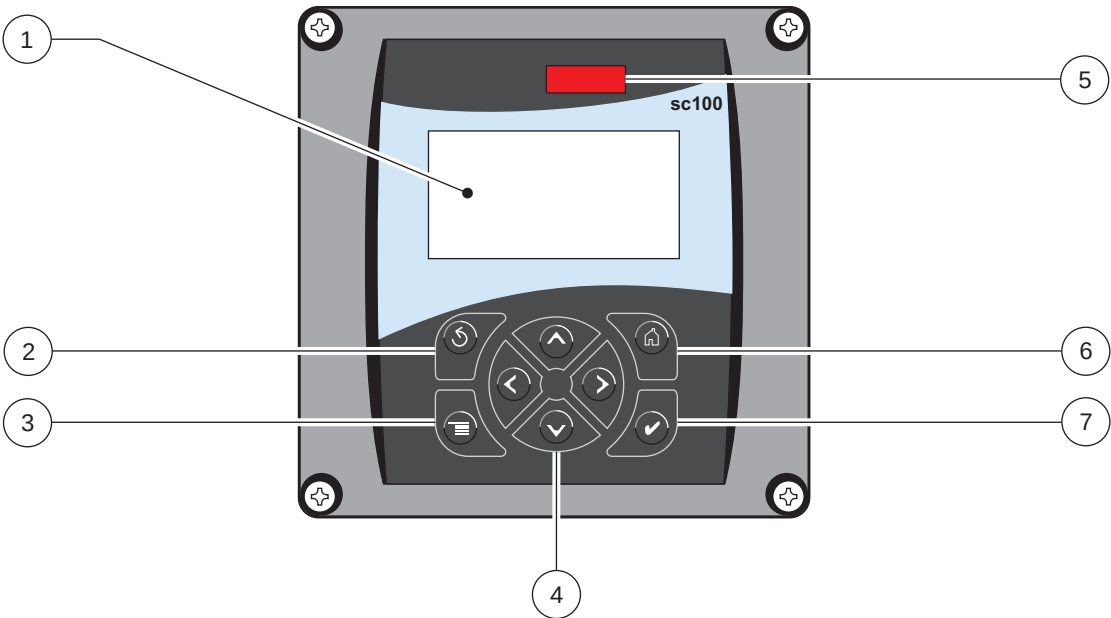
Figure 4 Sensor Installation Examples



4.1 Using the sc100 Controller

The front of the controller is shown in [Figure 5](#). The keypad consists of the eight keys described in [Table 2](#).

Figure 5 sc100 Display Features



1. Instrument display	5. IrDA Port
2. BACK key	6. HOME key
3. MENU key	7. ENTER key
4. RIGHT, LEFT, UP, and DOWN keys	

Table 2 Controller Key Functions/Features

Number	Key	Function
2		Moves back one level in the menu structure.
3		Moves to the main menu from other menus. This key is not active in menus where a selection or other input must be made.
4		Navigates through the menus, changes settings, and increments and decrements digits.
6		Moves to the Main Measurement screen from any other screen. This key is not active in menus where a selection or other input must be made.
7		Accepts an input value, updates, or accepts displayed menu options.

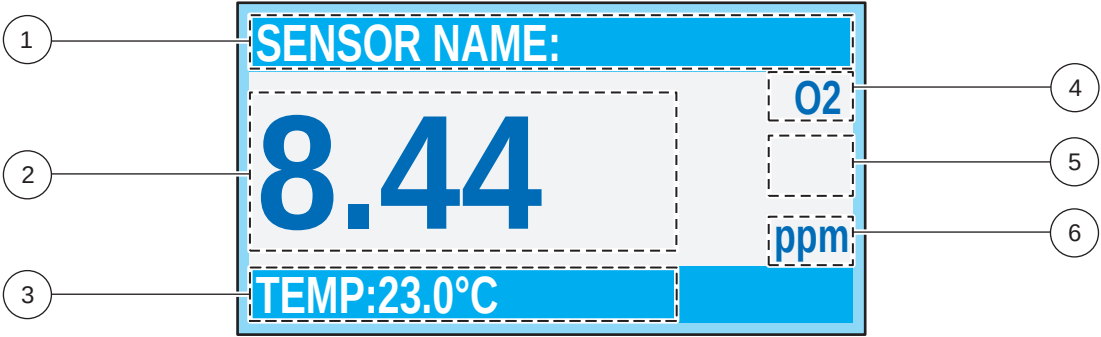
4.1.1 sc100 Display Features

When a sensor is connected and the controller is in measurement mode, the controller display will show the current dissolved oxygen reading plus the sample temperature.

The display will flash on startup, when a sensor error has occurred and when a sensor is calibrated.

An active system warning will cause the warning icon (a triangle with an exclamation point inside) to be displayed on the right side of the display.

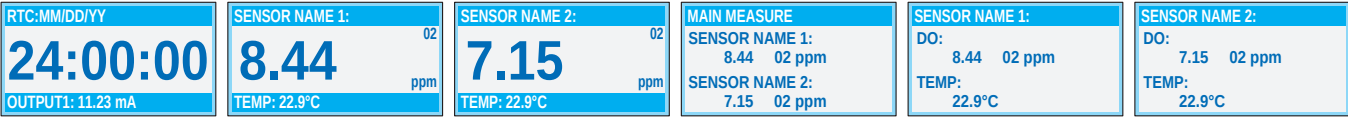
Figure 6 Display



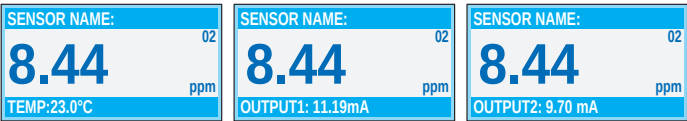
1. Status bar. Indicates the sensor name and status of relays. The relay letter is displayed when the relay is energized.	4. Parameter
2. Main measurement	5. Warning icon area
3. Secondary measurement	6. Measurement units

4.1.2 Important Key Presses

- Press **HOME** then the **RIGHT** or **LEFT** key to display two readings when two sensors are connected. Continue to press the **RIGHT** or **LEFT** key to toggle through the available display options.



- Press the **UP** and **DOWN** keys to toggle the status bar at the bottom of the measurement display to display the secondary measurement (temperature) and output information.



- When in Menu mode, an arrow may appear on the right side of the display to indicate that more menus are available. Press the **UP** or **DOWN** key (corresponding to the arrow direction) to display additional menus.



4.2 Sensor Setup

When a sensor is initially installed, the serial number of the sensor will be displayed as the sensor name. To change the sensor name refer to the following instructions:

4.2.1 Changing the Sensor Name

Step	Select	Menu Level/Instructions	Confirm
1		MAIN MENU	—
2		SENSOR SETUP	
3		Highlight the appropriate sensor if more than one sensor is attached.	
4		CONFIGURE	
5		EDIT NAME	
6	 	Select character to edit (shown in brackets).	—
	 	Scroll to appropriate character.	

4.2.2 Sensor Data Log

The data logs store the measurement data at selected intervals. The data logs are stored in a packed binary format and the event logs are stored in a CSV format. The logs can be downloaded through the digital network port, service port, or the IrDA port. DataCom is needed for downloading logs to a computer.

4.2.2.1 Sensor Data Logging

Step	Select	Menu Level/Instructions	Confirm
1		MAIN MENU	—
2		SENSOR SETUP	
3		CONFIGURE	
2		LOG SETUP	
4		SENSOR INTERVAL	
2		Scroll through the displayed options.	
4		TEMP INTERVAL	
2		Scroll through the displayed options.	
5		SET INTERVAL	

4.2.3 Pressure and Elevation

Table 3 can be used to estimate the true barometric pressure at certain elevations. The correspondence is based on the assumption that at sea level the barometric pressure is 760 mmHg. After determining the barometric pressure from the table or obtaining it from a local weather service, enter this value into the instrument, see [section 4.2.4 on page 16](#).

Note: If the barometric pressure from Table 3 is entered in the meter, the altitude entered in combination with this value must be 0 feet.

Table 3 Elevation Barometric Pressure

Elevation (Feet)	Barometric pressure (mmHg)	Elevation (Feet)	Barometric pressure (mmHg)
0	760	6000	613
500	746	6500	601
1000	733	7000	590
1500	720	7500	579
2000	708	8000	568
2500	695	8500	559
3000	683	9000	548
3500	671	9500	538
4000	659	10000	527
4500	647	10500	517
5000	635	11000	506
5500	624	—	—

4.2.4 Selecting Atmospheric Pressure Units

Note: The SET PRESSURE setting must be correct for proper measurement of percent saturation and proper operation of air calibration.

4.2.4.1 Atmospheric Pressure Units Procedure

Step	Select	Menu Level/Instructions	Confirm
1		MAIN MENU	—
2		SENSOR SETUP	
3		Highlight appropriate sensor if more than one sensor is attached.	
4		CONFIGURE	
5		PRESSURE UNITS	
6		Select from the displayed options (mmHg or altitude in feet or meters).	
7	 	Main Menu or Main Measurement Screen	—

4.3 Sensor Diagnostics Menu

SELECT SENSOR
ERROR LIST—See section 7.1 on page 37 .
WARNING LIST—See section 7.2 on page 37 .

4.4 Sensor Setup Menu

SELECT SENSOR (if more than one sensor is attached)
CALIBRATE
AIR CAL
Perform an air calibration of the sensor (slope calibration). See section 4.5.1 on page 19 .
SAMPLE CAL
Enter a value for the DO concentration as determined by another sensor or independent method. The instrument performs an offset calibration based on the entered value. See section 4.5.2 on page 20 .
TEMP ADJUST
Displays the measured temperature and allows the user to adjust the temperature by $\pm 15^{\circ}\text{C}$.
DEFAULT SETUP
Restores the gain and offset values to 1.0 and 0.0, respectively, and restores the sensor code to default.
CONFIGURE
EDIT NAME
Enter up to a 10-digit name in any combination of symbols and alpha or numeric characters.
MEAS UNITS
Select the appropriate measurement units to display. Choose from: mg/L, ppm, or percent. Default: ppm
TEMP UNITS
Select Celsius ($^{\circ}\text{C}$) or Fahrenheit ($^{\circ}\text{F}$); Default: $^{\circ}\text{C}$
AC FREQUENCY
Choose 50 or 60 Hz depending on the power line frequency for optimal noise rejection. Default is 60 Hz.
FILTER
Specify the number of seconds for signal averaging (0–60). Default: 0 seconds.
PRESSURE UNITS
Choose pressure units in mmHg, feet, meters. Default: mmHg
SET PRESSURE
Enter either altitude or air pressure. Correlates to the pressure units setting. Range: –5000 to 15000. Default: 760 mmHg
SALINITY UNITS
Choose from mS/cm, mMol/L, ppt, or mg/L. Default: mS/cm
SET SALINITY
User-entered value. Default: 0.00 $\mu\text{S/cm}$
LOG SETUP
Disable or choose the datalogging interval for sensor and temperature measurements. Use the arrow keys to move through the available choices for each. Default: Disabled

4.4 Sensor Setup Menu

CONFIGURE (continued)	
TEMP ELEMENT	
	Choose SELECT TYPE to specify the temperature sensor that is integrated into the sensor or choose SET MANUAL to disable automatic temperature compensation. Default temperature sensor: NTC 30K
CAL DAYS	
	Shows the number of days since the last calibration. Default reminder at 60 days.
SENSOR DAYS	
	Shows the number of days the sensor has been in service. Automatically reminds the user to replace the sensor after a set period of time. Default reminder at 365 days. Reset counter in DIAG/TEST/RESET SENSOR menu.
DEFAULT SETUP	
	Resets the sensor software to default settings.
DIAG/TEST	
PROBE INFO	
	SENSOR NAME—Displays the entered name of the sensor. Default is the sensor serial number. SERIAL NUMBER—Serial number of the sensor. SOFTWARE VERS—Displays the software version number. DRIVER VERS—Displays the sensor driver version number.
CAL DATA	
	CAL Q VALUE—Display for service diagnostics only. OFFSET CORR—User editable—to change the calibration offset. LAST CAL DATE—Shows the date of the last calibration. Default: 1-1-00
SIGNALS	
	SENSOR SIGNAL—Displays the sensor output in mV. SENSOR ADC COUNTS—Raw data for sensor ADC counts. Comparable to A/D counts. TEMP ADC CNTS—Raw data for temperature ADC counts. Comparable to A/D counts.
COUNTERS	
	SENSOR DAYS—Cumulative days the sensor has been in use. RESET SENSOR—Resets sensor counter.

4.5 Calibration

The dissolved oxygen sensor has been calibrated at the factory ([Specifications on page 5](#)). The calibration procedures that follow will result in an instrument offset or gain correction and may be performed if required by your regulatory agency. The air calibration is the most accurate method.

4.5.1 Calibration in Air

Step	Select	Menu Level/Instructions	Confirm
1	—	Remove the probe from the process stream and wipe with a wet cloth to remove debris and biological growth.	—
2	—	Place the probe in the supplied Calibration Bag, add a small amount of water (25–50 mL) and secure the bag to the probe body.	—
3	—	Remove the bagged probe from any heat source. .	—
4		MAIN MENU	—
5		SENSOR SETUP	
6		Highlight the appropriate sensor if more than one sensor is attached.	
7		CALIBRATE	
8		AIR CAL	
9		Choose from the available Output Mode options (Active, Hold, or Transfer).	
10	—	“Move the sensor to air”. The probe has been moved to air (in the calibration bag).	
11	—	The Air Calibration procedure will begin and “Press Enter When Stable”, the current DO and temperature readings will be displayed.	
12	—	The calibration will automatically be performed when the reading stabilizes (maximum 45 minute time-out) or press ENTER to accept the currently displayed value. One of the responses from Table 4 will be displayed:	
13		Follow the prompts to return the probe to the process	—

4.5.2 Sample Calibration

Step	Select	Menu Level/Instructions	Confirm
1	—	Remove the probe from the process and clean it	—
2	—	Obtain a sample solution with a known value.	—
3		MAIN MENU	—
4		SENSOR Setup	
5		Highlight the appropriate sensor if more than one sensor is attached.	
6		CALIBRATE	
7		SAMPLE CAL	
8		Choose from the available Output Mode options (Active, Hold, or Transfer). An output that has been placed in Hold or Transfer status will be automatically released when the calibration is complete.	
9	—	Move the clean probe to the sample.	
10	 	The display will prompt for entry of a salinity value. Use the UP and DOWN keys to change the digit that is flashing. Press the LEFT key to move to another digit.	
11	—	The display will show “Press Enter When Stable” and the current DO and temperature readings. When ENTER is pressed or when the reading has been accepted as stable, the display will change to an entry screen. If ENTER is not pressed, the sensor will determine when the reading is stable. If it is not stable within 45 minutes, the display will show “Unable to Calibrate”.	
12	 	When a stable reading has been accepted, the display will show “Sample Value” and an area for entry of the sample value. Edit the displayed reading.	
13	—	The display will show a response from Table 4 .	
14	—	Return the probe to the process.	—
15		The display will show “Press Enter when Stabilized” and the current DO and temperature readings. When ENTER is pressed or when the reading has been accepted as stable, the display will change to an entry screen. If ENTER is not pressed, the sensor will determine when the reading is stable. Two to three minutes for the reading to stabilize is typical, however, if it has not stabilized after 45 minutes, the display will show “Unable to Calibrate”.	
16	—	When a stable reading has been accepted, the display will show “Sample Cal” and an area for entry of the value obtained from the Winkler Titration.	—
17		Main Menu or Main Measurement Screen	—

Table 4 Calibration Response

Calibration Response	Explanation
Complete	Indicates the calibration is complete and stored in the instrument.
Cal Fail, Offset High	Indicates the air calibration has failed due to an excessively high calculated gain value. Repeat the calibration.
Cal Fail, Offset Low	Indicates the air calibration has failed due to too low of a calculated gain value. Repeat the calibration.
Cal Fail, Unstable	Indicates the air calibration has failed because the readings did not stabilize during the maximum allowed calibration time interval. Repeat the calibration.

4.5.3 Concurrent Calibration of Two Sensors

Step	Select	Menu Level/Instructions	Confirm
1	—	Begin a calibration on the first sensor and proceed to “Wait to Stabilize” is displayed.	
2	—	Select LEAVE.	
3	—	The display will return to the main measurement screen. The reading for the sensor currently being calibrated will be flashing.	—
4	—	Begin the calibration for the remaining sensor and proceed to “Wait to Stabilize” is displayed.	
5	—	Select LEAVE.	
6	—	The display will return to the main measurement screen and the reading for both sensors will be flashing.	
7	—	To return to the calibration of either sensor, press MENU , select Probe Setup and ENTER . Select the appropriate sensor and ENTER .	

5.1 Using the sc1000 Controller

The sc1000 is a touch screen application. Use your finger to touch keys and menu commands. In normal operation the touch screen displays the measured values for the sensors selected.

5.1.1 Display Features

5.1.1.1 Using the Pop-up Toolbar

The pop-up toolbar provides access to the controller and sensor settings. The toolbar is normally hidden from view. To view the toolbar, touch the bottom-left of the screen.

Figure 7 Pop-up Toolbar Functions



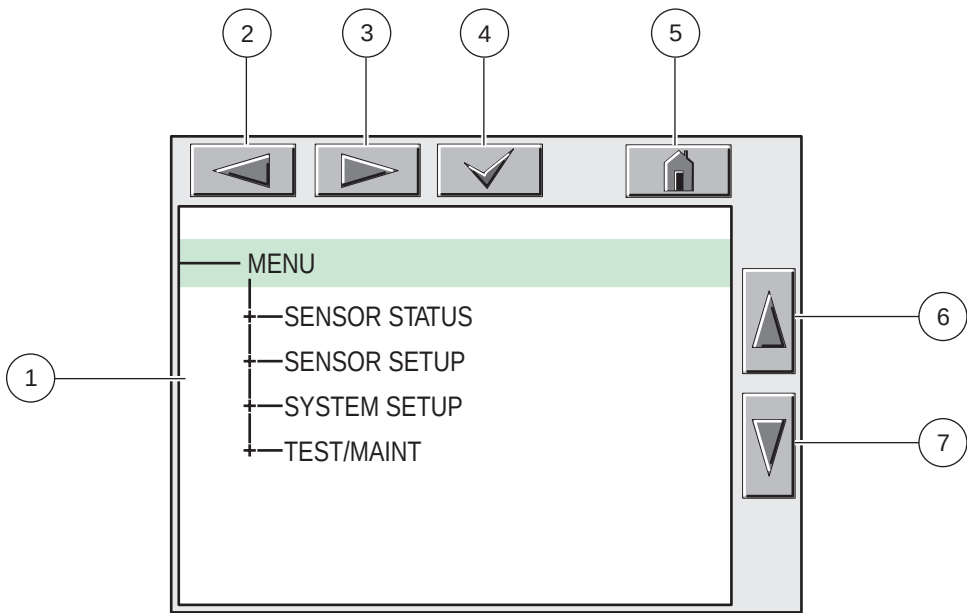
	MAIN MENU —displays the Main Menu Structure
	UP Arrow —scrolls up to the previous displayed value.
	Displays one value.
	Displays two values at the same time.
	Displays four values at the same time.
	LIST —displays the list of connected devices and sensors.
	DOWN Arrow —scrolls down to the next displayed value.

5.1.1.2 Using the Menu Windows

If the Menu button (from the pop-up toolbar) is selected, the Main Menu screen is opened. The Main Menu screen allows the user to view the sensor status, configure the sensor setup, system setup, and perform diagnostics.

The menu structure may vary depending on the configuration of the system.

Figure 8 Main Menu



1.	Display Area
2.	BACK
3.	FORWARD
4.	ENTER —confirms the entry or selection.
5.	HOME —changes to the display of measured values. The pop-up toolbar cannot open from the menu window. To view the Main Menu from this display, touch the Home button and then the bottom of the screen.
6.	UP —scrolls up
7.	DOWN —scrolls down

5.1.1.3 Navigating the Menu Windows

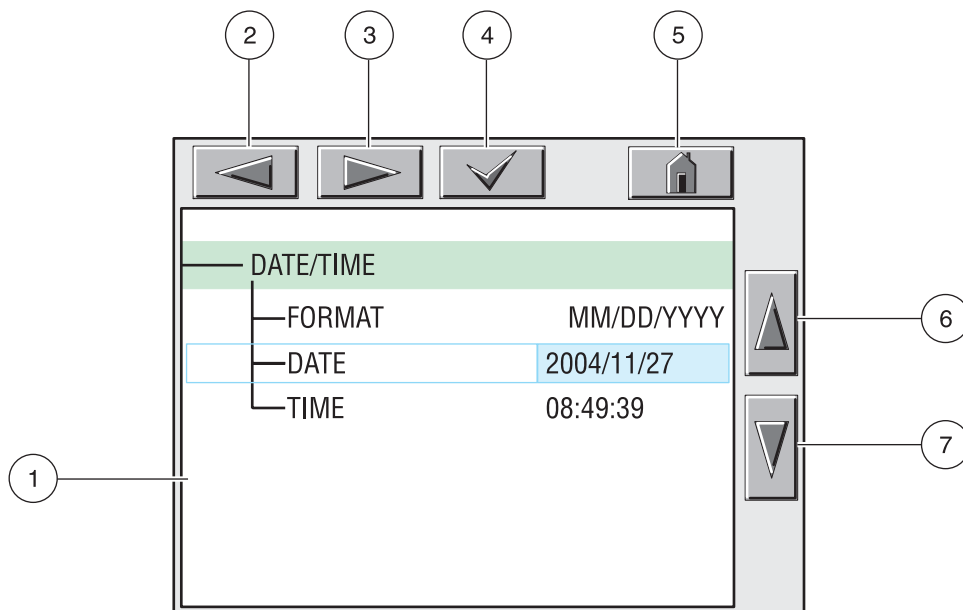
To view a menu item, touch the menu item or use the **UP** and **DOWN** keys to highlight the item. The menu item remains highlighted for approximately 4 seconds after it is selected. To view the highlighted command, select the area to the left of the menu item or select the **ENTER** button.

A “+” next to a menu command indicates there is a submenu. Touch the “+” to view the submenu. An “i” next to a menu command indicates it is information only.

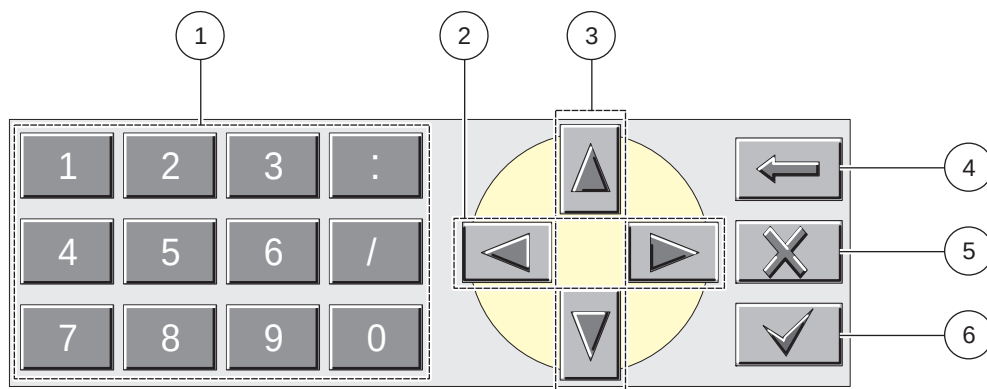
If a menu item is editable, highlight the item and touch the far-left part of the menu item until it is highlighted and press **ENTER** or double-tap the highlighted item. A keypad will be displayed to change an entry (Figure 10 on page 25) or a list box will be displayed (Figure 11 on page 26).

Messages are displayed in the message window (Figure 12 on page 26).

If an entry is incorrect, repeat the entry with the correct values. If the entry is outside the working range, a correction to the entry is made automatically.

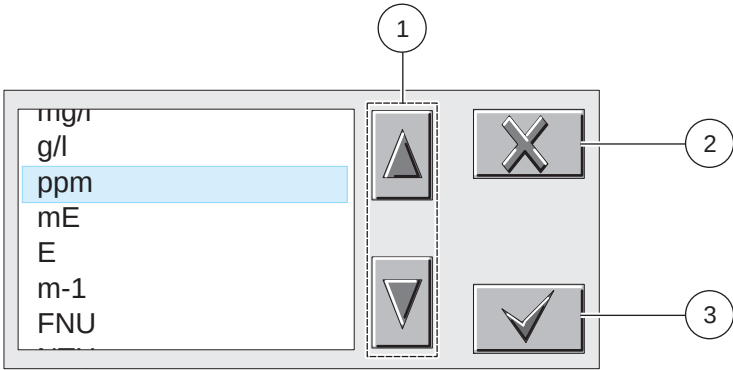
Figure 9 Changing a Menu Item

1. Display Area	5. HOME—changes to the display of measured values.
2. BACK	6. UP—scrolls up
3. FORWARD	7. DOWN—scrolls down
4. ENTER—confirms the entry or selection.	

Figure 10 Keypad

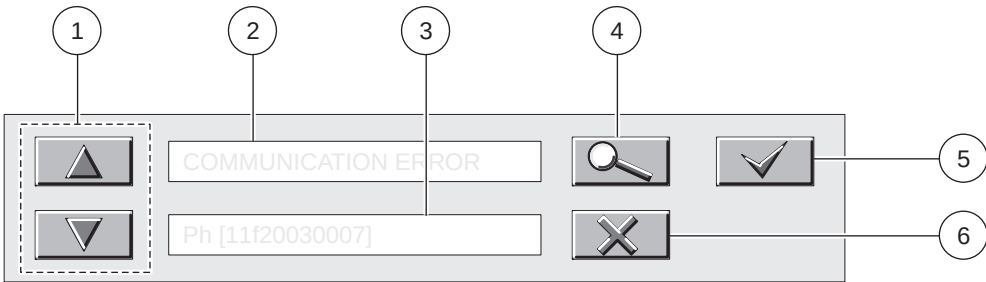
1. Enters numbers or the character as shown on the button.
2. Moves the cursor one position to the left or to the right.
3. Increase/Decrease a number or letter at the cursor position. Keep the button pressed to change the numbers/characters continuously.
4. Deletes the character to the left of the cursor.
5. CANCEL—cancels the entry.
6. ENTER—confirms the entry or selection.

Figure 11 List Box



- | |
|--|
| 1. Scrolls up or down |
| 2. CANCEL —cancels and entry. |
| 3. ENTER —confirms a selection. |

Figure 12 Message window



- | |
|---|
| 1. Scrolls up or down. |
| 2. Displays the messages or warnings. |
| 3. Displays details on the selected entry. |
| 4. This button changes back to the previous display. |
| 5. ENTER —confirms an entry. |
| 6. CANCEL —cancels an entry. |

5.2 Sensor Setup

When a sensor is initially installed, the serial number of the sensor will be displayed as the sensor name. To change the sensor name refer to the following instructions:

1. Tap the bottom-left of the screen to display the pop-up toolbar and press **MAIN MENU**.
2. From the Main Menu, select **SENSOR SETUP** and press **ENTER**.
3. Highlight the appropriate sensor if more than one sensor is attached and press **ENTER**.
4. Select **CONFIGURE** and press **ENTER**.
5. Select **EDIT NAME** and tap on the dark-blue highlighted area to the far-right. Use the keypad to edit the name. Press **ENTER** to confirm or **CANCEL** to return to the Sensor Setup menu.

5.3 Sensor Data Logging

The sc1000 provides a data log for each sensor.

1. Tap the bottom-left of the screen to display the pop-up toolbar and press **MAIN MENU**.
2. From the Main Menu, select **SENSOR SETUP** and press **ENTER**.
3. Highlight the appropriate sensor if more than one sensor is attached and press **ENTER**.
4. Select **CONFIGURE** and press **ENTER**.
5. Select **LOG SETUP** and press **ENTER**.
6. Select from the logging interval options from the list box and press **ENTER**.

5.4 Pressure and Elevation

Note: If the barometric pressure from [Table 5](#) is entered in the meter, the altitude entered in combination with this value must be 0 feet.

[Table 5](#) can be used to estimate the true barometric pressure at certain elevations. The correspondence is based on the assumption that at sea level the barometric pressure is 760 mm Hg. After determining the barometric pressure from the table or obtaining it from a local weather service, enter this value into the instrument.

Table 5 Elevation Barometric Pressure

Elevation in feet	Barometric pressure in mm Hg	Elevation in feet	Barometric pressure in mm Hg
0	760	6000	613
500	746	6500	601
1000	733	7000	590
1500	720	7500	579
2000	708	8000	568
2500	695	8500	559
3000	683	9000	548
3500	671	9500	538
4000	659	10000	527
4500	647	10500	517
5000	635	11000	506
5500	624	—	—

5.4.1 Selecting Atmospheric Pressure

1. Tap the bottom-left of the screen to display the pop-up toolbar and press **MAIN MENU**.
2. From the Main Menu, select SENSOR SETUP and press **ENTER**.
3. Select the appropriate sensor if more than one is attached and press **ENTER**.
4. Select CONFIGURE and press **ENTER**.
5. Select AIR PRESS/ALT UNITS and tap on the dark-blue highlighted area to the far-right. Select the appropriate units from the list box. Press **ENTER** to confirm the selection.
6. Select AIR PRESS/ALT and tap on the dark-blue highlighted area to the far-right. Change the value using the keypad and press **ENTER** to confirm the select.

***Note:** AirPress/Alt must be correct for proper measurement of % saturation and operation of air calibration.*

5.5 Sensor Status Menu

SELECT SENSOR
ERROR LIST—See section 7.1 on page 37 .
WARNING LIS—See section 7.2 on page 37 .

5.6 Sensor Setup Menu

SELECT SENSOR (if more than one sensor is attached)
CALIBRATE
AIR CAL
Perform an air calibration of the sensor (slope calibration). See section 5.7.1 on page 30 .
SAMPLE CAL
Enter a value for the DO concentration as determined by another sensor or independent method. The instrument performs an offset calibration based on the entered value. See section 5.7.2 on page 31 .
TEMP ADJUST
Displays the measured temperature and allows the user to adjust the temperature by ± 15 °C.
DEFAULT SETUP
Restores the gain and offset values to 1.0 and 0.0, respectively, and restores the sensor code to default.
CONFIGURE
EDIT NAME
Enter up to a 10-digit name in any combination of symbols and alpha or numeric characters.
MEAS UNITS
Select the appropriate measurement units to display. Choose from: mg/L, ppm, or percent. Default: ppm
TEMP UNITS
Select Celsius (°C) or Fahrenheit (°F); Default: °C
AC FREQUENCY
Choose 50 or 60 Hz depending on the power line frequency for optimal noise rejection. Default is 60 Hz.

5.6 Sensor Setup Menu (continued)

CONFIGURE (continued)	
FILTER	
	Specify the number of seconds for signal averaging (0–60). Default: 0 seconds.
PRESSURE UNITS	
	Choose pressure units in mmHg, feet, meters. Default: mmHg
SET PRESSURE	
	Enter either altitude or air pressure. Correlates to the pressure units setting. Range: –5000 to 15000. Default: 760 mmHg
SALINITY UNITS	
	Choose from mS/cm, mMol/L, ppt, or mg/L. Default: mS/cm
SET SALINITY	
	User-entered value. Default: 0.00 µS/cm
LOG SETUP	
	Disable or choose the datalogging interval for sensor and temperature measurements. Use the arrow keys to move through the available choices for each. Default: Disabled
TEMP ELEMENT	
	Choose SELECT TYPE to specify the temperature sensor that is integrated into the sensor or choose SET MANUAL to disable automatic temperature compensation. Default temperature sensor: NTC 30K
CAL DAYS	
	Shows the number of days since the last calibration. Default reminder at 60 days.
SENSOR DAYS	
	Shows the number of days the sensor has been in service. Automatically reminds the user to replace the sensor after a set period of time. Default reminder at 365 days. Reset counter in DIAG/TEST/RESET SENSOR menu.
DEFAULT SETUP	
	Resets the sensor software to default settings.
DIAG/TEST	
PROBE INFO	
	SENSOR NAME—Displays the entered name of the sensor. Default is the sensor serial number. SERIAL NUMBER—Serial number of the sensor. SOFTWARE VERS—Displays the software version number. DRIVER VERS—Displays the sensor driver version number.
CAL DATA	
	CAL Q VALUE—Display for service diagnostics only. OFFSET CORR—User editable—to change the calibration offset. LAST CAL DATE—Shows the date of the last calibration. Default: 1-1-00
SIGNALS	
	SENSOR SIGNAL—Displays the sensor output in mV. SENSOR ADC COUNTS—Raw data for sensor ADC counts. Comparable to A/D counts. TEMP ADC CNTS—Raw data for temperature ADC counts. Comparable to A/D counts.
COUNTERS	
	SENSOR DAYS—Cumulative days the sensor has been in use. RESET SENSOR—Resets sensor counter.

5.7 Calibration

The dissolved oxygen sensor has been calibrated at the factory to the specifications listed on [Specifications on page 5](#). Due to the inherent accuracy and stability of the luminescent dissolved oxygen technology, sensor calibration is seldom or never necessary. The calibration procedures will result in an instrument offset or gain correction and may be performed if required by regulatory agencies. The air calibration is the most accurate method. The calibration by comparison method is the least accurate and is therefore not recommended.

For continued accuracy and repeatability, the manufacturer recommends replacing the sensor cap after one year of operation.

5.7.1 Calibration in Air

1. Remove the sensor from the process stream and wipe with a wet cloth to remove debris and biological growth.
2. Place the sensor in the supplied Calibration Bag, add a small amount of water (25–50 mL) and secure the bag to the sensor body.
3. Lay the bagged probe on a flat surface where it will not be exposed to a heat source.
4. Tap the bottom-left of the screen to display the pop-up toolbar and press **MAIN MENU**.
5. From the Main Menu, select SENSOR SETUP and press **ENTER**.
6. Select the appropriate sensor if more than one is attached and press **ENTER**.
7. Select CALIBRATE and press **ENTER**.
8. Select AIR CAL and tap on the dark-blue highlighted area to the far-right. Select the available Output Mode (Active, Hold, or Transfer) from the list box and press **ENTER** to confirm.
9. “Move the sensor to air” will be displayed if the sensor is moved to air (in the calibration bag).
10. The Air Calibration procedure will begin and “Wait to Stabilize” will be displayed. The current DO and temperature readings will be displayed. Press **ENTER** to confirm?
11. The calibration will automatically occur when the reading stabilizes or when **ENTER** is selected to base the calibration on the currently displayed value. Two to three minutes for the reading to stabilize is typical, however, if it has not stabilized after 45 minutes, the display will read “Unable to Calibrate”. After calibration, one of the responses in [Table 6 on page 33](#) will be displayed.
12. Follow the prompts to return the sensor to the process.

5.7.2 Sample Cal—Calibration by Comparison to a Winkler Titration

1. Tap the bottom-left of the screen to display the pop-up toolbar and press **MAIN MENU**.
2. From the Main Menu, select **SENSOR SETUP** and press **ENTER**.
3. Select the appropriate sensor if more than one is attached and press **ENTER**.
4. Select **CALIBRATE** and press **ENTER**.
5. Select **SAMPLE CAL** and tap on the dark-blue highlighted area to the far-right. Select the available Output Mode (Active, Hold, or Transfer) from the list box and press **ENTER**.

Note: An output that has been placed in Hold or Transfer status will be automatically released when the calibration is complete.

6. Remove the sensor from the process stream and gently wipe with a wet cloth to remove all debris and biological growth. Remaining debris will affect the Winkler Method of analysis.
7. Measure 1000 mL of deionized water. Allow the water to come to the thermal and dissolved oxygen equilibrium (approximately 20 minutes).
8. Fill a standard BOD bottle and then place the sensor in a beaker containing the remainder of the deionized water.
9. Perform the Winkler Titration using Cat. No. 1469-00 Winkler Test Kit on the deionized water in the BOD bottle while waiting for the process sensor to stabilize.
10. Move the sensor to the sample.
11. The display will show "Press **ENTER** when Stabilized" and the current DO and temperature readings. When **ENTER** is pressed or when the reading has been accepted as stable, the display will change to an entry screen. If **ENTER** is not pressed, the sensor will determine when the reading is stable. Two to three minutes for the reading to stabilize is typical, however, if it has not stabilized after 45 minutes, the display will show "Unable to Calibrate".
12. When a stable reading has been accepted, the display will show "Sample Cal" and an area for entry of the value obtained from the comparison method. When the entry screen is displayed, enter the value from the hand-held or winkler titration and press **ENTER**.
13. After calibration, one of the responses in [Table 6 on page 33](#) will be displayed.

5.7.3 Sample Cal—Calibration by Comparison to a Hand-held DO Analyzer

1. Place the dissolved oxygen sensor as close to the LDO sensor as possible.
2. Wait for the hand-held DO analyzer to stabilize.
3. Tap the bottom-left of the screen to display the pop-up toolbar and press **MAIN MENU**.
4. From the Main Menu, select SENSOR SETUP and press **ENTER**.
5. Select the appropriate sensor if more than one is attached and press **ENTER**.
6. Select CALIBRATE and press **ENTER**.
7. Select SAMPLE CAL and tap on the dark-blue highlighted area to the far-right. Select the available Output Mode (Active, Hold, or Transfer) from the list box and press **ENTER** to confirm.
8. The display will show “Press Enter when Stabilized” and the current DO and temperature readings. When **ENTER** is pressed or when the reading has been accepted as stable, the display will change to an entry screen. If **ENTER** is not pressed, the sensor will determine when the reading is stable. Two to three minutes for the reading to stabilize is typical, however, if it has not stabilized after 45 minutes, the display will show “Unable to Calibrate”.
9. When a stable reading has been accepted, the display will show “Sample Cal” and an area for entry of the value obtained from the Winkler Titration.
10. Change the displayed reading to match the hand-held DO analyzer memory.
11. After calibration, one of the responses in [Table 6 on page 33](#) will be displayed.

5.7.4 Concurrent Calibration of Two Sensors

1. Begin a calibration on the first sensor and proceed when “Wait to Stabilize” is displayed.
2. Select the **BACK** arrow, then LEAVE. The display will return to the Main Measurement screen.
3. Begin the calibration for the second sensor and continue until “Wait to Stabilize” is displayed.
4. Select the **BACK** arrow, then LEAVE. The display will return to the Main Measurement screen and the reading for both sensors will be flashing.
5. To return to the calibration of either sensor, tap the bottom of the screen to display the pop-up toolbar. Select the Main Menu button. Select SENSOR SETUP and press **ENTER**. Select the appropriate sensor and **ENTER**.
6. The calibration in progress will be displayed. Continue with the calibration.

Table 6 Calibration Response

Calibration Response	Explanation
Cal Complete	Indicates the Calibration is complete.
Cal Fail, Offset High	Indicates the air calibration has failed due to an excessively high calculated gain value. Repeat the calibration.
Cal Fail, Offset Low	Indicates the air calibration has failed due to too low of a calculated gain value. Repeat the calibration.
Cal Fail, Unstable	Indicates the air calibration has failed because the readings did not stabilize during the maximum allowed calibration time interval. Repeat the calibration.

Section 6 Maintenance

DANGER

Only qualified personnel should conduct the tasks described in this section of the manual.

6.1 Maintenance Schedule

Maintenance Task	90 days	120 days	365 days
Clean the sensor ¹	x		
Inspect sensor for damage	x		
Replace sensor			x
Replace sensor O-rings		x	
Calibrate Sensor (as required by regulatory agency)	Per the schedule mandated by your regulatory agency.		

¹ Cleaning frequency is application dependent. More or less frequent cleaning will be appropriate in some applications.

6.2 Cleaning the Sensor

Clean the exterior of the sensor with a stream of water. If debris remains, wipe with a soft, wet cloth.

6.2.1 Cleaning the Galvanic Sensor

Clean the sensor membrane before each calibration to ensure best results. Clean and calibrate monthly or until operating experience determines appropriate intervals.

Using a soft wet cloth and mild soap solution, remove all debris from the membrane surface. Rinse thoroughly with distilled water.

Note: While cleaning the sensor membrane, be careful not to puncture it.

6.3 Preventing the Sensor Membrane from Drying Out

When the sensor is removed from the process solution, its membrane immediately begins drying out. After more than 24 hours, the electrolyte behind the membrane may become depleted due to evaporation. If the sensor is returned to operation after this has occurred, measurement readings may be inaccurate.

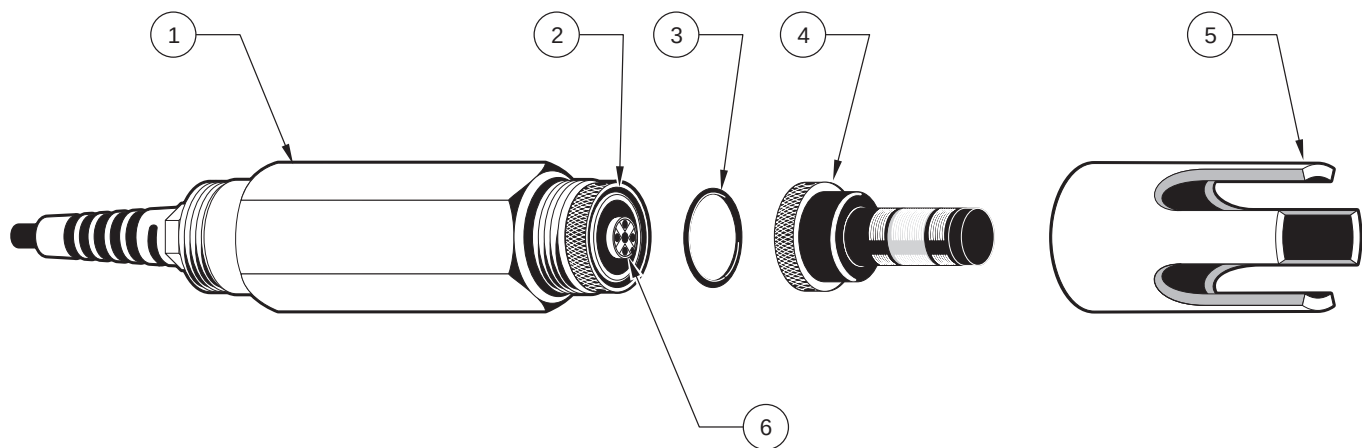
Membrane dry-out and electrolyte evaporation can be avoided by temporarily placing the sensor in a container of clean drinking water until it can be put back into operation.

6.4 Replacing the Sensor Assembly

The sensor assembly consists of a pre-installed membrane, electrolyte, and electrode.

- 1. Unscrew the sensor guard or optional lock ring and remove the spent or damaged sensor assembly.
- 2. Install the o-ring onto the groove in the probe body, see item 2 and 3 in [Figure 13](#).
- 3. Align the sensor assembly connector with the probe body socket, see item 6 in [Figure 13](#).
- 4. Reinstall the sensor guard or lock ring.
- 5. Condition the new sensor before taking measurements. See [section 5.2 on page 23](#).

Figure 13 Replacing the Sensor Assembly



1. Probe Body	4. Sensor Assembly
2. Item 3 seats in groove.	5. Sensor Guard (if sensor guard is not used, install the optional lock ring)
3. O-ring, (Cat. No. 1857100)	6. Check for connector orientation during assembly.

Section 7 Troubleshooting

7.1 Error Codes

When a sensor is experiencing an error condition, the sensor reading on the measurement screen will flash and all relays and analog outputs associated with this sensor will be held. The following conditions will cause the sensor reading to flash:

- Sensor calibration
- Relay timer washing cycle
- Loss of communication

Highlight the Sensor Diag menu and press **ENTER**. Highlight Errors and press **ENTER** to determine the cause of the error. Errors are defined in [Table 7](#).

Table 7 Error Codes

Displayed Error	Definition	Resolution
ADC FAILURE	A/D conversion fails.	Call the Service Department.
SENSOR PUNC	Sensor punctured.	Replace sensor cartridge. ¹

¹ Replacement of the cartridge will reset the read out.

7.2 Warnings

A sensor warning will leave all menus, relays, and outputs functioning normally, but will cause a warning icon to flash on the right side of the display. Highlight the Sensor Diag menu and press **ENTER** to determine the cause of the warning.

A warning may be used to trigger a relay and users can set warning levels to define the severity of the warning. Errors are defined in [Table 8](#).

Table 8 Warning Codes

Displayed Warning	Definition	Resolution
PROBE OUT RANGE	No probe connected or measurement reading is out of range.	Check the DO range and ensure that it is within 0–40 ppm.
TEMP OUT RANGE	No temperature element connected or temperature reading is out of range.	Check the temperature range and ensure that it is within –20 °C to 200 °C.
FLASH FAILURE	Cannot write flash memory.	Call the Service Department.
CAL REQUIRED	Past the calibration days since last calibration date.	Calibrate the sensor.
REPLACE SENSOR	Past the total days of current sensor in use.	Install new sensor.

7.3 Sensor Troubleshooting

Table 9 Sensor Troubleshooting

Problem	Cause	Resolution
Sensor reading remains at 0 or max. value for 24 hours or more	Membrane is punctured	Compare reading to measurement obtained by a hand-held DO sensor. If different, Replace sensor cartridge. Call Customer Service.
Cannot calibrate the sensor	Sensor module or sensor membrane is bad.	Replace sensor cartridge. Recalibrate the sensor. Call Customer Service.

Section 8 Replacement Parts

8.1 Replacement Items

Description	QTY	Catalog Number
5740 sc Galvanic Membrane Dissolved Oxygen Sensor	1	5740D0B
Calibration bags		276M1210
Instruction manual, DO System, English	1	6120018
O-ring, DO probe (0.070 x 0.926 ID)	1	1857100
Sensor Cartridge, replacement, galvanic membrane DO w/thermistor	1	6126700

8.2 Accessories

Description	QTY	Catalog Number
Air blast cleaning head for 5740 sc galvanic membrane dissolved oxygen sensor	1	6130500
Air blast cleaning system, 115 V, does not include head, order separately	1	6136100
Air blast cleaning system, 230 V, does not include head, order separately	1	6136200
Cable, sensor extension, 7.7 m (25 ft)	1	5796000
Cable, sensor extension, 15 m (50 ft)	1	5796100
Cable, sensor extension, 31 m (100 ft)	1	5796200
Electrolyte Solution (60 mL bottle)	1	25M7A1002-105
Mounting hardware kit, pipe	1	5794400
Mounting hardware kit, ball float	1	5794300
Plug, sealing, conduit opening	1	5868700
Strain relief, Heyco	1	16664
Termination Box	1	5867000
Winkler titration kit	1	146900

Section 9 How to Order

U.S.A. Customers

By Telephone:

6:30 a.m. to 5:00 p.m. MST
Monday through Friday
(800) 227-HACH (800-227-4224)

By Fax:

(970) 669-2932

By Mail:

Hach Company
P.O. Box 389
Loveland, Colorado 80539-0389 U.S.A.
Ordering information by e-mail: orders@hach.com

Information Required

- Hach account number (if available)
- Your name and phone number
- Purchase order number
- Brief description or model number
- Billing address
- Shipping address
- Catalog number
- Quantity

International Customers

Hach maintains a worldwide network of dealers and distributors. To locate the representative nearest you, send an e-mail to: intl@hach.com or contact:

Hach Company World Headquarters; Loveland, Colorado, U.S.A.
Telephone: (970) 669-3050; Fax: (970) 669-2932

Technical and Customer Service (U.S.A. only)

Hach Technical and Customer Service Department personnel are eager to answer questions about our products and their use. Specialists in analytical methods, they are happy to put their talents to work for you.

Call 1-800-227-4224 or e-mail techhelp@hach.com

Section 10 Repair Service

Authorization must be obtained from Hach Company before sending any items for repair.
Please contact the Hach Service Center serving your location.

In the United States:

[Hach Company](#)
[Ames Service](#)
100 Dayton Avenue
Ames, Iowa 50010
(800) 227-4224 (U.S.A. only)
FAX: (515) 232-3835

In Canada:

Hach Sales & Service Canada Ltd.
1313 Border Street, Unit 34
Winnipeg, Manitoba
R3H 0X4
(800) 665-7635 (Canada only)
Telephone: (204) 632-5598
FAX: (204) 694-5134
E-mail: canada@hach.com

In Latin America, the Caribbean, the Far East

Indian Subcontinent, Africa, Europe, or the Middle East:
Hach Company World Headquarters,
P.O. Box 389
Loveland, Colorado, 80539-0389 U.S.A.
Telephone: (970) 669-3050
FAX: (970) 669-2932
E-mail: intl@hach.com

Section 11 Limited Warranty

Hach Company warrants its products to the original purchaser against any defects that are due to faulty material or workmanship for a period of one year from date of shipment unless otherwise noted in the product manual.

In the event that a defect is discovered during the warranty period, Hach Company agrees that, at its option, it will repair or replace the defective product or refund the purchase price, excluding original shipping and handling charges. Any product repaired or replaced under this warranty will be warranted only for the remainder of the original product warranty period.

This warranty does not apply to consumable products such as chemical reagents; or consumable components of a product, such as, but not limited to, lamps and tubing.

Contact Hach Company or your distributor to initiate warranty support. Products may not be returned without authorization from Hach Company.

Limitations

This warranty does not cover:

- Damage caused by acts of God, natural disaster, labor unrest, acts of war (declared or undeclared), terrorism, civil strife or acts of any governmental jurisdiction
- Damage caused by misuse, neglect, accident or improper application or installation
- Damage caused by any repair or attempted repair not authorized by Hach Company
- Any product not used in accordance with the instructions furnished by Hach Company
- Freight charges to return merchandise to Hach Company
- Freight charges on expedited or express shipment of warranted parts or product
- Travel fees associated with on-site warranty repair

This warranty contains the sole express warranty made by Hach Company in connection with its products. All implied warranties, including without limitation, the warranties of merchantability and fitness for a particular purpose, are expressly disclaimed.

Some states within the United States do not allow the disclaimer of implied warranties and if this is true in your state the above limitation may not apply to you. This warranty gives you specific rights, and you may also have other rights that vary from state to state.

This warranty constitutes the final, complete, and exclusive statement of warranty terms and no person is authorized to make any other warranties or representations on behalf of Hach Company.

Limitation of Remedies

The remedies of repair, replacement or refund of purchase price as stated above are the exclusive remedies for the breach of this warranty. On the basis of strict liability or under any other legal theory, in no event shall Hach Company be liable for any incidental or consequential damages of any kind for breach of warranty or negligence.

Section 12 Compliance Information

Hach Co. certifies this instrument was tested thoroughly, inspected and found to meet its published specifications when it was shipped from the factory.

The **Galvanic Membrane Dissolved Oxygen Probe with the sc100 and sc1000** has been tested and is certified as indicated to the following instrumentation standards:

Product Safety

UL 61010A-1 (ETL Listing # 65454)
CSA C22.2 No. 1010.1 (ETLc Certification # 65454)
Certified by Hach Co. to EN 61010-1 Amds. 1 & 2 (IEC1010-1) per 73/23/EEC, supporting test records by Intertek Testing Services.

Immunity

This equipment was tested for industrial level EMC per:

EN 61326 (EMC Requirements for Electrical Equipment for Measurement, Control and Laboratory Use) **per 89/336/EEC EMC**: Supporting test records by Hach Company, certified compliance by Hach Company.

Standards include:

IEC 1000-4-2:1995 (EN 61000-4-2:1995) Electrostatic Discharge Immunity (Criteria B)
IEC 1000-4-3:1995 (EN 61000-4-3:1996) Radiated RF Electromagnetic Field Immunity (Criteria A)
IEC 1000-4-4:1995 (EN 61000-4-4:1995) Electrical Fast Transients/Burst (Criteria B)
IEC 1000-4-5:1995 (EN 61000-4-5:1995) Surge (Criteria B)
IEC 1000-4-6:1996 (EN 61000-4-6:1996) Conducted Disturbances Induced by RF Fields (Criteria A)
IEC 1000-4-11:1994 (EN 61000-4-11:1994) Voltage Dip/Short Interruptions (Criteria B)

Additional Immunity Standard/s include:

ENV 50204:1996 Radiated Electromagnetic Field from Digital Telephones (Criteria A)

Emissions

This equipment was tested for Radio Frequency Emissions as follows:

Per **89/336/EEC EMC: EN 61326:1998** (Electrical Equipment for measurement, control and laboratory use—EMC requirements) Class “A” emission limits. Supporting test records by Hewlett Packard, Fort Collins, Colorado Hardware Test Center (A2LA # 0905-01) and certified compliance by Hach Company.

Standards include:

EN 61000-3-2 Harmonic Disturbances Caused by Electrical Equipment
EN 61000-3-3 Voltage Fluctuation (Flicker) Disturbances Caused by Electrical Equipment

Additional Emissions Standard/s include:

EN 55011 (CISPR 11), Class “A” emission limits

Canadian Interference-causing Equipment Regulation, IECS-003, Class A

Supporting test records by Hewlett Packard, Fort Collins, Colorado Hardware Test Center (A2LA # 0905-01) and certified compliance by Hach Company.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

FCC PART 15, Class "A" Limits

Supporting test records by Hewlett Packard, Fort Collins, Colorado Hardware Test Center (A2LA # 0905-01) and certified compliance by Hach Company.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. The following techniques of reducing the interference problems are applied easily.

1. Disconnect the Controller from its power source to verify that it is or is not the source of the interference.
2. If the Controller is connected into the same outlet as the device with which it is interfering, try another outlet.
3. Move the Controller away from the device receiving the interference.
4. Reposition the receiving antenna for the device receiving the interference.
5. Try combinations of the above.

Appendix A Modbus Register Information

Table 10 Sensor Modbus Registers

Group Name	Tag Name	Register #	Data Type	Length	R/W	Description
Tags	SensorMeasTag	40001	Integer	1	R	Sensor Measurement Tag
Measurements	DOMeas	40002	Float	2	R	DO Measurement
Tags	TempMeasTag	40004	Integer	1	R	Temperature Measurement Tag
Measurements	TempDegCMeas	40005	Float	2	R	Temperature Measurement
Configuration	SensorName	40007	String	6	R/W	Sensor Name
Tags	FuncCode	40013	Integer	1	R/W	Function Code tag
Tags	NextState	40014	Integer	1	R/W	Next State Tag
Configuration	TempUnits	40015	Integer	1	R/W	Temperature Units—C or F
Configuration	Filter	40016	Integer	1	R/W	Sensor Filter
Configuration	TempElementType	40017	Integer	1	R/W	Temperature Element Type
Tags	TempUserValueTag	40018	Integer	1	R	Temperature User Value Tag
Configuration	TempUserDegCValue	40019	Float	2	R/W	Temperature User Value
Configuration	PressureUnits	40021	Integer	1	R/W	Pressure Units
Configuration	SalinityUnits	40022	Integer	1	R/W	Salinity Units
Tags	PressureTag	40023	Integer	1	R	Pressure Tag
Configuration	Pressure	40024	Float	2	R/W	Pressure
Tags	SalinityTag	40026	Integer	1	R	Salinity Units
Configuration	Salinity	40027	Float	2	R/W	Salinity
Configuration	MeasUnits	40029	Integer	1	R/W	Measurement Units
Calibration	OutputMode	40030	Integer	1	R/W	Output Mode
Calibration	CalLeave	40031	Integer	1	R/W	Cal Leave Mode
Calibration	CalAbort	40032	Integer	1	R/W	Cal Abort Mode
Tags	CalEditValueTag	40033	Integer	1	R	Cal Edit Value Tag
Calibration	CalEditDOValue	40034	Float	2	R/W	Cal Edit Value
Diagnostics	SoftwareVersion	40036	String	6	R	Software Version
Diagnostics	SerialNumber	40042	String	6	R	Serial Number
Diagnostics	CalQValue	40048	Float	2	R	DO Cal Q Value
Calibration	CalCode	40050	Integer	1	R	Cal Code
Configuration	SensorLogInterval	40051	Integer	1	R/W	Sensor Data Log Interval
Configuration	TempLogInterval	40052	Integer	1	R/W	Temperature Data Log Interval
Diagnostics	DOmV	40053	Float	2	R	DO mV
Diagnostics	ProdDate	40055	Date	2	R/W	Production Date
Diagnostics	LastCalDate	40057	Date	2	R	Last Calibration Date
Diagnostics	SensorDays	40059	Integer	1	R	Sensor Run\ning Days
Configuration	RejectFrequency	40060	Integer	1	R/W	Reject Frequency
Diagnostics	DeviceDriver	40061	String	5	R	Device Driver
Configuration	CalWarningDays	40066	Integer	1	R/W	Calibration Warning Days
Configuration	SensorWarningDays	40067	Integer	1	R/W	Sensor Warning Days

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