GE
Measurement & Control

Oxygen Analysis

oxy.IQ

Panametrics Oxygen Transmitter

User's Manual

imagination at work

910-296 Draft_02
April 2013

GE
Measurement & Control

oxy.IQ

Panametrics Oxygen Transmitter

User's Manual

910-296 Draft_02
April 2013

www.ge-mcs.com

[no content intended for this page]

Information Paragraphs

Note: *These paragraphs provide additional information about the topic which is helpful but is not essential to proper completion of the task.*

Important: *These paragraphs provide emphasis to instructions that are essential to proper setup of the equipment. Failure to follow these instructions carefully may cause unreliable performance.*

WARNING! Indicates a potentially hazardous situation which can result in serious personal injury or death, if it is not avoided.

CAUTION! Indicates a potentially hazardous situation which can result in minor or moderate injury to personnel or damage to the equipment, if it is not avoided.

Safety Issues

WARNING! It is the responsibility of the user to make sure all local, county, state and national codes, regulations, rules and laws related to safety and safe operating conditions are met for each installation.

Auxiliary Equipment

Local Safety Standards

The user must make sure that he operates all auxiliary equipment in accordance with local codes, standards, regulations, or laws applicable to safety.

Working Area

WARNING! Auxiliary equipment may have both manual and automatic modes of operation. As equipment can move suddenly and without warning, do not enter the work cell of this equipment during automatic operation, and do not enter the work envelope of this equipment during manual operation. If you do, serious injury can result.

WARNING! Make sure that power to the auxiliary equipment is turned OFF and locked out before you perform maintenance procedures on the equipment.

Qualification of Personnel

Make sure that all personnel have manufacturer-approved training applicable to the auxiliary equipment.

Personal Safety Equipment

Make sure that operators and maintenance personnel have all safety equipment applicable to the auxiliary equipment. Examples include safety glasses, protective headgear, safety shoes, etc.

Unauthorized Operation

Make sure that unauthorized personnel cannot gain access to the operation of the equipment.

Environmental Compliance

Waste Electrical and Electronic Equipment (WEEE) Directive

GE Measurement & Control Solutions is an active participant in Europe's *Waste Electrical and Electronic Equipment* (WEEE) take-back initiative, directive 2002/96/EC.

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

Visit **http://www.ge-mcs.com/en/about-us/environmental-health-and-safety/1741-weee-req.html** for take-back instructions and more information about this initiative.

[no content intended for this page]

Chapter 1. Features and Capabilities

1.1 Introduction

The **oxy.IQ** *Panametrics Oxygen Transmitter* (see *Figure 1* below) is a highly reliable and cost-effective two-wire, loop-powered transmitter with a linearized 4 to 20 mA output. It measures oxygen in ten ppm ranges (10, 20, 50, 100, 200, 500, 1000, 2000, 5000 and 10000 ppm) and eight percentage ranges (1, 2, 5, 10, 21, 25, 50 and 100%). All ranges are user-programmable. This compact transmitter uses proven sensor technology to accurately measure O2 in a variety of gases, even in hazardous environments.

Figure 1: oxy.IQ

1.2 Features

The **oxy.IQ** oxygen sensor is an advanced galvanic fuel cell that provides superior performance, accuracy, stability and long life. The cell's innovative design eliminates the potential for negative signal output, reduces sources of contamination and eliminates electrolyte leakage.

The cell is unaffected by other background gases or hydrocarbons and is compatible with acid gases (**OX-2** and **OX-4** cells). Recovery from air at low ppm levels takes just a few minutes. Because the cell is self-contained, little maintenance is required. There is no electrolyte to change and no electrodes to clean.

The **oxy.IQ** offers the following features:

- Two-wire, loop-powered, 4 to 20 mA transmitter
- Display with keypad
- Intrinsically safe operation
- Proven galvanic fuel cell O2 sensor technology
- Programmable ranges for ppm and percent oxygen
- User-friendly and intuitive user interface with diagnostics
- Microprocessor-based, all-digital technology for reliable operation
- Low maintenance, economical and compact
- Sensor failure alarm
- Sensor lifetime indication
- NAMUR error indication

Chapter 2. Installation

2.1 Mounting the oxy.IQ

To install the **oxy.IQ** into the process or sample system, refer to *Figure 9 on page 36* or *Figure 2* below and proceed to the next page.

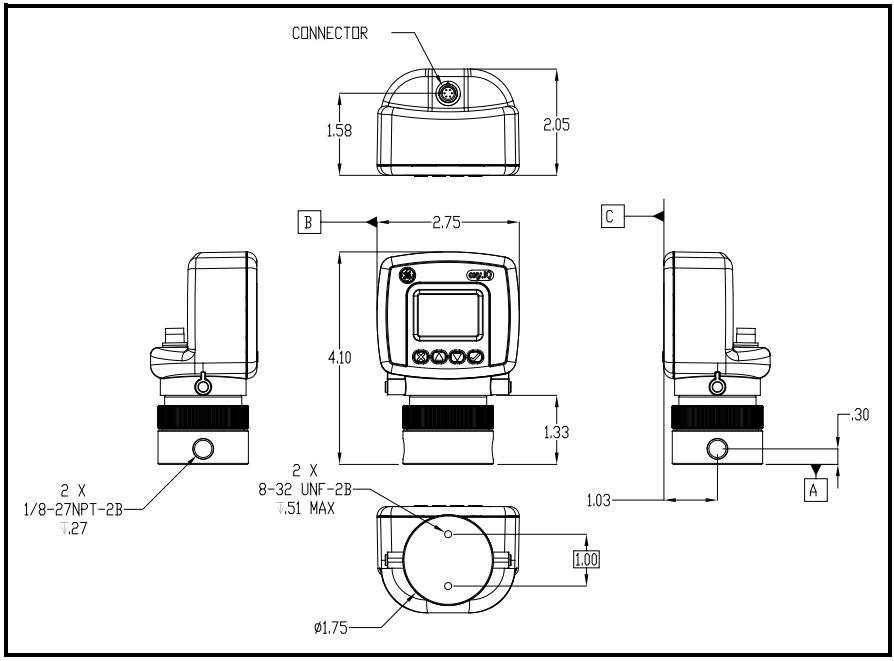

Figure 2: Outline and Installation Drawing

Note: *To avoid collecting condensate that may damage the oxygen sensor, mount the oxy.IQ in an upright position, with the sensor manifold below the electronics module.*

Mounting the oxy.IQ (cont.)

Install the oxy.IQ by completing the following steps:

1. Remove the oxy.IQ and the separately-packaged oxygen sensor (see *Figure 3* below) from the shipping container. Keep the shipping container and packaging material for possible future use.

Important: *DO NOT open the oxygen sensor package until you are ready to install the sensor.*

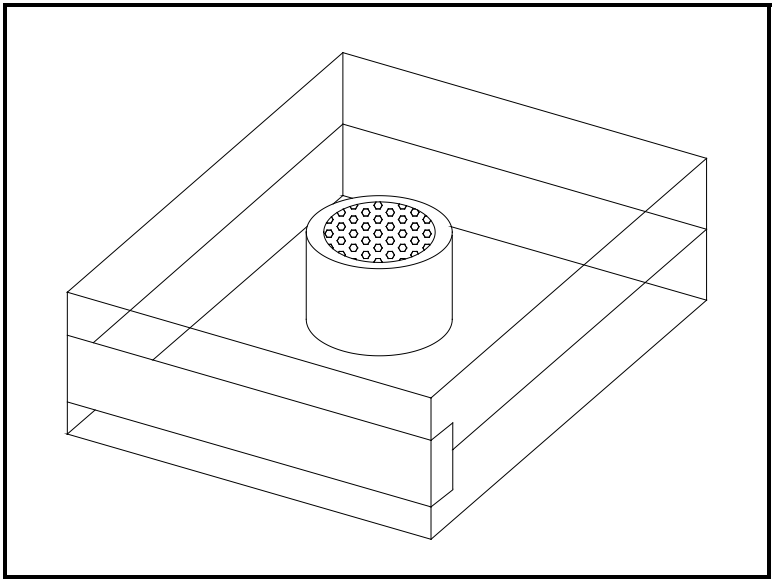

Figure 3: Packaged Oxygen Sensor

2. Remove the sensor manifold by unscrewing it from the blue knurled nut on the sensor base at the bottom of the electronics module.

Mounting the oxy.IQ (cont.)

3. Using PTFE tape as a sealant, connect the sample gas inlet and outlet to the 1/8" NPT ports on the sensor manifold (see *Figure 4* below). Either port may be used as the inlet or the outlet, as the direction of flow does not matter.

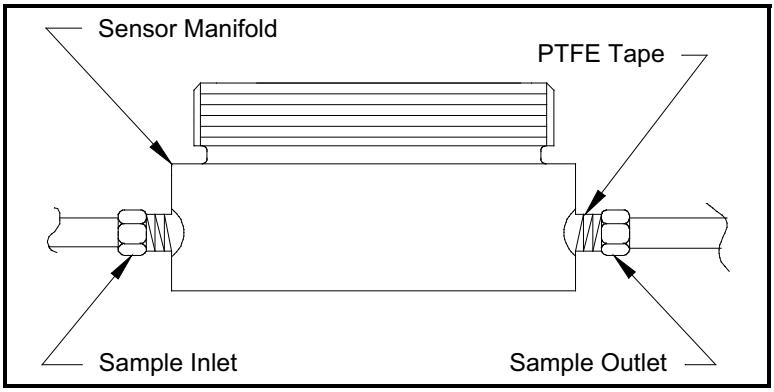

Figure 4: Sensor Manifold Installation

2.2 Wiring the oxy.IQ

To wire the oxy.IQ, refer to *Figure 14 on page 41*, then proceed as follows:

WARNING! For IS (Intrinsically Safe) applications, the oxy.IQ must be installed with a zener barrier (see the top of *Figure 14 on page 41*). Also, for installations in a hazardous location, the blue IS cable (p/n 704-1318-02, 10) must be used.

1. Attach the appropriate cable to the oxy.IQ (see *Figure 5* below). Be sure to align the white arrow on the cable connector with the white arrow on the oxy.IQ connector, and then push the top of the cable connector straight down onto the mating connector on the rear of the electronics module until you hear it click into place.

Important: *Do not rotate the cable connector during installation (it is not threaded) and do not hold the connector by its bottom section while pushing it down into place.*

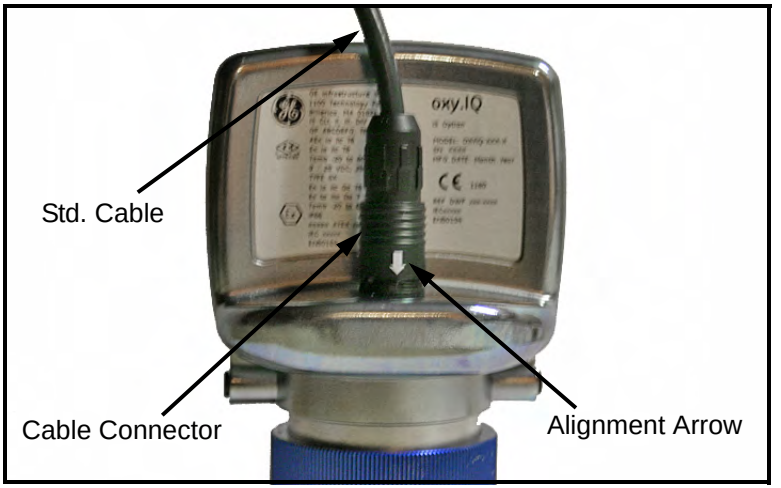

Figure 5: oxy.IQ Cable and Connector

Wiring the oxy.IQ (cont.)

2. Connect the flying lead end of the cable as shown in the wiring diagram, according to one of the following conditions:

- ***No Zener Barrier:*** For use in non-hazardous (safe) areas only.
- ***With Zener Barrier:*** Required for use in hazardous areas.

Important: *To remove the cable from the oxy.IQ electronics module, simply pull straight up on the lower section of the cable connector as close to the oxy.IQ body as possible. Do not pull on the cable or the upper portion of the cable connector, and do not try to unscrew the cable connector.*

2.2.1 Longer Cable Lengths

Longer cable lengths are not available from GE. If you require a longer cable, refer to the following figures for the required cable specifications and construct your own cable for splicing onto the standard GE cable:

- **Standard Cable:** *Figure 10 on page 37* and *Figure 11 on page 38*
- **IS Cable:** *Figure 12 on page 39* and *Figure 13 on page 40*

2.3 Installing an Oxygen Sensor

To install a new or replacement oxygen sensor in the oxy.IQ, refer to *Figure 6* below and complete the following steps:

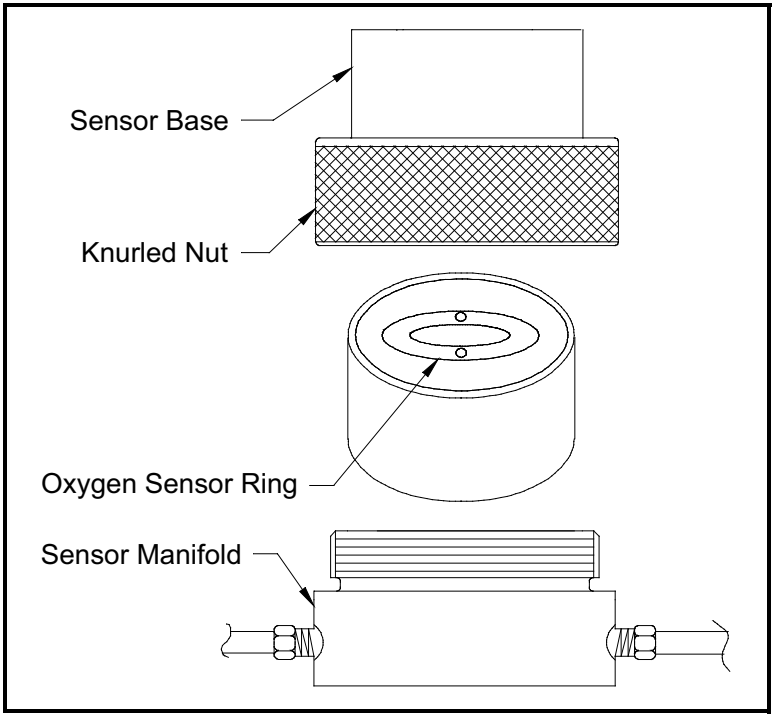

Figure 6: Oxygen Sensor Installation

1. Disconnect the power from the oxy.IQ.

2. Loosen the blue knurled nut and remove the oxy.IQ electronics module from the sensor manifold. If a previous oxygen sensor is already in place, remove and discard it.

Installing an Oxygen Sensor (cont.)

3. Apply power to the unit. The screen will display **"INITIALIZING PLEASE WAIT"** for a few seconds before it begins to display measurement data.

Note: *Before continuing with the installation, become familiar with the procedures for programming and calibrating the oxy.IQ discussed in* Chapter 3, Initial Setup & Operation.

4. Trim the 4-20 mA analog output and set the range to 0-25% oxygen.

5. Open the airtight package (see *Figure 3 on page 4*) and remove the oxygen sensor from the package. To maintain the oxygen sensor's energy level, remove the red grounding tab and **immediately** proceed to the next step.

6. Orient the sensor so that its gold-plated electrodes are facing the spring-loaded contact pins in the sensor base (see *Figure 6 on page 8*). Firmly press the oxygen sensor into the sensor base at the bottom of the oxy.IQ electronics module.

7. It is best to perform an air calibration on the new oxygen sensor at this time. On the 0-25% oxygen scale, a properly calibrated oxygen sensor shows a reading of 20.9% on the display and generates a current of 17.4 mA at the 4-20 mA analog output terminals.

8. Using the blue knurled nut, attach the oxy.IQ electronics module with the calibrated oxygen sensor to the sensor manifold. Rotate the display as desired and then hand-tighten the blue knurled nut.

Important: *Make sure that the O-ring on the top of the sensor manifold is in place and undamaged. If necessary, contact GE for a replacement.*

Installing an Oxygen Sensor (cont.)

9. Begin the flow of either the process or the calibration gas. The analog output reading should begin to drop as the oxygen sensor adjusts to the reduced oxygen level. During this time, reset the range as required.

10. For improved accuracy in the ppm oxygen ranges, a span gas calibration should now be performed (see *"Span Gas Calibration" on page 17*).

Important: *Sensor life is dependent on the application. High oxygen concentrations and contaminants such as acidic gases will shorten the sensor life.*

Chapter 3. Initial Setup & Operation

3.1 The oxy.IQ Display and Keypad

All programming of the **dew.IQ** is done via the front panel keypad and display, as illustrated below.

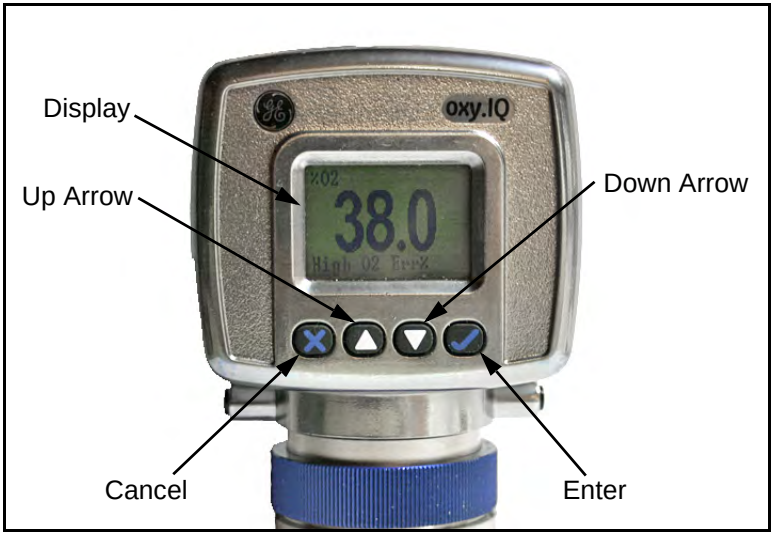

Figure 7: oxy.IQ Display and Keypad

The front panel components perform the following functions:

- **Display** - Data measurements and the programming menus and options are shown on the LCD display screen.
- **Enter** - While in measurement mode, press this key to enter the Main Menu. While in the *Main Menu*, press this key to save an entry and advance to the next screen.
- **Cancel** - While in the *Main Menu*, press this key to cancel an entry and to return to the previous screen.
- ▲ and ▼ **Keys** - In the *Main Menu*, use these keys to move the cursor between rows one row at a time in the direction indicated.

3.2 The oxy.IQ Menu Map

As an aid in navigating through the *Main Menu*, a complete *Menu Map* of the user program is shown in *Figure 15 on page 44*. Refer to this figure as needed while programming the oxy.IQ.

The oxy.IQ Main Menu consists of the following submenus:

- Calibration Menu (no passcode required)
- Display Menu (no passcode required)
- Output Menu (no passcode required)
- Service Menu (factory service passcode required)

To enter the *Main Menu* from normal display mode, simply press the **Enter** key at any time. To leave the *Main Menu* and return to measurement mode, press the **Cancel** key.

Note: *Depending on how deep you are in the menu structure, it may be necessary to press the* **Cancel** *key more than once to return all the way back to measurement mode.*

3.3 Adjusting and Calibrating the oxy.IQ

Upon startup, the following five-step adjustment and calibration procedure must be performed on the oxy.IQ:

1. Select the desired output range.
2. Trim the low (4 mA) and high (20 mA) analog outputs.
3. Upon installation of a new oxygen sensor, calibrate the unit with air for either a ppm or % sensor.
4. For ppm sensors only, purge the sensor with a low ppm oxygen gas.
5. For all subsequent calibrations, use a span gas that is appropriate for the sensor and range selected.

3.3.1 Selecting the Output Range

To select the desired measurement range, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the ▼ key twice and then press the **Enter** key to enter the *Output* menu.
3. Press the **Enter** key to select the *Range* menu option.
4. Use the ▲ and ▼ keys to scroll through the available options, as listed in *Table 1* below.

Table 1: Available Output Ranges

Units	Span Value
% O2	1, 2, 5, 10, 21, 25, 50, 100
ppm O2	10, 20, 50, 100, 200, 500, 1000, 2000, 5000, 10000

5. After selecting the desired output range, press the **Enter** key to save the selection. Then, press the **Cancel** key to return to the *Output* menu.

3.3.2 Trimming the Analog Output

To trim the analog output, calibrate the low (4 mA) end of the output then the high (20 mA) end of the output.

IMPORTANT: *The 4 mA and 20 mA adjustments interact with each other. Therefore, recheck the trim after the procedure has been completed.*

3.3.2a Preparing to Trim the Analog Output

Prepare to trim the analog output as follows:

1. Connect an ammeter in series with the positive oxy.IQ power supply lead, to monitor the analog output current.
2. Press the **Enter** key to enter the *Main Menu*.
3. Press the ▼ key twice and then press the **Enter** key to enter the *Output* menu.
4. Press the ▼ key and then press the **Enter** key to enter the *Trim* menu.

3.3.2b Trimming the Analog Output Low (4 mA) End

1. Press the **Enter** key to enter the *4 mA Trim* menu, and the analog output is driven to about 4 mA.
2. Use the ▲ and ▼ keys to adjust the analog output up or down, until it equals 4.00 ± 0.01 mA.
3. Press the **Enter** key to save the trim adjustment and return to the *Trim* menu.

3.3.2c Trimming the Analog Output High (20 mA) End

1. Press the ▼ key and then press the **Enter** key to enter the *20 mA Trim* menu, and the analog output is driven to about 20 mA.
2. Use the ▲ and ▼ keys to adjust the analog output up or down, until it equals 20.00 ± 0.01 mA.
3. Press the **Enter** key to save the trim adjustment and return to the *Trim* menu.

3.3.2d Completing the Trim Procedure

1. Repeat both the low (4 mA) end and high (20 mA) end analog output trimming steps until no further trimming adjustments are required.
2. Press the **Cancel** key twice to return to the *Main Menu*.

3.3.3 Air Calibration

An air calibration is always recommended upon installation of a new oxygen sensor. However, because of the non-linearity of the oxygen sensor, a span gas calibration (see the next section) should also be performed to ensure more accurate readings in the ppm ranges.

CAUTION! The useful life of ppm sensors will be extended by minimizing exposure of the sensor to air.

To perform an air calibration, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the **Enter** key to enter the *Calibration* menu.
3. Press the **Enter** key to select the *Air* menu option.
4. Proceed to the appropriate section, depending on whether you are calibrating a new sensor or recalibrating an existing sensor.

3.3.3a Calibrating a New Sensor

For a new sensor, continue the air calibration procedure as follows:

1. Press the ▼ key and then press the **Enter** key to select the *YES* menu option.
2. Press the **Enter** key to acknowledge that you are resetting the *sensor lifetime clock.*
3. As instructed, remove the sensor manifold to expose the new oxygen sensor to ambient air for about two minutes. Then, press the **Enter** key to continue.
4. A message indicating that the calibration is in progress will be displayed, and then the calibration data will be shown. At that time, press the **Enter** key to save the calibration data and return to measurement mode.

Note: A *second calibration of the new sensor should be performed within 1-2 days of the first calibration.*

3.3.3b Recalibrating an Existing Sensor

For an existing sensor, continue the air calibration procedure as follows:

1. Press the **Enter** key to select the *NO* menu option.
2. As instructed, remove the sensor manifold to expose the oxygen sensor to ambient air for about two minutes. Then, press the **Enter** key to continue.
3. A message indicating that the calibration is in progress will be displayed, and then the calibration data will be shown. At that time, press the **Enter** key to save the calibration data and return to measurement mode.

3.3.4 Span Gas Calibration

Before beginning the span gas calibration, use a low oxygen content purge gas to prepare the oxy.IQ. Then, start the flow of the span gas to the sensor After initial exposure to the calibration gas, obtaining a stable reading takes a few seconds in the higher ranges (e.g., 0-1,000 ppm and above) and a minute or more in the lower ranges (e.g., 0-10 and 0-100 ppm). For accurate calibration, the span gas should have an oxygen content of 70-90% of the range being calibrated.

To perform the span calibration, complete the following steps:

1. Use the equation below to calculate the expected mA output that corresponds to the known oxygen content of the span gas:

$$4.0 + 16.0 \times \frac{\text{Span Gas ppm}}{\text{Full Range ppm}} = \text{mA Output}$$

For example, if the span gas contains 80 ppm oxygen and the 0-100 ppm range is being calibrated, the analog output should equal 4 + 16 x (80/100) = 16.8 mA.

2. If you have not done so already, start the flow of span gas to the sensor, and allow the 4-20 mA output reading to stabilize.

3. After the reading has stabilized, press the **Enter** key to enter the *Main Menu*.

4. Press the **Enter** key to enter the *Calibration* menu.

5. Press the ▼ key and then press the **Enter** key to select the *Span Gas* menu option.

6. After the reading on the display has stabilized, press the **Enter** key to save the calibration. Then, press the **Cancel** key twice to return to measurement mode.

[no content intended for this page]

Chapter 4. User Programming

4.1 Introduction

IMPORTANT: *The oxy.IQ* Service *menu is for use by qualified service personnel only and requires a special passcode for access. That menu is not discussed in this chapter.*

This chapter provides instructions for programming all of the oxy.IQ menu options available to the user, which can be accessed without the use of a passcode. These menu options are found in the following *Main Menu* submenus:

- Calibration Menu
- Display Menu
- Output Menu

While programming these menus, refer to the menu map in *Figure 15 on page 44*.

Note: *The menu options for initial setup are described in Chapter 3,* Initial Setup & Operation*, and are only referenced in this chapter.*

4.2 The Calibration Menu

Proceed to the appropriate section to program the desired menu option.

4.2.1 Air

See *"Air Calibration" on page 15*.

4.2.2 Span Gas

See *"Span Gas Calibration" on page 17*.

4.2.3 Sensor Life

To read the sensor life, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the **Enter** key to enter the *Calibration* menu.
3. Press the ▼ key three times and then press the **Enter** key to enter the *Sensor Life* menu.
4. The number of days your sensor has been in use is displayed. When you have finished reading the information, press the **Enter** key to return to the *Calibration* menu.
5. Press the **Cancel** key twice to return to measurement mode.

4.3 The Display Menu

Proceed to the appropriate section to program the desired menu option.

4.3.1 O2

To select the O2 parameter for display, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the ▼ key once and then press the **Enter** key to enter the *Display* menu.
3. Press the **Enter** key to enter the *O2* menu.
4. Use the ▲ and ▼ keys to select the desired O2 range to be displayed:
   - ppm only
   - % only
   - Auto Select (based on the sensor type currently installed)
5. Press the **Enter** key to confirm your choice and return to measurement mode.

4.3.2 Display Range

To select whether or not the O2 range of the installed sensor is displayed, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the ▼ key once and then press the **Enter** key to enter the *Display* menu.
3. Press the ▼ key once and then press the **Enter** key to enter the *Display Range* menu.
4. Use the ▲ and ▼ keys to select the desired option:
   - On - the O2 range is displayed at the bottom of the screen
   - Off - the O2 range is not displayed at the bottom of the screen
5. Press the **Enter** key to confirm your choice and return to measurement mode.

4.3.3 Contrast

To adjust the display contrast, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the ▼ key twice and then press the **Enter** key to enter the *Contrast* menu.
3. Use the ▲ and ▼ keys to adjust the contrast to the desired value, then press the **Enter** key to save the new value.
4. Press the **Cancel** key twice to return to measurement mode.

4.4 The Output Menu

Proceed to the appropriate section to program the desired menu option.

4.4.1 Range

See *"Selecting the Output Range" on page 13*.

4.4.2 Trim

See *"Trimming the Analog Output" on page 14*.

4.4.3 Error Type

To select the process conditions that will activate an on-screen warning and send an alarm to the analog output device, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the ▼ key twice and then press the **Enter** key to enter the *Output* menu.
3. Press the ▼ key twice and then press the **Enter** key to enter the *Error Type* menu.

4.4.3 Error Type (cont.)

4. Use the ▲ and ▼ keys to select the desired option and then press the **Enter** key to activate that error type. A check mark will appear next to the selected option to indicate that it is activated. The following options are available, and you may activate as many of these options as you wish.

Note: *Only the first four options are displayed on the screen upon entering this menu. When you scroll down to the fourth option (Low Temp), a down arrow to the right of this option indicates that an additional screen of options is available.*

- High O2
- Low O2 (programmable)
- High Temp
- Low Temp (programmable)
- Temp Comp (listed on second screen of options)

Note: *Pressing the* **Enter** *key on an error type that has already been activated, will deactivate that option and remove the check mark.*

5. Press the **Cancel** key three times to return to measurement mode.

4.4.4 Error Output

To select the desired output value that will be sent to the analog output device upon an error, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the ▼ key twice and then press the **Enter** key to enter the *Output* menu.
3. Press the ▼ key three times and then press the **Enter** key to enter the *Error Output* menu.
4. Use the ▲ and ▼ keys to select the desired option and then press the **Enter** key to activate that error output. A check mark will appear next to the selected option to indicate that it is activated. The following options are available, and you may activate only one option at a time.

Note: *Only the first four options are displayed on the screen upon entering this menu. When you scroll down to the fourth option (NAMUR), a down arrow to the right of this option indicates that an additional screen of options is available.*

- None (no error output is generated)
- Low (an output below 4 mA is generated)
- High (an output above 20 mA is generated)
- Value (an error output at a programmable fixed value is generated)
- NAMUR (listed on second screen of options)

Note: *Pressing the* **Enter** *key on a different error output will automatically deselect any previously selected output.*

5. Press the **Cancel** key three times to return to measurement mode.

[no content intended for this page]

Chapter 5. The Service Menu

CAUTION! The *Service Menu* is intended for use by qualified service personnel only, and access to this menu requires entry of the service passcode. Misuse of the information in this menu may significantly impair the accuracy and performance of your oxy.IQ and may cause it to fail to meet its published specifications.

5.1 Menu Map & Service Passcode

For help in navigating through the *Service Menu*, refer to the menu map shown in *Figure 16 on page 45*. The *service passcode* required for access to the oxy.IQ *Service Menu* is:

7378

5.2 Entering the Service Menu

To enter the *Service Menu*, complete the following steps:

1. Press the **Enter** key to enter the *Main Menu*.
2. Press the ▼ key three times and then press the **Enter** key to select the *Service* menu.
3. Use the ▲ and ▼ keys to increment or decrement the displayed value (default = 5000) to enter the *service passcode*, and then press the **Enter** key to access the *Service* menu.

Note: *When entering the passcode, press and release an arrow key to change the value one digit at a time, or press and hold an arrow key to change the value at an accelerating rate.*

4. Proceed to the appropriate section for the desired menu option.

5.2.1 Diagnostics

To enter the *Diagnostics* menu option from the *Service Menu*, complete the following steps:

1. Use the ▲ and ▼ keys as necessary to highlight the *Diagnostics* menu option.
2. Press the **Enter** key to enter the *Diagnostics* menu.
3. *Page 1* of the *Diagnostics* option displays the current values for the following parameters:
   - O2 µA
   - Output mA
   - Output %

   When you have finished reading the information, press the **Enter** key to move to *Page 2* of the *Diagnostics* menu or press the **Cancel** key to exit the *Diagnostics* menu.
4. *Page 2* of the *Diagnostics* option displays the current values for the following parameters:
   - Temp °C
   - Temp Res
   - Gain
   - OX-n (currently installed sensor type, n = 1, 2, 3 or 4)

   When you have finished reading the information, press the **Enter** key to move to *Page 1* of the *Diagnostics* menu or press the **Cancel** key to exit the *Diagnostics* menu.
5. Press the **Cancel** key twice to return to measurement mode.

5.2.2 Sensor Type

Whenever a new sensor has been installed, you must enter the *Service Menu* and select the sensor type, by completing the following steps:

1. Use the ▲ and ▼ keys as necessary to highlight the *Sensor Type* menu option.
2. Press the **Enter** key to enter the *Sensor Type* menu.
3. The sensor type (OX-1, OX-2, OX-3 or OX-4) currently selected is indicated by a pointer to the left of the selection. Use the ▲ and ▼ keys as necessary to select the type of sensor currently installed.
4. Press the **Cancel** key to exit the *Diagnostics* menu.
5. Press the **Cancel** key twice to return to measurement mode.

5.2.3 TR Menu

To enter the TR value, enter the *Service Menu* and complete the following steps:

1. Use the ▲ and ▼ keys as necessary to highlight the *TR* menu option.
2. Press the **Enter** key to access the *TR* menu.
3. Use the ▲ and ▼ keys as necessary to increment or decrement the current TR value as desired.
4. Press the **Enter** key to save the new value and exit the *TR* menu, or press the **Cancel** key to exit the *TR* menu without saving the new value.
5. Press the **Cancel** key twice to return to measurement mode.

[no content intended for this page]

Chapter 6. Specifications

6.1 Intrinsically Safe (IS) Installation

Intrinsically safe installations require an MTL7706 zener barrier, one IS cable and one non-IS cable.

6.1.1 Power Requirements

24 to 28 VDC at 50 mA

6.1.2 Cable

- **704-1317-02, 10 (non-hazardous (safe) area):** black, three-conductor; 26 AWG; 4000 ft (1219 m) maximum length
- **704-1318-02, 10 (hazardous area):** blue, two-conductor, twisted pair; 26 AWG; 1100 ft (335 m) maximum length

6.1.3 Output

Total load must equal 250 Ω ±5%

6.2 Non-Incendive (Division 2, Zone 2)

No zener barrier is used.

6.3 Process Wetted Materials

- *SS process unit:* 316 stainless steel, Viton® O-ring and glass

6.4 Power Requirements

- 9 to 28 VDC loop powered, 0.6 W max

6.5 Cable

2 conductor, twisted pair with connector; 26 AWG; 0.04 Ω/ft; 4000 ft (1219 m) maximum cable length

6.6 Output

Max. load (W) = [40 W x (PSV – 8)] – RC,
where: PSV = power supply voltage in VDC, and
RC = cable resistance (22 AWG cable has 0.04 Ω/ft)

Example: Given a 24 VDC power supply and a 1000 ft (305 m) cable (22 AWG, 0.04 Ω/ft), RC = 1000 ft x 0.04 Ω/ft = 40 Ω and Max. load = [40 x (24 – 8)] – 40 = [40 x 16] – 40 = 600 Ω

6.7 Field Programmable Measurement Ranges

- *PPM sensors:*
  – 0 to 10 ppmv O2 (OX-1 or OX-2 only)
  – 0 to 100 ppmv O2
  – 0 to 1000 ppmv O2
  – 0 to 10,000 ppmv O2
- *Percent sensors:*
  – 0% to 1% O2
  – 0% to 10% O2
  – 0% to 25% O2

6.8 Accuracy

- ±1% of span at calibration point
- ±2% of span at the calibration point for the 0 to 10 ppmv range (OX-1 or OX-2 only)

6.9 Repeatability

- ±1% of span
- ±2% of span for the 0 to 10 ppmv range (OX-1 or OX-2 only)

6.10 Resolution

±0.1% of span

6.11 Linearity

±2% of span

6.12 Operating Temperature

32°F to 113°F (0°C to 45°C)

6.13 Ambient Temperature Effect

±3% of reading over operating temperature range

6.14 Sample Pressure

Vented to atmosphere during operation and calibration

6.15 Atmospheric Pressure Effect

±0.13% of reading per mmHg (directly proportional to absolute pressure). During calibration, pressure and flow must be kept constant.

6.16 Process Connection

- *316 stainless steel and Delrin process units:* 1/8 in NPT inlet and outlet
- *Ambient air monitoring unit:* None

6.17 Dimensions

4.10 in x 2.75 in

6.18 Weight

1.31 lb (594.7 grams)

6.19 Sample Flow Rate

1.0 SCFH (500 cc/min) recommended for process units

6.20 Electrical Classification/Certification

Intrinsically Safe with use of zener barrier or galvanic isolator:
USA NFPA/NEC and Canada CSA
IS for Class I, Div 1, Groups A, B, C, D
EU ATEX and International IECEx
Ex ia IIC T4 Gb

Non-incendive without use of zener barrier or galvanic isolator:
USA NFPA/NEC and Canada CSA
IS for Class I, Division 2, Groups A, B, C, D
EU ATEX and International IECEx
Ex na IIC T6

Weatherproof/Corrosion Resistant:
Type 4X
IP66

6.21 European Compliance

Complies with EMC Directive 2004/108/EC
EN 50104, 32° to 104°F (0° to 40°C)

6.22 Product Label

A typical product label is shown in *Figure 8* below:

Figure 8: Typical oxy.IQ Product Label

Appendix A. Outline and Installation Drawings

This appendix includes the following **oxy.IQ** drawings:

- Outline & Installation
  (Ref. Drawing 712-1840, sheet 1 of 1)
- Cable, Standard
  (Ref. Drawing 704-1317, sheet 1 of 2)
- Cable, Standard
  (Ref. Drawing 704-1317, sheet 2 of 2)
- Cable, IS
  (Ref. Drawing 704-1318, sheet 1 of 2)
- Cable, IS
  (Ref. Drawing 704-1318, sheet 2 of 2)
- Wiring Diagram
  (Ref. Drawing 752-099, sheets 1 & 2 of 2)

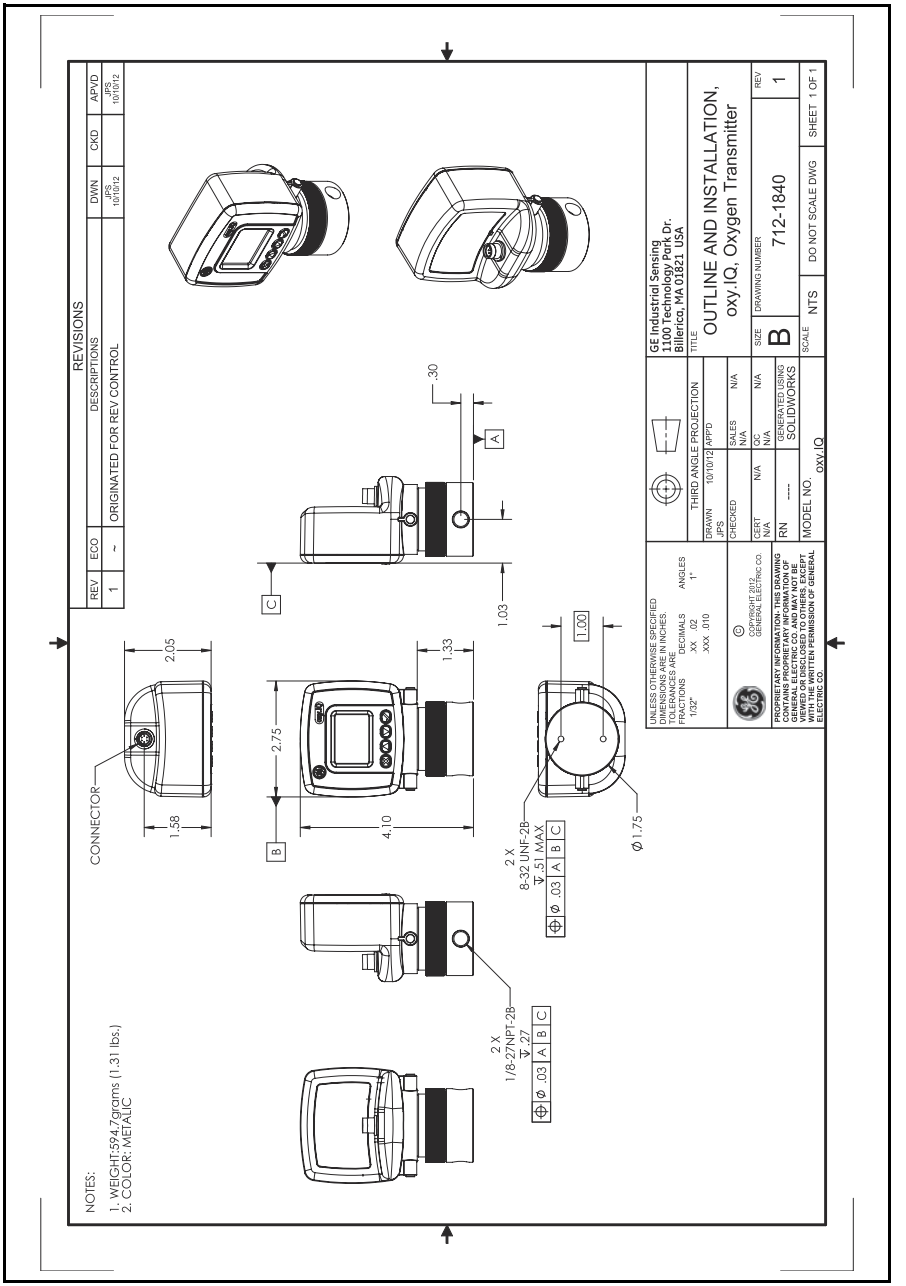

Figure 9: Outline & Installation (ref. dwg 712-1840, SH 1 of 1)

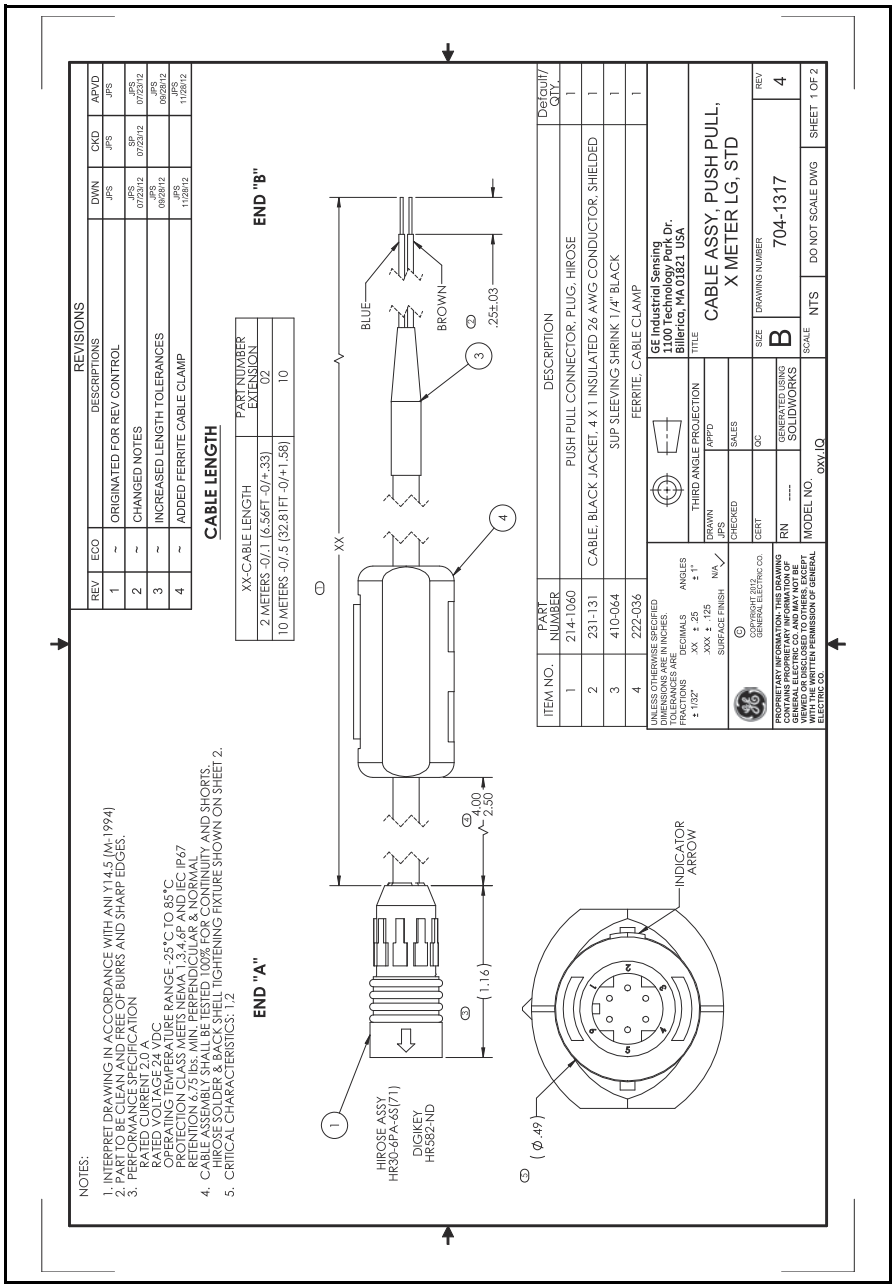

Figure 10: Cable, Standard (ref. dwg 704-1317, SH 1 of 2)

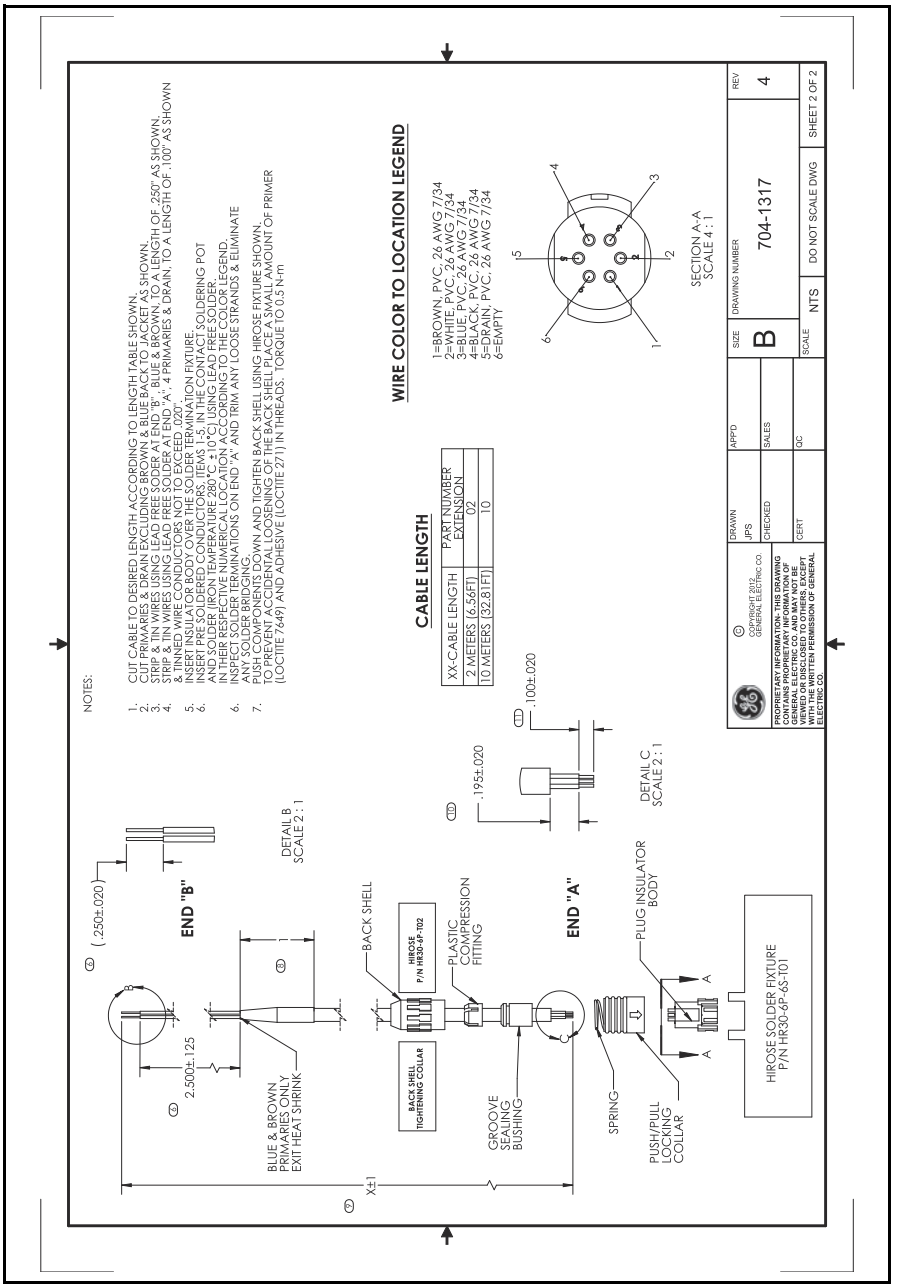

Figure 11: Cable, Standard (ref. dwg 704-1317, SH 2 of 2)

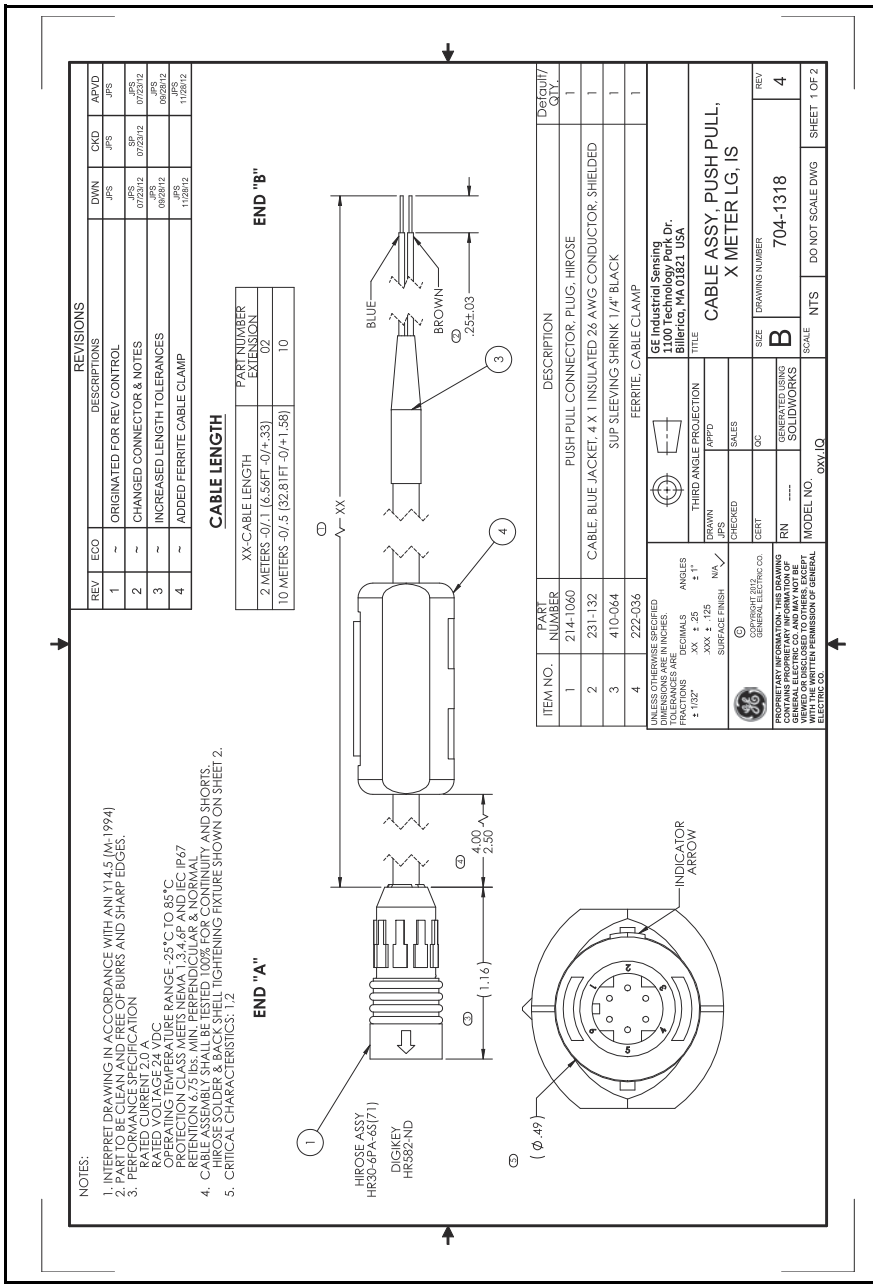

Figure 12: Cable, IS (ref. dwg 704-1318, SH 1 of 2)

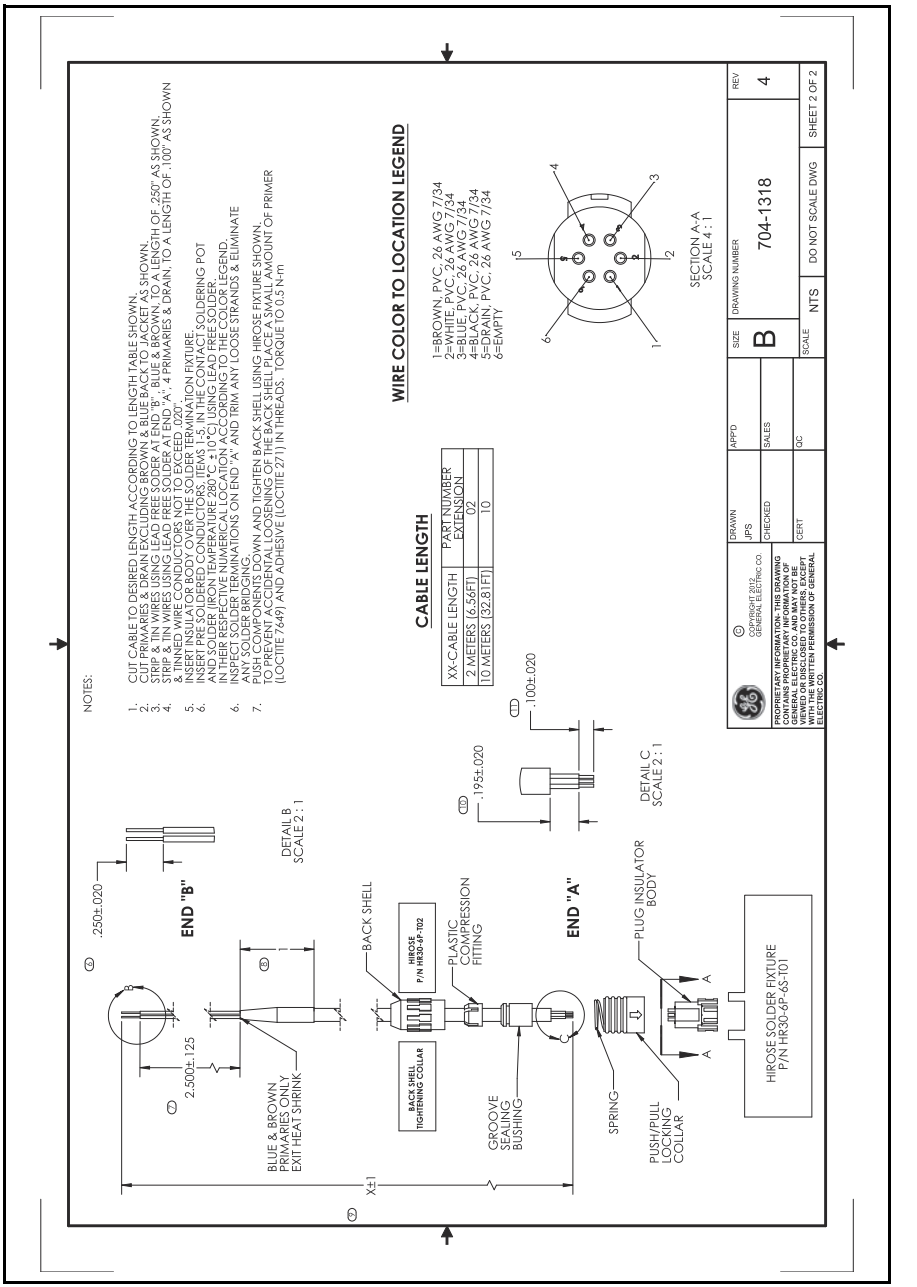

Figure 13: Cable, IS (ref. dwg 704-1318, SH 2 of 2)

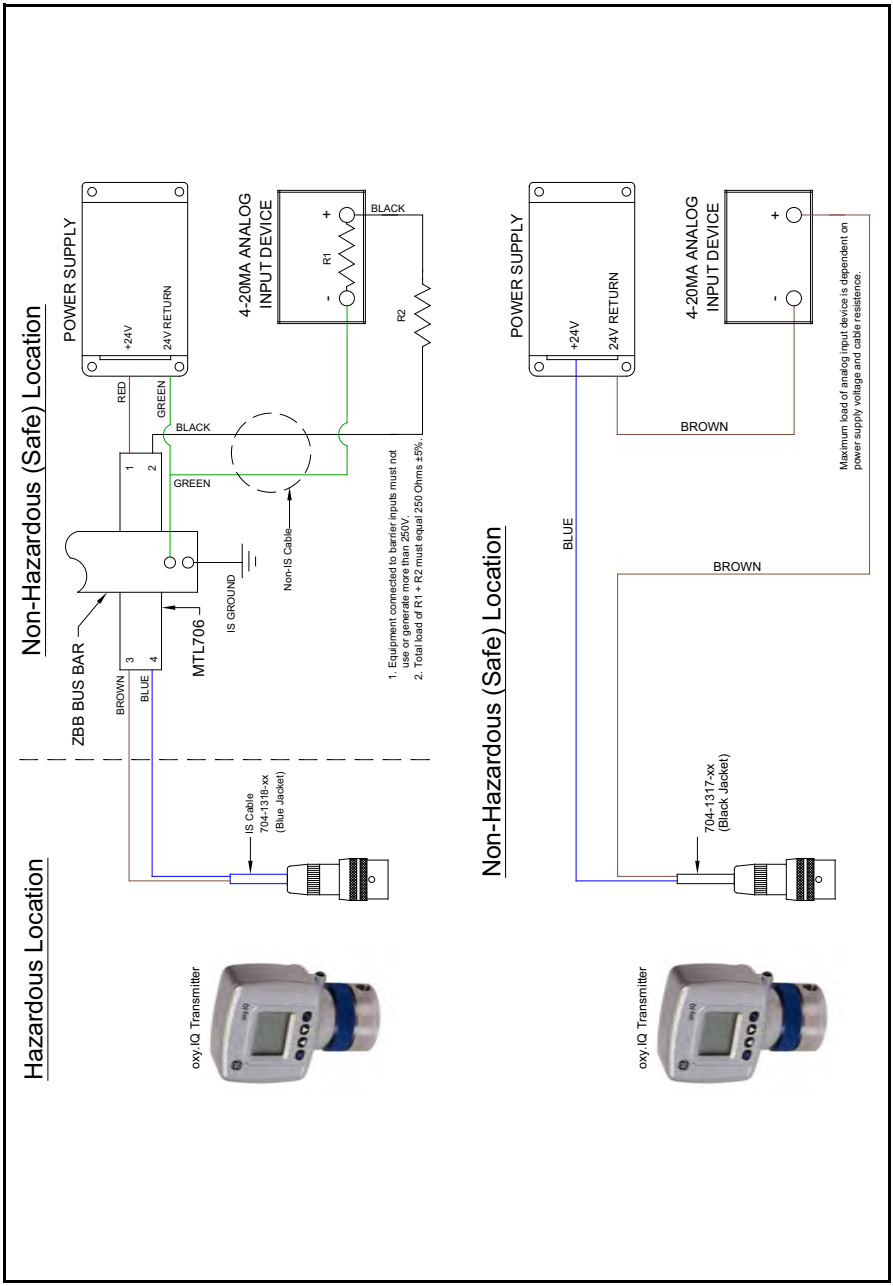

Figure 14: Wiring Diagram (ref. dwg 752-099, SH 1 & 2 of 2)

[no content intended for this page]

Appendix B. Menu Maps

This appendix includes the following **oxy.IQ** menu maps:

- User's Menu Map for **oxy.IQ**
- Service Personnel Menu Map for **oxy.IQ**

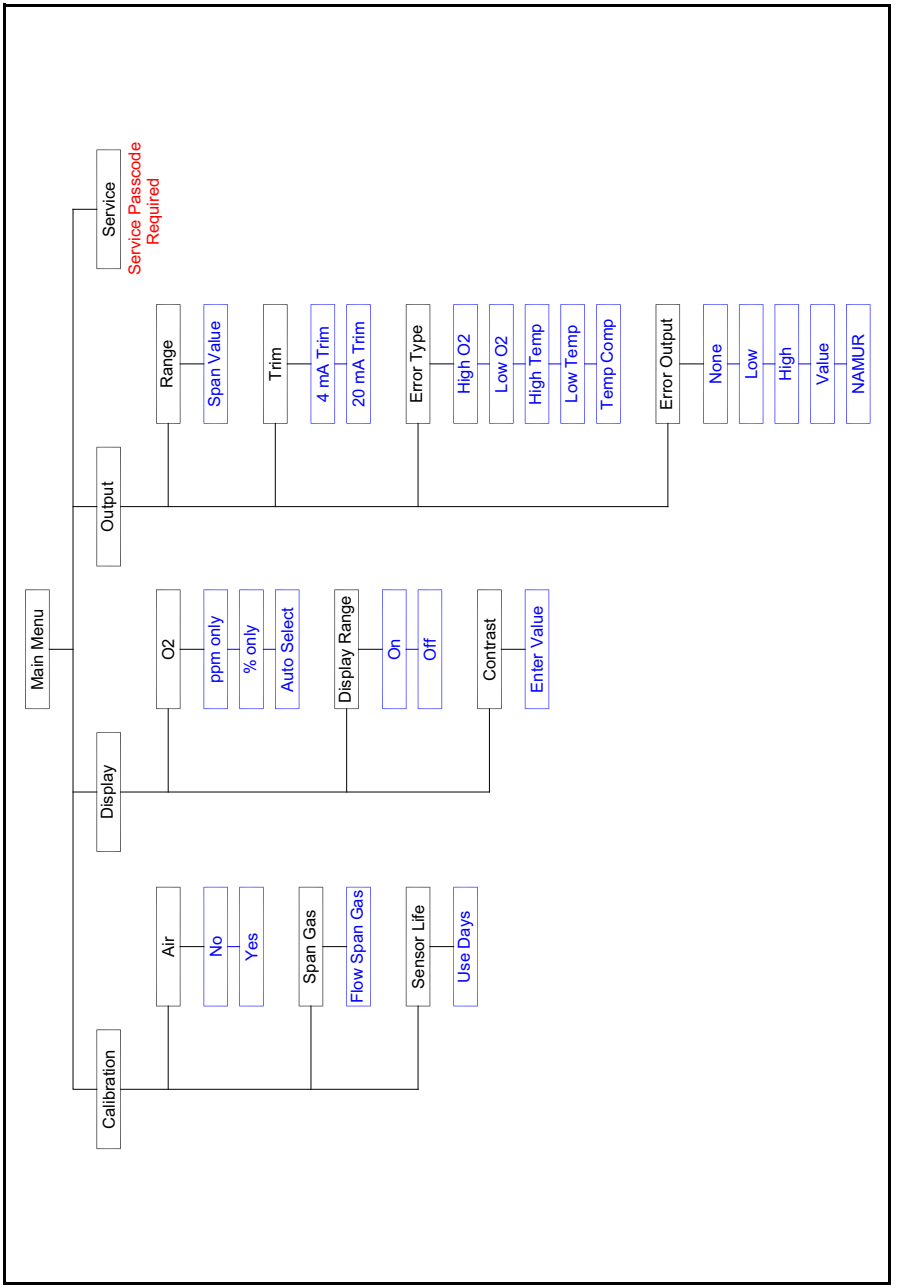

Figure 15: User's Menu Map

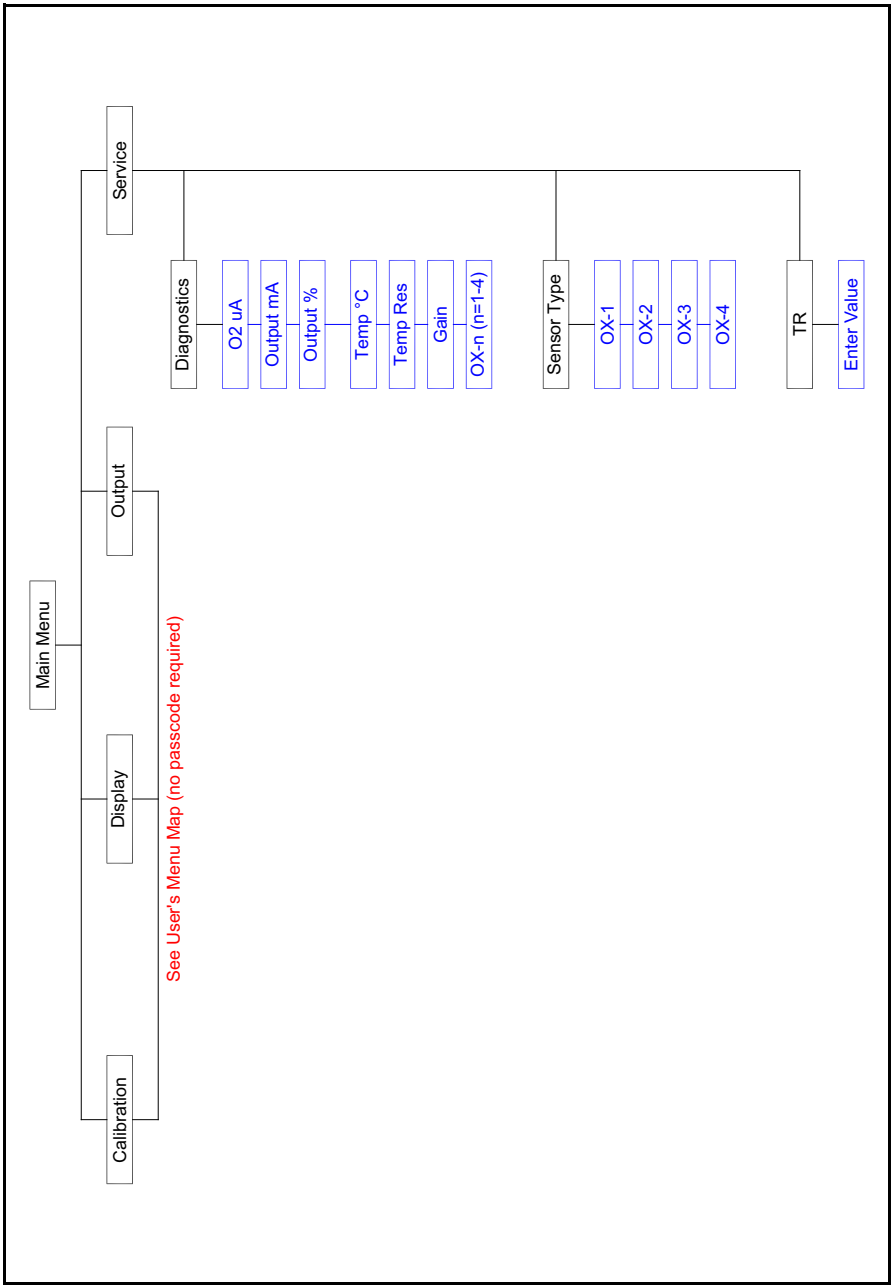

Figure 16: Service Personnel Menu Map

[no content intended for this page]

Appendix C. Order String

The **oxy.IQ** order string is shown in *Table 2* below.

Table 2: oxy.IQ Order String

OXYIQ - BCDES	
Option Code	**Description**
A - Model oxy.IQ	• oxy.IQ Oxygen Transmitter; 4 to 20 mA Output
B - Sensor • 0 • 1 • 2 • 3 • 4 • 5	 • no sensor • standard ppm sensor, 0 to 10 ppm • acid ppm sensor, 0 to 10, 100 & 1000 ppm • standard percent sensor • acid percent sensor • standard ppm sensor, 0 to 100 & 1000 ppm
C - Package • 1 • 2	 • standard package • Intrinsically safe & weatherproof FM CSA Class I, Division 1, Groups ABCD Class II, III, Division 1, Groups EFG ATEX EEx ia IIC T4 & IEC Ex ia IIC T4 IP 66 Type 4X
D - Cable Length • 0 • 1 • 2	 • no cable • 2 meter • 10 meter
E - Zener Barrier • 0 • 2	 • none • Zener Barrier
S - Special • 0 • 1	 • none • special

[no content intended for this page]

A

B

C

D

E

T

W

Warranty

Each instrument manufactured by GE Sensing is warranted to be free from defects in material and workmanship. Liability under this warranty is limited to restoring the instrument to normal operation or replacing the instrument, at the sole discretion of GE Sensing. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If GE Sensing determines that the equipment was defective, the warranty period is:

- One year from delivery for electronic or mechanical failures
- One year from delivery for sensor shelf life

If GE Sensing determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified by GE Sensing, the repairs are not covered under this warranty.

The warranties set forth herein are exclusive and are in lieu of all other warranties whether statutory, express or implied (including warranties or merchantability and fitness for a particular purpose, and warranties arising from course of dealing or usage or trade).

Return Policy

If a GE Sensing instrument malfunctions within the warranty period, the following procedure must be completed:

1. Notify GE Sensing, giving full details of the problem, and provide the model number and serial number of the instrument. If the nature of the problem indicates the need for factory service, GE Sensing will issue a RETURN AUTHORIZATION NUMBER (RAN), and shipping instructions for the return of the instrument to a service center will be provided.
2. If GE Sensing instructs you to send your instrument to a service center, it must be shipped prepaid to the authorized repair station indicated in the shipping instructions.
3. Upon receipt, GE Sensing will evaluate the instrument to determine the cause of the malfunction.

Then, one of the following courses of action will then be taken:

- If the damage is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.
- If GE Sensing determines that the damage is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs at standard rates will be provided. Upon receipt of the owner's approval to proceed, the instrument will be repaired and returned.

Customer Support Centers

U.S.A.

The Boston Center
1100 Technology Park Drive
Billerica, MA 01821
U.S.A.
Tel: 800 833 9438 (toll-free)
978 437 1000
E-mail: sensing@ge.com

Ireland

Sensing House
Shannon Free Zone East
Shannon, County Clare
Ireland
Tel: +35 361 470291
E-mail: gesensingsnnservices@ge.com

An ISO 9001:2008 Certified Company

www.ge-mcs.com/en/about-us/quality.html

www.ge-mcs.com

910-296 Draft_02