Gas analysis XDP

User's manual

910-204 Rev. E

MISURA & AUTOMAZIONE

Panametrics

a Baker Hughes business

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XDP

Panametrics explosion-proof display

User's manual

[Attention! This manual for use with standard software (E=1) only.]

910-204 Rev. E
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[no content intended for this page - proceed to next page]

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Information Paragraphs

Note: These paragraphs provide information that provides a deeper understanding of the situation, but is not essential to the proper completion of the instructions.

IMPORTANT

These paragraphs provide information that emphasizes instructions that are essential to proper setup of the equipment. Failure to follow these instructions carefully may cause unreliable performance.

CAUTION!

This symbol indicates a risk of potential minor personal injury and/or severe damage to the equipment, unless these instructions are followed carefully.

WARNING!

This symbol indicates a risk of potential serious personal injury, unless these instructions are followed carefully.

HIGH VOLTAGE!

This symbol indicates the presence of high voltage, which presents a potential shock hazard for personnel operating the equipment. Read and follow these instructions carefully.

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.

WARNING!

For installations in potentially hazardous areas, be sure to read the certification and safety statements document at the end of this manual before beginning the 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

Panametrics is an active participant in Europe's Waste Electrical and Electronic Equipment (WEEE) take-back initiative, directive 2012/19/EU.

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 https://www.bakerhughesds.com/health-safety-and-environment-hse for take-back instructions and more information about this initiative.

Chapter 1. General information

1.1 Introduction

The *XDP* explosion-proof display is a general-purpose display/control unit used for oxygen and thermal conductivity measurement applications in zone 1 environments. A second part of the system is a remotely-mounted sensor/transmitter, such as the Panametrics *oxy.IQ, XMO2* or *XMTC*.

NOTE: Refer to the documentation supplied with the specific transmitter for complete information on the transmitter.

The XDP performs the following basic functions:

- Supplies 24 VDC to power the transmitter
- Accepts and processes a 4-20 mA output from the transmitter
- Shows a selected process parameter on a digital display
- Provides a user interface for programming the system
- Provides user-configurable alarm relays and an analog output

The XDP is wall-mounted via its integral mounting plate and it is connected to the transmitter with an electrical conduit. It is certified for use in zone 1 hazardous areas.

1.2 Basic features

The XDP incorporates the following basic features:

- Wall-mountable, explosion-proof enclosure
- Universal 100-240 VAC power input
- 24 VDC power output
- 4-20 mA analog input
- 4-20 mA/0-20 mA/0-2 V analog output
- RS-232/RS-485 serial port
- High-resolution, backlit LCD digital display
- Six-key, magnetic ("through-the-glass") keypad
- Five general-purpose alarm relays
- Automatic calibration

See *"Figure 1" on page 1* for a picture of the XDP.

1.3 System overview

Figure 1: The XDP

In a binary gas mixture, the transmitter measures the concentration of a target gas in a known background gas (see the transmitter documentation for a discussion of the specific technology employed by the sensor mechanism). To be suitable for use in an XDP system, the transmitter must:

- Be self-powered or powered by the +24 VDC output from the XDP
- Output a 4-20 mA signal to the XDP analog input
- Comply with all performance specifications for the system
- Mains supply voltage should not exceed 10% of nominal supply voltage
- Installation category II
- Pollution degree 2
- Maximum altitude: 2000 m
- Humidity: up to 80% humidity for temperatures up to 31 °C (88 °F) decreasing linearly to 50% humidity at 40 °C (104 °F)
- Temperature range: -10 °C to +65 °C (+14 °F to +149 °F).

The XDP accepts a 4-20 mA analog output from the transmitter and processes the information. Then, the results are displayed on the built-in digital display window. In addition, the data may be output as a linear analog signal to drive a data recorder or similar device.

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Chapter 2. Installation

2.1 Introduction

This chapter provides a general description of the XDP explosion-proof display and gives directions on how to install and wire the unit for proper operation.

WARNING!

The XDP requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the unit.

Be sure to observe all installation limits and precautions described in this chapter. Pay particular attention to the ambient temperature range of –10° to +60°C (14° to +140°F) specified for the instrument.

WARNING!

To ensure safe operation of the XDP, the unit must be installed and operated as described in this manual. Also, be sure to follow all applicable local safety codes and regulations for installing electrical equipment. In addition, all procedures should be performed by trained service personnel.

Proceed to the next page to begin the installation.

2.2 Choosing an installation site

All environmental and installation factors should have been discussed with a Panametrics applications engineer or field sales person at the time the XDP was ordered. Thus, the equipment should be suited to the application and the planned installation site. However, before installing the unit, read these guidelines to verify that the best installation site has been chosen for optimum instrument accuracy and reliability.

- Make sure that the XDP and transmitter enclosures are suitable for the environmental conditions at the installation site.
- Install the system in a location with little or no vibration.
- Mount the transmitter in accordance with the instructions provided in its accompanying documentation.
- Make sure the ambient temperature at the XDP installation site is –10° to 60°C (14° to 140°F).
- Use a suitable electrical conduit to interconnect the remote transmitter and the XDP enclosure.
- Use a suitable sample system between the gas source and the sample inlet of the transmitter.
- Observe all normal safety precautions. Specifically, do not exceed the maximum pressure and temperature ratings of the transmitter or the sample system.
- Install the XDP system in a location that provides ready access for programming, testing, and servicing the unit.
- Protect all cables from excessive physical strain (bending, pulling, twisting, etc.). Do not subject the cables to temperatures above 65°C (149°F) or below –50°C (–58°F).
- Be sure that the line voltage at the planned installation site is within the specified power input rating for the XDP (100-240 VAC; 50/60 Hz; 40 W maximum).

2.3 Mounting the XDP system

This section explains how to mount the XDP system components and the transmitter/sample system at the installation site.

WARNING!

The XDP requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the unit.

HIGH VOLTAGE!

This symbol indicates the presence of high voltage, which presents a potential shock hazard for personnel operating the equipment. Read and follow these instructions carefully.

2.3.1 Mounting the XDP enclosure

Refer to *"Figure 2" on page 8* , through *"Figure 7" on page 13*, and complete the following steps to mount the XDP enclosure:

1. Select a flat surface on a vertical wall or instrument panel with sufficient space to hold the XDP enclosure.
2. Locate and prepare four (4) mounting holes or two (2) horizontal mounting rails on the vertical surface.
3. Secure the XDP enclosure to the mounting surface with four (4) sets of mounting hardware. Be sure that the enclosure is in a vertical position, with the display window upright.

2.3.2 Mounting the remote transmitter/sample system

Mount the remote transmitter in accordance with the instructions in its accompanying documentation.

NOTE: Most Panametrics transmitters may be located up to 2800 ft (850 m) from the XDP enclosure.

To provide reliable and accurate results, the transmitter is often installed in a suitable sample system. The sample system must deliver a clean, representative gas sample to the inlet of the transmitter at the proper temperature, pressure and flow rate.

NOTE: A suitable sample system may be ordered directly from Panametrics. The sample system would be supplied fully assembled on a flat plate with four (4) mounting holes. See the sample system and/or transmitter manual for more details.

2.4 Wiring the XDP

To completely wire the XDP, connect the following items:

- Analog input (terminal J6)
- +24 VDC output (terminal J6)
- System fault alarm (terminal J2)
- XDP alarms (terminal J3)
- Additional relays (terminal J7)
- System analog output (terminal J5)
- XDP analog output (terminal J8)
- Serial port (terminal J4)
- Line power (terminal TB1)

Refer to the wiring diagram shown in *"Figure 8" on page 14*, while completing the instructions in this section.

Attention European customers!

To meet CE Mark requirements, install all cables as described in Appendix A, CE Mark Compliance.

WARNING!

The XDP requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the unit.

WARNING!

To ensure safe operation of the XDP, the unit must be installed and operated as described in this manual. Also, be sure to follow all applicable local safety codes and regulations for installing electrical equipment. In addition, all procedures should be performed by trained service personnel.

Remove the two side covers on the XDP enclosure. This is accomplished by loosening the set screw in the cover and using a long screwdriver or rod in the slots provided to unscrew the cover. Proceed to the appropriate section to wire each of the terminal blocks.

NOTE: A long, pin-like, plastic wiring tool is stored inside both ports of the XDP enclosure. Insert the tool into a connector pin to open the hole, and then insert the wire. When the tool is removed, the wire is clamped into the connector.

2.4.1 Wiring the analog input and 24 VDC output - J6

Terminal block J6 contains the analog input and power connections for the remote transmitter. To wire the transmitter, complete the following steps:

NOTE: Refer to the transmitter manual for details on wiring the transmitter's terminal block(s).

1. Connect pin #1 to the positive terminal of the analog output from the transmitter.
2. Connect pin #2 to the +24 VDC loop power input on the transmitter.
3. Connect pin #3 to the return connection of the analog output from the transmitter.

2.4.2 Wiring the system fault alarm - J2

Terminal block J2 contains the system fault alarm connections. To wire this alarm, complete the following steps:

NOTE: The system fault alarm on terminal block J2 is usually factory-configured as a "fail-safe" alarm. That is, it is energized during normal operation and de-energized when tripped.

1. Connect pin #1 (NC) to the alarm device input.
2. Connect pin #2 (C) to the alarm device return.
3. Pin #3 (NO) is not used for fail-safe operation.

NOTE: For non-fail-safe operation, reprogram the alarm or move the pin #1 connection to pin #3.

2.4.3 Wiring the XDP alarms - J3

Terminal block J3 contains connections for the four XDP alarms. To wire these alarms, complete the following steps:

NOTE: The following instructions show the wiring for fail-safe operation. For non-fail-safe operation reprogram the alarm or move the pin #1 connection to pin #3 for that alarm.

1. Connect the XDP high alarm (alarm 1) as follows:
   a. Connect pin #1 (NC) to the alarm device input.
   b. Connect pin #2 (C) to the alarm device return.
2. Pin #3 (NO) is not used for fail-safe operation
3. Connect the XDP high high alarm (alarm 2) as follows:
   a. Connect pin #4 (NC) to the alarm device input.
   b. Connect pin #5 (C) to the alarm device return.
   c. Pin #6 (NO) is not used for fail-safe operation
4. Connect the XDP low alarm (alarm 3) as follows:
   a. Connect pin #7 (NC) to the alarm device input.
   b. Connect pin #8 (C) to the alarm device return.
   c. Pin #9 (NO) is not used for fail-safe operation.
5. Connect the XDP low low alarm (alarm 4) as follows:
   a. Connect pin #10 (NC) to the alarm device input.
   b. Connect pin #11 (C) to the alarm device return.
   c. Pin #12 (NO) is not used for fail-safe operation.

2.4.4 Wiring the calibration relays - J7

Terminal block J7 contains connections for the four calibration relays. To wire these relays, complete the following steps:

NOTE: These relays are configured for non-fail-safe operation.

1. Connect the process/cal relay (relay 1) as follows:
   a. Pin #1 (NC) is not used for non-fail-safe operation.
   b. Connect pin #2 (C) to the alarm device return.
   c. Connect pin #3 (NO) to the alarm device input.
2. Connect the zero/span cal relay (relay 2) as follows:
   a. Pin #4 (NC) is not used for non-fail-safe operation.
   b. Connect pin #5 (C) to the alarm device return.
   c. Connect pin #6 (NO) to the alarm device input.
3. Connect the AutoCal indication alarm (relay 3) as follows:
   a. Pin #7 (NC) is not used for non-fail-safe operation.
   b. Connect pin #8 (C) to the alarm device return.
   c. Connect pin #9 (NO) to the alarm device input.
4. Connect the Auto verification alarm (relay 4) as follows:
   a. Pin #10 (NC) is not used for non-fail-safe operation.
   b. Connect pin #11 (C) to the alarm device return.
   c. Connect pin #12 (NO) to the alarm device input.

2.4.5 Wiring the system analog output - J5

Terminal block J5 contains connections for the system analog output. To wire the system analog output, complete the following steps:

1. Connect pin #1 to positive input on the device.
2. Connect pin #2 to the return line from the device.
3. Pin #3 has no connection.

2.4.6 Wiring the XDP analog output - J8

Terminal block J8 contains connections for the XDP analog output. To wire the XDP analog output, complete the following steps:

1. Connect pin #1 to positive input on the device.
2. Connect pin #2 to the return line from device.
3. Pin #3 has no connection.

2.4.7 Wiring the serial port - J4

Terminal block J4 contains connections for the RS-232/RS-485 (RS-485 supports multi-drop installations) serial port. To wire the serial port, complete the following steps:

1. Connect pin #1 to the transmit pin on the PC serial port.
2. Connect pin #2 to the receive pin on the PC serial port.
3. Connect pin #3 to the return pin on the PC serial port.

NOTE: This connection may be made with a Panametrics #704-668 cable. If this cable is used, connect the red wire to pin #1, the white wire to pin #2, and the green wire to pin #3.

See *EIA-RS serial communications* (Panametrics document 916-054) for a detailed discussion of serial port wiring.

2.4.8 Wiring the line power - TB1

Terminal block TB1 on the power supply board contains connections for the line power to the XDP. Make these connections only with wire that meets the following specifications:

- Individual conductor gauge of 18 AWG minimum (maximum current capacity of 12 Amps)
- Voltage rating of 600 volts minimum
- Insulation temperature rating of 105°C minimum

WARNING!

The rating of the wire insulation must be at least 15°C above the expected ambient temperature.

Refer to *"Figure 8" on page 14* and complete the following steps:

WARNING!

Before proceeding with the section, verify that the line power has been turned off at the external disconnect device.

1. Attach a cable or conduit with the three line power conductors to a cable entry port on the XDP enclosure.

CAUTION!

Be sure that the input voltage complies with the input power rating for the XDP (see *"Chapter 7. Specifications" on page 37*).

2. Connect the line power leads to terminal block J1 as follows:
   a. Connect the *line* power lead (black or brown) to pin L on the power connector.
   b. Connect the *neutral* power lead (white or blue) to pin N on the power connector.
   c. Connect the *ground* power lead (green or green/yellow) to the chassis ground screw shown in *"Figure 8" on page 14*.
3. Make sure that the factory-installed jumper wire at pin G on the power connector is secure.

This completes the wiring of the XDP. Proceed to *"Chapter 3. Operation" on page 15*, for instructions on using the flow meter.

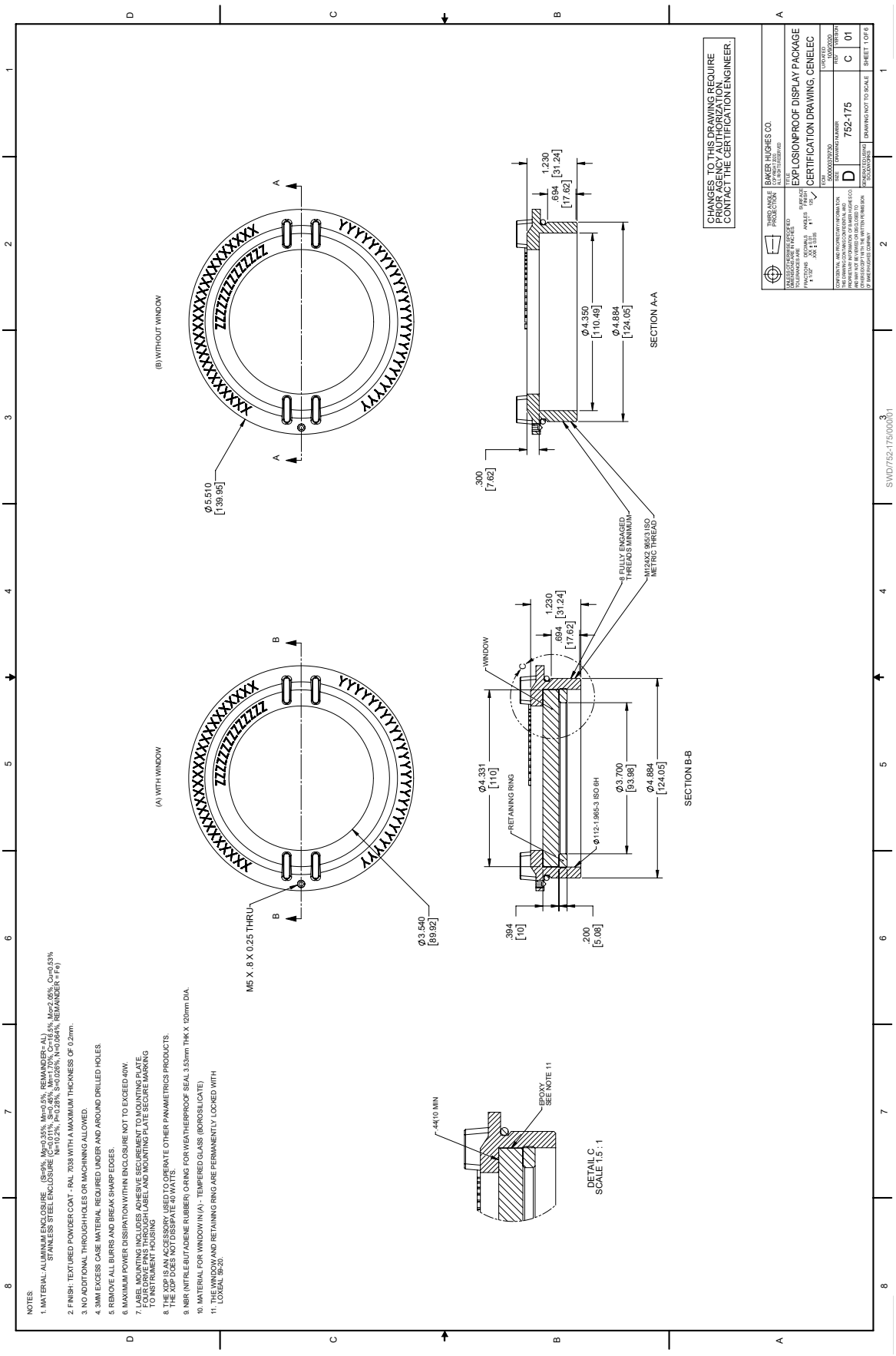


Figure 2: XDP Certification drawing, Cenelec (752-175revA, sheet 1 of 6)

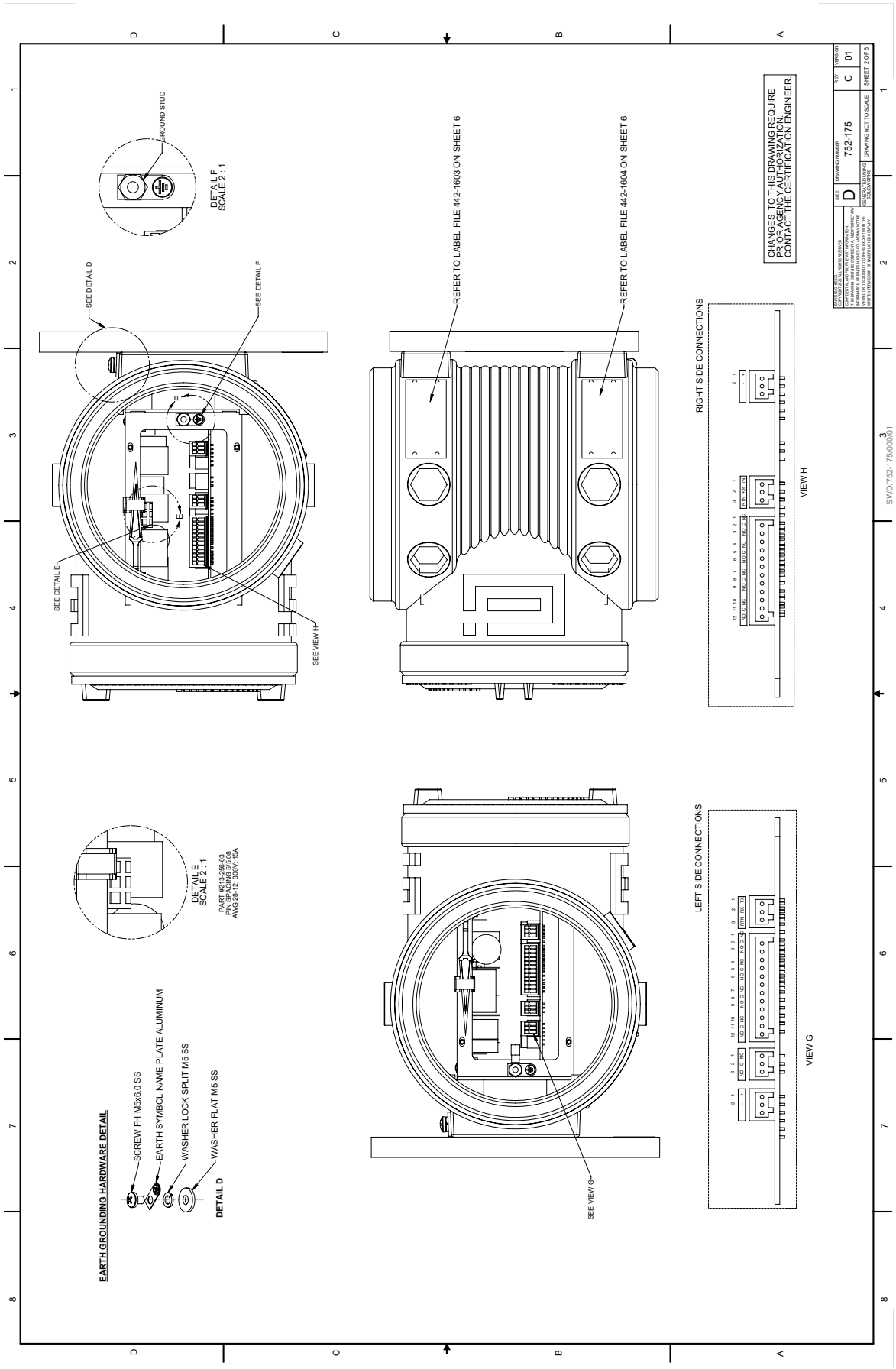


Figure 3: XDP certification drawing, Cenelec (752-175revA, sheet 2 of 6)

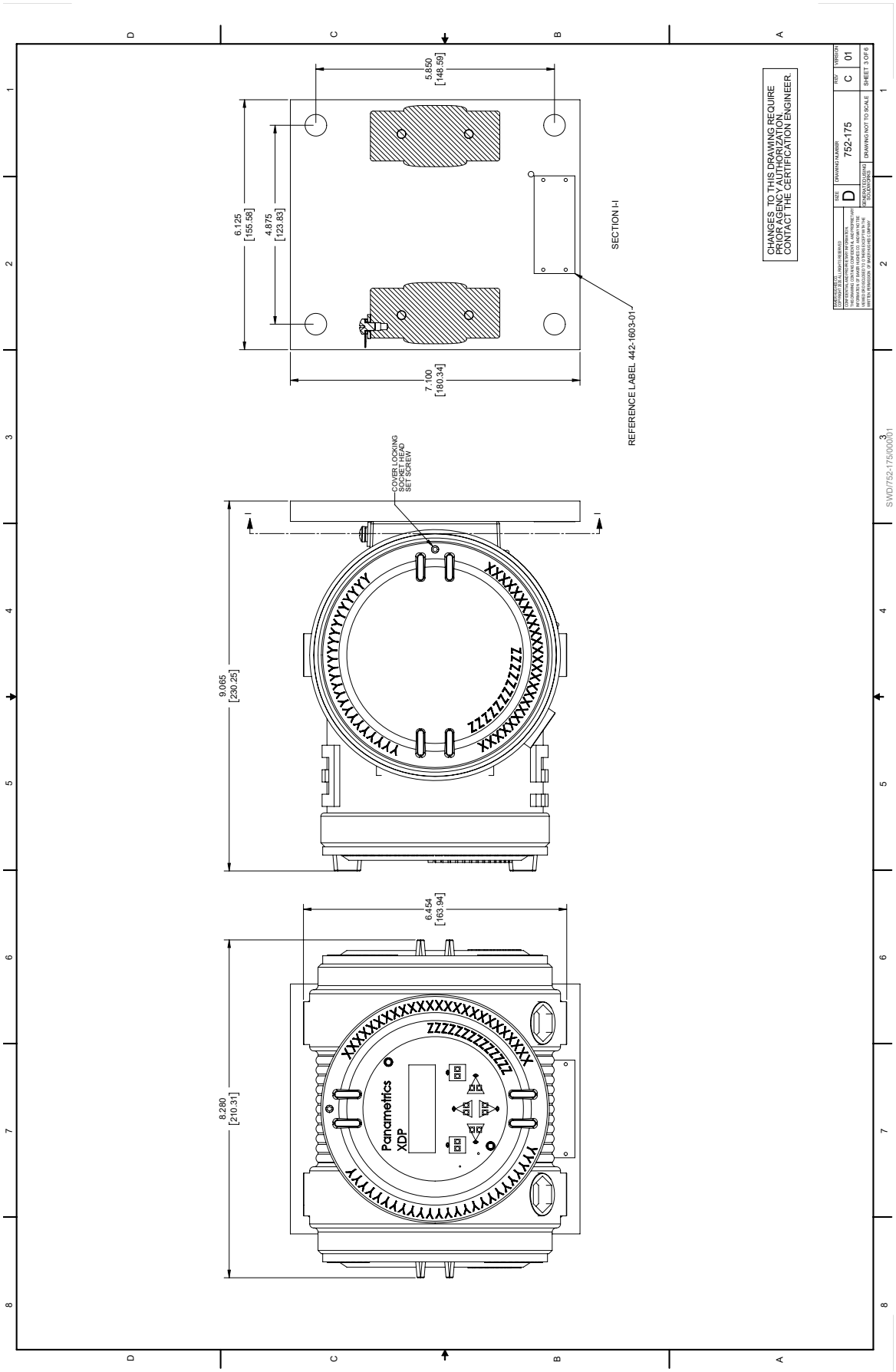


Figure 4: XDP certification drawing, Cenelec (752-175revA, sheet 3 of 6)

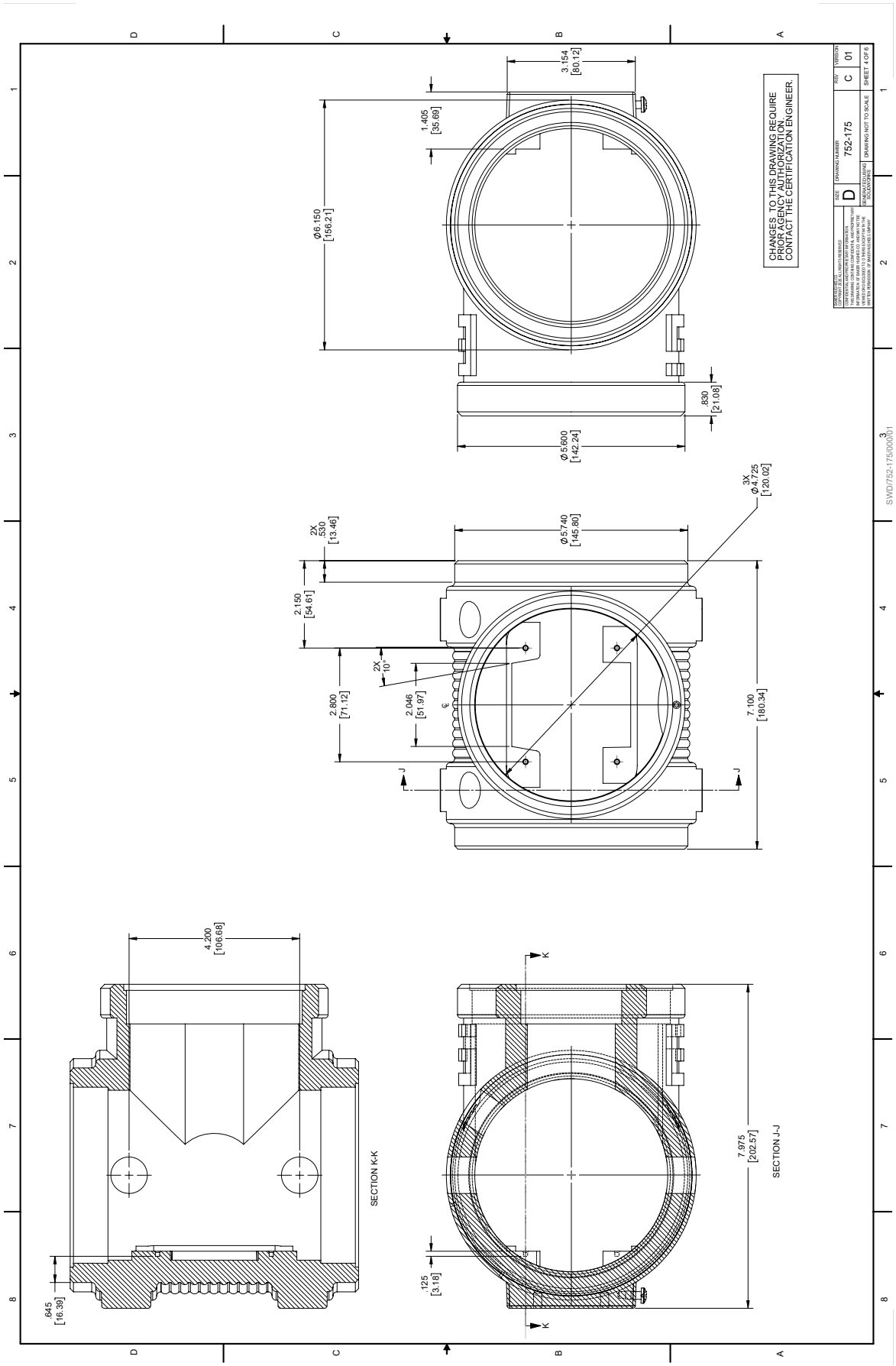


Figure 5: XDP Certification drawing, Cenelec (752-175revA, sheet 4 of 6)

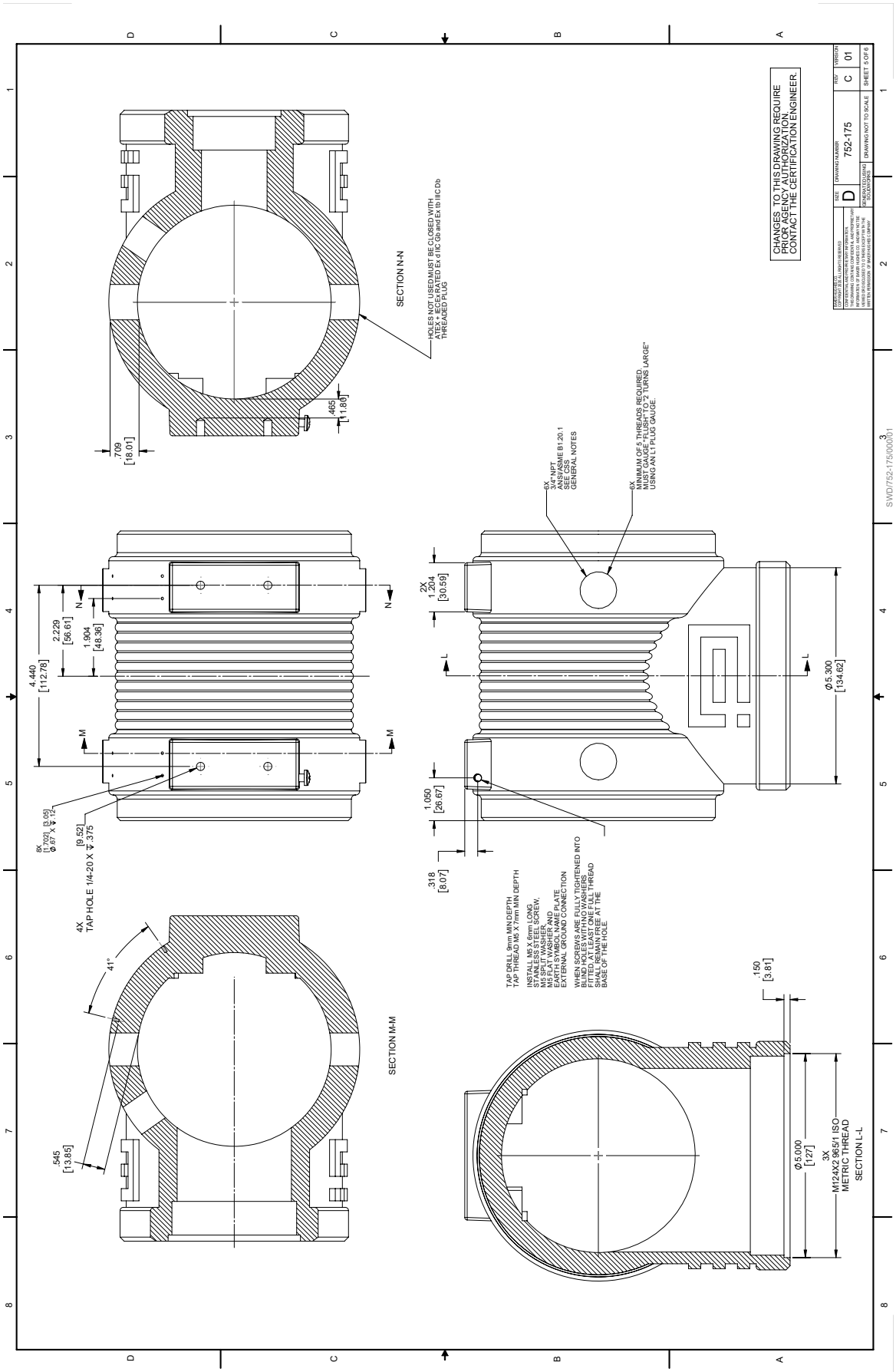


Figure 6: XDP certification drawing, Cenelec (752-175revA, sheet 5 of 6)

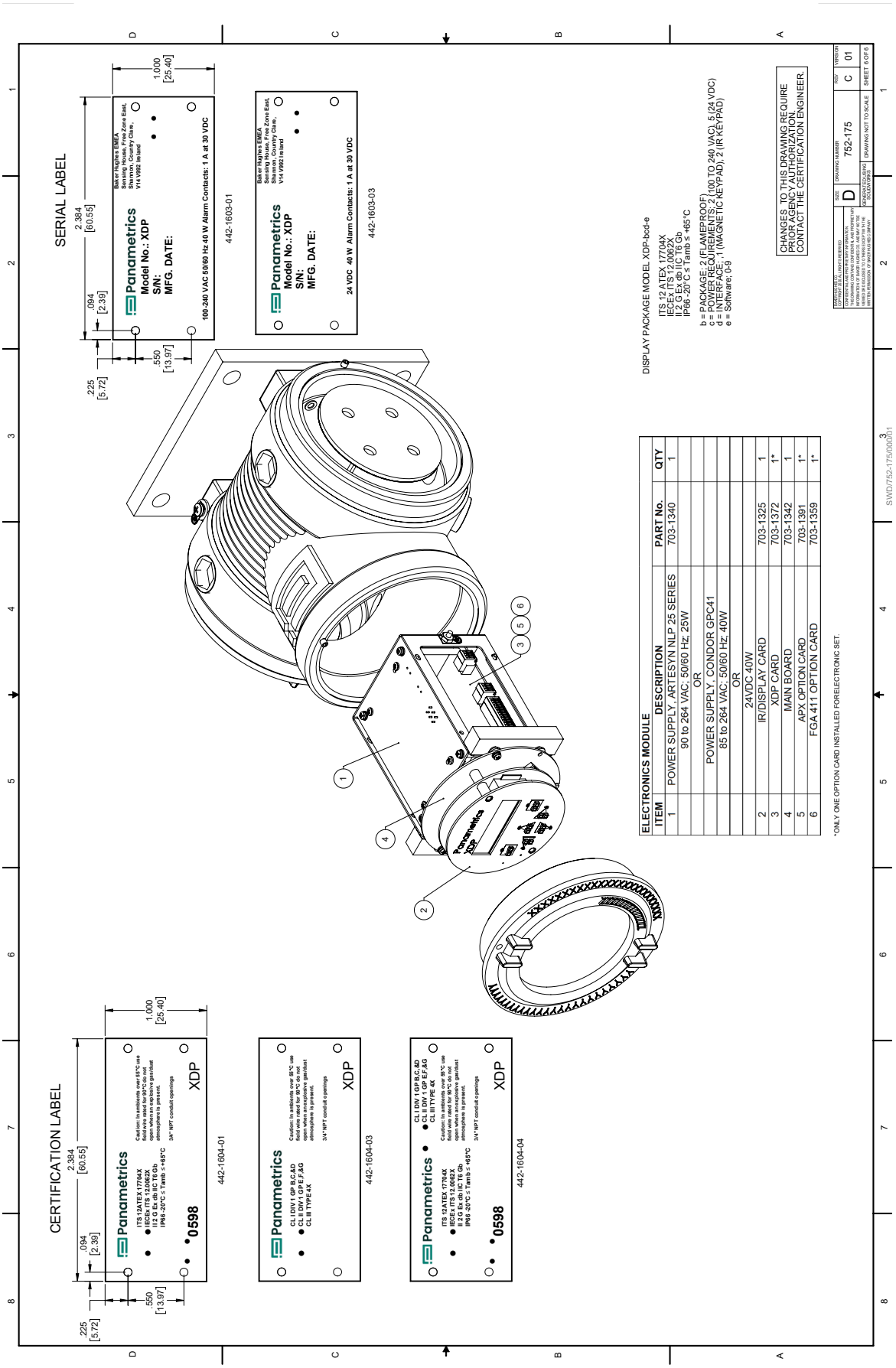
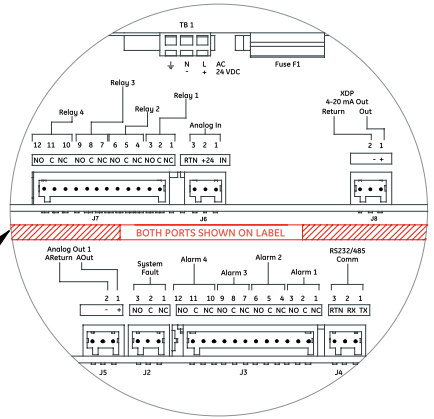


Figure 7: XDP certification drawing, Cenelec (752-175revA, sheet 6 of 6)

Figure 8: XDP interconnection label (442-790-01revF, sheet 1 of 1)

REVISIONS					
REV	ECO	DESCRIPTIONS	DWN	CKD	APVD
F	05515	REPLACE FORMAT & UPDATED PER ECO	SM 03/30/05	DJ 04/01/05	GT 04/04//05



BORDER & HATCH LINES IN THIS AREA TO BE RED PMS 485 C-0% M-95% Y-100% K-0%

NOTES:

1. MATERIAL: .007 THK (REF) MYLAR BASE WITH REVERSE SCREENING AND 3M NO. 468 PERMANENT ADHESIVE BACKING. LABELL DIA 3.75 IN.

2. FINISH: MATTE VELVET TEXTURE

3. COLORS: BACKGROUND: WHITE
   BOTH PORTS SHOWN ON LABEL : RED 485 (FONT: GE INSPIRA BOLD)
   ALL OTHER TEXT AND LINES: BLACK (ALL FONTS: GE INSPIRA BOLD)

4. ALL COLORS PER PANTONE MATCHING SYSTEM

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS : DECIMALS .XX : .XXX : ANGLES :
SURFACE FINISH

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THIRD ANGLE PROJECTION

DRAWN SM 03/30/05	APP'D GT 04/04/05
CHECKED DJ 04/01/05	SALES
CERT	QC
RN	GENERATED USING ADOBE
MODEL NO. XDP	

Panametrics

TITLE: INTERCONNECT LABEL, XDP

SIZE	DRAWING NUMBER	REV
B	442-790-01	F

SCALE		SHEET
1:1	DO NOT SCALE DWG	1 OF 1

Chapter 3. Operation

3.1 Introduction

The XDP is an easily operated monitoring/control device. Make sure that the system has been installed in accordance with the instructions given in *"Chapter 2. Installation" on page 3*, before applying power. This chapter includes discussions of the following topics:

- Preventing common problems
- Powering up the system
- Programming the meter
- Taking measurements

WARNING!

To ensure safe operation of the XDP, the unit must be installed and operated as described in this manual. Also, be sure to follow all applicable local safety codes and regulations for installing electrical equipment. In addition, all procedures should be performed by trained service personnel.

3.2 Preventing common problems

The complexity of accurately measuring the target gas mixtures dictates that some basic precautions be observed in using the XDP. Failure to observe these simple procedures is often the cause of some common problems. Compliance with the following points will help to eliminate such problems:

- The transmitter must be properly connected to the XDP **before** applying power to the system. Connecting or disconnecting the transmitter while the XDP is powered up may generate a *24 volt power fault* message. If this should occur, cycle the power to the system OFF and then ON to clear the problem.
- The automatic calibration feature should be enabled and scheduled to be run on a regular basis. The optimum calibration interval depends on the application (consult Panametrics for recommendations).
- Never use thread sealant on any connection in the sample gas flow path. Thread sealant emits combustible vapors that can cause reading errors.
- The magnetic keypad may not function properly if the XDP is installed in an area that has other nearby magnetic devices in operation. To minimize this factor, provide a suitable installation location.

3.3 Cleaning the enclosure

If the glass window or the case of the XDP becomes soiled, use a soft cloth dampened with water for cleaning. Never use solvents or detergents to clean the XDP.

3.4 Powering up the system

Check the wiring connections and close both the XDP and transmitter enclosures before applying power. Energize the external disconnect device to power up the XDP. Allow the transmitter to warm up for at least thirty minutes, before taking measurements.

WARNING!

The XDP requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the unit.

3.4.1 The enclosure window

The window at the top of the XDP enclosure includes the components shown in *Figure 9* below.

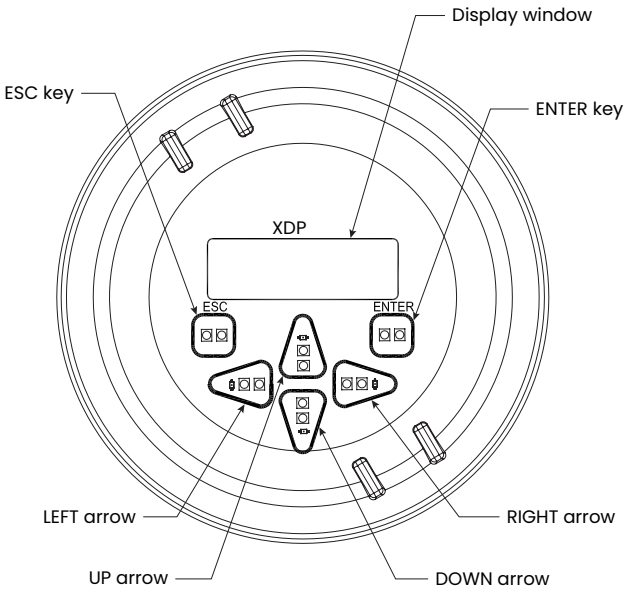


Figure 9: The enclosure window

The XDP is factory-configured to display *O2 ppm/pcnt with a resolution of 0.01* as the default. However, changing the gas label, the gas units, and the display resolution are easily accomplished. See *"Chapter 4. Setup" on page 19*, for programming instructions.

IMPORTANT

The XDP magnetic keypad permits programming of the instrument through the glass faceplate without removing the cover. Thus, all programming procedures may be performed while the unit is installed in a hazardous area.

3.4.2 Initial screen displays

Immediately upon power up, the digital display shows the following sequence of informational screens, as the meter performs its internal systems checks.

BSeries Loader v1.05 Boot is Flash. Program CRC valid. Booting from Flash	This is a typical example of the first initialization screen.
Scanning Hardware Found Image Slot 1 Downloading Slot 1	This is a typical example of the second initialization screen.
Scanning Hardware Initializing Machine Initializing UI	This is a typical example of the final initialization screen.

If the meter passes all of its internal system checks, the following initial data screen appears:

1 O2 HH:MM 0.00 pcnt LL	Notice that the absence of a valid signal has triggered the low low alarm (the LL symbol in the lower right corner).

NOTE: The padlock icon at the upper right hand corner of the above display indicates that the *user program* is locked with password protection.

3.4.3 Starting the sample gas

Start the sample gas flow to the transmitter and allow a few minutes for the system to reach equilibrium. The following data screen should appear if the oxygen level is above the low alarm setpoint and below the high alarm setpoint.

1 O2 HH:MM X.XX pcnt	This is a typical display. The actual oxygen concentration of your sample gas will be shown here.

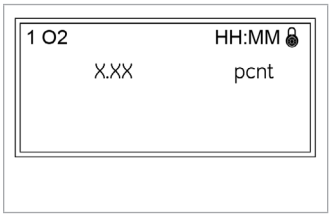
NOTE: Allow approximately 30 minutes for the sensor to reach temperature equilibrium, to ensure accurate readings

Notice that the display shows the *slot number*, the *gas label*, and the *current time* on the top line. The current *data value* along with the *units* are displayed across the bottom of the screen.

NOTE: Slot 0 is the main circuit board, slot 1 holds the XDP circuit board, and slots 2-4 are normally not used.

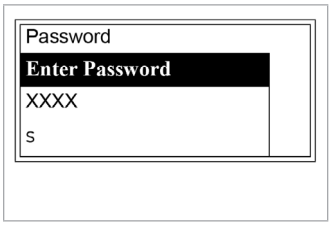
3.5 Accessing the user program

To configure the XDP for a specific application, it is necessary to leave measurement mode and enter the *user program* as follows (see menu maps in *"Figure 14" on page 44* and *"Figure 15" on page 45*):

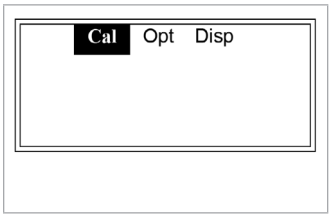


While in measurement mode, press the [ENTER], [ENTER], [ESC], [ENTER], and [ESC] keys in sequence.

Enter the operator-level password (**2719**) at the next screen to access the menus available to the end user. Note that a different password is required to access the factory-level menus.



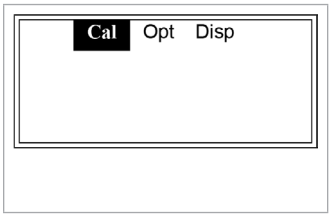
Use [◀] and [▶] to position the cursor under the desired character. Then, use [▲] and [▼] to increment the value. Press [ENTER] when done.



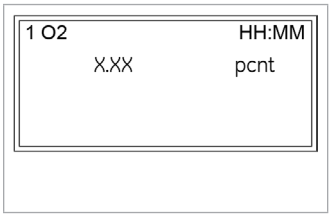
This screen shows the highest level of the *user program*, which is referred to as the *main menu*.

3.6 Exiting the user program

To leave the *user program*, proceed as follows from the main menu:



Press the [ESC] key.



You are now back in normal measurement mode.

Notice that the padlock is no longer visible at the upper right corner of the display window. Once the *user program* has been accessed with a valid password, the menus at that programming level remain unlocked when you return to measurement mode. With the menus unlocked, you may reenter the user program by simply pressing the [ESC] key only. To re-lock the menus, see the instructions in *"Chapter 4. Setup" on page 19*.

NOTE: If the unit is powered down, the *user program* will be locked when the unit is powered up again.

To program a specific feature of the XDP, proceed to the appropriate section of *"Chapter 4. Setup" on page 19*.

3.7 Error codes

As an aid in monitoring the status of your system, the XDP may display a variety of blinking error codes on the LCD. These error codes are listed in *Table 1* below.

Table 1: Error code descriptions

Code	Meaning	Code	Meaning
LL	Low low alarm has been tripped (low alarm normally also tripped)	Input over range	Analog input is above the programmed range
L	Low alarm has been tripped	Zero drift/cal	Zero drift/cal is over programmed limit
H	High alarm has been tripped	Zero drift/total	Zero drift/total is over programmed limit
HH	High high alarm has been tripped (high alarm normally also tripped)	Span drift/cal	Span drift/cal is over programmed limit
CV	Auto verification alarm has been tripped	Span drift/total	Span drift/total is over programmed limit
Input under range	Analog input is below the programmed range		

[no content intended for this page - proceed to next page]

Chapter 4. Setup

4.1 Introduction

Although the XDP is set up at the factory with default values that are suitable for most applications (see *"Appendix D. Factory default settings" on page 47*), the *user program* provides a means for customizing many of the meter parameters. Proper setup and calibration of the XDP is important to ensure accurate readings.

WARNING!

To ensure safe operation of the XDP, the unit must be installed and operated as described in this manual. Also, be sure to follow all applicable local safety codes and regulations for installing electrical equipment. In addition, all procedures should be performed by trained service personnel.

The following procedures are described in this chapter:

- Setting up the display
- Setting up the analog input
- Setting up the alarms
- Setting up the analog and digital outputs
- Using up the XDP utilities

4.2 Programming steps

To program your XDP, complete the following steps:

NOTE: The factory default values for all of the programmable XDP parameters are listed in *"Appendix D. Factory default settings" on page 47*.

1. Access the *user program* as described in “accessing the user program” on page 26.
2. Use the menu maps in *"Figure 14" on page 44* and *"Figure 15" on page 45* as guide in navigating to the desired menu option.
3. Follow the instructions in the appropriate section of this chapter to program the selected menu option.
4. Exit the *user program* as described in “exiting the user program” on page 27.

NOTE: While in the *user program*, press *[ESC]* at any time to abort the current operation and move back up one menu level.

Proceed to the appropriate section to perform the desired task.

4.3 Setting up the display

Use the instructions in this section to configure the display window as desired.

4.3.1 Switching display windows

If multiple XDP display windows have been set up (see *"Chapter 7. Specifications" on page 37*, for instructions), the display may easily be switched between these windows from the within the *user program*. To accomplish this, navigate to the disp option in the main menu and proceed as follows:

NOTE: As a shortcut, the display windows may be switched from measurement mode by using the [▲] and [▼] keys.

1. At the *disp* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight the desired display window.
3. Press [ENTER].

4.3.2 Configuring the display

For any display window, the clock, gas label, gas units, and resolution may be adjusted as desired.

Begin by navigating to the *cal>1:cal>setup>disp* menu and proceed as follows:

1. At the *disp* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *gas label* option and press [ENTER].
3. A gas label of up to eight characters may be entered as follows:
   a. Use the [◀] and [▶] keys to select a character position within the square brackets ([xxxxxxxx]) and press [ENTER].
   b. Use the four arrow keys to highlight the desired character in the table and press [ENTER]. Repeat until all of the characters have been entered.
   c. Use the [▶] key to move the cursor to *done* and press [ENTER].
4. Use the [▲] and [▼] keys to highlight the *gas unit* option and press [ENTER].
5. The gas unit may be specified as follows:
   a. Use the [▲] and [▼] keys to highlight either the *pcnt* or the *ppm* option.
   b. Press [ENTER].
6. Use the [▲] and [▼] keys to highlight the *resolution* option and press [ENTER].
7. The resolution (number of digits after the decimal point) may be specified as follows:
   a. Use the [▲] and [▼] keys to highlight either the *1, 0.1 or 0.01* option.
   b. Press [ENTER].

The real-time clock is set in a different menu. To set the date and time, navigate to the cal>1:cal>setup>clock menu and proceed as follows:

1. At the *clock* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *set date* option and press [ENTER].
3. Set the date as follows:
   a. Use the [◀] and [▶] keys to select a character position within the MM/DD/YY field.
   b. Use the [▲] and [▼] keys to set the desired value for that position.
   c. After the date has been completely set, press [ENTER].
4. Use the [▲] and [▼] keys to highlight the *set time* option and press [ENTER].
5. Set the date as follows:

   NOTE: The date must be entered in 24-hour format.
   a. Use the [◀] and [▶] keys to select a character position within the HH:MM field.
   b. Use the [▲] and [▼] keys to set the desired value for that position.
   c. After the time has been completely set, press [ENTER].

4.3.3 Adjusting the display contrast

To adjust the contrast of the LCD display, navigate to the *opt>user>contrast* menu and proceed as follows:

1. At the *contrast* menu, press [ENTER].
2. Use the [▲] and [▼] keys to increment the value to a number between 0 (min. contrast) and 99 (max. contrast).
3. When done, press [ENTER].

4.3.4 Setting the display backlight

The display backlight has three possible settings:

- **Off** - the backlight is permanently turned off
- **On** - the backlight is continuously on
- **Timed** - the backlight comes on whenever a key is pressed and remains on until a specified time interval has elapsed with no keypad activity

To adjust the LCD display backlight, navigate to the opt>user>backlight menu and proceed as follows:

1. At the *backlight* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the desired setting and press [ENTER].
3. If *on* or *off* was selected, the programming is complete. However, if *timed* was selected, continue with the following steps.
4. Use the [◀] and [▶] keys to select a character position.
5. Use the [▲] and [▼] keys to increment the values in each position to set to a time between 0 and 99 minutes.
6. When done, press [ENTER].

4.4 Setting up the analog input

Use the instructions in this section to configure the manner in which the XDP responds to the 4-20 mA input signal from the transmitter.

4.4.1 Entering calibration data

The XDP converts the 4-20 mA analog input signal from the transmitter into either ppm or pcnt of the target gas for output on the display. Program this conversion process by entering up to nine data points on the conversion curve. To accomplish this, navigate to the *cal>1:cal>setup>cal data* menu and proceed as follows:

1. At the *cal data* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *cal points* option and press [ENTER].
3. Use the [▲] and [▼] keys to set the value to the desired number of data points (2-9). Press [ENTER].
4. Use the [▲] and [▼] keys to highlight the *cal table* option and press [ENTER].
5. Using the four arrow keys, program the mA value and the corresponding ppm/pcnt value for the first data point.
6. At the up/Down arrows symbol at the end of the data line, use the [▲] and [▼] keys to move to the next data point number.
7. Repeat steps 5 and 6 until all of the data points have been entered.
8. Press [ENTER].

4.4.2 Setting the analog input error limits

The XDP system fault alarm is tripped whenever the 4-20 mA analog input signal is outside a specified signal range. To program this range, navigate to the *cal>1:cal>setup>4-20mA input* menu and proceed as follows:

1. At the *4-20mA input* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *over range limit* option and press [ENTER].
3. Using the four arrow keys, program the mA value for the upper end of the acceptable range (usually 20 mA). Press [ENTER].
4. Use the [▲] and [▼] keys to highlight the *under range limit* option and press [ENTER].
5. Using the four arrow keys, program the mA value for the lower end of the acceptable range (usually 4 mA). Press [ENTER].

If the system fault alarm is configured (see the next section) and the error handler is enabled (see *"Chapter 5. Calibration" on page 27*), the fault alarm will be tripped and the designated error message will be displayed whenever the analog input signal is outside the range programmed above.

4.5 Setting up the alarms

Use the instructions in this section to configure the system fault alarm and the four XDP alarms.

4.5.1 Setting up the system fault alarm

The system fault alarm is tripped whenever the 4-20 mA analog input signal from the transmitter is outside the range that was programmed in the previous section or the zero drift/cal, zero drift/total, span drift/cal, or span drift/total exceeds the programmed limit. The system fault alarm has two possible operating modes:

- **Non-fail-safe:** The alarm is wired to the normally-open (NO) and common (C) contacts, and the alarm relay is de-energized until a fault condition energizes the alarm relay to close these contacts and trip the alarm.
- **Fail-safe:** The alarm is wired to the normally-closed (NC) and common (C) contacts, and the alarm relay is energized until a fault condition de-energizes the alarm relay to allow these contacts to close and trip the alarm.

To specify the system fault alarm type, navigate to the *opt>user>fault alarm* menu and proceed as follows:

1. At the *fault alarm* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight either the *non-fail-safe* option or the *fail-safe* option.
3. Press [ENTER].

4.5.2 Setting up the four XDP alarms

The XDP has four general-purpose, programmable alarms that are linked to the ppm/pcnt value. These alarms are designated as:

- Low low alarm
- Low alarm
- High alarm
- High high alarm

The following parameters may be programmed for each alarm:

- **Trip point** - the "low" and "low low" alarms will be tripped if the current ppm/pcnt value is below this setpoint; the "high" and "high high" alarms will be tripped if the current ppm/pcnt value is above this setpoint. When an alarm trips, the corresponding symbol (LL, L, H, or HH) is shown in the lower right corner of the display.
- **Deadband** - this specifies the amount by which the measurement must change before a tripped alarm will be reset. This is to prevent the relay from constantly tripping and resetting in response to minor measurement fluctuations right near the trip point.
- **Alarm type** - the alarm may be set for either non-fail-safe or fail-safe operation (see the previous section).

To program the four XDP alarms, navigate to the *cal>1:cal>setup>alarms* menu and proceed as follows:

1. At the *alarms* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight the menu option for the desired alarm and press [ENTER].
3. Program the three alarm parameters as follows:
   a. Use the [▲] and [▼] keys to highlight the *trip point* menu option and press [ENTER].
   b. Using the four arrow keys, program the mA/pcnt value for the desired alarm trip point. Press [ENTER].
   c. Use the [▲] and [▼] keys to highlight the *deadband* menu option and press [ENTER].
   d. Using the four arrow keys, program the mA/pcnt value for the desired alarm deadband. Press [ENTER].
   e. Use the [▲] and [▼] keys to highlight the *fail-safe* menu option and press [ENTER].
   f. Use the [▲] and [▼] keys to highlight the desired *alarm type* menu option and press [ENTER].
4. To test the alarm that was just programmed, use the [▲] and [▼] keys to highlight the *test* menu option and press [ENTER].
   a. Use the [▲] and [▼] keys to highlight either the *trip* or *reset* menu option and press [ENTER]. The alarm relay should respond accordingly.
   b. When done, press [ESC].
5. Repeat steps 2-4 until all of the alarms have been programmed.

4.6 Setting up the analog and digital outputs

Use the instructions in this section to configure the system analog output, the XDP analog output, and the digital serial port output.

4.6.1 Setting up the system analog output

The system analog output has the following programmable features:

- **Analog output type** - the 0-20 mA, 4-20 mA, 0-2 V, and NAMUR output types are available.

  NOTE: The NAMUR NE43 specification requires a 4-20 mA analog output to be clamped in specific bands to indicate out-of-range errors.
- **Zero setpoint** - enter the measurement value that corresponds to the low end of the system analog output range.
- **Span setpoint** - enter the measurement value that corresponds to the high end of the system analog output range minus the zero setpoint.
- **Test** - manually generate a system analog output with a known value.
- **Zero trim** - adjust the system analog output to equal the low end of the recorder range.
- **Span trim** - adjust the system analog output to equal the high end of the recorder range minus the zero setpoint.

To set up the system analog output, navigate to the *opt>user>analog output* menu and proceed as follows:

1. At the *analog output* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *Aout type* option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the menu option for the desired output type and press [ENTER].
4. Use the [▲] and [▼] keys to highlight the *zero setpoint* option and press [ENTER].
5. Using the four arrow keys, program the ppm/pcnt measurement value that corresponds to the low end of the chosen analog output range. Press [ENTER].
6. Use the [▲] and [▼] keys to highlight the *span setpoint* option and press [ENTER].
7. Using the four arrow keys, program the ppm/pcnt measurement value that corresponds to the upper end of the chosen analog output range. Press [ENTER].

Having set the basic parameters for the analog output, the output should now be tested and trimmed by continuing as follows:

1. Use the [▲] and [▼] keys to highlight the test option and press [ENTER].
2. Enter a test percentage (0-100%) based on the full scale value for the chosen analog output type (e.g. a 50% test value for the 4-20 mA range would be 12 mA). Press [ENTER] to leave the edit box and press [ENTER] again at either the *test, zero trim*, or *span trim* menu choice to send the test value to the analog output device.
3. Repeat step 2 for as many test percentages as desired, then press [ENTER].

IMPORTANT

Before proceeding, make sure the output percentage to be trimmed has been entered in the test menu.

4. Use the [▲] and [▼] keys to highlight the *zero trim* option and press [ENTER].
5. Use the [▲] and [▼] keys to trim the zero point until your output device reads the exact value for the low end of the chosen analog output range (e.g. 4 mA for a 4-20 mA range). Press [ENTER].
6. Use the [▲] and [▼] keys to highlight the *span trim* option and press [ENTER].
7. Use the [▲] and [▼] keys to trim the span point until your output device reads the exact value for the high end of the chosen analog output range (e.g. 20 mA for a 4-20 mA range). Press [ENTER].

4.6.2 Setting up the XDP analog output

The XDP analog output has the following programmable features:

- **Analog output type** - the 0-20 mA, 4-20 mA, and 0-2 V output types are available (there is no NAMUR option).
- **Zero setpoint** - enter the measurement value that corresponds to the low end of the system analog output range.
- **Span setpoint** - enter the measurement value that corresponds to the high end of the system analog output range.
- **Error handlers** - enable/disable six different error handlers.
- **Test** - manually generate a system analog output with a known value.
- **Zero trim** - adjust the system analog output to equal the low end of the recorder range.
- **Span trim** - adjust the system analog output to equal the high end of the recorder range.

To configure the XDP output, navigate to the *cal>1:cal>setup>analog output* menu and proceed as follows:

1. At the *analog output* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *Aout type* option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the menu option for the desired output type and press [ENTER].
4. Use the [▲] and [▼] keys to highlight the *zero setpoint* option and press [ENTER].
5. Using the four arrow keys, program the mA/pcnt measurement value that corresponds to the low end of the chosen analog output range. Press [ENTER].
6. Use the [▲] and [▼] keys to highlight the *span setpoint* option and press [ENTER].
7. Using the four arrow keys, program the ppm/pcnt measurement value that corresponds to the upper end of the chosen analog output range. Press [ENTER].

4.6.2a Error handler options

At this point, the programming of the XDP analog output differs from that of the system analog output described in the previous section. The difference lies in the programming of error handlers for the following six fault conditions:

- Input mA over range
- Input mA under range
- Zero drift/cal > max drift/cal
- Zero drift/total > max drift/total
- Span drift/cal > max drift/cal
- Span drift/total > max drift/total

NOTE: See *"Chapter 5. Calibration" on page 27*, for instruction on viewing the current values for last four parameters listed above.

4.6.2b Configuring the error handlers

To set up the error handlers, continue the programming as follows:

1. At the *error handlers* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight the desired *fault condition* error handler (see list on previous page) and press [ENTER].
3. Use the [▲] and [▼] keys to highlight either the *enable* or the *disable* option and press [ENTER].
4. If you *disabled* this error handler, skip to step 7. If you *enabled* this error handler continue with the next step.
5. Use the [▲] and [▼] keys to highlight the manner in which you want the XDP to respond to a fault in this parameter:
   - **Force high** - displays a value equal to the high point of the selected analog output range (e.g. 20 mA for a 4-20 mA range).
   - **Force low** - displays a value equal to the low point of the selected analog output range (e.g. 4 mA for a 4-20 mA range).
   - **Force to value** - displays a preprogrammed value.
   - **No effect** - displays the current live value
   - **Hold last value** - displays the last valid measurement prior to the fault condition.

   After making your choice, press [ENTER].
6. If you selected *force high, force low, no effect*, or *hold last value*, go to step 7. If you selected force to value, proceed as follows:
   a. Using the four arrow keys, program the ppm/pcnt measurement value that should be displayed if there is a fault condition in this parameter. Press [ENTER].
   b. Press [ESC] twice.
7. Return to step 2 to program additional error handlers, until all of the error handlers have been configured.

4.6.2c Testing and trimming the analog output

Having set the basic parameters for the analog output, the output should now be tested and trimmed by continuing as follows:

1. Use the [▲] and [▼] keys to highlight the test option and press [ENTER].
2. Enter a test percentage (0-100%) based on the full scale value for the chosen analog output type (e.g. a 50% test value for the 4-20 mA range would be 12 mA). Press [ENTER] to leave the edit box and press [ENTER] again at either the *test, zero trim*, or *span trim* menu choice to send the test value to the analog output device.
3. Repeat step 2 for as many test percentages as desired, then press [ENTER].

IMPORTANT

Before proceeding, make sure the output percentage to be trimmed has been entered in the test menu.

4. Use the [▲] and [▼] keys to highlight the *zero trim* option and press [ENTER].
5. Use the [▲] and [▼] keys to trim the zero point until your output device reads the exact value for the low end of the chosen analog output range (e.g. 4 mA for a 4-20 mA range). Press [ENTER].
6. Use the [▲] and [▼] keys to highlight the *span trim* option and press [ENTER].
7. Use the [▲] and [▼] keys to trim the span point until your output device reads the exact value for the high end of the chosen analog output range (e.g. 20 mA for a 4-20 mA range). Press [ENTER].

4.6.3 Setting up the serial port digital output

The serial port digital output, which is used to interface the XDP with a personal computer, has the following programmable features:

- **Node ID** - 16, 32, 48, 64, 80, 96, 112, 128, 144, 160, 176, 192, 208, 224, and 240 are the available options.
- **Baud rate** - 300, 1200, 2400, 9600, 19200, 38400, 57600, and 115200 are the available options.
- **Data length** - 7 bits and 8 bits are the available options.
- **Parity** - none, odd, and even are the available options.
- **Stop bits** - 1 bit and 2 bits are the available options.
- **Comm type** - RS-232 and RS-485 (multi-drop installations are supported) are the available options.

To configure the serial port digital output, navigate to the *opt>user>comm* menu and proceed as follows:

1. At the *comm* menu option press [ENTER].
2. Use the [▲] and [▼] keys to highlight the desired *feature* option and press [ENTER].
3. Use the [▲] and [▼] keys to select the desired setting and press [ENTER].
4. Repeat steps 2 and 3 until all of the features have been programmed.

4.7 Using the XDP utility functions

Complete the instructions in this section to use the following XDP utility functions:

- Lock menus
- Lock all
- Versions

4.7.1 Lock menus

To protect against unauthorized reprogramming, password protection may be reinstated. To accomplish this, navigate to the *opt>lock* menus menu and proceed as follows:

1. At the *lock* menus menu option press [ENTER].
2. Notice that you have exited the *user program* and the outline of a padlock now appears in the upper right corner of the display.

To program the XDP, you must now follow the instructions in *"accessing the user program" on page 26* to re-enter the *user program*.

4.7.2 Lock all

To lock all meter functions (such as display window selection) in addition to the *user program*, navigate to the *opt>lock all* menu and proceed as follows:

1. At the *lock all* menu option press [ENTER].
2. Notice that you have exited the *user program* and a solid padlock now appears in the upper right corner of the display.

To program the XDP, you must now follow the instructions in *"accessing the user program" on page 26* to re-enter the *user program*.

4.7.3 Versions

To view the current software versions installed in your meter, navigate to the *opt>versions* menu and proceed as follows:

1. At the *versions* menu option press [ENTER].
2. The following information is presented in the screen that appears:
   - 0: BSERIES.STD.OO2.Z
   - 1: XDP-STD.002.A
   - 2:
   - 3:
   - 4:
3. When you have finished viewing the information, press [ENTER].

The above information represents the software versions installed in the hardware located in each of the XDP slots. Slots 2-4 are usually not used for the XDP, therefore these lines are usually blank.

NOTE: The versions of the software installed in slots 0 and 1 at the above prompt are used only as an example. The actual versions of your software will appear instead.

[no content intended for this page - proceed to next page]

Chapter 5. Calibration

5.1 Introduction

The XDP has been designed to perform periodic automatic self-calibrations, based on the current live ppm/pcnt measurement. To ensure accurate readings, the automatic calibration (hereafter referred to as *AutoCal*) should be scheduled and configured in a manner that best suits your specific application. The optimum calibration interval and configuration depends on the specific application and is best determined by periodic calibration checks after the initial installation.

WARNING!

To ensure safe operation of the XDP, the unit must be installed and operated as described in this manual. Also, be sure to follow all applicable local safety codes and regulations for installing electrical equipment. In addition, all procedures should be performed by trained service personnel.

In order to complete the calibration procedure, the following items are required:

- The chosen calibration gas or gases
- A sample system capable of providing the calibration gas or gases to the transmitter at the correct flow rate and pressure.

IMPORTANT

Each gas cylinder must be certified as to the **exact** composition of the gas. The accuracy of the calibration is only as good as the accuracy of the calibration gas or gases used.

5.2 Programming steps

To program your XDP, complete the following steps:

1. Access the *user program* as described in *"accessing the user program" on page 26*.
2. Use the menu maps in *"Figure 14" on page 44* and *"Figure 15" on page 45* as guide in navigating to the desired menu option.
3. Follow the instructions in the appropriate section of this chapter to program the selected menu option.
4. Exit the *user program* as described in *"exiting the user program" on page 27.*

NOTE: While in the user program, press [ESC] at any time to abort the current operation and move back up one menu level.

Proceed to the appropriate section to perform the desired task.

5.3 Configuring AutoCal

Use the instructions in this chapter to configure the AutoCal process as desired. Begin by navigating to the *cal>1:cal>AutoCal* menu. Then, proceed to the next section to begin.

5.3.1 Enabling AutoCal

The first step in configuring AutoCal is to program whether this process is activated or deactivated. To perform this task, proceed as follows:

1. At the *AutoCal* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *enable/disable* option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight either the *enable* option or the *disable* option and press [ENTER].
4. If you chose to disable AutoCal, no additional AutoCal programming is required. If you chose to *enable* AutoCal, continue the programming in the next section.

5.3.2 Selecting the AutoCal type

After enabling AutoCal, the next step is to select the type of calibration to perform. The following three options are available:

- **Offset calibration** - this is a one-point calibration that uses an offset correction at one specified ppm/pcnt value.
- **Zero/span calibration** - this is a two-point calibration that uses an offset correction at both the zero and span (full-scale) ppm/pcnt values.

  NOTE: The instructions in this manual assume that the XDP has been programmed to calibrate the zero point first (see *"zero/span cal type"* on page 56). If your unit is configured to calibrate the span point first, the option above will be shown as "span/zero calibration" and steps 5a and 5c on the next page will be reversed.
- **Slope calibration** - this is a one-point calibration that uses an offset correction at just the span (full-scale) ppm/pcnt value.

  NOTE: The *slope* calibration is really just a special case of the zero/span calibration where there is no offset correction at the zero point.

To select the AutoCal type, proceed as follows:

1. Enable *AutoCal* as described in the previous section.
2. Use the [▲] and [▼] keys to highlight the *AutoCal types* menu option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the desired calibration method and press [ENTER].

Proceed to the appropriate step below for the type of calibration you chose in step 3 above.

4. For the **offset cal** method, proceed as follows:
   a. Using the four arrow keys, program the ppm/pcnt value that you wish to use for the offset correction.
   b. Press [ENTER] to complete the programming.
5. For the **zero/span cal** method, proceed as follows:
   a. Using the four arrow keys, program the ppm/pcnt value that you wish to use for the zero correction.
   b. Press [ENTER].
   c. Using the four arrow keys, program the ppm/pcnt value that you wish to use for the span (full-scale) correction.
   d. Press [ENTER] to complete the programming.
6. For the **slope cal** method, proceed as follows:
   a. Using the four arrow keys, program the ppm/pcnt value that you wish to use for the span (full-scale) correction.
   b. Press [ENTER] to complete the programming.

5.3.3 Setting calibration gas flow times

To optimize the AutoCal process, you may program the length of the gas flow times during a calibration. To do so, proceed as follows:

1. Enable *AutoCal* as described on page 5-2.
2. Use the [▲] and [▼] keys to highlight the *AutoCal control* menu option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the *zero gas on time* option and press [ENTER].
4. Using the four arrow keys, program the time in minutes that you wish to allow for the zero gas to settle. Press [ENTER].
5. Use the [▲] and [▼] keys to highlight the *span gas on time* option and press [ENTER].
6. Using the four arrow keys, program the time in minutes that you wish to allow for the span gas to settle. Press [ENTER].
7. Use the [▲] and [▼] keys to highlight the *gas settling time* option and press [ENTER].
8. Using the four arrow keys, program the time in minutes that you wish the allow for the process gas to settle. Press [ENTER].
9. Use the [▲] and [▼] keys to highlight the *gas measuring time* option and press [ENTER].
10. Using the four arrow keys, program the time in minutes that you wish to allow for the data collection. Then, press [ENTER].

5.3.4 Scheduling AutoCal

To customize the AutoCal process, you must program the calibration schedule. To do so, proceed as follows:

IMPORTANT

The following steps are required for the AutoCAL process to function properly. The date and time entered below are used by the XDP to trigger the initial AutoCAL. Subsequently, the date and time are updated by the interval specified below to let the XDP know when to initiate another AutoCAL.

Failure to program the date and time accurately may result in AutoCALs occurring at unexpected times.

1. Enable *AutoCal* as described in *"enabling AutoCal" on page 44*.
2. Use the [▲] and [▼] keys to highlight the *schedule AutoCal* menu option and press [ENTER].
3. Using the four arrow keys, program the date (MM/DD/YY) on which the first AutoCal will occur. Then, press [ENTER].
4. Using the four arrow keys, program the time (HH:MM in 24-hour mode) at which the first AutoCal will occur. Then, press [ENTER].
5. Use the [▲] and [▼] keys to highlight either the *days* option or the *hours* option to specify the unit of measure for the interval between AutoCals. Press [ENTER].
6. Using the four arrow keys, program the interval (in the units selected in step 5) between each AutoCal. Then, press [ENTER].

5.3.5 Indicating an AutoCal

The XDP analog output may be programmed to indicate that an AutoCal is in progress by forcing it to one of the following values:

- **Force high** - outputs a value equal to the high point of the selected analog output range (e.g. 20 mA for a 4-20 mA range).
- **Force low** - outputs a value equal to the low point of the selected analog output range (e.g. 4 mA for a 4-20 mA range).
- **Force to value** - outputs a preprogrammed value.
- **Track cal gas** - outputs the current live calibration gas value
- **Hold last value** - outputs the last valid measurement prior to the start of the AutoCal.

To program the manner in which the XDP analog output indicates an AutoCal in progress, proceed as follows:

1. Enable *AutoCal* as described in *"enabling AutoCal" on page 44*.
2. Use the [▲] and [▼] keys to highlight the *Aout indication* menu option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the desired analog output indication method. Press [ENTER].
4. If you selected *force high, force low, track cal gas*, or *hold last value*, the programming is complete. If you selected *force to value*, use the four arrow keys to program the analog output value that should be forced during an AutoCal. Press [ENTER].

5.3.6 Initiating an AutoCal

In addition to the regularly scheduled AutoCals, you may manually initiate an AutoCal at any time. To do so, proceed as follows:

1. Enable *AutoCal* as described in *"Enabling AutoCal" on page 44*.
2. Use the [▲] and [▼] keys to highlight the *initiate AutoCal* menu option and press [ENTER].
3. Use the [◀] and [▶] keys to highlight the *yes* or *no* response to the question about initiating an AutoCal now. Then, press [ENTER].

If you responded *no* in step 3, no AutoCal is performed. If you responded *yes* in step 3, an AutoCal is initiated immediately.

NOTE: If you attempt to initiate an AutoCal while a regularly scheduled AutoCal is in progress, the request is ignored.

5.3.7 Setting the AutoCal drift limits

If the calibration drift exceeds the preset drift limits during an AutoCal, an error condition is indicated via the analog output error handlers (see page 4-10), if they have been enabled. To program these maximum calibration drift limits, proceed as follows:

1. Enable *AutoCal* as described in *"Enabling AutoCal" on page 44*.
2. Use the [▲] and [▼] keys to highlight the *AutoCal limits* menu option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the *max drift/cal* menu option and press [ENTER].
4. Using the four arrow keys, enter the ppm/pcnt value for the maximum drift since the previous AutoCal that will not generate an error condition. Press [ENTER].
5. Use the [▲] and [▼] keys to highlight the *max drift/total* menu option and press [ENTER].
6. Using the four arrow keys, enter the ppm/pcnt value for the maximum drift from this AutoCal that will not generate an error condition. Press [ENTER].

5.3.8 Setting AutoCal verification

The *auto verification* function permits you to specify a calibration drift limit that will trip a verification alarm and alter the manner in which the drift data is handled immediately following AutoCal. If this function is disabled, the drift data is always updated and the verification alarm will not be tripped. However, if Auto verification is enabled, the following events may occur after an AutoCal:

- If the drift was lower than the preset auto verification limit, the drift data is not updated and the verification alarm is not tripped. This situation means that the AutoCal did not detect any significant calibration drift, and the results are ignored.
- If the drift exceeded the preset auto verification limit but remained below both the max drift/cal and
- Max drift/total limits, the drift data is updated and the auto verification alarm is tripped. This situation means that the AutoCal detected a significant but acceptable amount of calibration drift, and the verification alarm informs you that the drift data has been updated.
- If the drift exceeds either the max drift/cal or the max drift/total limits, the system fault alarm is tripped and an error message is displayed on the LCD. This situation means that the AutoCal detected an unacceptable amount of calibration drift, and the fault alarm informs you of the error condition.

To program the auto verification function, proceed as follows:

1. Enable *AutoCal* as described in *"Enabling AutoCal" on page 44*.
2. Use the [▲] and [▼] keys to highlight the auto verification menu option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight either the *enable* option or the *disable* option and press [ENTER].
4. If you chose the *disable* option in step 3, no additional programming is required. If you chose the *enable* option in step 3, continue the programming with step 5.
5. Using the four arrow keys, enter the ppm/pcnt value for the verif limit/cal. This is the amount of drift since the previous AutoCal that will trigger the auto verification process. Then, press [ENTER].

NOTE: When the auto verification alarm is tripped, a blinking "CV" symbol is displayed on the LCD. You must follow the instructions in "*Resetting the verification alarm" on page 50* to manually reset the alarm.

5.3.9 Viewing the drift data

The calibration drift data that has been accumulated during the previous AutoCal runs is stored internally by the XDP. You may view this data at any time by completing the following steps:

1. At the *AutoCal* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *view drift data* option and press [ENTER].
3. Read the following data from the screen that appears:
   - **Zero/cal:** ±xx.xx (zero drift since last AutoCal)
   - **Zero/tot:** ±xx.xx (total zero drift from this AutoCal)
   - **Span/cal:** ±xx.xx (span drift since last AutoCal)
   - **Zero/tot:** ±xx.xx (total span drift from this AutoCal)
4. When you have completed viewing the drift data, press [ENTER].

5.4 Clearing the drift data

The calibration drift data that has been accumulated during the previous AutoCal runs is stored internally by the XDP. You may clear this data at any time by completing the following steps:

IMPORTANT

If you clear the drift data, the XDP will no longer apply any drift compensation to the measurements.

1. At the *AutoCal* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *clear drift data* option and press [ENTER].
3. Use the [◀] and [▶] keys to highlight the *yes* or *no* response to the question about clearing the drift data. Then, press [ENTER].

If you responded *no* in step 3, the existing drift data is retained. If you responded *yes* in step 3, all of the drift data values shown in step 3 of the previous section are reset to zero.

5.5 Resetting the verification alarm

Whenever the auto verification alarm is tripped (see *"Setting AutoCal verification"* on page 48), it must be reset manually. To do this, complete the following steps:

1. At the *AutoCal* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *reset verif alarm* option and press [ENTER].
3. Use the [◀] and [▶] keys to highlight the *yes* or *no* response to the question about resetting the verification alarm. Then, press [ENTER].

If you responded *no* in step 3 above, the verification alarm remains tripped. If you responded *yes* in step 3 above, the verification alarm is reset.

5.5.1 Abort AutoCAL

You may terminate an AutoCAL that is already in progress at any time. To do this, complete the following steps:

1. At the *AutoCal* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *abort AutoCAL* option and press [ENTER].
3. Use the [◀] and [▶] keys to highlight the *OK* or *cancel* response at the confirmation screen. Press [ENTER].

If you chose *OK* in step 3 above, the AutoCAL currently in progress is terminated and you are returned to normal measurement mode. If you chose *cancel* in step 3 above, the AutoCAL currently in progress will continue uninterrupted.

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Chapter 6. Factory-level programming

6.1 Introduction

The XDP is factory-configured to provide optimum performance in the specified application. Because many of the critical settings programmed into the meter during this procedure are essential for reliable and accurate operation, the operator does not see these menu items during routine programming of the XDP. However, in order to address operational problems or to fine-tune the performance of the system for a specific application, these factory-level programming options are made available to authorized service personnel.

CAUTION!

Always consult Panametrics before programming any of these factory-level features. Improper setup may impair the performance of the XDP system and/or prevent it from meeting its design specifications.

6.2 Programming levels

Factory-level programming of the XDP is divided into two categories, which require passwords that are different from each other and from the operator-level password noted below and in *"accessing the user program" on page 26*. All three of the programming levels are summarized below:

- **Operator-level:** password = **2719**
- **Setup-level:** password = **consult factory**
- **Factory-level:** password = **consult factory**

6.3 Programming steps

To program the factory-level XDP features, use the following steps:

1. Access the *user program* as described in *"accessing the user program" on page 26*, but enter the password for one of the advanced programming levels.
2. Use the menu map in *"Figure 16" on page 46* as guide in navigating to the desired menu option.
3. Follow the instructions in the appropriate section of this chapter to program the selected menu option.
4. Exit the *user program* as described in *"exiting the user program" on page 27*.

NOTE: While in the *user program*, press [ESC] at any time to abort the current operation and move back up one menu level.

Proceed to the appropriate section to perform any programming task that is not included in the operator-level programming.

6.4 Setup-level programming

At this programming level, the *Cfg* menu option is now available. As you will recall, this option is blank at the operator-level (**2719** password).

6.4.1 Configuring the display

In *"Setting up the display" on page 30*, we discussed the procedures for using the disp menu to switch the LCD between a list of available oxygen measurement windows. This section provides instructions on how to create and edit that list. To perform this task, navigate to the *Cfg>1:Cfg>O2* menu and proceed as follows:

1. At the *O2* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *mA* option and press [ENTER].
3. Select the outputs (0:display, 0:fault alarm, 0:analog output) that you wish to receive the oxygen measurement values in mA:
   a. Use the [▲] and [▼] keys to highlight a specific system output. (Make sure that *0:display* is included on the list).
   b. Use the [◀] and [▶] keys to select *add* or remove and press the [ENTER] key to change the status of the selected output. An output is selected if an asterisk (*) appears next to it.
   c. Change the status of any additional outputs that you wish.
   d. When the list of outputs is complete, use the [◀] and [▶] keys to select *OK* and press [ENTER].

NOTE: You may also abort the display configuration by selecting cancel in step 3D above.

4. Use the [▲] and [▼] keys to highlight the pcnt option and press [ENTER].
5. Select the outputs (0:display, 0:fault alarm, 0:analog output) that you wish to receive the oxygen measurement values in pcnt:
   a. Use the [▲] and [▼] keys to highlight a specific system output. (Make sure that 0:display is included on the list).
   b. Use the [◀] and [▶] keys to select add or remove and press the [ENTER] key to change the status of the selected output. An output is selected if an asterisk (*) appears next to it.
   c. Change the status of any additional outputs that you wish.
   d. When the list of outputs is complete, use the [◀] and [▶] keys to select OK and press [ENTER].

NOTE: You may also abort the display configuration by selecting *cancel* in step 5D above.

6.5 Factory-level programming

At this programming level, all menu options are available. The new menus, which are available only at this level, are the *cal>1:cal>adv* menu and the opt>setup menu. Proceed to the appropriate section for instructions on using these menus.

CAUTION!

Always consult Panametrics before programming any of these factory-level features. Improper setup may impair the performance of the XDP system and/or prevent it from meeting its design specifications.

6.5.1 The adv menu

This menu includes the following submenus:

- Edit drift data
- 4-20mA input trim
- AutoCal relays test
- Zero/span cal type

Instructions for programming these features begin on the next page.

6.5.1a Edit drift data

The XDP stores the results of its calibration process as drift data. This data is then used to compensate the live input so that an accurate measurement result is shown on the LCD. This menu provides the means to manually edit the drift data that resulted from the AutoCal process. To use this menu, navigate to the *cal>1:cal>adv* menu and proceed as follows:

IMPORTANT

Always consult the factory before editing the drift data via this menu.

1. At the *adv* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *edit drift data* option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the *zero drift* option and press [ENTER].
4. Program the following *zero drift* values:
   a. Use the [▲] and [▼] keys to highlight the *zero drift/cal* option and press [ENTER]. Using the four arrow keys, enter the new ppm/pcnt value. Then, press [ENTER].
   b. Use the [▲] and [▼] keys to highlight the *zero drift/total* option and press [ENTER]. Using the four arrow keys, enter the new ppm/pcnt value. Then, press [ENTER].

c. Use the [▲] and [▼] keys to highlight the *zero setpoint* option and press [ENTER]. Using the four arrow keys, enter the new ppm/pcnt value. Then, press [ENTER].

5. Press [ESC].
6. Use the [▲] and [▼] keys to highlight the *span drift* option and press [ENTER].
7. Program the following *span drift* values:
   a. Use the [▲] and [▼] keys to highlight the *span drift/cal* option and press [ENTER]. Using the four arrow keys, enter the new ppm/pcnt value. Then, press [ENTER].
   b. Use the [▲] and [▼] keys to highlight the *span drift/ total* option and press [ENTER]. Using the four arrow keys, enter the new ppm/pcnt value. Then, press [ENTER].
   c. Use the [▲] and [▼] keys to highlight the *span setpoint* option and press [ENTER]. Using the four arrow keys, enter the new ppm/pcnt value. Then, press [ENTER].

6.5.1b 4-20mA input trim

The XDP obtains its measurements via the 4-20 mA analog input from the transmitter. It then converts that signal to the digital ppm/pcnt value that is shown on the LCD. This menu is used to adjust the circuit that processes the analog input so that maximum accuracy is ensured. To use this menu, navigate to the *cal>1:cal>adv* menu and proceed as follows:

1. At the *adv* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *4-20mA input trim* option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the *zero trim* option and press [ENTER].
4. To trim the zero point of the 4-20 mA analog input:
   a. Make sure an accurate current source is connected to the 4-20 mA analog input terminals (J6), and set the current source to supply exactly 4.00 mA.
   b. Use the [▲] and [▼] keys to adjust the displayed value to read exactly 4.00. Then, press [ENTER].
5. Use the [▲] and [▼] keys to highlight the *span trim* option and press [ENTER].
6. To trim the span point of the 4-20 mA analog input:
   a. Make sure an accurate current source is connected to the 4-20 mA analog input terminals (J6), and set the current source to supply exactly 20.00 mA.
   b. Use the [▲] and [▼] keys to adjust the displayed value to read exactly 20.00. Then, press [ENTER].

6.5.1c AutoCal relays test

The XDP includes four alarm relays that are related to the calibration process. This menu is used to manually test the relays. To use the menu, navigate to the *cal>1:cal>adv* menu and proceed as follows:

NOTE: All of these alarms/relays are non-fail-safe types.

1. At the *adv* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *AutoCal relays test* option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight the *AutoCal alarm* option and press [ENTER]. Continue as follows:
   a. Use the [▲] and [▼] keys to highlight either the *trip* or *reset* menu option and press [ENTER]. The alarm relay should respond accordingly.
   b. When done, press [ESC].

NOTE: upon leaving the test loop, the alarm is automatically reset to its normal state.

4. Use the [▲] and [▼] keys to highlight the *auto verif alarm* option and press [ENTER]. Continue as follows:
   a. Use the [▲] and [▼] keys to highlight either the *trip* or *reset* menu option and press [ENTER]. The alarm relay should respond accordingly.
   b. When done, press [ESC].
5. Use the [▲] and [▼] keys to highlight the *process cal relay* option and press [ENTER]. Continue as follows:
   a. Use the [▲] and [▼] keys to highlight either the *trip* or *reset* menu option and press [ENTER]. The alarm relay should respond accordingly.
   b. When done, press [ESC].
6. Use the [▲] and [▼] keys to highlight the *zero/span cal relay* option and press [ENTER]. Continue as follows:
   a. Use the [▲] and [▼] keys to highlight either the *trip* or *reset* menu option and press [ENTER]. The alarm relay should respond accordingly.
   b. When done, press [ESC].

6.5.1d Zero/span cal type

If the XDP is programmed to perform a zero gas/span gas two-point calibration, it is necessary to provide both the zero gas and the span gas to the XDP at the appropriate time in the AutoCAL cycle. This menu is used to specify which of the two gases is called for first in the calibration cycle. To use the menu, navigate to the *cal>1:cal>adv* menu and proceed as follows:

1. At the *adv* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *zero/span cal* type option and press [ENTER].
3. Use the [▲] and [▼] keys to highlight either the *zero gas first* or *span gas first* menu option and press [ENTER].

6.5.2 The opt>setup menu

This menu is used to restore corrupted software or to download new software to the XDP. The following items are required:

- A hardware connection between the XDP serial port and the serial port on a personal computer
- The new main code and slot code software files, as provided by Panametrics
- An ASCII data transfer program, such as windows Hyperterminal When you have all of the above items, proceed as follows:

6.5.2a Loading the new main code

The first step in the process is to download the new main code to the XDP. To do this, navigate to the *opt>setup* menu on the XDP and proceed as follows:

1. From the PC, open the data transfer program and configure the serial port as follows: baud rate = 19200, data bits = 8, stop bits = 1, parity = none, and hardware flow control = none.
2. From the XDP, at the *setup* menu, press [ENTER].
3. Use the XDP [▲] and [▼] keys to highlight the *load main* option and press [ENTER].
4. From the PC, when asked, press the **<Y>** key to proceed.
5. Select **<transfer>** and then **<send file>**.
6. Browse to the *main code *.cod* file provided by Panametrics, and select **<Xmodem>** for the transfer protocol.
7. Press **<send>**.

After the new main code has been downloaded, the XDP will reboot. Re-enter the factory-level password and proceed to the next section.

6.5.2b Erasing the old main code and slot code

The next step in the process is to erase the old software from the XDP. To do this, navigate to the *opt>setup* menu on the XDP and proceed as follows:

1. At the *setup* menu, press [ENTER].
2. Use the [▲] and [▼] keys to highlight the *erase main* option and press [ENTER]. All the current customer configuration data will be erased and the XDP will reboot.
3. During the reboot process, *scanning hardware* will appear on the XDP display. When it does, use the [◀] and [▶] keys to select *skip slot download* and then select *yes*.
4. Re-enter the factory-level password when prompted, and the XDP will reboot again. When the reboot is complete, re-enter the factory-level password and navigate to the *opt>setup* menu
5. Use the [▲] and [▼] keys to highlight the *erase slot* option and press [ENTER]. The old slot code will be erased and the XDP will reboot.

Re-enter the factory-level password and proceed to the next section.

6.5.2c Loading the new slot code

The final step in the process is to load the new slot code. To do this, navigate to the opt>setup menu on the XDP and proceed as follows:

1. At the *setup* menu, press [ENTER].
2. Use the XDP [▲] and [▼] keys to highlight the *load slot* option and press [ENTER].
3. From the PC, when asked, press the **<Y>** key to proceed.
4. Select <transfer> and then **<Send File>**.
5. Browse to the *slot code *.cod* file provided by Panametrics, and select **<Xmodem>** for the transfer protocol.
6. Press **<send>**.

After the new slot code has been downloaded, the XDP will reboot. The XDP software upgrade has now been completed, but all programming options will now be in the factory default state. You will need to reprogram the unit with your preferred settings.

Chapter 7. Specifications

7.1 Functional specifications

Analog output

Linearized isolated 4 to 20 mA, 0 to 20 mA or NAMUR user-selectable, field-programmable output for any range from 0 to 100 percent or 0 to 10,000 ppm.

Input power

85 to 264 VAC, 47 to 63 Hz, 40 W

Fuse

1.25 A

Analog input

4 to 20 mA

Output power supply

24 VDC ±2 VDC at 1.2 A

Ambient temperature range

14°F to 140°F (-10°C to 60°C)

Keypad

Magnetic, through the glass, six keys

Display

Four-line, backlit liquid crystal display

Display accuracy

±0.25% of full scale

Relay outputs

- Contact ratings: 2 A, 28 VDC, SPDT
- Programmable as fail-safe or non-fail-safe

7.2 Standard software for O_2 analysis

Measurement range examples

- 0 to 10; 100; 1,000; or 10,000 ppm O_2
- 0% to 1%; 10%; 21%; 25%; or 100% O_2

Relays

- Four process alarms
- One fault alarm
- Two automatic calibration contacts
- Two calibration alarms

7.3 Hydrogen-cooled generator software

Three ranges

- 0% to 100% H_2 in air
- 0% to 100% H_2 in CO_2
- 0% to 100% air in CO_2

Relays

- Two process alarms
- One fault alarm
- One normal alarm

7.4 Physical specifications

Dimensions (w x h x d)

9 in x 10 in x 9 in. (229 mm x 254 mm x 229 mm)

Weight

15 lb (6.8 kg)

Environmental/certifications

- **Weatherproof:** type 4X enclosure: IP66
- **Explosion-proof:** type 7 enclosure: FM/CSA class I, division 1, group B, C and D
- **Flameproof:** Intertek ITS12ATEX17703X II 2 G Ex d IIC T6 Gb IECEx ITS 12.0058x

European compliance

Complies with EMC directive 2014/30/EU, 2014/35/EU LVD (installation category II, pollution degree 2)

Conduit entry

Six, 3/4" NPTF conduit ports

Mounting holes

Four, 3/8" (10 mm) holes

7.5 Order information

To ensure that the appropriate XDP is supplied, a full and accurate model number must be specified at the time of purchase. This model number should be constructed as follows:

XDP -	B	C	D	E
B: Package	2 = Explosion-proof/weatherproof			
C: Power	2 = 100-240 VAC			
	5 = 24 VDC			
D: Keypad	1 = Magnetic			
E: Software	1 = Standard			
	2 = Hydrogen cooled generator*			

*__DO NOT__ use this manual with software option 2!

For example, an XDP in an explosion-proof enclosure with standard software, a magnetic keypad, and a 100-240 VAC input voltage requirement would be specified as: **XDP-2211**.

Appendix A. CE Mark compliance

A1. Introduction

For CE Mark compliance, the XDP must meet both the *EMC* and *LVD* directives.

Attention European customers!

CE Mark compliance is required for all units used in EU countries.

A2. EMC compliance

For *EMC* compliance, the electrical connections must be shielded and grounded as shown in *Table 2* below. After all the necessary electrical connections have been made, seal any unused cable entry holes with standard conduit plugs or equivalent.

NOTE: If the instructions in this appendix are followed, the unit will comply with the EMC directive.

Table 2: Wiring modifications for EMC compliance

Connection	Wiring modification
Power	• When connecting the power, select the cable entry closest to the chassis ground. • Use shielded cable* to connect the power to the xdp enclosure. Connect the shield to the nearest chassis ground terminal. • Connect the power line ground wire to the nearest chassis ground terminal.
Input/output	• Use shielded cable* to interconnect the model xdp enclosure with any external i/o devices. • Connect the shields to the nearest chassis ground terminal.

*Wires enclosed in a properly-grounded metal conduit do not require additional shielding.

A3. LVD compliance

For compliance with the European Union's low voltage directive, the XDP requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the unit.

NOTE: If the instructions in this appendix are followed, the unit will comply with the low voltage directive.

Appendix B. PanaView™ programming

B.1 Introduction

Panametrics offers a Windows-based instrument interface software called *PanaView*. This software is installed on a personal computer (PC) and communicates with many Panametrics instruments via an RS-232 serial port link. The purpose of PanaView is to permit remote access to the instrument.

B.2 Initial setup

Before you can use PanaView with the XDP, the following setup steps must be completed:

1. Install PanaView on the PC.
2. Connect the XDP serial port to the PC serial port.
3. Power up the XDP.
4. Launch PanaView.
5. Use PanaView to establish communications with the XDP.

NOTE: A detailed *user's manual* is included with the PanaView software. All of the above steps are thoroughly described in that manual (Panametrics document 910-211).

With the PanaView network tree fully expanded, your PanaView screen should look similar to *"Figure 10" on page 40*.

B.3 Viewing data

PanaView may be used to view the live measurement data being collected by the XDP. This display is in addition to the standard LCD screen on the face of the instrument. There are several advantages to using PanaView to view your live data. Among these are:

- The PC with the XDP data display may be located in a safe area remote from the XDP installation site.
- The data may be displayed in either text or graphical format.
- Both text and graphical displays may be viewed at the same time.
- Multiple parameters may be viewed simultaneously. For example, the transmitter signal may be displayed in both mA and ppm/pcnt values in separate windows at the same time.

For detailed instructions on setting up and customizing the text and graphical data displays, see the *PanaView user's manual* (Panametrics document 910-211). As an example, *"Figure 11" on page 41* shows the simultaneous text displays of an oxygen signal input in both mA and ppm/pcnt values.

As a further example of using PanaView to view your live data, *"Figure 12" on page 41* shows a typical display that includes both the text and graphical windows for the oxygen ppm/pcnt values.

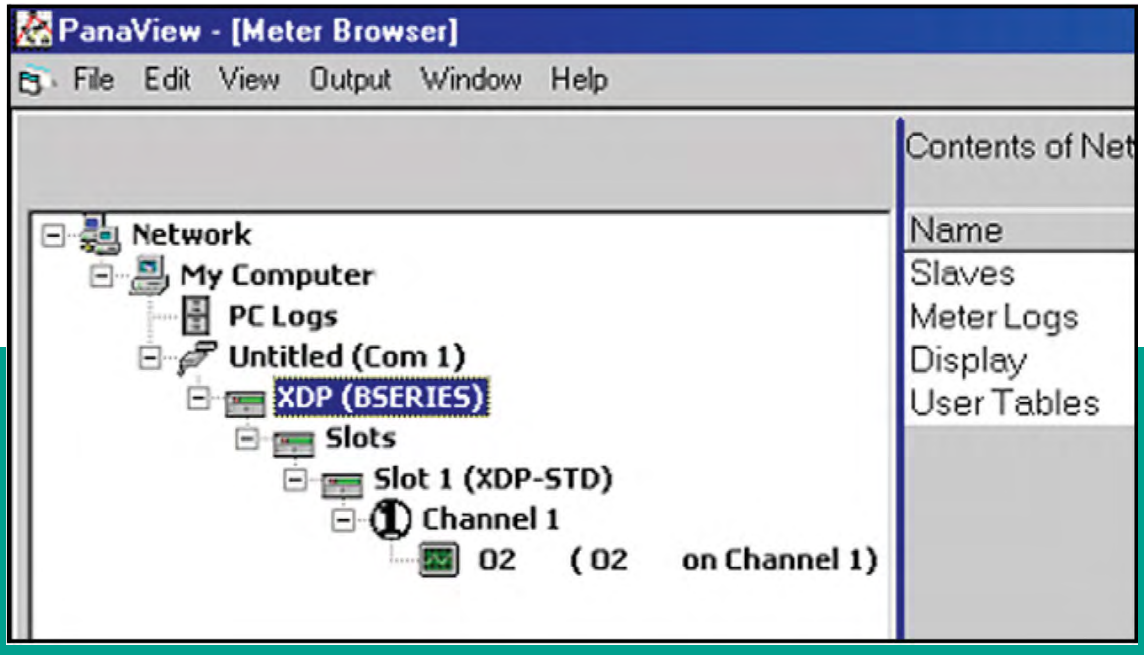

Figure 10: XDP PanaView screen

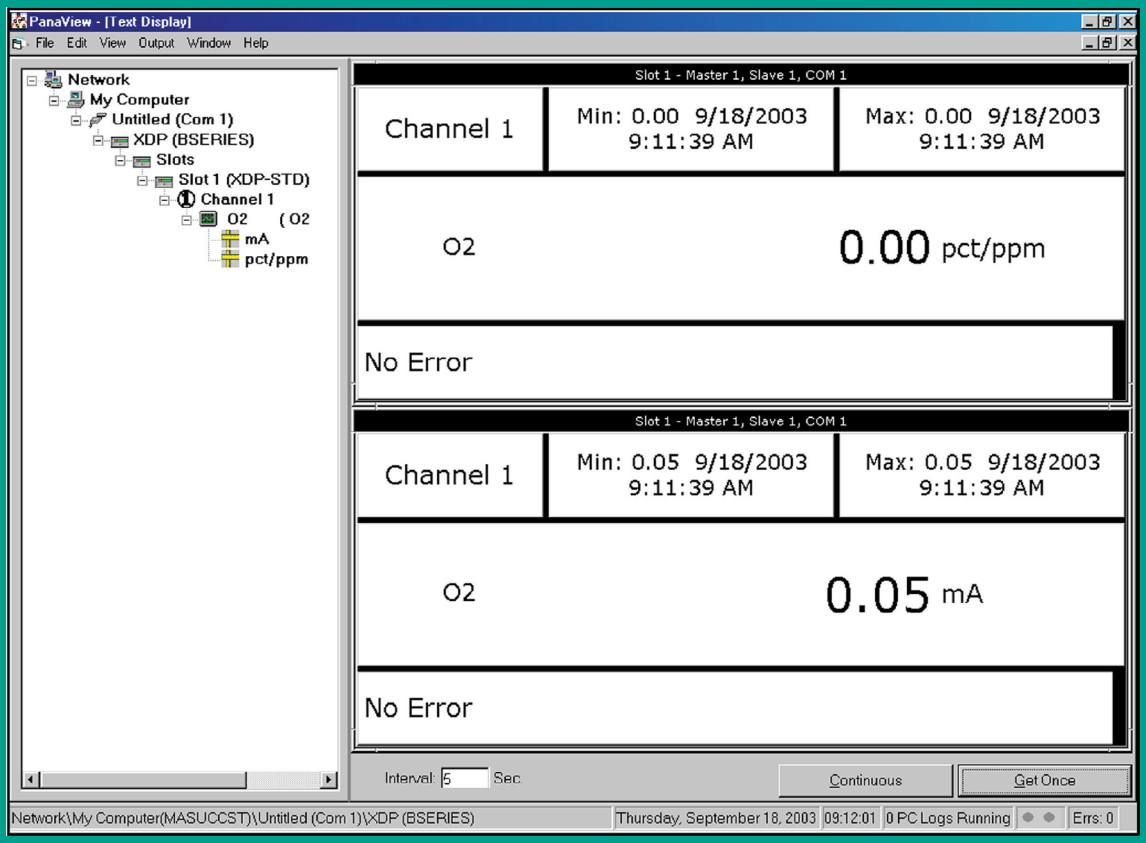

Figure 11: Simultaneous mA and ppm/pcnt text displays

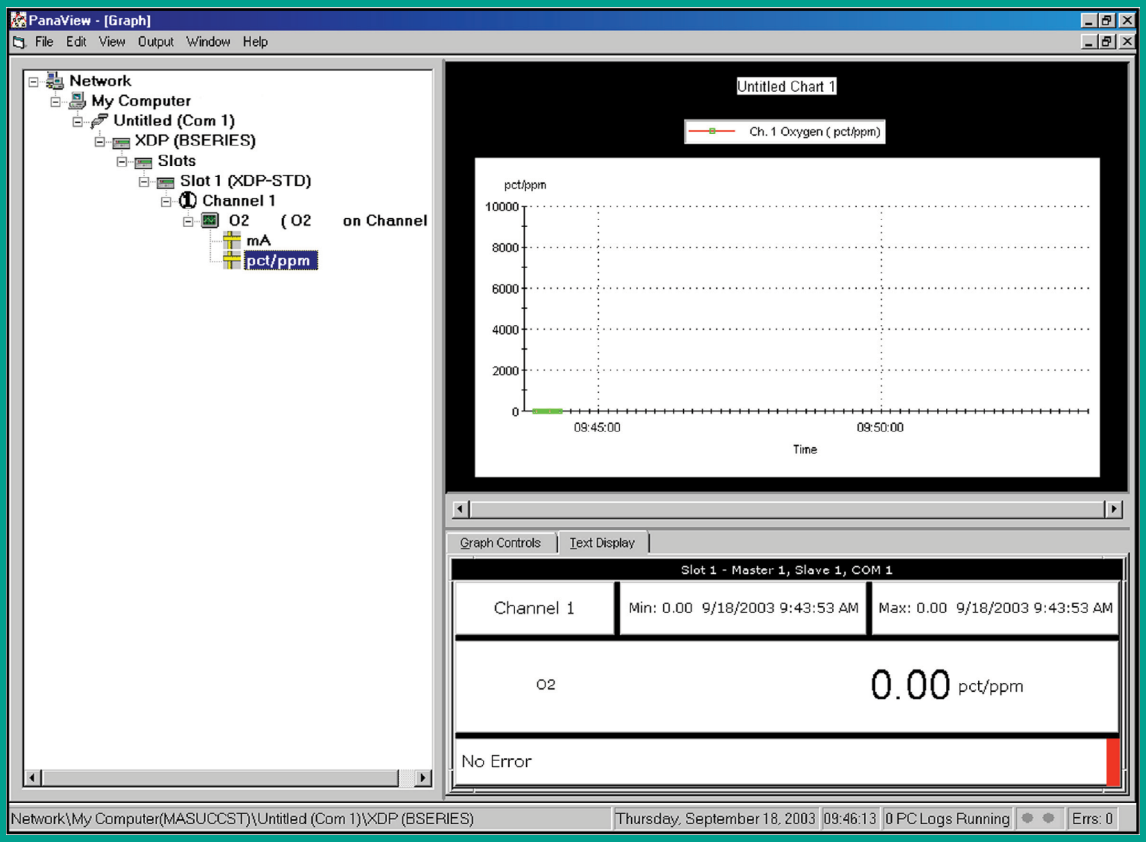

Figure 12: ppm/pcnt text and graphical displays

NOTE: The above information is just a brief overview of how to view your live XDP data with PanaView. For complete instructions on using all of the available features and capabilities, refer to the *PanaView user's manual* (Panametrics document 910-211).

B.4 Logging data

In addition to viewing your live XDP data, PanaView allows you to accumulate the live data readings in the form of a data *log file* that is stored on the hard drive of the PC. As with the live data, the log files may be viewed on the PC screen in either text or graphical format.

After setting up the parameters for the logging procedure, the progress of the log file may be monitored as the data is accumulated. When the log file has been completed, it may be named and stored on the PC. The resulting log file may be opened for viewing or printing at any time. *"Figure 13" on page 42* shows the contents of a typical log file in progress.

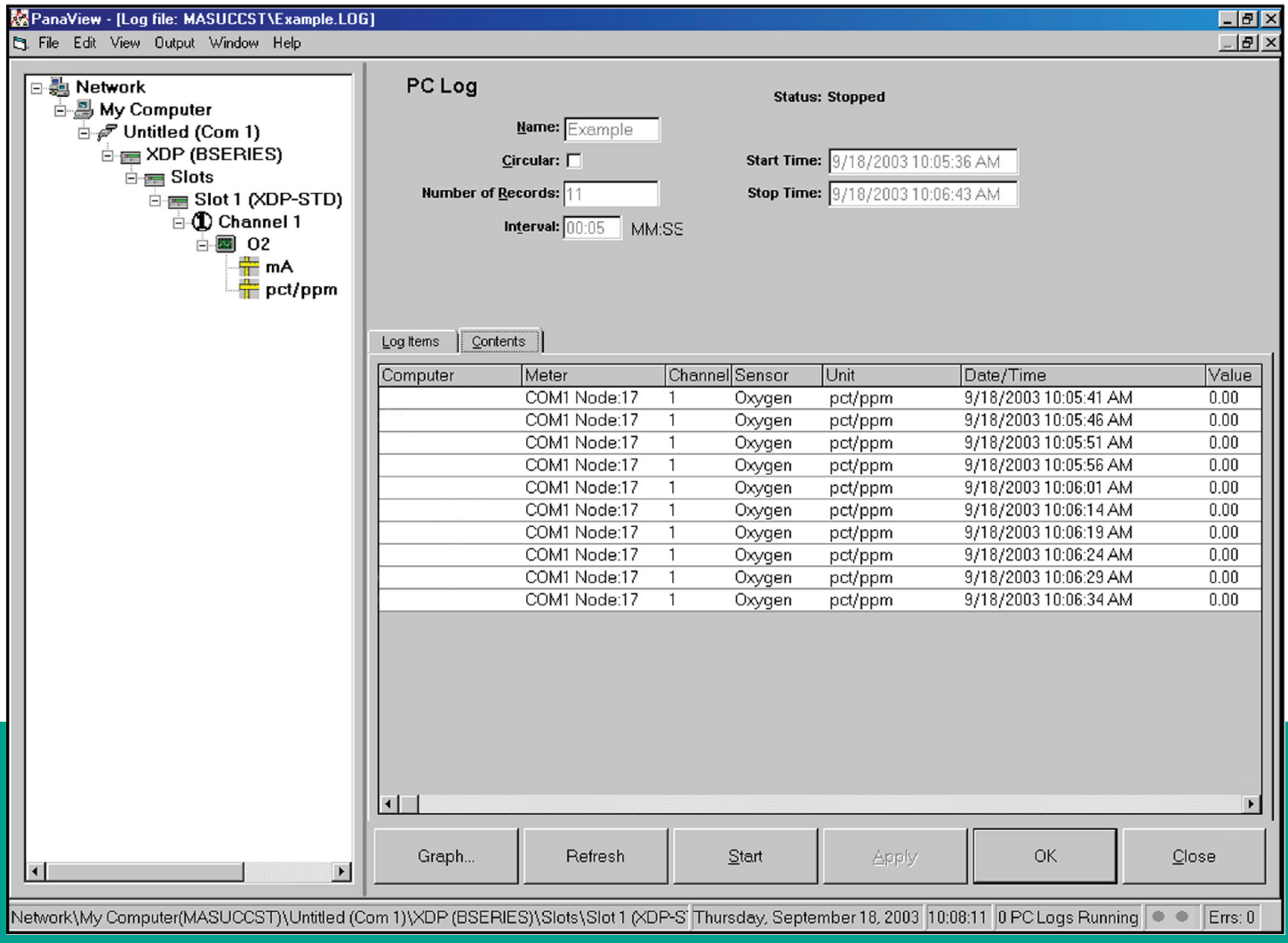

Figure 13: A typical log file in progress

NOTE: The above information is just a brief overview of how to log your live XDP data with PanaView. For complete instructions on using all of the available features and capabilities, refer to the *PanaView user's manual* (*Panametrics document 910-211*).

Appendix C. Menu maps

C.1 List of menu maps

- Operator-level [cal] and [disp] menu map *"Figure 14" on page 44*
- Operator-level [opt] menu map *"Figure 15" on page 45*
- Factory-level menu map *"Figure 16" on page 46*

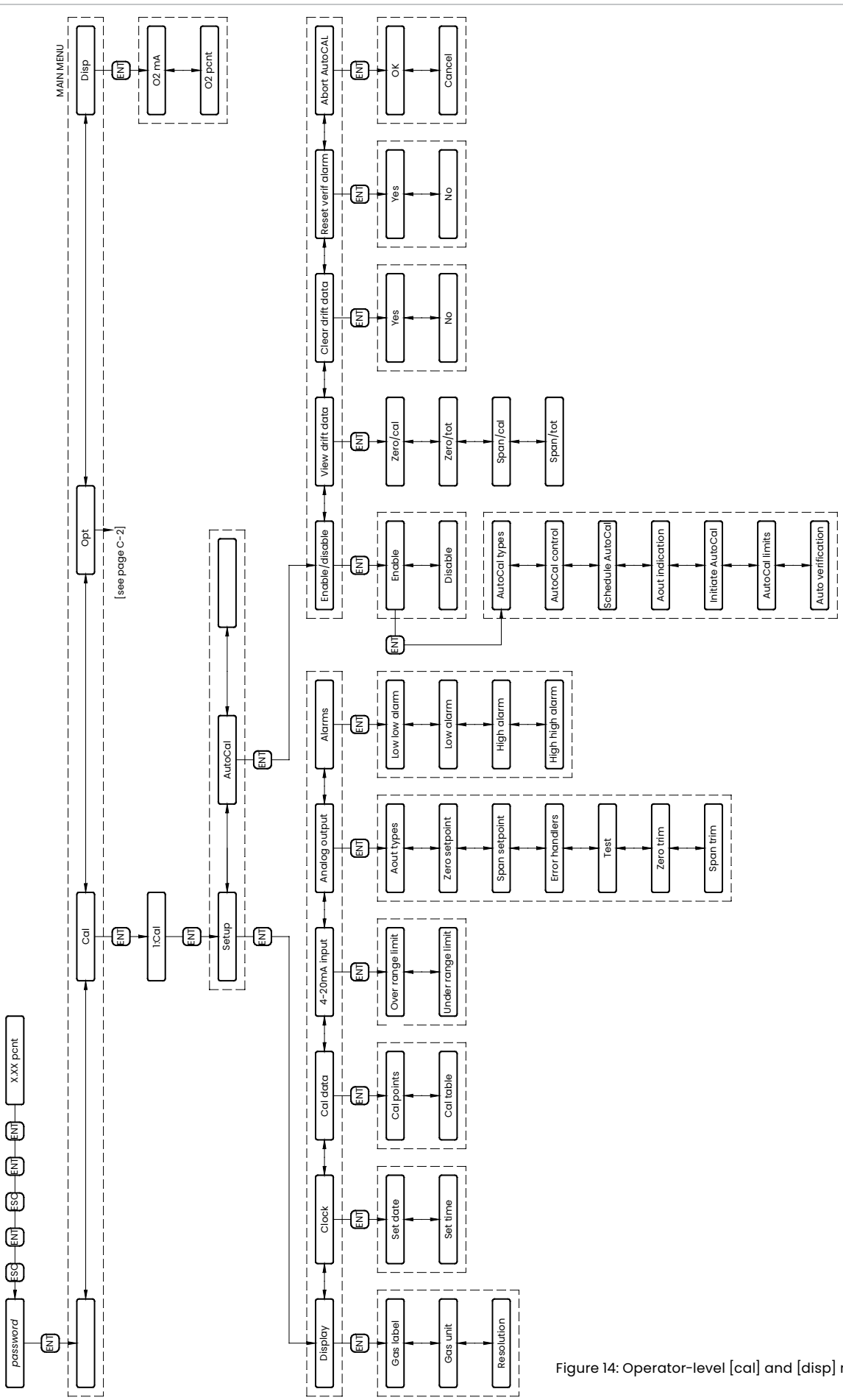

Figure 14: Operator-level [cal] and [disp] menu map

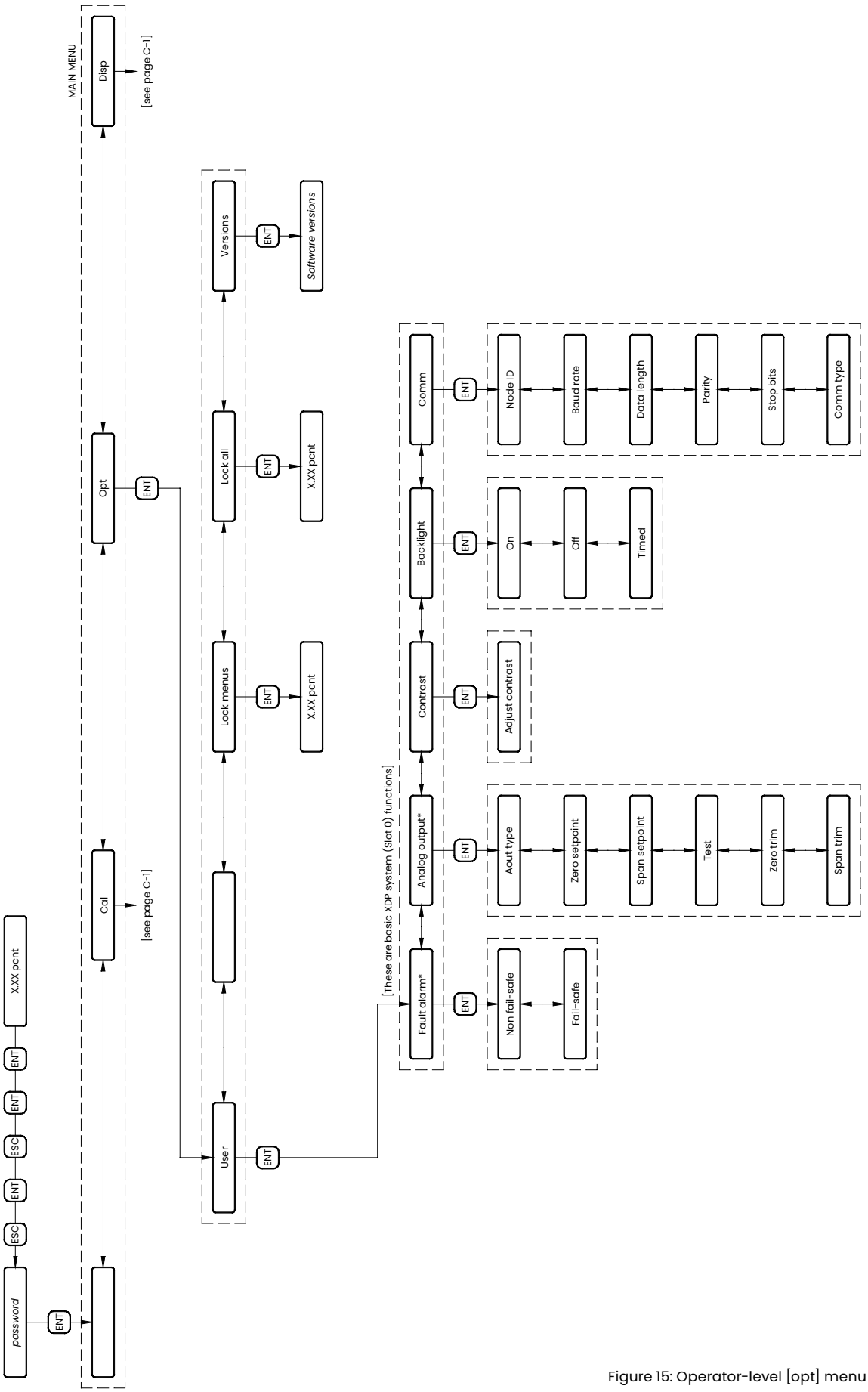

Figure 15: Operator-level [opt] menu map

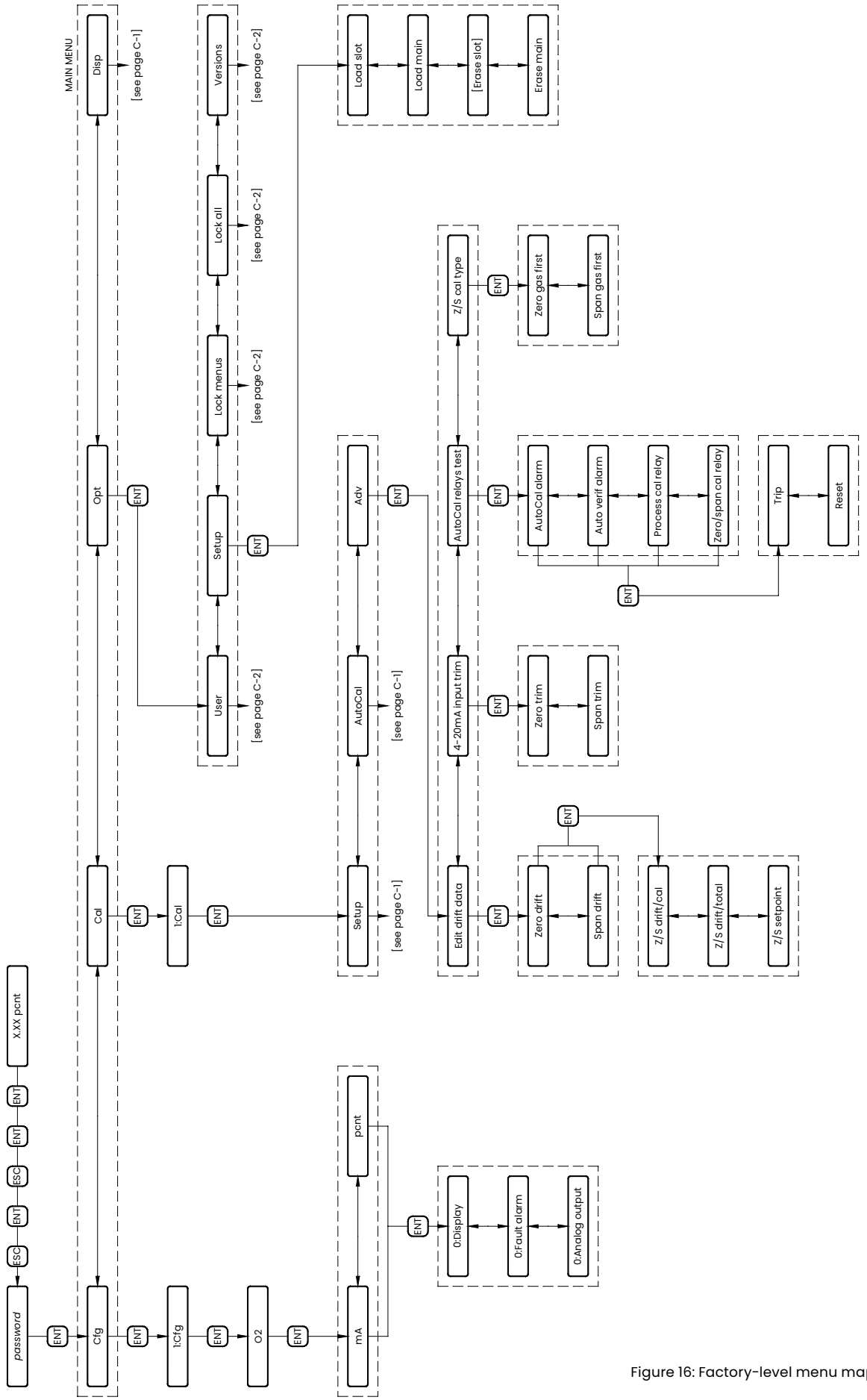

Figure 16: Factory-level menu map

Appendix D. Factory default settings

D.1 Introduction

Prior to shipment, each XDP is programmed with values that are suitable for many applications. Although these values are readily reprogrammed to meet specific application requirements, the default values usually allow for a quick and easy initial startup of the instrument.

D.2 Default values

The default values for an XDP using the standard software (E=1) are listed in the following sections.

D.2.1 Display

Gas label: O2 gas unit: %

Gas resolution: 0.01

D.2.2 Cal data

Cal points: 2 points

Cal table: 0.00/4.00, 20.0, 100.0

D.2.3 4-20 mA input

INPUT_UNDER_RANGE_LIMIT: 2.0

INPUT_OVER_RANGE_LIMIT: 22.0

D.2.4 Slot analog output

Type: 4-20mA

Zero setpoint: 0.0

Span setpoint: 100

All error handlers: Disabled

Error handler: No effect

Error handler force to value: 0.0

D.2.5 Alarms

Trip point: HH=100, H=100, L=0, LL=0

Deadband: 0.2

Type: Non-fail-safe

D.2.6 AutoCAL

Type: offset cal

Zero/span cal type: span gas first

Zero setpoint: 0.0

Span setpoint: 100

Offset cal setpoint: 0.0

Slope cal setpoint: 20.93 zero drift/cal: 0.0

Zero drift/total: 0.0

Span drift/cal: 0.0

Span drift/total: 0.0

Verify drift/cal: 5.0 (verification limit)

Max drift/cal: 10.0 (cal limit)

Max drift/total: 25.0 (cal limit)

Analog output indication: Hold last value

Analog output force to value: 0.0

Zero gas ON: 4.0 min.

Span gas ON: 4.0 min.

Gas settling time: 2.0 min.

Measuring time: 0.25 min.

Schedule AutoCAL: MM/DD/YY = 12/31/99

HH:MM = 01:01

Interval type = days

Interval = 1

AutoCal: disabled

Auto verification: disabled

[no content intended for this page - proceed to next page]

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Warranty

Each instrument manufactured by Panametrics 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 Panametrics. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If Panametrics 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 Panametrics determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified by Panametrics, 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 Panametrics instrument malfunctions within the warranty period, the following procedure must be completed:

1. Notify Panametrics, 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, Panametrics 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 Panametrics 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, Panametrics will evaluate the instrument to determine the cause of the malfunction.

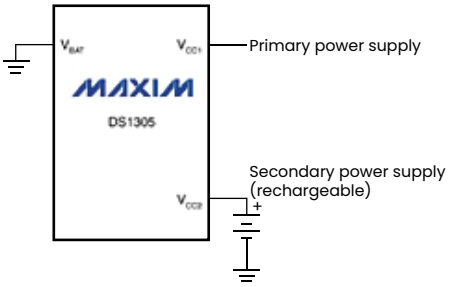
Then, one of the following courses of action will then be taken:

- 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 Panametrics 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.

Certification & safety statements for the XDP explosion-proof display XDP

When installing this apparatus, the following requirements must be met:

- Field wiring shall be rated 90° C for ambient temperatures above 55°C.
- Connecting cables shall be mounted securely and protected from mechanical damage, pulling and twisting.
- Cable entries are ¾" NPT.
- Cable glands of an approved flameproof design, ATEX + IECEx rated Ex db IIC Gb. These must be installed according to the manufacturer's instructions. Where the cable glands are provided by Panametrics, the manufacturer's instructions, as supplied to Panametrics, will be included in the documentation.
- Unused entries must be sealed using a certified, ATEX + IECEx rated Ex db IIC Gb, threaded plug.
- Modifications to the flameproof enclosure are not permitted.
- The apparatus should be de-energized before opening.
- Installation should comply with IEC/EN 60079-14.
- Equipment is of type flameproof "d" design and complies with: EN 60079-0:2017, EN 60079-1:2014.
- The product contains no exposed parts which produce surface temperature infrared, electromagnetic ionizing, or non-electrical dangers.
- The product must not be subjected to mechanical or thermal stresses in excess of those permitted in the certification documentation and the instruction manual.
- The product cannot be repaired by the user; it must be replaced by an equivalent certified product. Repairs should only be carried out by the manufacturer or by an approved repairer.
- Only trained, competent personnel may install, operate and maintain the equipment.
- Replacement of Cells or Batteries is not permitted by the end user.
- The Battery is protected from Stray Voltage by Real Time Clock, UL Recognized (see image to the right).
- The product is an electrical apparatus and must be installed in the hazardous area in accordance with the requirements of the EU Type Examination Certificate. The installation must be carried out in accordance with all the appropriate international, national and local standard codes and practices and site regulations for flameproof apparatus and in accordance with the instructions contained in the manual. Access to the circuitry must not be made during operation.



1100 Technology Park Drive, Billerica, MA
01821, U.S.A.
Telephone: 978-437-1000 or 800-833-9438
Sensing House, Shannon Free Zone East,
Shannon, County Clare, Ireland
Telephone: +353 61 470200

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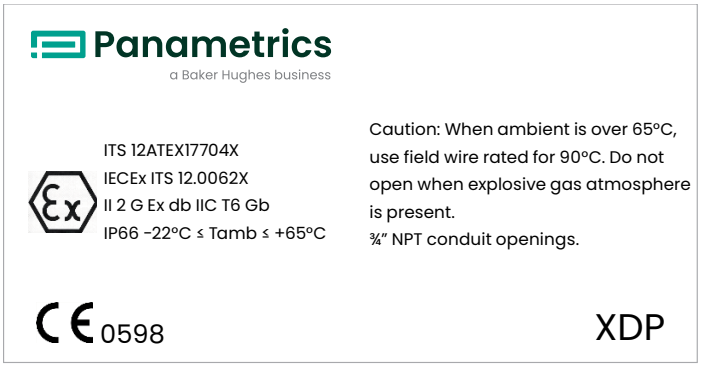
July 2020

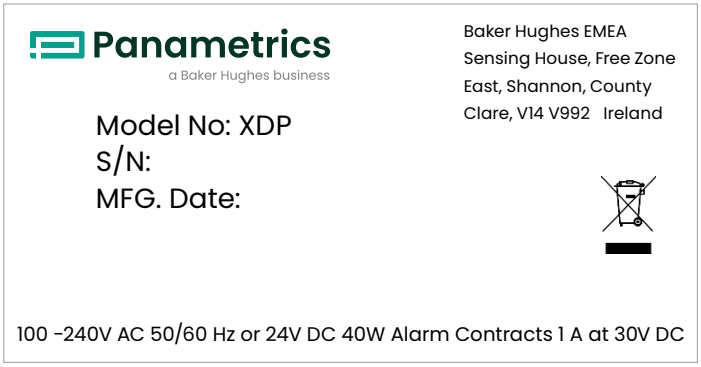
Special conditions for safe use

- Consult the manufacturer if dimensional information on the flameproof joints is necessary.

Markings

- Markings shall appear on the product as shown below:





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Panametrics, a Baker Hughes Business, provides solutions in the toughest applications and environments for moisture, oxygen, liquid and gas flow measurement. Experts in flare management, Panametrics technology also reduces flare emissions and optimizes performance.

With a reach that extends across the globe, Panametrics' critical measurement solutions and flare emissions management are enabling customers to drive efficiency and achieve carbon reduction targets across critical industries including: Oil & Gas; Energy; Healthcare; Water and Wastewater; Chemical Processing; Food & Beverage and many others.

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