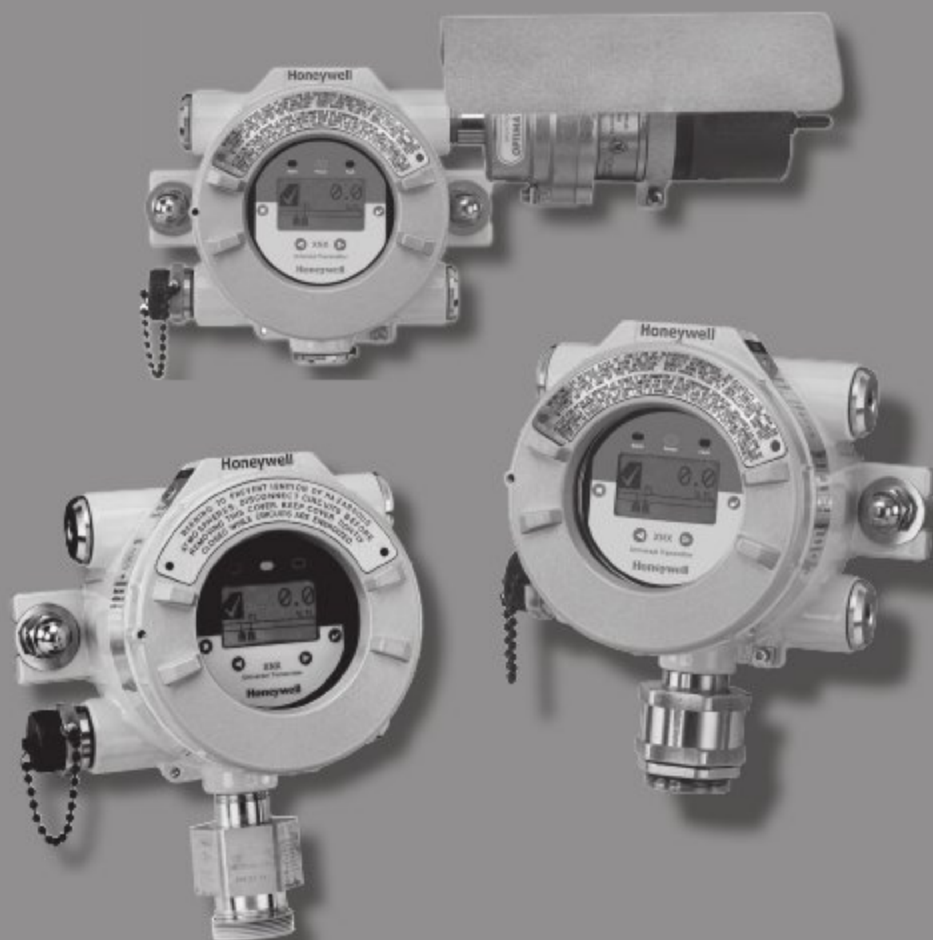




## XNX® Universal Transmitter



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## 1 Introduction

The XNX Quick Start Guide is an abbreviated print reference for the installation, operation, and maintenance of the XNX® Universal Transmitter. Refer to the XNX Universal Transmitter Resource CD (Honeywell part number 1998-0748) for these comprehensive documents, as appropriate, before installing or commissioning the transmitter:

### Manuals

XNX Technical Manual (1998M0738)

XNX Quick Start Guide (1998-0744)

MPD Operating Manual (1998-0745)

XNX Safety Manual (1998-0808)

XNX Foundation Field bus Technical Manual (1998-xxxx)

### Control Drawings

1226E0402 XNX Control Drawing- UL, CSA, XM Approved Model XNX-UT\*-\*\*\*\*\*

1226E0454 XNX Control Drawing- UL, INMETRO Approved Models XNX-BT\*\*\*\*\*

3000E3159 XNX ECC Cartridge Control Drawing- XNXX\*\*\*\*\* Series EC  
Cartridges and Remote Mount Kit.

For other sensor types such as Sensepoint Optima Plus, Searchline Excel, model 705 HT, or Sensepoint sensors, refer to their respective manuals for installation and ordering information.

## 2 Warnings



- High off-scale readings may indicate an explosive concentration of gas.
- Installation must be in accordance with the recognized standards of the appropriate authority in the country concerned.
- Any work on the interior of the detector must be conducted only by trained personnel.
- Ensure that local regulations and site procedures are followed when carrying out any work. Appropriate standards must be followed to maintain the overall certification of the detector.
- To reduce the risk of ignition of hazardous atmosphere, disconnect the equipment from the supply circuit before opening the detector enclosure. Conduit runs must have a seal fitting connected within 18 inches (45 cm) of the enclosures. Keep the assembly tightly closed during operation.
- Never open the XNX enclosure under power unless the area is known to be non-hazardous.
- The detector must be earthed/grounded for Intrinsic Safety, electrical safety, and to limit the effects of radio frequency interference. Earth/ground points are provided inside and outside the unit. EMI note for applications using shielded cable: Cable shield terminations must be made at the cable glands with suitable EMI type glands. Avoid terminating cable shields at the Earth ground lug inside the XNX enclosure. In cases where wiring is in pipe, a shielded cable is not required. The external terminal is only a supplemental bonding connection where local authorities permit or require such a connection.
- Take care when handling EC sensor cells as they may contain corrosive solutions.
- Do not tamper with or in any way disassemble the sensor cells.
- Do not expose the transmitter or sensor cells to temperatures outside the recommended range.
- Do not expose the sensor to organic solvents or flammable liquids.
- At the end of their working lives, sensors must be disposed of in an environmentally safe manner. Disposal should be according to local waste management requirements and environmental legislation.
- Alternatively, sensors may be securely packaged, clearly marked for environmental disposal, and returned to Honeywell Analytics.
- Do NOT incinerate electrochemical cells as they may emit toxic fumes.
- Verify all outputs, including display, after installation, after service events, and periodically to ensure the safety and integrity of the system.
- Delays resulting from transmission errors between sensor and transmitter extend response times T90 by more than one-third. The period until fault indication is 10 seconds.
- As some test gases are hazardous, exhaust the flow housing outlet to a safe area. Do not use the XNX Universal Transmitter in oxygen-enriched atmospheres. (In oxygen-enriched atmospheres, the electrical safety is not given.)

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#### HAZARDOUS LOCATIONS INSTALLATION REQUIREMENTS (UL/CSA/FM)

- To reduce the risk of ignition of hazardous atmospheres, conduit runs must have a pour gland installed within 18 inches (457mm) of enclosure.
- All ¾ inch NPT conduit, stopping plugs and adapters must be installed with 5 ¼ threads (minimum) engaged to Maintain Explosion Proof rating.
- The XNX Cover Assembly must be fully seated to enclosure 9 threads (minimum) to maintain Explosion Proof rating.
- Stopping Plugs supplied (Honeywell Part Number 1226-0258) are approved for use ONLY with the XNX Universal Transmitter.
- For units fitted with the optional relay module: Relay contact ratings are 250 VAC 5A, 24 VDC 5A Resistive Loads Only.
- Use copper conductors only, 60/75°C. Terminal block screws should be tightened to 4.5 lb/in maximum.
- For models XNX-UT\*\*-\*\*\*\*, refer to XNX control drawing 1226E0402 or, for models
- XNX-BT\*\*-\*\*\*\*, refer to control drawing 1226E0454 for additional information regarding IS function (local HART and EC personalities).
- XNX Universal Transmitters carrying UL/CSA/FM approvals that are configured for devices measuring %LEL will not allow adjustments to the full scale value. The range is fixed at 100%.

#### HAZARDOUS LOCATIONS INSTALLATION REQUIREMENTS (ATEX)

- Read and understand Technical Manual 1998M0738 before installation and use.
- Use only Certified M25 cable glands for installation.
- Shielded armoured cable is required for CE compliance.
- Special conditions for safe use
  - The following applies to the HART Barrier intrinsically safe circuits: For installations in which both the Ci and Li of the intrinsically safe apparatus exceeds 1% of the Co and Lo parameters of the associated apparatus (excluding the cable), then 50% of Co and Lo parameters are applicable and shall not be exceeded, i.e. the Ci of the device plus the C of the cable must be less than or equal to 50% of the Co of the associated apparatus, and the Li of the device plus the L of the cable must be less than or equal to 50% of the Lo of the associated apparatus.
  - For circuits connected to the EC barrier in which the capacitance and inductance exceed 1% of the permitted values, then the maximum permitted capacitance is limited to 600nF for group IIC and 1uF for group IIIC.
  - The connection to the HART circuit shall be rated a minimum of IP 6X.

### 3 Mounting and Location of Detectors



#### CAUTION

The location of the transmitters and sensors should be made in accordance with any relevant local and national legislation, standards or codes of practice. Always replace detectors with a detector of the same type. The detector should be mounted where the gas is most likely to be present. The following points should be noted when locating gas detectors.

- **Consider the possible damage caused by natural events e.g. rain or flooding when locating detectors.**
- **Consider ease of access for functional testing and servicing.**
- **Consider how escaping gas may behave due to natural or forced air currents.**

#### NOTES:

The placement of detectors should be determined following the advice of experts having specialist knowledge of gas dispersion, experts having knowledge of the process plant system and equipment involved, safety and engineering personnel. The agreement reached on the location of detectors should be recorded.

CSA certification does not cover XNX EC cartridges or XNX EC cartridge remote mounting kit, daisy-chained XNX combustible gas transmitters or the use of HART®, Modbus, or Foundation Fieldbus used for combustible gas performance. HART®, Modbus, or Foundation Fieldbus may be used only for data collection or record keeping with regards to combustible gas detection.

FM approved configurations (see the XNX Universal Transmitter Technical Manual, section 6.3 XNX Certifications by Part Number Series) also limit the use of HART®, Modbus, or Foundation Fieldbus to use for diagnostics, data collection, or record keeping.

The XNX Universal Transmitter is certified and designed for installation and use worldwide in hazardous areas.

### 3.1 Mounting the XNX Universal Transmitter

The XNX Universal Transmitter can be mounted in a number of different methods using the integral mounting tabs.

Using the mounting tabs, the XNX can be attached to:

- **Flat wall surface**
- **Unistrut®**

With the optional Pipe Mount kit, the XNX can be mounted to pipe of diameter 2 to 6 in (50 to 150mm).

A ceiling mount bracket kit (1226A0358) is also available.

#### NOTES:

Agency certifications require that EC and mV sensors face down. Optima sensors must be mounted horizontally.



Figure 1. Integral mounting lugs and optional pipe and ceiling mounts

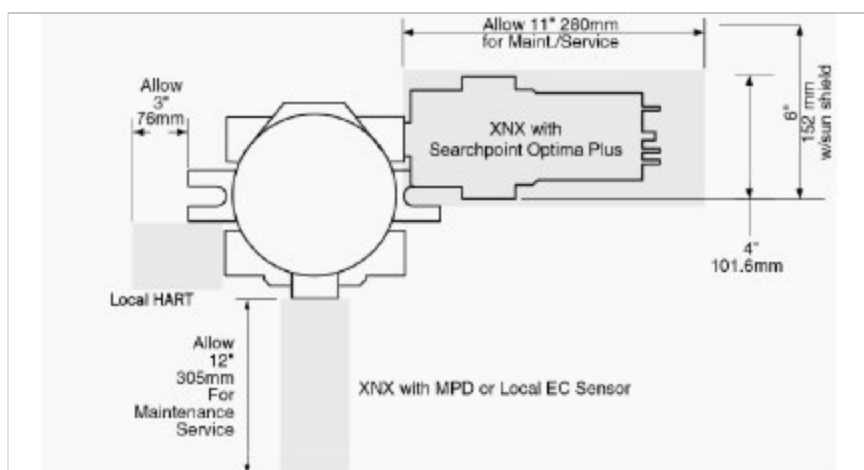
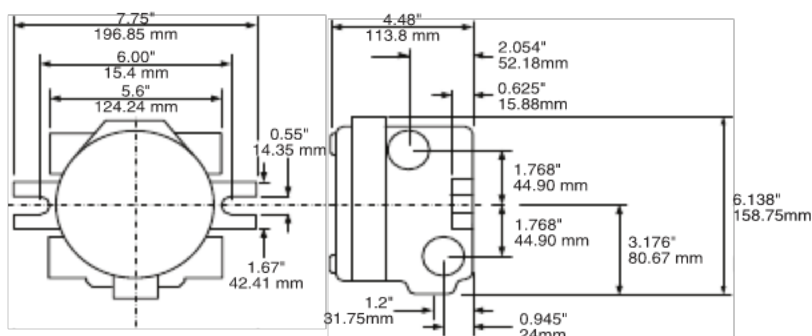


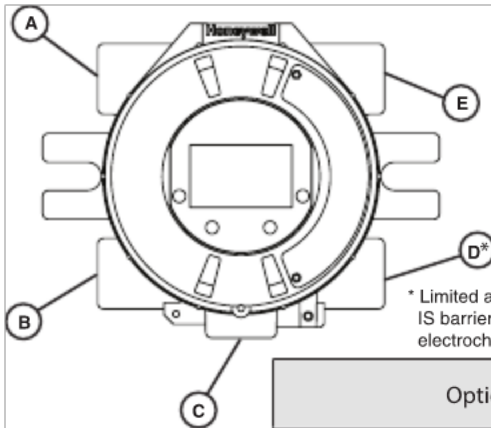
Figure 2. XNX Universal Transmitter mounting dimensions and clearances



## WARNING

When the XNX is equipped with the optional Remote Mount Kit, the remote sensor **MUST** be securely mounted to a fixed position. The Remote Sensor Kit is not intended to be used as a hand-held detector.

The XNX is configured with 5 cable/conduit entries built into the housing for wiring and mounting sensors. Figure 3 provides the guidelines to proper installation of the XNX.



## NOTE

While relay wiring can use any available cable/conduit entry in the XNX enclosure, do not use the same cable/conduit entry for both relay reset and relay signal lines to avoid electrical noise.

\* Limited access due to IS barrier if equipped with electrochemical cell.

| Option                               | Position      |
|--------------------------------------|---------------|
| Local HART <sup>®</sup> Option       | B             |
| MPD, 705 Series, Sensepoint Series   | C             |
| Catalytic Bead Sensor                | C             |
| Searchpoint Optima Plus              | A or E        |
| Searchline Excel                     | Typically C   |
| Remote Sensor Connection (except EC) | Any remaining |
| Searchpoint Optima Plus - Remote     | Any remaining |
| Modbus <sup>®</sup>                  | Any remaining |
| Relays                               | Any remaining |
| Foundation Fieldbus                  | Any remaining |
| Power                                | Any remaining |

Figure 3. XNX Universal Transmitter cable/conduit entry assignments

## 4 Wiring the XNX transmitter

Personality circuit boards determine the XNX behavior based on the sensor type attached to the XNX interface.

The table below defines the three XNX transmitter configurations and the sensors each support.

| XNX IR Personality                                                                               |                                                                                   | XNX EC Personality                                                                |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|                 |  |  |
| Searchline Excel                                                                                 | SearchpointOptimaPlusLocal/Remote                                                 | XNX EC Sensor                                                                     |
| Generic mA Sensors                                                                               |                                                                                   | XNX EC Sensor Remote Mount Kit                                                    |
| XNX mV Personality                                                                               |                                                                                   |                                                                                   |
|                 |  |  |
| 705 Local / Remote                                                                               | MPD Local (cat bead and IR)                                                       | Sensepoint Local / Remote                                                         |
| 705HT Local / Remote                                                                             | MPD Remote                                                                        | SensepointPPMLocal/Remote                                                         |
|                                                                                                  |                                                                                   | Sensepoint HT Remote                                                              |
|  <b>CAUTION</b> |                                                                                   |                                                                                   |

Before wiring the transmitter, confirm that the correct personality boards and options are installed.

### 4.1 General Wiring Considerations

For proper operation of the XNX Universal Transmitter and Sensor Technologies, consideration of wiring induced voltage drops, transient electrical noise and dissimilar Earth ground potentials is imperative in the design and installation of the system.

#### NOTE:

EMI note for applications using shielded cable: Cable shield must provide 90% coverage of the wiring. Cable shield terminations must be made at the cable glands with suitable EMI-type glands. Avoid terminating cable shields at the Earth ground lug inside the XNX enclosure. Where wiring is in pipe, a shielded cable is not required.

#### Loading

Wiring for DC Power, 4-20mA Signal, remote wiring to sensors must be sized sufficiently to provide sufficient voltages for the line length and the loads that will be used.

## Isolation

Isolating power and signal carrying conductors is recommended.

## Circuit Protection

Supply circuits must provide over current protection. Class 2 power supplies are required for 24 volt DC supply. Consider Inrush current in specifying any DC supply. Power supply range is 16 to 32 VDC for EC and mV versions, 18 to 32 VDC for Searchpoint Optima Plus and Searchline Excel and 16 to 32 VDC dependent on the limitations of device for the generic 4-20mA input.

## Loads

The use of High Inrush or Inductive loads may affect the performance of the XNX. For best reliability use resistive loads only.

## 4.2 Distance Considerations for Installation

### Types of Installations

There are three basic types of installation: a single transmitter; multiple transmitters connected to a single power source; and multiple transmitters connected in a daisy-chain configuration.

### Power Source Selection

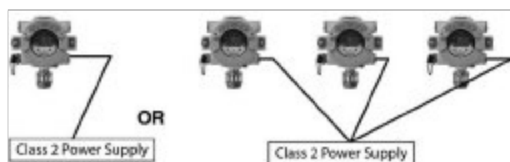
| XNX Universal Transmitter Maximum Power Consumption |                          |                                                                     |                          |                                                                     |
|-----------------------------------------------------|--------------------------|---------------------------------------------------------------------|--------------------------|---------------------------------------------------------------------|
| Configuration                                       | -40°C to +65°C           |                                                                     | -10°C to +65°C           |                                                                     |
|                                                     | HART over 4-20mA (watts) | HART over 4-20mA with Relay, Modbus, or Foundation Fieldbus (watts) | HART over 4-20mA (watts) | HART over 4-20mA with Relay, Modbus, or Foundation Fieldbus (watts) |
| XNX with toxic sensors                              | 5.1                      | 6.2                                                                 | 3.4                      | 4.5                                                                 |
| XNX with catalytic sensors                          | 5.4                      | 6.5                                                                 | 3.7                      | 4.8                                                                 |
| XNX with infrared cartridge                         | 5.4                      | 6.5                                                                 | 3.7                      | 4.8                                                                 |
| XNX with Searchpoint Optima Plus                    | 8.6                      | 9.7                                                                 | 6.9                      | 8.0                                                                 |
| XNX with Searchline Excel                           | 12.1                     | 13.2                                                                | 10.4                     | 11.5                                                                |

## Wire Selection

The type of wire used for connections has an effect on the distance of the installation. This is because some of the voltage is lost in the wire on the way to the transmitter.

## Single Transmitter Distances

For installations that have dedicated wiring between the transmitter and the power supply, use the following chart. These distances assume stranded wire is used.



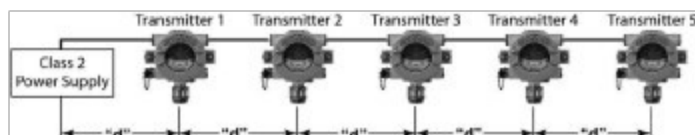
| Single Transmitter Distances         |                                  |                                  |                                  |                                  |
|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Configuration                        | 18 AWG<br>[1.0 mm <sup>2</sup> ] | 16 AWG<br>[1.5 mm <sup>2</sup> ] | 14 AWG<br>[2.0 mm <sup>2</sup> ] | 12 AWG<br>[3.5 mm <sup>2</sup> ] |
| XXN mV or EC<br>With Sensor          | 1140 feet<br>[347 meters]        | 1810 feet<br>[551 meters]        | 2890 feet<br>[880 meters]        | 4620 feet<br>[1408 meters]       |
| XXN IR with<br>SearchpointOptimaPlus | 660 feet<br>[201 meters]         | 1060 feet<br>[323 meters]        | 1690 feet<br>[515 meters]        | 2690 feet<br>[820 meters]        |
| XXN IR with<br>Searchline Excel      | 550 feet<br>[168 meters]         | 890 feet<br>[270 meters]         | 1410 feet<br>[430 meters]        | 2260 feet<br>[690 meters]        |

### NOTE

If multiple transmitters are using the same power supply, make sure the power supply wattage rating is high enough to power all transmitters simultaneously.

## Daisy-Chain Transmitter Distances

A few selected scenarios are presented here to provide a base to work from.



- Several transmitters equally spaced from themselves and the power source.

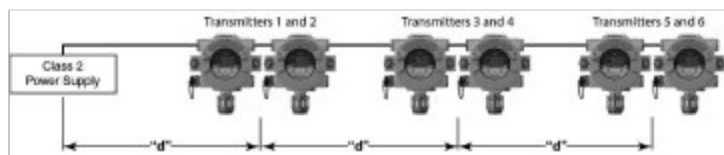
| 2 Transmitters - Distance "d"        |                                  |                                  |                                  |                                  |
|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Configuration                        | 18 AWG<br>[1.0 mm <sup>2</sup> ] | 16 AWG<br>[1.5 mm <sup>2</sup> ] | 14 AWG<br>[2.0 mm <sup>2</sup> ] | 12 AWG<br>[3.5 mm <sup>2</sup> ] |
| XXN mV or EC<br>With Sensor          | 380 feet<br>[115 meters]         | 600 feet<br>[183 meters]         | 960 feet<br>[292 meters]         | 1540 feet<br>[469 meters]        |
| XXN IR with<br>SearchpointOptimaPlus | 220 feet<br>[67 meters]          | 350 feet<br>[106 meters]         | 560 feet<br>[170 meters]         | 900 feet<br>[274 meters]         |
| XXN IR with<br>Searchline Excel      | 185 feet<br>[56 meters]          | 295 feet<br>[90 meters]          | 470 feet<br>[143 meters]         | 750 feet<br>[229 meters]         |

| 3 Transmitters - Distance "d"        |                                  |                                  |                                  |                                  |
|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Configuration                        | 18 AWG<br>[1.0 mm <sup>2</sup> ] | 16 AWG<br>[1.5 mm <sup>2</sup> ] | 14 AWG<br>[2.0 mm <sup>2</sup> ] | 12 AWG<br>[3.5 mm <sup>2</sup> ] |
| XNX mV or EC<br>With Sensor          | 190 feet<br>[58 meters]          | 300 feet<br>[91 meters]          | 480 feet<br>[146 meters]         | 770 feet<br>[234 meters]         |
| XNX IR with<br>SearchpointOptimaPlus | 110 feet<br>[33 meters]          | 175 feet<br>[53 meters]          | 280 feet<br>[85 meters]          | 450 feet<br>[137 meters]         |
| XNX IR with<br>Searchline Excel      | 90 feet<br>[27 meters]           | 145 feet<br>[44 meters]          | 235 feet<br>[71 meters]          | 375 feet<br>[114 meters]         |

| 4 Transmitters - Distance "d"        |                                  |                                  |                                  |                                  |
|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Configuration                        | 18 AWG<br>[1.0 mm <sup>2</sup> ] | 16 AWG<br>[1.5 mm <sup>2</sup> ] | 14 AWG<br>[2.0 mm <sup>2</sup> ] | 12 AWG<br>[3.5 mm <sup>2</sup> ] |
| XNX mV or EC<br>With Sensor          | 110 feet<br>[33 meters]          | 180 feet<br>[55 meters]          | 290 feet<br>[88 meters]          | 460 feet<br>[140 meters]         |
| XNX IR with<br>SearchpointOptimaPlus | 65 feet<br>[20 meters]           | 105 feet<br>[32 meters]          | 165 feet<br>[50 meters]          | 270 feet<br>[82 meters]          |
| XNX IR with<br>Searchline Excel      | 55 feet<br>[17 meters]           | 85 feet<br>[26 meters]           | 140 feet<br>[43 meters]          | 225 feet<br>[68 meters]          |

| 5 Transmitters - Distance "d"        |                                  |                                  |                                  |                                  |
|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Configuration                        | 18 AWG<br>[1.0 mm <sup>2</sup> ] | 16 AWG<br>[1.5 mm <sup>2</sup> ] | 14 AWG<br>[2.0 mm <sup>2</sup> ] | 12 AWG<br>[3.5 mm <sup>2</sup> ] |
| XNX mV or EC<br>With Sensor          | 75 feet<br>[23 meters]           | 120 feet<br>[36 meters]          | 190 feet<br>[58 meters]          | 300 feet<br>[91 meters]          |
| XNX IR with<br>SearchpointOptimaPlus | 45 feet<br>[13 meters]           | 70 feet<br>[21 meters]           | 110 feet<br>[33 meters]          | 180 feet<br>[55 meters]          |
| XNX IR with<br>Searchline Excel      | 35 feet<br>[11 meters]           | 55 feet<br>[17 meters]           | 90 feet<br>[27 meters]           | 150 feet<br>[46 meters]          |

- Several transmitters installed in pairs with each pair equally spaced from themselves and the power source. These distances assume the paired transmitters are installed within 10 feet [3 meters] of each other.



| 2 Transmitters - Distance "d"        |                                  |                                  |                                  |                                  |
|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Configuration                        | 18 AWG<br>[1.0 mm <sup>2</sup> ] | 16 AWG<br>[1.5 mm <sup>2</sup> ] | 14 AWG<br>[2.0 mm <sup>2</sup> ] | 12 AWG<br>[3.5 mm <sup>2</sup> ] |
| XNX mV or EC<br>With Sensor          | 485 feet<br>[147 meters]         | 775 feet<br>[235 meters]         | 1230 feet<br>[292 meters]        | 1970 feet<br>[600 meters]        |
| XNX IR with<br>SearchpointOptimaPlus | 380 feet<br>[115 meters]         | 600 feet<br>[180 meters]         | 960 feet<br>[290 meters]         | 1540 feet<br>[470 meters]        |
| XNX IR with<br>Searchline Excel      | 280 feet<br>[85 meters]          | 440 feet<br>[134 meters]         | 700 feet<br>[213 meters]         | 1130 feet<br>[344 meters]        |

| 4 Transmitters - Distance "d"        |                                  |                                  |                                  |                                  |
|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Configuration                        | 18 AWG<br>[1.0 mm <sup>2</sup> ] | 16 AWG<br>[1.5 mm <sup>2</sup> ] | 14 AWG<br>[2.0 mm <sup>2</sup> ] | 12 AWG<br>[3.5 mm <sup>2</sup> ] |
| XNX mV or EC<br>With Sensor          | 190 feet<br>[58 meters]          | 300 feet<br>[91 meters]          | 480 feet<br>[146 meters]         | 770 feet<br>[234 meters]         |
| XNX IR with<br>SearchpointOptimaPlus | 110 feet<br>[33 meters]          | 175 feet<br>[53 meters]          | 280 feet<br>[85 meters]          | 450 feet<br>[137 meters]         |
| XNX IR with<br>Searchline Excel      | 90 feet<br>[27 meters]           | 145 feet<br>[44 meters]          | 235 feet<br>[71 meters]          | 375 feet<br>[114 meters]         |

| 6 Transmitters - Distance "d"        |                                  |                                  |                                  |                                  |
|--------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Configuration                        | 18 AWG<br>[1.0 mm <sup>2</sup> ] | 16 AWG<br>[1.5 mm <sup>2</sup> ] | 14 AWG<br>[2.0 mm <sup>2</sup> ] | 12 AWG<br>[3.5 mm <sup>2</sup> ] |
| XNX mV or EC<br>With Sensor          | 95 feet<br>[33 meters]           | 150 feet<br>[45 meters]          | 240 feet<br>[73 meters]          | 385 feet<br>[117 meters]         |
| XNX IR with<br>SearchpointOptimaPlus | 55 feet<br>[17 meters]           | 85 feet<br>[26 meters]           | 140 feet<br>[42 meters]          | 225 feet<br>[68 meters]          |
| XNX IR with<br>Searchline Excel      | 45 feet<br>[14 meters]           | 70 feet<br>[21 meters]           | 115 feet<br>[35 meters]          | 185 feet<br>[56 meters]          |

### 4.3 POD Connections

The illustration in Figure 4 details the connections available on each of the terminal blocks for each type of personality board.

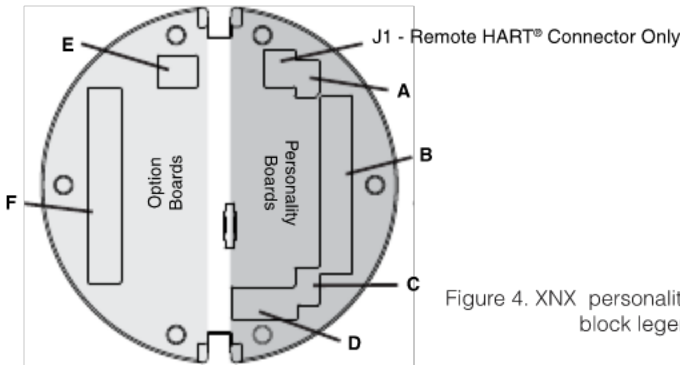


Figure 4. XNX personality board terminal block legend

| Table A        |               |          |    |    |
|----------------|---------------|----------|----|----|
| Board Type     | Function      |          | S1 | S2 |
| EC Personality | 4-20mA Output | Source   | ▼  | ▲  |
| mV Personality |               | Sink     | ▲  | ▼  |
| IR Personality |               | Isolated | ▼  | ▼  |

| Table B        |            |                                    |
|----------------|------------|------------------------------------|
| Board Type     | Connection | Function                           |
| EC Personality | TB1        | Power, 4-20mA                      |
| mV Personality |            | Power, 4-20mA, Sensor              |
| IR Personality |            | Power, 4-20mA, IR Power and Signal |

| Table C        |                 |        |    |    |
|----------------|-----------------|--------|----|----|
| Board Type     | Function        |        | S3 | S4 |
| IR Personality | IR 4-20mA Input | Source | ▼  | ▼  |
|                |                 | Sink   | ▲  | ▲  |

| Table D        |            |               |
|----------------|------------|---------------|
| Board Type     | Connection | Function      |
| EC Personality | J2         | EC IS Barrier |
| IR Personality | TB2        | Com A and B   |

| Table E             |            |                        |
|---------------------|------------|------------------------|
| Board Type          | Connection | Function               |
| Relay               | TB4        | Remote Reset Connector |
| Modbus <sup>*</sup> | SW5        | Bus Loop Terminators   |
| Foundation Fieldbus | SW5        | Simulation Mode        |

| Table F             |            |                |
|---------------------|------------|----------------|
| Board Type          | Connection | Function       |
| Relay               | TB3        | Relay Output   |
| Modbus <sup>*</sup> | TB3        | DataConnection |
| Foundation Fieldbus | TB3        | DataConnection |

#### 4.4 4-20mA Output, Common Connections and Power

##### Setting 4-20mA operation; S1 & S2

The XNX Universal Transmitter allows the user to configure the 4-20mA output to Sink, Source or Isolated mode operation via two programming switches on the POD. The table below shows the S1 and S2 setting and corresponding output configuration.

| Output Configuration | S1   | S2   |
|----------------------|------|------|
| Source               | Down | Up   |
| Sink                 | Up   | Down |
| Isolated             | Down | Down |

Power and 4-20mA connections are made at TB-1 and are identical for the EC, IR, and mV personality boards. The minimum loop impedance is 200 ohms; the maximum is 500 ohms when the transmitter is supplied with an input of 16 volts. Failure to perform “Calibrate mA Output” or with loads outside the recommended values may result in diagnostic warning or fault messages.

The total load resistance recommended for the 4-20mA output should be kept lower than 500 ohms, including the resistance of the properly selected 4-20mA cable and input impedance of the equipment to be connected.

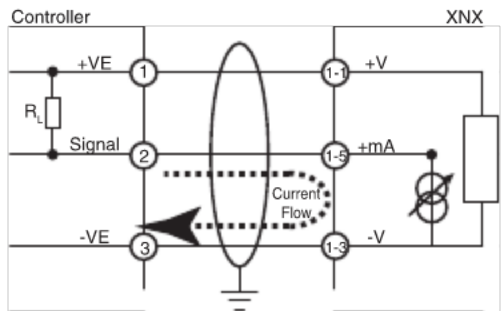


Figure 5. Sink wiring for XNX

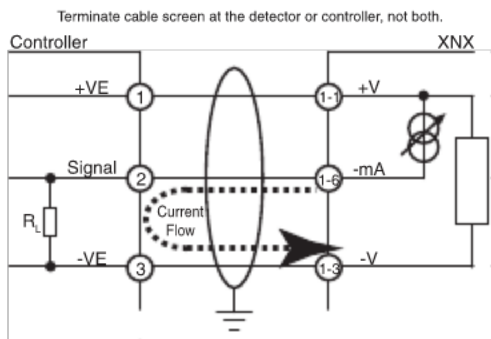


Figure 6. Source wiring for XNX

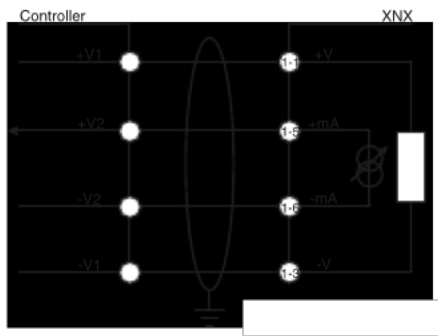


Figure 7. Isolated wiring for XNX

The XNX Universal Transmitter power consumption is dependent on the sensor and options for the specific configuration. For proper operation, the input voltage must be maintained at 16 to 32 volts DC (for EC and mV transmitters) or 18 to 32 volts DC (for IR transmitters).

The table below defines the XNX typical and maximum power consumption based on configuration:

| Configuration   | Max Power | Inrush           |
|-----------------|-----------|------------------|
| XNX EC          | 6.2 w     | <1A, <10ms@24VDC |
| XNX mV          | 6.5 w     | <750mA<2ms@24VDC |
| XNX IR (Optima) | 9.7 w     | <1A <10ms@24VDC  |
| XNX IR (Excel)  | 13.2 w    | <1A <10ms@24VDC  |

HART® devices can operate in one of two configurations: point-to-point or multi-drop.

## HART® Communications

### Point-to-Point Mode

In point-to-point mode, the 4–20 mA analog output is used to report concentration and the status of the transmitter to a dedicated channel of the control system. Additionally, concentration, status, diagnostics, and configuration are available digitally using the HART® protocol.

### Multi-drop Mode

Multi-drop mode allows up to eight transmitters to interface with a single channel of a control system for non-safety-critical applications.

#### NOTE:

Use a multi-drop connection for supervisory control installations that are widely spaced such as pipelines, custody transfer stations, and tank farms.

The minimum conductor size is 0.51mm diameter (#24 AWG) for cable runs less than 1,524m (5,000 ft) and 0.81mm diameter (#20 AWG) for longer runs.

### Cable Length

Most installations are within the 3,000m (10,000 ft) theoretical limit for HART® communication. However, the electrical characteristics of the cable (mostly capacitance) and the combination of connected devices can affect the maximum allowable cable length of a HART® network. The following table shows the effect of cable capacitance and the number of network devices on cable length. The table is based on typical installations of HART® devices in non-IS environments, i.e. no miscellaneous series impedance.

| Allowable Cable Lengths for Various Capacitances<br>(for 1 mm, #18 AWG shielded twisted pair) |                          |                          |                           |                           |                                 |
|-----------------------------------------------------------------------------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------------|
|                                                                                               | Cable Capacitance        |                          |                           |                           | Number of<br>Network<br>Devices |
|                                                                                               | 20 pf/ft<br>(65<br>pf/m) | 30 pf/ft<br>(95<br>pf/m) | 50 pf/ft<br>(160<br>pf/m) | 70 pf/ft<br>(225<br>pf/m) |                                 |
| <b>Allowable<br/>Lengths</b>                                                                  | 9,000 ft<br>(2,769 m)    | 6,500 ft<br>(2,000 m)    | 4,200 ft<br>(1,292 m)     | 3,200 ft<br>(985 m)       | <b>1</b>                        |
|                                                                                               | 8,000 ft<br>(2,462 m)    | 5,900 ft<br>(1,815 m)    | 3,700 ft<br>(1,138 m)     | 2,900 ft<br>(892 m)       | <b>5</b>                        |
|                                                                                               | 7,000 ft<br>(2,154 m)    | 5,200 ft<br>(1,600 m)    | 3,300 ft<br>(1,015 m)     | 2,500 ft<br>(769 m)       | <b>10</b>                       |
|                                                                                               | 6,000 ft<br>(1,846 m)    | 4,600 ft<br>(1,415 m)    | 2,900 ft<br>(892 m)       | 2,300 ft<br>(708 m)       | <b>15</b>                       |

**NOTE:**

See Appendix A of the XNX Technical Manual for more information about the Local HART® Handheld.

## 4.5 Terminal Block Connections

Customer connections to the XNX are made via pluggable terminal blocks secured to the back of the POD. The terminal blocks are keyed and polarized. A color coded label is affixed to assist in wiring when the block is removed from the POD.

The terminals are suitable for use with 12 to 28 AWG or 0.8 to 2.5mm wire. Wire insulation must be stripped 5/16 (0.312) inches or 8mm. Tighten each terminal to a maximum of 4.5 in/lbs. Up to four terminal blocks will be supplied; each will be configured with 2, 6, 9, or 10 positions.

Two terminal block jumpers are provided to provide an electrical connection without connecting to the Personality Board. Install the jumpers between pins 1 and 2 and between pins 3 and 4 to support multi-node wiring.

For user convenience, a second set of terminals has been provided to eliminate the need for a secondary junction box in multi-node systems. Two terminal block jumpers are provided which enable an electrical connection without connecting to the Personality Board. Install the jumpers between pins 1 and 2 and between pins 3 and 4 to support multi-node wiring.

**NOTE:**

Pins 2 and 4 of terminal block TB1 have no internal connection on the personality board. When used in conjunction with the terminal block jumpers, pins 2 and 4 can provide additional 4-20mA connections or power feed for daisy-chained units.

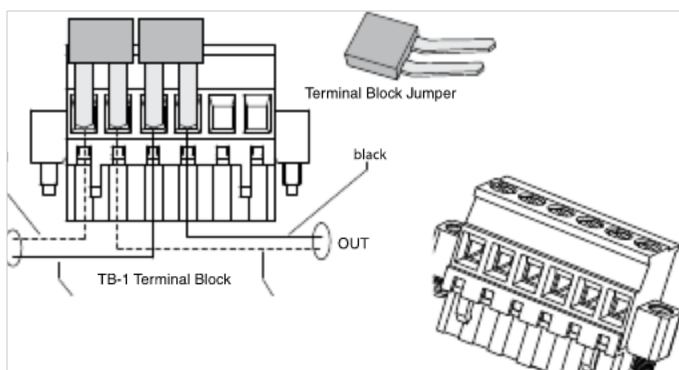


Figure 8. Pluggable terminal block and terminal block jumper

## 4.6 EC Personality Wiring



### WARNING

When the XNX is equipped with the optional Remote Mount Kit, the remote sensor **MUST** be securely mounted to a fixed position. The Remote Sensor Kit is not intended to be used as a hand-held detector.

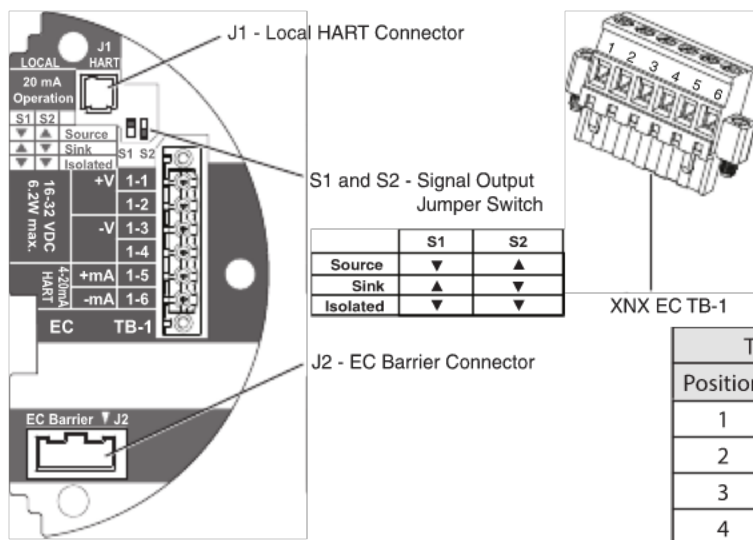


Figure 9. XNX EC personality board terminal blocks, jumper switches, and terminal block assignments



## CAUTION

Be certain to dress the wires properly to ensure cabling does not contact switches 1-2 on the back of the POD.

Do not force the POD into the enclosure as it may indicate an interference condition resulting in damage to the wiring, POD or switch settings.

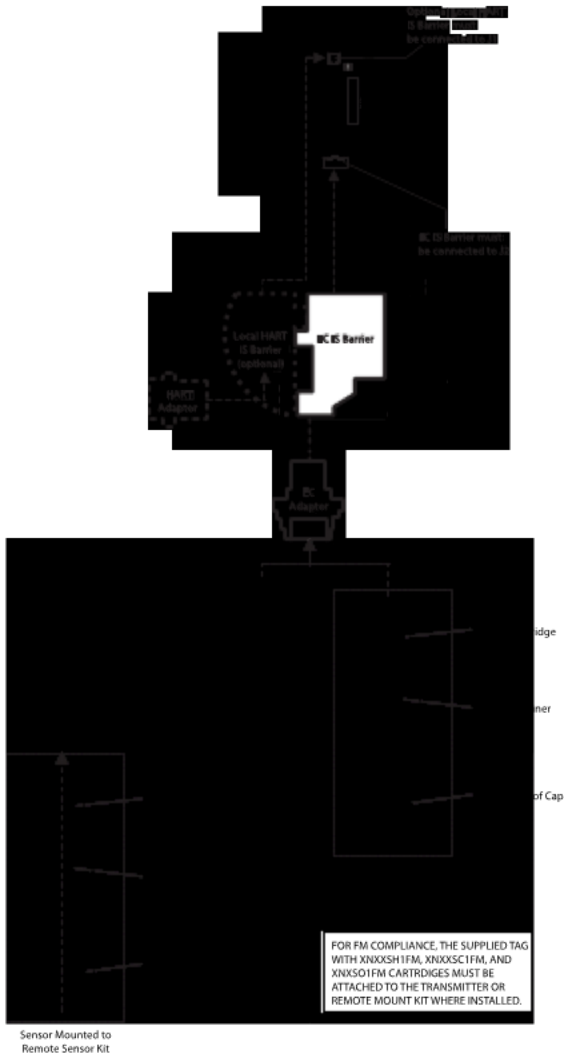


Figure 10. EC personality wiring

### NOTE:

Refer to control drawing 3000E3159 for installation requirements for EC cells and remote mounting.

#### 4.6.1 XNX Electrochemical (EC) Sensor Installation



#### CAUTION

For biased sensors (e.g. Nitrogen Dioxide) remove the sensor stabilizer from the bottom of the sensor prior to installation.

Using Figure 11 as a guide, follow the procedure below:

1. Check that the label on the new sensor is the correct gas type.
2. Unscrew the weatherproof cover, loosen the retainer locking screw with the supplied hex key and unscrew the sensor retainer.
3. Plug in the new sensor taking care to align the sensor pins with the connector.
4. Refit the sensor retainer, tighten the locking screw with the supplied hex key and refit the weatherproof cover.
5. Countdown time of up to 180 seconds (dependent on sensor type) is displayed.
6. Acknowledgement of the gas type will be required before proceeding. For more information on setting gas type, see the XNX Technical Manual Section 2.51 Gas Selection.
7. After the sensor is installed and the gas type is confirmed, the Range, alarm levels and other important settings must be set; see appropriate section in Section 6 - Powering the XNX for the First Time.
8. Once the XNX has been configured, calibrate the detector following the procedures in Section 8.1 - Calibration.

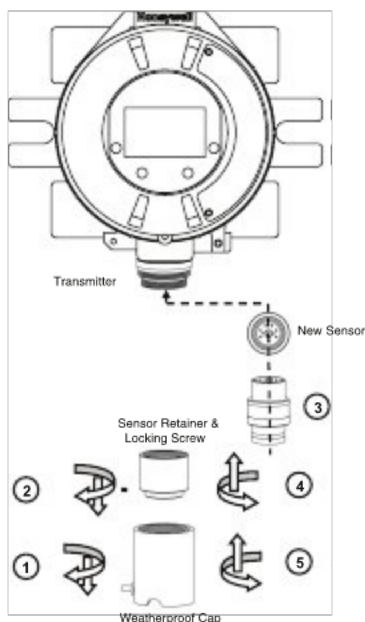


Figure 11. Installing the plug-in sensor

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#### **4.6.2 XNX EC Sensor Remote Mounting Kit**

The remote sensor mounting kit is used to remotely mount the sensor from the transmitter. To remotely mount the sensor, follow the procedure below.

- 1. Unscrew the weatherproof cover, loosen the retainer locking screw and unscrew the sensor retainer.**
- 2. Remove the sensor by pulling without twisting.**
- 3. Plug the remote sensor cable connector into the bottom of the transmitter and secure the retainer.**
- 4. Route the cable to the location where the remote sensor is to be mounted.**
- 5. Optional: make a loop of cable at the junction box. This will provide some slack for any future re-terminations.**
- 6. Mount the remote sensor junction box. Allow enough room below it to fit the sensor and the weatherproof cover.**
- 7. Plug the sensor into the socket at the bottom of the terminal box.**
- 8. Fit the sensor retainer, tighten the locking screw and fit the weatherproof cover.**
- 9. Calibrate the detector following the procedures in Section 8.1 - Calibration.**

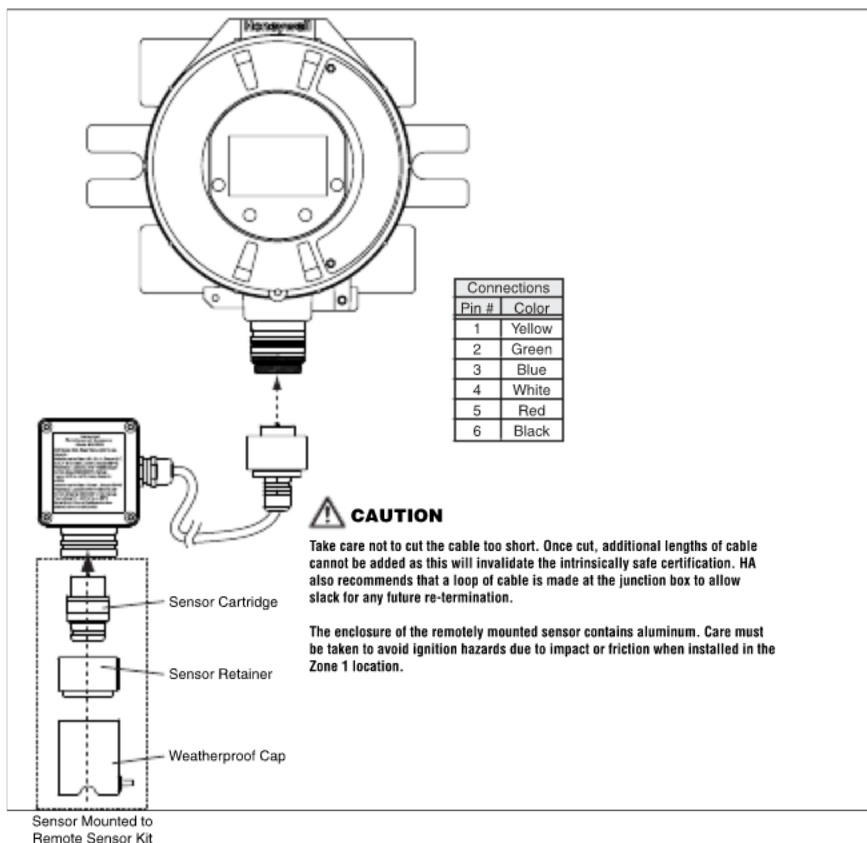


Figure 12. Installing remote sensor mounting kit

#### 4.7 mV Personality Wiring

XNX Universal Transmitter with the mV personality Board allows interface to a number of Honeywell Analytics' Multi Purpose Detector (MPD) and field proven 705 and Sensepoint devices.



#### CAUTION

Check to ensure the XNX and mV Sensor has the appropriate approvals for your installation prior to commissioning.

Check the mV Sensor you are installing has compatible threads - 3/4 NPT or M25.

Connections from the mV sensor to the XNX are made via a single pluggable terminal block allowing ease of installation and service. HA recommends an 8" (203mm) service length for wiring be maintained. The wire colors for the connections for each sensor type are shown in the table on the following page. Be sure wires for 4-20mA outputs are routed away from sources of noise such as relay wires.

NOTE

The black and red wires from the MPD are not used with the XNX mV Personality Board. Ensure that they are properly isolated from live connections. DO NOT CUT.



CAUTION

Be certain to dress the wires properly to ensure cabling does not contact switches 1-2 on the back of the POD. Do not force the POD into the enclosure as it may indicate an interference condition resulting in damage to the wiring, POD or switch settings.

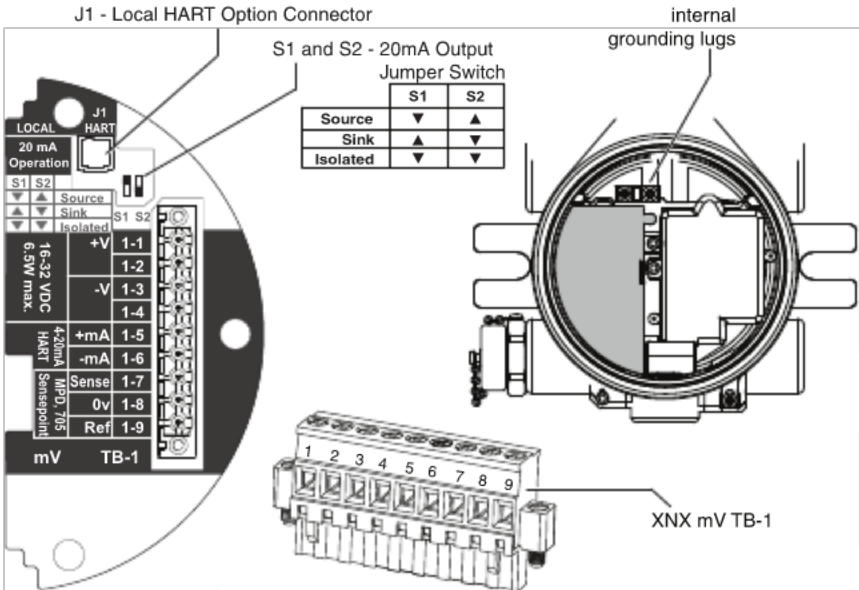


Figure 13. XNX mV personality board wiring

| TB-1     | Desc. | Wire Color from Sensor                                |           |                   |              |                    |                 |         |
|----------|-------|-------------------------------------------------------|-----------|-------------------|--------------|--------------------|-----------------|---------|
|          |       | mV Catalytic Bead Sensor                              |           |                   | Sensept PPM* | mv MPD w/IR Sensor |                 |         |
|          |       | MPD                                                   | 705 705HT | Sensept Senspt HT |              | IR 5%              |                 | IR Flam |
|          |       |                                                       |           |                   |              | CO <sub>2</sub>    | CH <sub>4</sub> |         |
| Pins 1-6 |       | See subsections in Section 4.4 for pin identification |           |                   |              |                    |                 |         |
| 7        | Sense | Brown                                                 |           |                   | Red          | Brown              |                 |         |
| 8        | 0v    | White                                                 |           |                   | Green        | White              |                 |         |
| 9        | Ref   | Blue                                                  |           |                   | Blue         | Blue               |                 |         |

\*Internal earth ground; approximately one inch of the black sheath that contains the Sensepoint PPM's four wires (red, blue, green, silver) must be split to allow the silver grounding wire to reach the internal grounding lugs.

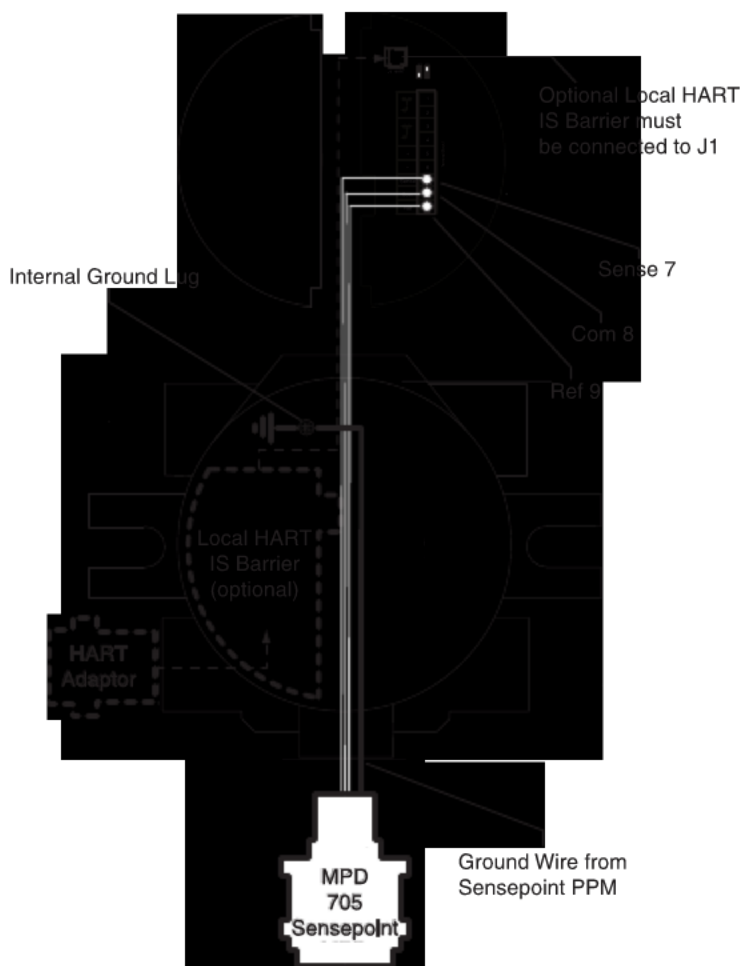


Figure 14. mV personality wiring  
(Refer to the table on the preceding page for wire colors.)

### 4.7.1 mV Remote Sensor Mounting

The millivolt (mV) sensor can be mounted remotely from the XNX transmitter. The distance between the transmitter and the remote sensor must comply with the table below which identifies the proper wire gauges and distances to ensure proper operation.

| AWG | Metric Wire Gauge    | MPD CB1, 705 Series.Sensepoint Series Sensors | MPD IC1, IV1 & IF1 Sensors |
|-----|----------------------|-----------------------------------------------|----------------------------|
| 24  | 0.25 mm <sup>2</sup> | 12m (47 ft.)                                  | 30m (97 ft.)               |
| 22  |                      | 20m (65 ft.)                                  | 50m (162 ft.)              |
| 20  | 0.5 mm <sup>2</sup>  | 30m (97 ft.)                                  | 80m (260 ft.)              |
| 18  |                      | 50m (162 ft.)                                 | 120m (390 ft.)*            |
| 16  | 1.0 mm <sup>2</sup>  | 80m (260 ft.)*                                | 200m (650 ft.)*            |

\*The frequency of zero calibrations may increase due to the changes in wire resistance caused by changing temperatures.

To remotely mount the sensor, follow this procedure:

1. **Install a junction box in the desired location. Allow sufficient room for installation and calibration of the sensor. (MPD sensors must be installed with the sinter pointing down.)**
2. **Loosen the retainer locking screw on the transmitter with the supplied hex key.**
3. **Unscrew the transmitter's weatherproof cover.**
4. **Run conduit or cable from one of the transmitter's available conduit entries to the location of the remote junction box in accordance with local requirements. UL and CSA require a conduit pour fitting within 45 cm (18 in.) of each enclosure.**
5. **Mount the remote sensor junction box. Allow enough room below it to fit the sensor and the weatherproof cover.**
6. **Attach the conduit or cable to the remote junction box. The junction box provides a mounting base for the sensor and contains the associated electronic circuit.**

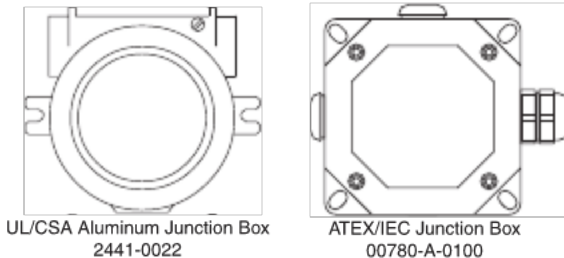


Figure 15. Remote junction boxes

7. Plug the connector into the back of the mV personality board.
8. Install the mV sensor.
9. Terminate wiring at the mV sensor.
10. At the transmitter, pass the wires through the ferrite bead as shown in Figure 16 and terminate the wiring at the pluggable terminal block as shown in Figure 14.

In remote mount MPD configurations, the three wires from the sensor that connect to the pluggable terminal block must be routed through the supplied ferrite bead (part no. 0060-1051, supplied in the accessory kit), as shown in Figure 16.

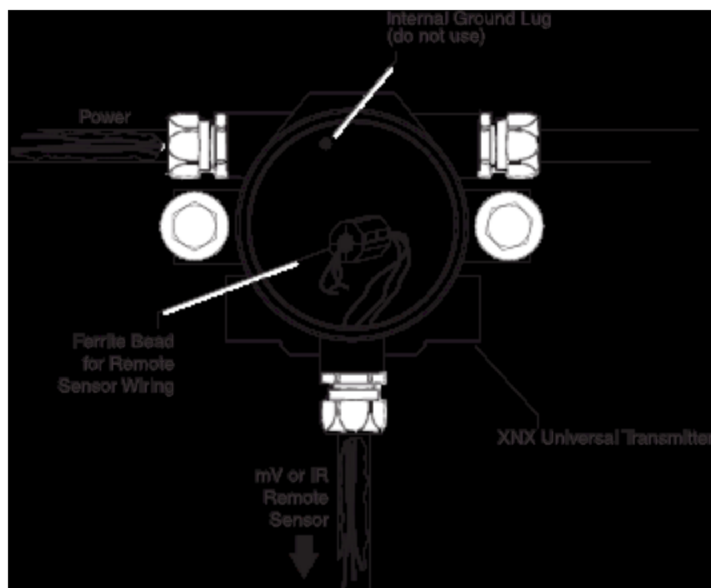


Figure 16. Ferrite bead wiring

11. Verify point-to-point connections before completing the installation and applying power.
12. Calibrate the sensor.
13. Reinstall the weatherproof cover on the transmitter.

Note: Environmental conditions that compromise the IP66 protection provided by the weather proof cover will extend published response times. Safety protocols or maintenance procedures that consider these environmental conditions are recommended specific to the installation.

---

## NOTE

The black and red wires from the MPD are not used with the XNX mV personality board. Ensure that they are properly isolated from live connections. DO NOT CUT.



## CAUTION

The enclosure of the remotely mounted 705 HT sensor contains aluminum. Care must be taken to avoid ignition hazards due to impact or friction when installed in the Zone 1 location.

All cable entry devices and blanking elements of the Junction Box shall be certified in type of explosion protection "Ex d" or "Ex e", suitable for the conditions of use and correctly installed.

**14. Attach and wire the sensor into the terminal box.**

**15. Fit the terminal box lid.**

**16. Fit the sensor retainer, tighten the locking screw and fit the weatherproof cover (if required).**

**17. Calibrate the detector following the procedure in Section 8.1 - Calibration.**

Ensure that wiring is adequately protected from mechanical failure in installation. Specific shorted or open circuit conditions of wiring to the MPD \*\*\* sensors may result in full scale concentration readings prior to, or preventing the internal diagnostic routines from identifying the external installation fault.

## 4.8 IR Personality Wiring

The RS-485 digital communication is the primary interface in which the XNX transmitter reads gas concentration and sensor status from the Optima Plus/Searchline Excel. If RS-485 communication fails, the Optima Plus/Searchline Excel 4-20mA output becomes the primary source to read gas concentration.

Connections from the Searchpoint Optima Plus or Searchline Excel to the XNX are made via two pluggable terminal blocks allowing ease of installation and service (see Figure 20). HA recommends an 8" (203mm) service length for wiring be maintained.

Be sure wires for 4-20mA outputs are routed away from sources of noise such as relay wires. The Searchpoint Optima Plus or Searchline Excel can be supplied in either Sink or Source mode operation and is typically labeled on the white wire exiting the Searchpoint Optima Plus or Searchline Excel. Use the table in Figure 20 to set S3 and S4 to the complimentary operating state of the equipment.

For more information see the Searchpoint Optima Plus Operating Instructions (2104M0508) or the Searchline Excel Technical Manual (2104M0506).



## CAUTION

Be certain to dress the wires properly to ensure cabling does not contact switches 1-4 on the back of the POD.

Do not force the POD into the enclosure as it may indicate an interference condition resulting in damage to the wiring, POD or switch settings.



## WARNING

Setting of S3 and S4 while power is applied or improperly set prior to applying power WILL PERMANENTLY DAMAGE the XNX. Both switches must be set in either Source or Sink prior to applying power.

Do not adjust switch settings while power is applied to the XNX; permanent damage WILL occur.

### 4.8.1 Connecting a Searchpoint Optima Plus or Searchline Excel

Connections from the Searchpoint Optima Plus or Searchline Excel to the XNX are made via two pluggable terminal blocks allowing ease of installation and service (see Figure 18). HA recommends an 8" (203mm) service length for wiring be maintained.

The Searchpoint Optima Plus or Searchline Excel can be supplied in either Sink or Source mode operation and is typically labeled on the white wire exiting the Searchpoint Optima Plus or Searchline Excel. Use the table in Figure 18 to set S3 and S4 to the SAME output type that appears on the wire tag of the IR device.

#### NOTE:

A second, black-handled screwdriver is included for use on terminal blocks 2 and 4. This tool is smaller than the magnetic wand and is designed to fit into the terminal connections on TB2 and TB4.

For more information see the Searchpoint Optima Plus Operating Instructions (2104M0508) or the Searchline Excel Technical Manual (2104M0506).

#### Attaching the Searchpoint Optima Plus to the XNX Universal Transmitter

For M25 entries, insert the seal (P/N 1226-0410) into the proper cable/conduit opening then thread the lock nut (P/N 1226-0409) onto the Optima to the end of the threads. Thread the Optima body into the XNX until the seal compresses and/or Optima bottoms out. Reverse until the semi-circular pattern of holes on the front of the weather protection are on the bottom (see Figure 17) then tighten the lock nut to the XNX body.

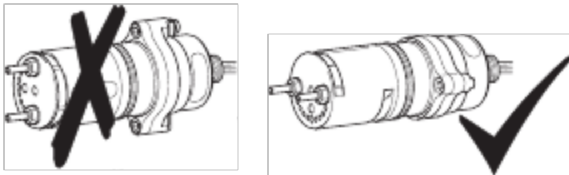


Figure 17. Optima body orientation

The 3/4" NPT entries do not require the seal and locknut, the form of the threads provide positive locking and sealing.

#### NOTE:

When attaching the Searchpoint Optima Plus, be sure to coat the threads with an anti-seize compound to prevent corrosion.

---

## Searchline Excel and Searchpoint Optima Plus Remote Installation

Junction Boxes are available for the Searchline Excel and Searchpoint Optima Plus to facilitate remote mounting from the XNX Universal Transmitter. Junction boxes are available for installations requiring UL/CSA or ATEX approvals. Consult the Searchline Excel Technical Handbook (2104M0506) or Searchpoint Optima Plus Operating Instructions (2104M0508) for specifics on remote installations or contact your Honeywell Analytics representative for more information.

For remote mount installations, the maximum distance between the XNX Universal Transmitter and the Searchpoint Optima Plus unit is 33m (100 ft.), using 18 gauge wire.

## Searchpoint Optima Plus or Searchline Excel Wiring Recommendations

When wiring the XNX and the Searchpoint Optima Plus or Searchline Excel for remote applications, the General Recommendations of the ANSI/TIA/EIA-485-A standard must be adhered to with the following additions:

1. **When mounting the Searchline Excel or Searchpoint Optima Plus, run wiring connections between each Excel or Optima and the XNX in a dedicated separate conduit.**
2. **Use 18 AWG twisted shielded cable for the RS485 connection between Excel or Optima and the XNX. Make sure that the shield of the cable is grounded to earth and XNX ground on one end ONLY.**
3. **Avoid running wiring near main cables or other high voltage equipment.**
4. **DO NOT APPLY 120 Ohm terminating resistors. These resistors are not required due to low data rates.**
5. **HA recommends that Excel or Optima and the XNX be wired to building ground. The system should be grounded at one point only.**

### INSTALLATION TIP:

Always issue a soft reset after connecting the Optima and XNX for the first time. The soft reset is performed by accessing the XNX calibration menu.

### NOTE:

When the soft reset is initiated for the Optima IR Sensor, the RS-485 communication will be interrupted temporarily and faults F120 and/or F161 may be observed. RS-485 communication will be re-established in a few minutes and the faults will be reset automatically in the Non-Latching Mode. The faults must be reset manually in the Latching Mode.

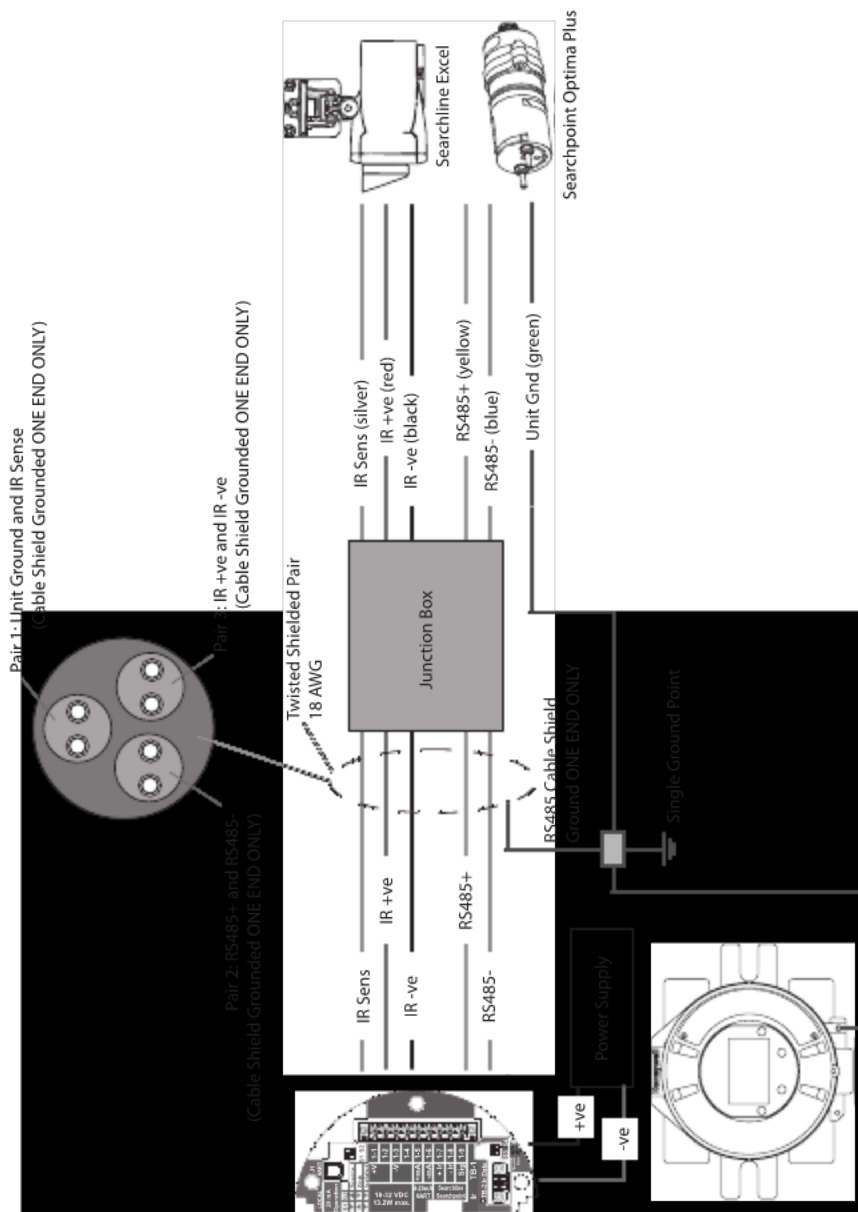


Figure 18. XNX IR remote wiring

### 4.8.2 Connecting Generic mA Device

IR personality type provides for a Generic mA input under sensor type configuration. The XNX transmitter can be used to convert the mA input to be read over HART® protocol or optional Modbus or Foundation Fieldbus and set optional relays (if equipped). Additional configuration of gas type and unit ID for reporting is required (see XNX Technical Manual Section 2.51 Gas Selection). For Generic mA devices, input values below 3mA will generate Fault 155.

Use the following schematics to set S3 and S4 to the same output type that appears on the wire tag of the mA device.

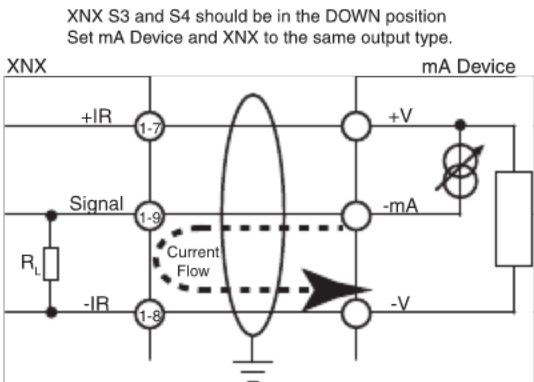
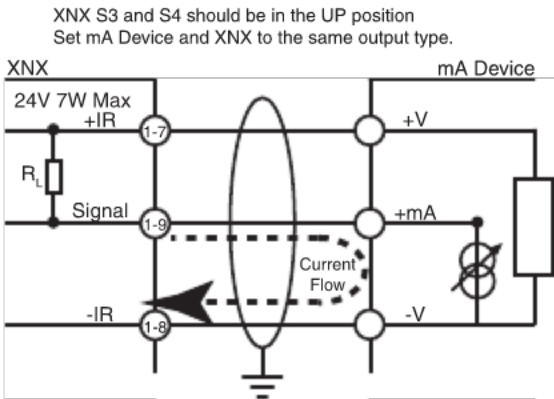
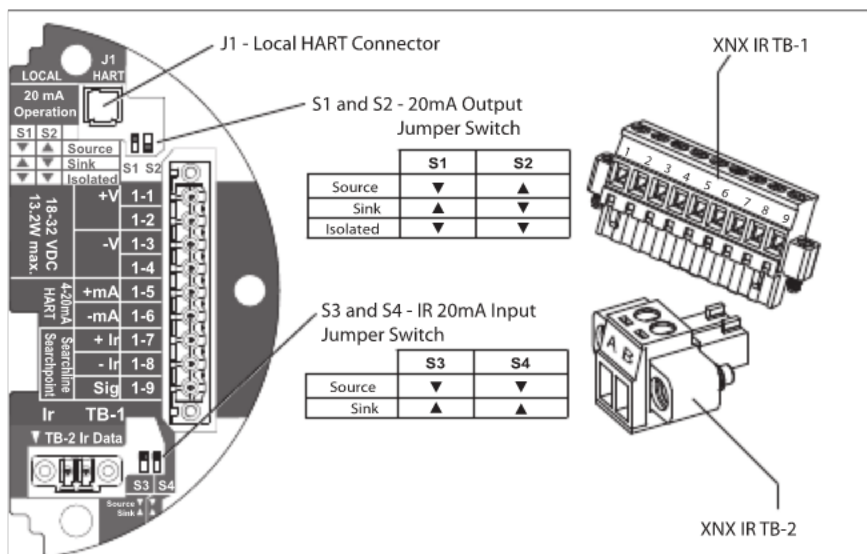


Figure 19. Generic mA device sink/source schematics



| TB1   |        |                                               | TB2          |                                               |
|-------|--------|-----------------------------------------------|--------------|-----------------------------------------------|
| Desc. |        | From Searchpoint Optima Plus Searchline Excel | Terminal No. | From Searchpoint Optima Plus Searchline Excel |
| 1     | 24v    | See Common Connections Section 2.4            | A            | Blue                                          |
| 2     |        |                                               | B            | Orange                                        |
| 3     | Gnd    |                                               |              |                                               |
| 4     |        |                                               |              |                                               |
| 5     | 20mA + |                                               |              |                                               |
| 6     | 20mA - |                                               |              |                                               |
| 7     | 24v    | Red                                           |              |                                               |
| 8     | 0v     | Black                                         |              |                                               |
| 9     | Sig    | White                                         |              |                                               |

| XNX   |                                               |
|-------|-----------------------------------------------|
| Desc. | From Searchpoint Optima Plus Searchline Excel |
| Earth | Green/Yellow                                  |

Figure 20. XNX IR personality board terminal blocks, jumper switches, and wiring guide

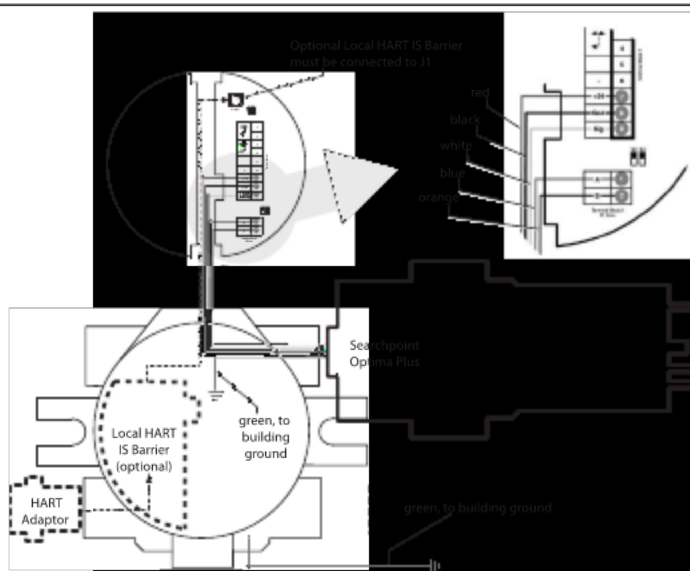


Figure 21. IR personality wiring - Searchpoint Optima Plus

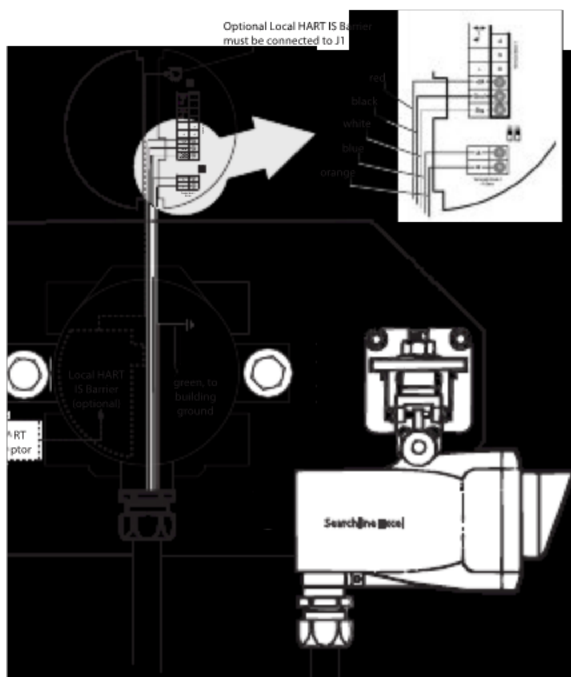


Figure 22. IR personality wiring - Searchline Excel

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## 5 Options

### 5.1 Local HART® Interface

Available with any sensor technology or option, this option provides an external access to the HART® interface in the XNX. An IS barrier inside the XNX allows the user to attach an external hand-held interrogator for programming and configuration. The external interface is installed in the lower left cable/conduit entry of the XNX and is intrinsically safe (IS).

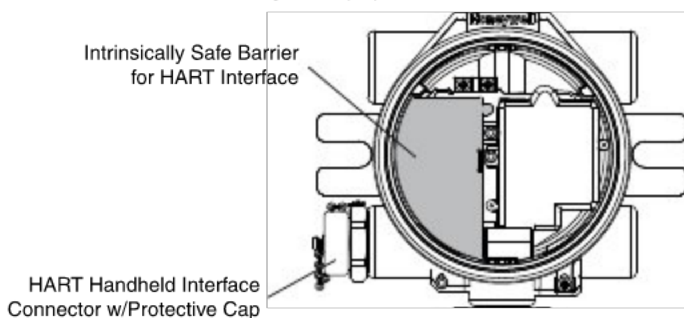


Figure 23. XNX Universal Transmitter with HART® interface IS barrier installed

### 5.2 Relays

The relay option (XNX-Relay) provides 3 form “C” (SPDT) normally/ open/ normally closed (NO/NC) contacts for alarm and fault indication. A remote reset is provided to silence alarms. TB4 is provided as a connection to a user installed momentary switch to silence alarms remotely.

#### Exploring the functionality of the relay option board’s remote reset switch

The remote reset switch (designated TB-4 and labeled “Remote Reset SW”) is located on the relay option board. It provides a remote hardware-based reset of faults and alarms to the transmitter. In the event that direct access to the Local User (LUI) and HART® interfaces is not possible, alarms and faults from an XNX transmitter may be reset remotely using a switch.

The transmitter can be reset by activating a switch (Off-Mom). This will momentarily close the circuit between the two pins of TB4, providing the same functionality as a Reset Alarms & Faults command performed from the main screen of the LUI or the HART® interface.

#### NOTE:

Relays are not available when the Modbus® or Foundation Fieldbus options are installed.

Wiring for the relays is through an available cable/conduit entry to a pluggable terminal block. See Figure 24 for the terminal block legend.

#### NOTE:

A second, black-handled screwdriver is included for use on terminal blocks 2 and 4. This tool is smaller than the magnetic wand and is designed to fit into the terminal connections on TB4.

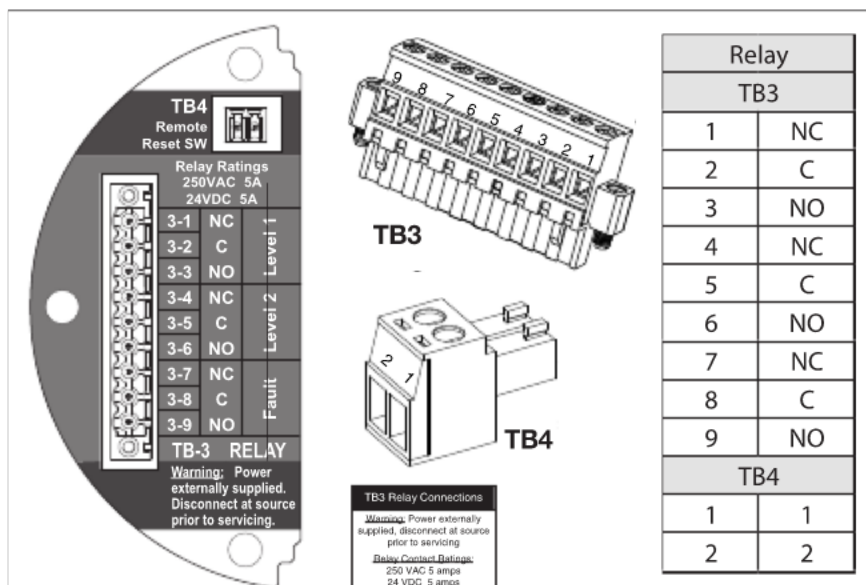


Figure 24. XNX relay option board and terminal block

### 5.3 Modbus®

Modbus® connections to the XNX are made through a pluggable terminal block on the Modbus® interface circuit board. A loop termination point (SW5) is included on the Modbus® interface board to provide termination of the Modbus® loop.

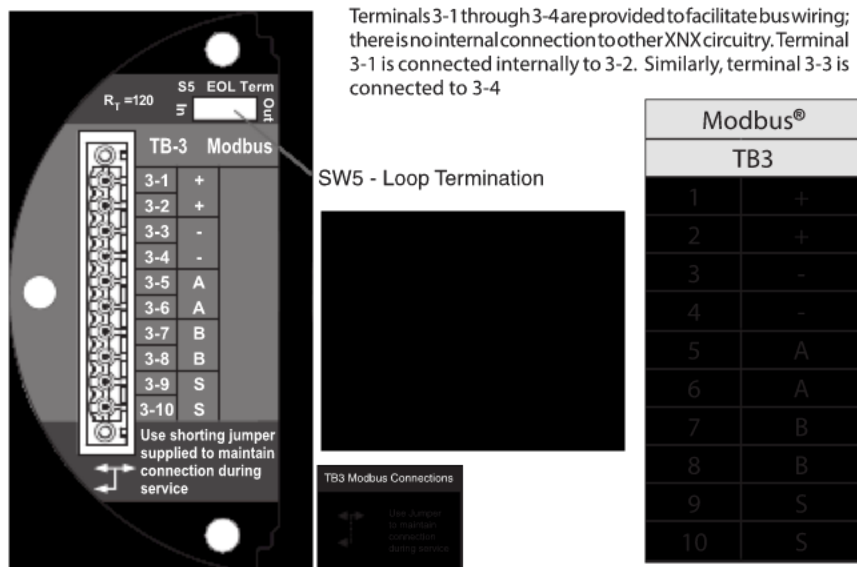


Figure 25. XNX Modbus® option board, terminal block, and jumper switch

### 5.4 Foundation Fieldbus

Foundation Fieldbus connections to the XNX transmitter are made through a pluggable terminal block on the Foundation Fieldbus option board, shown in Figure 26. A simulation switch (SW5) is included on the board to enable/disable simulation mode. Terminals 3-1 through 3-4 are provided to facilitate bus wiring; there is no internal connection to other XNX circuitry. Terminal 3-1 is connected internally to 3-2. Similarly, terminal 3-3 is connected internally to 3-4.

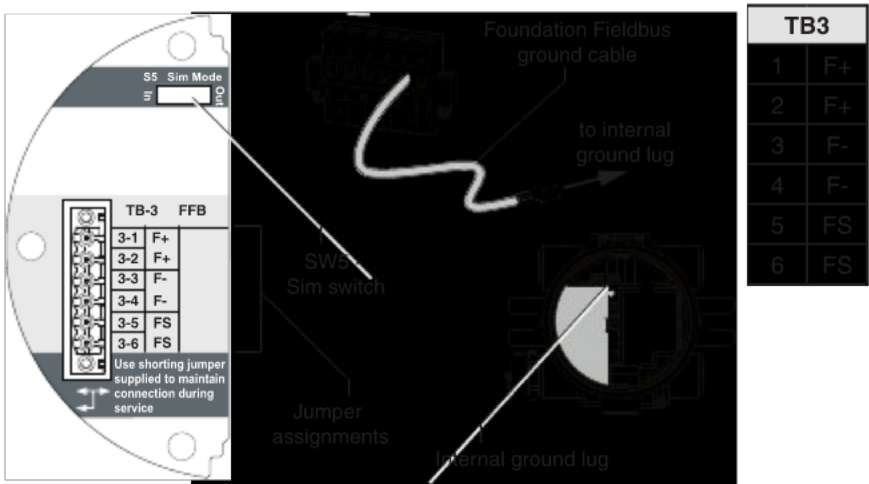


Figure 26. Foundation Fieldbus option board, terminal block, and jumper switch

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## 6 Powering the XNX for the First Time

### 6.1 XNX Units Configured for EC, mV, and IR (except Searchline Excel)

After mounting and wiring the XNX, the plug in sensor should be fitted (if equipped) and the installation visually and electrically tested as below.



#### WARNING

Prior to carrying out any work, ensure local and site procedures are followed. Ensure that the associated control panel is inhibited so as to prevent false alarms. Minimum and maximum controller alarm levels should not be set at less than 10% or greater than 90% of the full scale range of the detector. CSA and FM agency limits are 60% LEL or 0.6mg/m<sup>3</sup>.



#### CAUTION

The following procedure should be followed carefully and only performed by suitably trained personnel.

1. **Check that the transmitter is wired correctly according to this manual and the associated control equipment manual.**
2. **If equipped, unscrew the weatherproof cover, loosen the sensor retainer locking screw and unscrew the retainer.**
3. **Plug in the sensor cartridge taking care to align the sensor pins with the connector holes in the PCB.**



#### CAUTION

For toxic sensors, remove the shorting clip from the bottom of the sensor prior to installation. For O<sub>2</sub> sensors, there is no shorting clip provided.

4. **Refit the sensor retainer, tighten the locking screw and refit the weatherproof cover.**

#### NOTE:

Before replacing the cover on the transmitter housing, coat the threads with anti-seize compound to prevent corrosion buildup.

Also inspect the cover o-ring for cracking or any other defect that might compromise the integrity of the seal. If it is damaged, replace with the o-ring supplied in the accessory kit.

5. **Apply power to the XNX which will in turn provide power to the detector.**
6. **The detector output will be forced to 3mA (default fault/inhibit).**
7. **The XNX display will enter a start up routine displaying the initialization screen, then the transmitter loads its operating system, data from the sensor and checks if it is the same type transmitter and sensor software version numbers, gas type, the detection range and span calibration gas level, estimated time to next calibration due, and self test result. The boot-up procedure takes approximately 45 seconds. The LCD and LED test is performed in the initialization after powering on. All LCD pixels and LEDs (red,**

green, and yellow) are turned on for 1.5 seconds. The LCD then goes blank and the LEDs turn off.



Figure 27. XNX Initialization and General Status screens

**NOTE:**

In the final stages of boot-up, warnings and faults may be observed until the user performs the proper configuration, calibration, and reset activities described in the following sections. See Sections 11 and 12 for descriptions of warnings and faults.

- 8. Once the General Status screen appears, the transmitter and detector are in normal 'monitoring' mode.**

**NOTE:**

Calibration of sensors attached to the XNX is mandatory before the detector can be used for gas monitoring. Refer to Section 6.1 - Calibration for the proper procedure. For EC and mV personalities, perform Accept New Sensor Type before calibrating the sensor.

## 6.2 XNX IR Units Configured for Searchline Excel

When powering the XNX fitted to the Searchline Excel, the following procedure must be followed to assure proper installation.



**CAUTION**

The following procedure should be followed carefully and only performed by suitably trained personnel

- 1. Check that the transmitter is wired correctly according to this manual and the associated control equipment manual.**
- 2. Apply power to the XNX which will in turn provide power to the detector.**
- 3. The detector output will be forced to 3mA (default fault/inhibit).**
- 4. The XNX display will enter a start up routine as described in Section 6.1.7**



Figure 28. XNX Initialization and General Status screens

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**NOTE:**

In the final stages of boot-up, warnings and faults may be observed until the user performs the proper configuration, calibration, and reset activities described in the following sections. See Sections 11 and 12 for descriptions of warnings and faults.

- 5. When the XNX completes boot-up, perform a soft reset on the Excel from the Calibration Menu.**
- 6. Set the Path Length for the application, then align the transmitter and receiver with Align Excel.**
- 7. Once the alignment is complete, a Zero Calibration must be performed on the Excel to complete the commissioning process. (See the Searchline Excel Technical Manual for calibration information P/N 2104M0506).**
- 8. Reset any faults displayed on the XNX display. The XNX and Excel are now ready to monitor.**

## **XNX Remote Calibration for MPD Sensors**

In addition to functional gas testing to ensure the system is operating properly, remote calibration for the MPD CB1 catalytic combustible sensor and MPD IV1 and MPD IF1 infrared combustible sensors can be performed provided the following requirements are met:

Remote sensor is installed in an indoor environment

Internal air velocity does not exceed 0.5 m/s

Weather housing part number 0200-A-1640 is installed on the sensor housing

A 1 LPM regulator is used for calibration gas delivery

The remote calibration procedure should be performed in accordance with Section 6.1 with the exception of the weather guard, part number 0200-A-1640, which should be used instead of the regular flow housing, part number 1226A0411.

Honeywell Analytics recommends MPD sensor calibration at a maximum interval of 180 days (the XNX default value). This value can be reprogrammed in accordance with site procedures to assure the highest level of safety. Correct operation of each sensor should be confirmed before each use by calibration with a certified test gas of known concentration. In addition, the pellistors used in flammable gas sensors can suffer from a loss of sensitivity when in the presence of poisons or inhibitors, e.g., silicones, sulfides, chlorine, lead, or halogenated hydrocarbons.

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<sup>1</sup> Special states that inhibit the transmitter from detecting gas are indicated as 2 mA on analog outputs.

### 6.3 Configuring the XNX Universal Transmitter

The XNX Universal Transmitter can be configured via the front panel by using the menus available in the Configure Menu. For information on accessing and navigating the menus, see Section 7.1 - Controls and Navigation.

**The XNX is shipped with the following settings:**

|                                          |                                   |                                                                   |
|------------------------------------------|-----------------------------------|-------------------------------------------------------------------|
| <b>Display Language</b>                  |                                   | English                                                           |
| <b>Date Format</b>                       |                                   | mm/dd/yy                                                          |
| <b>Time Format</b>                       |                                   | HH:MM                                                             |
| <b>mV Sensor Type (w/mV personality)</b> |                                   | MPD-IC1 (%Vol)                                                    |
| <b>Alarm Levels</b>                      |                                   | Sensor Cartridge Dependent                                        |
| <b>Latching/Non-Latching Alarms</b>      |                                   | Alarm: Latching<br>Fault: Non-Latching                            |
| <b>Display Units</b>                     |                                   | PPM, %VOL or %LEL<br>(dependent on personality and sensor choice) |
| <b>4-20 mA Levels<sup>1</sup></b>        |                                   | Inhibit: 2.0 mA<br>Warning: 3.0 mA<br>Overrange: 21.0 mA          |
| <b>Calibration Interval</b>              |                                   | 180 Days (HA recommends 30 day interval)                          |
| <b>Unit ID</b>                           |                                   | XNX #nnnnnnnn                                                     |
| <b>Relay Settings</b>                    |                                   | Alarm Normally De-Energized                                       |
| <b>Fieldbus Settings</b>                 | <b>HART®</b>                      | Address: 0<br>Mode: Point-To-Point                                |
|                                          | <b>Modbus®<br/>(if installed)</b> | Address: 5<br>Baud Rate: 19200                                    |
| <b>Level 1 Password Access</b>           |                                   | 0000                                                              |
| <b>Level 2 Password Access</b>           |                                   | 0000                                                              |
| <b>Easy Reset Enabled</b>                |                                   | Yes                                                               |

## 7 The XNX Front Panel

The XNX uses magnetic switches to enable non intrusive operation. To activate a magnetic switch, hold the factory-supplied magnet up to the glass window and swipe the magnet directly over the shaded area.

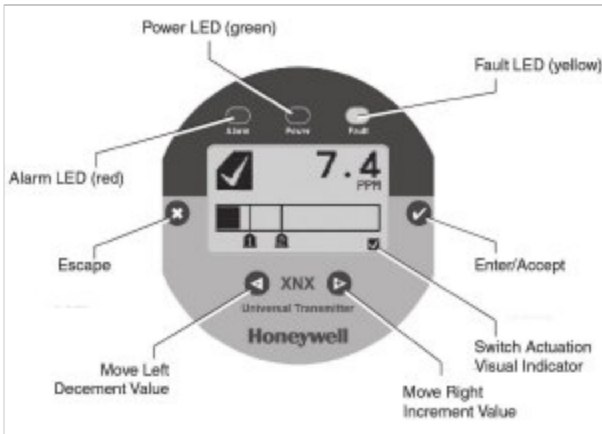


Figure 29. The XNX front panel display

### 7.1 Controls and Navigation

| Control                                                                                                           | Action                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <br>Enter / Accept               | The Enter/Accept key is used to access menus, accept changes and to respond "YES" to system prompts.                |
| <br>Escape / Back                | The Escape key is used to return to previous menus or to answer "NO" to system prompts.                             |
| <br>Move Left/Decrement Value   | The Left / Decrement arrow is used to move through menu options or decrement values when entering text or numbers.  |
| <br>Move Right/Increment Value | The Right / Increment arrow is used to move through menu options or increment values when entering text or numbers. |

### 7.2 The General Status Screen

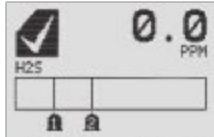


Figure 30. General Status screen

The General Status Screen provides a visual indication of the status of the XNX. Warnings, faults, alarm levels and current concentration levels are displayed continuously.

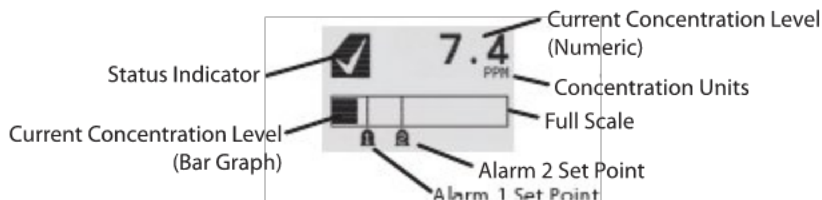


Figure 31. General Status screen - normal operating mode

The Normal Operating Mode icon  gives visual indication of proper operation. When a warning is triggered, the Warning icon  appears and information is displayed on the General Status Screen.

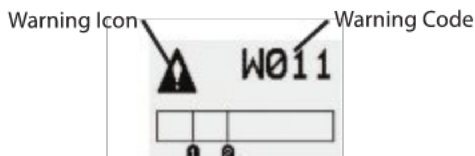


Figure 32. General Status Warning - detail

If the fault icon is displayed,  a fault condition has been triggered and the display will alternate the display of the target gas concentration and the fault code.



Figure 33. General Status Fault - detail

When an alarm icon  is displayed, the target gas concentration exceeds one or both preset alarm levels. The General Status Screen displays the gas concentration and alarm level exceeded.



Figure 34. General Status Alarm - detail

In an overrange condition, the alarm icon will display but the target gas concentration bar graph and alarm setpoints will flash, see illustration below.

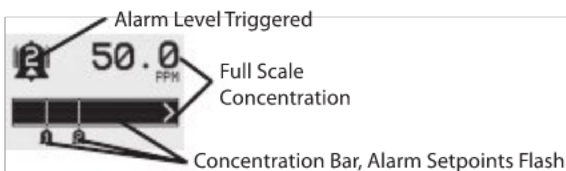


Figure 35. General Status Overrange - detail

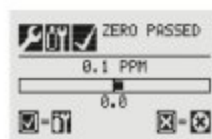


Figure 38. Zero Calibration Passed

In addition to the graphic Alarm, Fault and Warning

indicators, the LEDs on the front panel will flash in a pattern based on the condition:

| Condition | LED      |          |          |
|-----------|----------|----------|----------|
|           | Red      | Green    | Yellow   |
| Alarm 1   | Solid    |          |          |
| Alarm 2   | Flashing |          |          |
| Warning   |          |          | Solid    |
| Fault     |          |          | Flashing |
| Health    |          | Flashing |          |

### 7.3 Entering the Menu Structure

Swiping the magnet over the magnetic switch  or  gives the user access to the XNX to reset faults and/or alarms, display current settings or make adjustments to the device.

#### NOTE:

If the Reset option is set to Lock, users will not have access to reset alarms and faults. For more information on Security Settings for the XNX, see XNX Universal Transmitter Technical Manual.



Figure 36. Alarm Reset screen

From the General Status menu, if the  or 'escape' magnetic switch is swiped, the Alarm Reset Screen activates. This allows any user to silence alarms and reset faults generated by the XNX.

Using the  switch resets all alarms and faults and returns to the General Status Screen. Choosing 'X' will return to the General Status Screen without resetting the alarms and faults.



Figure 37. Passcode screen

Using the  switch will return the user to the General Status Menu. If the user selects  from the General Status menu, it will activate the passcode screen.

There are two levels that control access based upon the security level of the user. The passcodes for both levels are set at "0000" from the factory.

Level 1 Routine Maintenance

Level 2 Technician and Password Admin



#### WARNING

The factory-set passcodes must be reset to prevent unauthorized access to the XNX menus (see the XNX Universal Transmitter Technical Manual).

Once the Passcode Screen is displayed, the first passcode digit is highlighted. Use the   switches to increment or decrement through the values. Once the correct value is displayed for the first digit,  accepts the value and moves to the next digit or  will move to the previous digit of the passcode.



Figure 39. Entering the passcode

Repeat for each of the remaining digits in the passcode. If the passcode is not entered correctly, the Invalid Passcode screen is displayed and the user is returned to the General Status screen.

## 7.4 Displaying Transmitter Information

While in the General Status display, swiping the magnet over the magnetic switch  will display information about the transmitter. The General Status display will replace the bargraph in the lower portion of the screen with the unit serial number, date and time, as well as the unit part number.



Figure 40. General Status screen with unit information

## 8 Gas Calibration Menu

The Gas Calibration menu is used for Zero and Span calibration as well as functional gas testing (bump test). The Gas Calibration menu is accessed from the main menu screen.



Figure 41. Gas Calibration menu

| Function            | Symbol                                                                              |
|---------------------|-------------------------------------------------------------------------------------|
| Gas Calibration     |  |
| Bump Test           |  |
| Align Excel         |  |
| Calibrate mA Output |  |
| Soft Reset          |  |

## 8.1 Calibration



### WARNING

Do not use the XNX Universal Transmitter in oxygen-enriched atmospheres. Concentrations displayed will be adversely affected by oxygen depletion.



### CAUTION

The calibration procedure should only be performed by qualified personnel.

#### NOTE:

The default calibration values for the "Calibration Required" diagnostic vary based on sensor type. This value can be reprogrammed in accordance with site requirements to ensure the highest level of safety. Correct operation of each sensor/detector should be confirmed using calibration with a certified test gas of known concentration before commissioning. See Section 9 - Sensor Data for calibration gas specifications.

### 8.1.1 Calibration Procedure

#### NOTE:

Follow the specific procedure outlined in the Operating Manual for each sensing device. The Zero Calibration procedure should be performed prior to the Span Calibration procedure.

1. **If using compressed gas cylinder, attach the calibration gas flow housing onto the bottom of the sensor and apply the gas.**
2. **Access the calibration mode. The Gas Calibration menu is for both Zero and Span Calibration.**

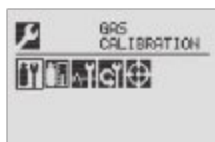


Figure 42. Gas Calibration menu

### Zero Calibration



Figure 43. Zero Calibration screen



Figure 44. Zero Calibration in Progress

Select  then apply the zero gas. As the sensor detects the gas and the concentration increases, the values displayed will reflect the changing concentration. Selecting  will return to the Gas Calibration menu.

3. If the Zero Calibration is successful, the XNX Universal Transmitter will display the Zero Passed screen.

## Span Calibration

NOTE:

If a Span Calibration is not required, select the  to skip the Span Calibration and return to the Calibration menu.

4. When the Zero Calibration is complete or it is skipped, the Span Concentration screen appears to indicate the concentration value of the gas used for calibration.



Figure 45. Span Gas Concentration screen

5. Select  to choose the first digit and use the  and  switches to increment or decrement the values. Select  to accept the new value and move to the next digit. Continue until all 3 digits have been selected.

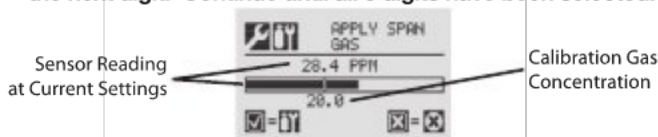


Figure 46. Span Calibration screen

6. Select  then apply the target gas. As the sensor detects the gas and the concentration increases, the sensor reading values in the display will change to reflect the changing concentration.
7. When the concentration values stabilize, the gas concentration as read by the installed sensor is stable. At this time, the gas readings are taken by the sensor. The Span Calibration process also determines whether the sensor is within the proper range to accurately detect the target gas.
8. When the sensor has completed the calibration and the span algorithms have determined that it is within range, the Span Passed screen will appear.

If the calibration is not successful, the Span Failed screen will display. Selecting  will return to the Span Concentration screen to begin the span calibration again.  will exit Span Calibration and return to the Main Calibrate screen.

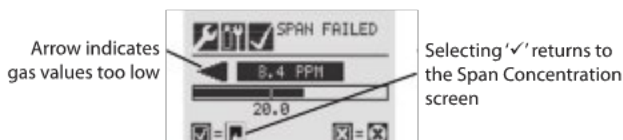


Figure 47. Span Calibration Failed screen

Once the Zero and Span calibrations are completed successfully, the XNX will exit the calibration procedure. Before returning to the Gas Calibration menu however, the user will be prompted to exit with inhibit off, exit with inhibit on, or not exit.



Figure 48. Exiting options



## WARNING

While XNX is in Inhibit Mode, alarms are silenced. This will prevent an actual gas event from being reported. Inhibit Mode must be reset after testing or maintenance activities.

## 8.1.2 Zero and Span Calibration for XNX EC Sensors



## CAUTION

Before initial calibration, allow the detector to stabilize for 30 minutes after applying power. When in zero and span calibration mode, the current output from the detector is inhibited (default 3mA) to avoid false alarms.

It is recommended for most sticky gases (i.e.: HCl, Cl<sub>2</sub>) the tubing should be PTFE with short pieces of rubber tube to make the final connection due to the inflexibility of PTFE. This minimizes adhesion of the gas to the tube surface and allows for more accurate measurement.

Recalibration is recommended if the temperature of local environment has varied by more than +/-15 degrees C from the temperature of calibration.

EN performance standards require 10 minutes stabilization time for application of zero and span gas for performance-approved EC, mV, and IR sensors prior to calibration..

To calibrate the detector, use an appropriate span gas cylinder, flow regulator set to 300-375mL/min, tubing, magnet and calibration gas flow housing. A compressed gas cylinder (20.9%Vol oxygen) should be used to perform the zero calibration if the area where the detector is located contains any residual amount of the target gas. If no residual gas is present then the background air can be used to perform the zero calibration. Contact your HA representative for details of suitable calibration kits.

**To calibrate the detector follow the procedure in Section 8.1.1.**

### NOTE:

The Oxygen sensor does not require a zeroing procedure. Background air (20.9%Vol oxygen) can be used to span the oxygen sensor in place of a compressed air cylinder (20.9%Vol oxygen).

**See section 6.3.2 of the XNX Technical Manual for other EC sensors.**

## 8.1.3 Zero and Span Calibration of XNX EC Hydrogen Sulfide (H<sub>2</sub>S) Sensors



## CAUTION

Before initial calibration, allow the detector to stabilize for 30 minutes after applying power. When in zero and span calibration mode, the current output from the detector is inhibited (default 3mA) to avoid false alarms.

Recalibration is recommended if the temperature of local environment has varied by more than +/-15 degrees C from the temperature of calibration.

**Hydrogen Sulfide sensors can be affected by extreme humidity changes. A**

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sudden increase in ambient humidity can result in a short-term positive drift in the instrument's reading. A sudden decrease in ambient humidity can result in a short-term negative drift in the instrument's reading. These are most likely to be noticed during calibration with dry or cylinder gas.

When calibrating Hydrogen Sulfide cartridges the following should be taken into account while following the procedure in Section 8.1.1:

1. **To zero the sensor, use a compressed gas cylinder of 20.9%Vol oxygen (not Nitrogen). Do not use background air.**
2. **If a span calibration is to be performed, the span calibration gas should be applied to the sensor immediately after the zeroing procedure. Do not allow the sensor to return to ambient air conditions.**

### 8.1.4 XNX EC Sensor Operational Life

Typical life of a toxic gas sensor is dependent on the application, frequency and amount of gas exposure. Under normal conditions, with a 3 month visual inspection and 6 month test/re-calibration, the toxic sensor has an expected life equal to or greater than the lifetime as listed below:

- **12 months for Ammonia and Hydrogen Fluoride sensors. (See Ammonia note below.)**
- **24 months for Chlorine Dioxide, Oxygen, and other toxic sensors.**



#### CAUTION

Oxygen deficient atmospheres (less than 6%V/V) may result in inaccuracy of reading and performance.

#### NOTE:

Ammonia electrochemical cells are reliable and suitable for applications where no background concentration of ammonia exists. Under these conditions the cells are expected to operate for 12 to 24 months.

These ammonia cells are of the consumptive type. Their operating life can be adversely affected by continuous or excessive exposure to ammonia, or by prolonged exposure to high temperatures and moisture.

To ensure continued detection availability, it is recommended that the detectors are regularly bump tested and a relevant cell replacement program be implemented.

### 8.1.5 Zero and Span Calibration for MPD Sensors



#### CAUTION

Extended or frequent exposure to elevated concentrations of combustible gases may affect sensor sensitivity. Verify sensor performance by frequent calibration.



#### CAUTION

Before initial calibration, allow the detector to stabilize for 30 minutes after applying power. When in zero and span calibration mode, the current output from the detector is inhibited (default 3mA) to avoid false alarms.

This section describes how to calibrate MPD flammable sensors fitted to the XNX. The calibration adjustments are made on the XNX's display and gassing is performed at the sensor. This may be locally or remotely located.

**The following equipment is required:**

- **Flow Housing (Part No: 1226A0411)**
- **Test gas**
- **Regulator**

**NOTE:**

Zero gas and Span gas should be at roughly the same humidity levels to avoid erroneous cell responses.

- 1. At the MPD, remove the Weatherproof Cap if equipped.**
- 2. Fit the Flow Adaptor onto the MPD.**

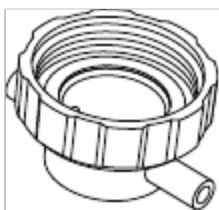


Figure 49. Flow adaptor

Reverse the cap removal procedure. The following diagram shows the Flow Adaptor accessory fitted to the MPD.

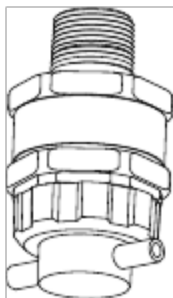


Figure 50. MPD with flow adaptor

**NOTE**

The Gas Calibration menu is for both Zero and Span Calibration.

- 3. Connect the Flow Adaptor (using either gas pipe) to the regulated cylinder containing a known concentration of the target gas at approximately the sensor alarm point (e.g. 50% LEL Methane in air).**



**WARNING**

As some test gases may be hazardous, the Flow Housing outlet should exhaust to a safe area.

- 4. Follow the procedure in Section 8.1 for both Zero and Span calibrations.**

---

**5. Apply the target gas to the sensor. Pass the gas through the Flow Adaptor at a rate of 0.5 l/m  $\pm$ 0.2 l/m.**

**NOTE:**

Sensors should be calibrated at concentrations representative of those to be measured. It is always recommended that the sensor is calibrated with the target gas it is to detect.



**CAUTION**

Where the user calibrates any sensor using a different gas, responsibility for identifying and recording calibration rests with the user. Refer to the local regulations where appropriate.

- 6. Ensure that the sensor and the vicinity around it is clear all traces of the calibration gas before continuing. This is to avoid triggering spurious alarms. If calibration fails at any point, discard the cartridge and replace with a new one.**
- 7. Remove the test equipment, refit the weatherproof cap to the sensor (if previously removed for the test) and return the system to normal operation.**

### **8.1.6 MPD Flammable Sensor**

The pellistors used in the flammable gas sensor can suffer from a loss of sensitivity when in the presence of poisons or inhibitors, e.g., silicone, sulfides, chlorine, lead, or halogenated hydrocarbons. The pellistors are poison resistant to maximise the operational life of the flammable sensor.

### **8.1.7 Cross Calibration procedure for MPD-CB1**



**CAUTION**

Where the user calibrates any sensor using a different gas, responsibility for identifying and recording calibration rests with the user. Refer to the local regulations where appropriate.

When the MPD-CB1 Combustible LEL sensor is to be calibrated with a gas which is different from the gas or vapor to be detected, the following cross calibration procedure should be followed:

**NOTE**

- The first table on page 49 lists the gases according to the reaction they produce at a given detector.
- An eight star (8\*) gas produces the highest output, while a one star (1\*) gas produces the lowest output. (These are not applicable at ppm levels.)

| Gas            | Star Rating | Gas          | Star Rating | Gas              | Star Rating |
|----------------|-------------|--------------|-------------|------------------|-------------|
| Acetone        | 4*          | Ethane       | 6*          | Nonane           | 2*          |
| Ammonia        | 7*          | Ethanol      | 5*          | Octane           | 3*          |
| Benzene        | 3*          | Ethylacetate | 3*          | Pentane          | 4*          |
| Butanone       | 3*          | Ethylene     | 5*          | Propane          | 5*          |
| Butane         | 4*          | Heptane      | 3*          | Propan-2-ol      | 4*          |
| Butyl acetate  | 1*          | Hexane       | 3*          | Styrene          | 2*          |
| Butyl acrylate | 1*          | Hydrogen     | 6*          | Tetra hydrofuran | 4*          |
| Cyclohexane    | 3*          | Methane      | 6*          | Toluene          | 3*          |
| Cyclohexanone  | 1*          | Methanol     | 5*          | Triethylamine    | 3*          |
| Diethyl ether  | 4*          | MIBK         | 3*          | Xylene           | 2*          |

To cross calibrate the MPD-CB1 combustible gas sensor:

1. Obtain the star rating for both the test gas and the gas to be detected from the table above.
2. Set the gas selection to the star rating which is the same star rating of the gas being detected.
3. These values may then be used in the following table to obtain the required meter setting when a 50% LEL test gas is applied to the detector.

| * Rating of Calibration Gas | * Rating of Gas to be Detected |    |    |    |    |    |    |    |
|-----------------------------|--------------------------------|----|----|----|----|----|----|----|
|                             | 8*                             | 7* | 6* | 5* | 4* | 3* | 2* | 1* |
| 8*                          | 50                             | 62 | 76 | 95 | -  | -  | -  | -  |
| 7*                          | 40                             | 50 | 61 | 76 | 95 | -  | -  | -  |
| 6*                          | 33                             | 41 | 50 | 62 | 78 | 95 | -  | -  |
| 5*                          | 26                             | 33 | 40 | 50 | 63 | 79 | 95 | -  |
| 4*                          | -                              | 26 | 32 | 40 | 50 | 63 | 80 | 95 |
| 3*                          | -                              | -  | 26 | 32 | 40 | 50 | 64 | 81 |
| 2*                          | -                              | -  | -  | 25 | 31 | 39 | 50 | 64 |
| 1*                          | -                              | -  | -  | -  | 25 | 31 | 39 | 50 |

#### NOTE

These settings must only be used with a calibration gas concentration of 50% LEL.

4. If a sensor is to be used to detect a gas other than that for which it was calibrated, the required correction factor may be obtained from the following multiplication table. The meter reading should be multiplied by this number in order to obtain the true gas concentration.

| Sensor calibrated to detect | Sensor used to detect |      |      |      |      |      |      |      |
|-----------------------------|-----------------------|------|------|------|------|------|------|------|
|                             | 8*                    | 7*   | 6*   | 5*   | 4*   | 3*   | 2*   | 1*   |
| 8*                          | 1.00                  | 1.24 | 1.52 | 1.89 | 2.37 | 2.98 | 3.78 | 4.83 |
| 7*                          | 0.81                  | 1.00 | 1.23 | 1.53 | 1.92 | 2.40 | 3.05 | 3.90 |
| 6*                          | 0.66                  | 0.81 | 1.00 | 1.24 | 1.56 | 1.96 | 2.49 | 3.17 |
| 5*                          | 0.53                  | 0.66 | 0.80 | 1.00 | 1.25 | 1.58 | 2.00 | 2.55 |
| 4*                          | 0.42                  | 0.52 | 0.64 | 0.80 | 1.00 | 1.26 | 1.60 | 2.03 |
| 3*                          | 0.34                  | 0.42 | 0.51 | 0.64 | 0.80 | 1.00 | 1.27 | 1.62 |
| 2*                          | 0.26                  | 0.33 | 0.40 | 0.50 | 0.63 | 0.79 | 1.00 | 1.28 |
| 1*                          | 0.21                  | 0.26 | 0.32 | 0.39 | 0.49 | 0.62 | 0.78 | 1.00 |

#### NOTE

Since combustible sensors require oxygen for correct operation, a mixture of gas in air should be used for calibration purposes. Assuming average performance of the sensor, the sensitivity information in Tables 1 to 3 is normally accurate to +20%.

#### EXAMPLE

If target gas to be detected is Butane and the calibration gas available is Methane (50% LEL):

1. Look up the star rating for each gas in the first table on page 51: Butane 4\* and Methane 6\*.
2. Check the meter settings for 50% LEL calibration gas in the second table: 78.
3. The meter should therefore be set to 78% to give an accurate reading for Butane using 50% LEL Methane as a calibration gas.

#### NOTE

It is important to calibrate the sensor at the approximate alarm levels to allow for non-linearity of the sensors at gas concentrations above 80% LEL.

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### **8.1.8 Calibrating the 705/705HT**

For more complete calibration and configuration information, see the Type 705 Operating Instructions (p/n:00705M5002).

### **8.1.9 Calibrating the Sensepoint/Sensepoint HT**

For more complete calibration and configuration information, see the Sieger Sensepoint Technical Handbook (p/n:2106M0502).

### **8.1.10 Calibrating the Searchline Excel and Searchpoint Optima Plus**

Complete calibration and configuration information can be found in the Searchline Excel Technical Handbook (p/n:2104M0506) and the Searchpoint Optima Plus Operating Instructions (p/n:2108M0501). If properly installed and maintained, the Searchpoint Optima Plus sensor will not require routine calibration. This is due to the inherent stability of the IR absorption process and the unit's fully compensated optical configuration.

## 8.2 Functional Gas Testing (Bump Test)



### WARNING

Honeywell recommends periodic bump tests (every 30 days or in accordance with customer site procedures) to the sensor to insure proper operation and compliance with the Functional Safety rating of the installation.



### WARNING

Exposure to desensitizing or contaminating substances or concentrations causing operation of any alarm may affect sensor sensitivity. Following such events, it is recommended to verify sensor performance by performing a functional gas test (bump test).



### CAUTION

The calibration procedure should be performed only by qualified personnel. Take appropriate precautions with cylinders of flammable and toxic gases..

It is recommended that the detector is tested frequently to ensure the system is operating properly. Keep in mind different sensor types may require more frequent maintenance depending on the environmental conditions and gases present. The weatherproof cover has a spigot for attaching tubing from a gas cylinder. This may be used for a simple functional (or bump) test of the sensor. However, this method may not be suitable for all gas types and/or applications due to environmental conditions. It is the responsibility of the user to ensure suitability of this method for each application.

1. When bump gas is applied to the sensor, the bump test screen displays the current reading of the sensor and the peak reading that has occurred during the bump test.

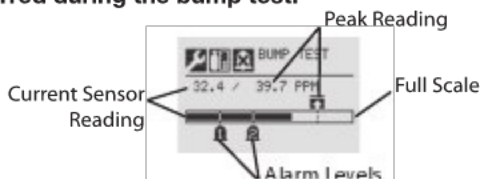


Figure 51. Bump Test screen

2. If the difference between reading and applied gas concentration is outside the acceptable limits for the application follow the procedures for zeroing and calibrating the detector (see Section 8.1).
3. If reading is still inaccurate replace the sensor.

## 9 Sensor Data

### 9.1 Operating and Storage Conditions for Performance Tested EC Cartridges

| Gas                     |                  | Cartridge P/N | Operating Pressure | Operating Air Speed | Warm-up Time (minimum) | Storage Conditions*   |               |              |
|-------------------------|------------------|---------------|--------------------|---------------------|------------------------|-----------------------|---------------|--------------|
|                         |                  |               |                    |                     |                        | Temperature           | Pressure      | Humidity     |
| O <sub>2</sub>          | Oxygen           | XNXXSG1SS     | 80 kPa ~ 120 kPa   | 0 ~ 6 m/sec         | 60 sec.                | 0 to 20°C, 32 to 68°F | 80 to 120 kPa | 5 to 95% RH  |
|                         |                  | XNXXSG1FM     |                    |                     |                        |                       |               |              |
| H <sub>2</sub> S        | Hydrogen Sulfide | XNXXSH1SS     | 80 kPa ~ 120 kPa   | 0 ~ 6 m/sec         | 60 sec.                | 0 to 20°C, 32 to 68°F | 70 to 110 kPa | 30 to 70% RH |
|                         |                  | XNXXSH1FM     |                    |                     |                        |                       |               |              |
| H <sub>2</sub> S (High) | Hydrogen Sulfide | XNXXSH2SS     | 80 kPa ~ 120 kPa   | 0 ~ 6 m/sec         | 60 sec.                | 0 to 20°C, 32 to 68°F | 70 to 110 kPa | 30 to 70% RH |
|                         |                  | XNXXSH2FM     |                    |                     |                        |                       |               |              |
| CO                      | Carbon Monoxide  | XNXXSC1SS     | 80 kPa ~ 120 kPa   | 0 ~ 6 m/sec         | 60 sec.                | 0 to 20°C, 32 to 68°F | 70 to 110 kPa | 30 to 70% RH |
|                         |                  | XNXXSC1FM     |                    |                     |                        |                       |               |              |

\*Store in sealed packages

\*\*Check cartridge certificates

## 9.2 EC Sensor Performance Data, Factory Mutual Verified

| Gas              | Cartridge P/N          | Selectable Full Scale Range (Display and 4-20mA Full Scale) | Default Range | Range Increments | Lower Alarm Limit | Lower Detection Limit | Lower Explosive Limit (% Vol) | Zero Deviation | Selectable Cal Gas Range                   | Default Cal Point | Response Time (T50) sec | Response Time (T90) sec | Accuracy                                      | Operating Temperature |              | Operating Humidity |        |
|------------------|------------------------|-------------------------------------------------------------|---------------|------------------|-------------------|-----------------------|-------------------------------|----------------|--------------------------------------------|-------------------|-------------------------|-------------------------|-----------------------------------------------|-----------------------|--------------|--------------------|--------|
|                  |                        |                                                             |               |                  |                   |                       |                               |                |                                            |                   |                         |                         |                                               | Min                   | Max          | Min RH             | Max RH |
| O <sub>2</sub>   | XNXXSC1FM              | n/a                                                         | 23.0% Vol     | n/a              | 5.0%Vol           | 5% Vol                | n/a                           | n/a            | 20.9 %Vol (fixed)                          | 20.9 %Vol         | <30                     | T20 <10                 | <±0.5 %Vol                                    | -30°C / -34°F         | 55°C / 131°F | 15%                | 90%    |
| H <sub>2</sub> S | XNXXSH1FM              | 10.0 to 50.0 ppm                                            | 15.0 ppm      | 0.1 ppm          | 5.0 ppm           | 1.5 ppm               | n/a                           | -2.5 ppm       | 30 to 70% of the selected full scale range | 10 ppm            | <30                     | <20                     | 2 ppm or 10% of reading, whichever is greater | -40°C / -40°F         | 55°C / 131°F | 15%                | 90%    |
| CO               | XNXXSC1FM <sup>1</sup> | 100 to 1000 ppm                                             | 300 ppm       | 100 ppm          | 30 ppm            | 15 ppm                | na/                           | -25 ppm        | full scale range                           | 100 ppm           | <30                     | <15                     | See footnote 1                                | -40°C / -40°F         | 55°C / 131°F | 15%                | 90%    |

### Footnotes:

1. XNXXSC1FM accuracy over temperature <±10% of reading 20°C/68°F to 55°C/131°F, <±20% of reading 20°C/68°F to -10°C/14°F, <±30% of reading -10°C/14°F to -20°C/-4°F. Recalibration is recommended if the temperature of the local environment has varied by more than -30°C.

### Notes:

- Performance figures are measured by test units calibrated at 50% of full scale, at ambient conditions of 20°C, 50% RH, with the EC weatherproof cover attached
- IP rating of FM Cartridges is IP63.
- Barometric pressure effects on the O<sub>2</sub> sensor: The output from the O<sub>2</sub> sensor has pressure effects of <0.1% change of output per % change in pressure. When the barometric pressure changes by ±20% the output from the O<sub>2</sub> sensor changes <±0.4%Vol. However, the oxygen sensor shows transient behavior when subjected to a rapid change in ambient pressure due to either weather or altitude. For example, a 10KPa instantaneous positive pressure step change may cause an overscale alarm condition for a period of about 12 seconds.
- Operating the XNX EC sensor at extended temperature ranges for a prolonged time period exceeding 12 hours may cause deterioration in the sensor performance and shorten sensor life. Extended temperature range for XNX EC sensors is -40°C to -20°C.
- Response times may increase at lower temperatures.
- Contact Honeywell Analytics for additional data or details.

### 9.3 EC Sensor Performance Data, DEKRA EXAM Verified

| Gas                     | Cartridge P/N | Selectable Full Scale Range (Display and 4-20mA Full Scale) | Default Range | Range Increments | Lower Alarm Limit | Lower Detection Limit | Zero Variation | Selectable Cal Gas Range             | Default Cal Point | Re-sponse Time (T50) (sec) | T90 Response Time (sec) | Accuracy <sup>1</sup> | Operating Temperature |              | Operating Humidity |        |
|-------------------------|---------------|-------------------------------------------------------------|---------------|------------------|-------------------|-----------------------|----------------|--------------------------------------|-------------------|----------------------------|-------------------------|-----------------------|-----------------------|--------------|--------------------|--------|
|                         |               |                                                             |               |                  |                   |                       |                |                                      |                   |                            |                         |                       | Min                   | Max          | Min RH             | Max RH |
| O <sub>2</sub>          |               | n/a                                                         | 25.0 %Vol     | n/a              | 5.0%Vol           | 3.5 %Vol              | n/a            | 20.9 %Vol (fixed)                    | 20.9 %Vol         | T20 <10                    | <30                     | <+/-0.6 %Vol          | -30°C / -34°F         | 55°C / 131°F | 15%                | 90%    |
| H <sub>2</sub> S        |               | 10.0 to 50.0 ppm                                            | 15.0 ppm      | 0.1ppm           | 3.0 ppm           | 1.0 ppm               | 2.0 ppm        | 30 to 70% of the selected full scale | 10 ppm            | <20                        | <30                     | <+/-0.3 ppm           | -40°C / -40°F         | 55°C / 131°F | 15%                | 90%    |
| H <sub>2</sub> S (High) |               | 50 to 500 ppm                                               | 100 ppm       | 10 ppm           | 5 ppm             | 1 ppm                 | 2 ppm          |                                      | 50 ppm            | <20                        | <30                     | <+/-5 ppm             | -40°C / -40°F         | 55°C / 131°F | 15%                | 90%    |
| CO                      |               | 100 to 500 ppm                                              | 300 ppm       | 100 ppm          | 15 ppm            | 5 ppm                 | 10 ppm         |                                      | 100 ppm           | <15                        | <30                     | <+/-2 ppm             | -40°C / -40°F         | 55°C / 131°F | 15%                | 90%    |

#### Footnote:

1. Accuracy of reading at default Alarm 1 concentration (typically 10% FS or defined minimum alarm level setting, whichever is greater) when operated at default full scale.

#### Note:

- Sensor drift between LDL and negative drift fault limits (typically > negative zero variation) appear as 0 on the display and outputs of the device.
- Long-term drift: XNXXSC1SS <5%/year, XNXXSO1SS <4%/year, XNXXSH1SS and XNXXSH2SS <2%/month. Performance figures are measured by test units calibrated at 50% of full scale, at ambient conditions of 20°C, 50% RH, with the EC weatherproof cover attached.
- Operating the XNX EC sensor at extended temperature ranges for a prolonged time period exceeding 12 hours may cause deterioration in sensor performance and shorten sensor life. Extended temperature ranges for XNX EC sensor cartridges are -40°C to -20°C.
- Barometric pressure effects on the O<sub>2</sub> sensor. The output from the O<sub>2</sub> sensor has pressure effects of <0.1% change of output per % change in pressure. When the barometric pressure changes by ±20%, the output from the O<sub>2</sub> sensor changes <±0.4%Vol. However, the oxygen sensor shows transient behavior when subjected to a rapid change in ambient pressure due to either weather or altitude. For example, a 10KPa instantaneous positive pressure step change may cause an overscale alarm condition for a period of about 12 seconds.
- Response times may increase at lower temperatures.
- Contact Honeywell Analytics for any additional data or details.

## 9.4 Other EC Sensors

| Gas                    | Cartridge P/N | Selectable Full Scale Range (0-200ppm and 4-20mA Full Scale) | Default Range | Range Increments | Lower Alarm Limit | Lower Detection Limit | Zero Deviation | Selectable Cal Gas Range                   | Default Cal Point | Re-response Time (T50) sec | Re-response Time (T90) sec | Accuracy <sup>1</sup> of applied gas <sup>2,3</sup> | Typical Accuracy at Lowest Alarm Level | Operating Temperature |            | Operating Humidity |        |
|------------------------|---------------|--------------------------------------------------------------|---------------|------------------|-------------------|-----------------------|----------------|--------------------------------------------|-------------------|----------------------------|----------------------------|-----------------------------------------------------|----------------------------------------|-----------------------|------------|--------------------|--------|
|                        |               |                                                              |               |                  |                   |                       |                |                                            |                   |                            |                            |                                                     |                                        | Min                   | Max        | Min RH             | Max RH |
| HCl                    | XNXXSR1SS     | 10.0 to 20.0 ppm                                             | 10.0 ppm      | 1.0 ppm          | 5.0 ppm           | 0.6 ppm               | -1.0 ppm       |                                            | 5.0 ppm           | <45 <sup>2,3</sup>         | <150 <sup>2,3</sup>        | <+/-1.0 ppm or 20% of applied gas <sup>2,3</sup>    | <+/-1.0 @ 3 ppm                        | -20°C/-4°F            | 40°C/104°F | 15%                | 90%    |
| H <sub>2</sub> S (Low) | XNXXSGH3SS    | n/a                                                          | 15.0 ppm      | n/a              | 3.0 ppm           | 1.0 ppm               | -2.5 ppm       |                                            | 10 ppm            | <20                        | <40                        | <+/-0.3 @ 3 ppm                                     | <+/-0.3 @ 3 ppm                        | -40°C/-40°F           | 55°C/131°F | 15%                | 90%    |
| SO <sub>2</sub>        | XNXXSF1SS     | 5.0 to 20.0 ppm                                              | 15.0 ppm      | 5.0 ppm          | 2.0 ppm           | 0.6 ppm               | -1.0 ppm       |                                            | 5.0 ppm           | <15                        | <30                        | <+/-0.3 @ 2 ppm                                     | <+/-0.3 @ 2 ppm                        | -40°C/-40°F           | 55°C/131°F | 15%                | 90%    |
| SO <sub>2</sub> (High) | XNXXSS2SS     | 20.0 to 50.0 ppm                                             | 50.0 ppm      | 10.0 ppm         | 5.0 ppm           | 1.5 ppm               | -2.5 ppm       |                                            | 25 ppm            | <15                        | <30                        | <+/-0.6 @ 5 ppm                                     | <+/-0.6 @ 5 ppm                        | -40°C/-40°F           | 55°C/131°F | 15%                | 90%    |
| NH <sub>3</sub>        | XNXXSA1SS     | 50 to 200 ppm                                                | 200 ppm       | 50 ppm           | 20 ppm            | 6 ppm                 | -10 ppm        |                                            | 100 ppm           | <60                        | <180                       | <+/-4 @ 20 ppm                                      | <+/-4 @ 20 ppm                         | -20°C/-4°F            | 40°C/104°F | 15%                | 90%    |
| NH <sub>3</sub> (High) | XNXXSA2SS     | 200 to 1000 ppm                                              | 1,000 ppm     | 50 ppm           | 100 ppm           | 30 ppm                | -50 ppm        | 30 to 70% of the selected full scale range | 300 ppm           | <60                        | <180                       | <+/-20 ppm                                          | <+/-20 @ 100 ppm                       | -20°C/-4°F            | 104°F      | 15%                | 90%    |
| Cl <sub>2</sub>        | XNXXSL2SS     | n/a                                                          | 5.00 ppm      | n/a              | 0.50 ppm          | 0.15 ppm              | -0.25 ppm      |                                            | 2.0 ppm           | <20                        | <60                        | <+/-0.2 ppm                                         | <+/-0.2 @ 0.50 ppm                     | -10°C/14°F            | 55°C/131°F | 15%                | 90%    |
| Cl <sub>2</sub> (High) | XNXXSL1SS     | 5.0 to 20.0 ppm                                              | 5.0 ppm       | 5.0 ppm          | 1.0 ppm           | 0.6 ppm               | -1.0 ppm       |                                            | 2.0 ppm           | <20                        | <30                        | <+/-0.2 ppm                                         | <+/-0.2 @ 1 ppm                        | -10°C/14°F            | 55°C/131°F | 15%                | 90%    |
| ClO <sub>2</sub>       | XNXXSH1SS     | n/a                                                          | 1.00 ppm      | n/a              | 0.10 ppm          | 0.03 ppm              | -0.05 ppm      |                                            | 0.5 ppm           | <30                        | <120                       | <+/-30%                                             | <+/-0.03 @ 0.1 ppm                     | -20°C/-4°F            | 131°F      | 15%                | 90%    |
| NO                     | XNXXSH1SS     | n/a                                                          | 100 ppm       | n/a              | 10 ppm            | 3 ppm                 | -5 ppm         |                                            | 50 ppm            | <15                        | <30                        | <+/-2 ppm                                           | <+/-2.0 @ 10 ppm                       | -20°C/-4°F            | 55°C/131°F | 15%                | 90%    |
| NO <sub>2</sub>        | XNXXSH1SS     | 5.0 to 50.0 ppm                                              | 10.0 ppm      | 5.0 ppm          | 5.0 ppm           | 1.5 ppm               | -2.5 ppm       |                                            | 5 ppm             | <15                        | <30                        | <+/-0.2 ppm                                         | <+/-0.2 @ 5 ppm                        | -20°C/-4°F            | 55°C/131°F | 15%                | 90%    |
| H <sub>2</sub>         | XNXXSG1SS     | n/a                                                          | 1,000 ppm     | n/a              | 100 ppm           | 30 ppm                | -50 ppm        |                                            | 500 ppm           | <60                        | <90 <sup>2</sup>           | <+/-8 ppm                                           | <+/-8 @ 100 ppm                        | -20°C/-4°F            | 55°C/131°F | 15%                | 90%    |
| H <sub>2</sub> (High)  | XNXXSG2SS     | n/a                                                          | 10,000 ppm    | n/a              | 1,000 ppm         | 300 ppm               | -500 ppm       |                                            | 5000 ppm          | <15                        | <30                        | <+/-150 ppm                                         | <+/-150 @ 1000 ppm                     | -20°C/-4°F            | 55°C/131°F | 15%                | 90%    |
| HF                     | XNXXSF1SS     | n/a                                                          | 12.0 ppm      | n/a              | 1.5 ppm           | 0.4 ppm               | -0.6 ppm       |                                            | 5.0 ppm           | 120                        | <240                       | <+/-0.5 @ 1.5 ppm                                   | <+/-0.5 @ 1.5 ppm                      | -20°C/-4°F            | 55°C/131°F | 20%                | 75%    |
| PH <sub>3</sub>        | XNXXSP1SS     | n/a                                                          | 1.20 ppm      | n/a              | 0.15 ppm          | 0.04 ppm              | -0.06 ppm      |                                            | 0.5 ppm           | <15                        | <30                        | <+/-0.02 @ 0.15 ppm                                 | <+/-0.02 @ 0.15 ppm                    | -20°C/-4°F            | 104°F      | 10%                | 90%    |

See notes and footnotes on following page

**Footnotes (see table on previous page):**

1. Accuracy of reading at default Alarm 1 concentration (typically 10%FS or defined minimum alarm level setting, whichever greater) when operated at default full scale.
2. System conditioning may be required to achieve stated results. Contact Honeywell Analytics for details.
3. Measured using calibration flow housing at calibration flow rate (300-375 ml/min) with dry gas.

**Notes (see table on previous page):**

- Data taken at ambient conditions of 20°C, 50% RH.
- Data represents typical values of freshly calibrated sensors without optional accessories attached.
- Performance figures are measured by test units calibrated at 50% of full scale.
- Standard temperature range for XNX EC Sensors is -20°C to +55°C; ATEX, IECEx.
- Extended temperature ranges for the XNX EC Sensors are -40°C to -20°C
- Accuracy between the temperatures of -40°C and -20°C is  $\pm 30\%$  at the applied gas concentration.
- Operating the XNX EC Sensors at extended temperature ranges for a prolonged time period exceeding 12 hours may cause deterioration in sensor performance and shorter sensor life.
- Barometric pressure effects on the O<sub>2</sub> sensor: The output from the O<sub>2</sub> sensor has pressure effects of <0.1% change of output per % change in pressure. When the barometric pressure changes by  $\pm 20\%$  the output from the O<sub>2</sub> sensor changes  $\leq \pm 0.4\%$  Vol. However, the oxygen sensor shows transient behavior when subjected to a rapid change in ambient pressure due to either weather or altitude. For example, a 10kPa instantaneous positive pressure step change may cause an overscale alarm condition for a period of about 12 seconds.
- Recalibration is recommended if the temperature of local environment has varied by more than  $\pm 15^\circ\text{C}$  from the temperature of calibration.
- Response times may increase at lower temperatures.
- Contact Honeywell Analytics for any additional data or details.

## 10 XNX Catalytic Bead and IR Replacement Sensor Cartridges

| Sensor Type <sup>1,2</sup> | Target Gas     | Cartridge Part No | Operating Pressure Range (kPa) | Operating Humidity Range (% RH non-condensing) | Air Speed (m/s) | Maximum Range | Selectable Range <sup>3</sup> | Increment | Default Range | Cal Gas Range    | Cal Gas P/N | Cal Gas Description                         |
|----------------------------|----------------|-------------------|--------------------------------|------------------------------------------------|-----------------|---------------|-------------------------------|-----------|---------------|------------------|-------------|---------------------------------------------|
| MPD-IC1                    | Carbon Dioxide | 1226-0301         | 80 - 110                       | 0 - 95                                         | 0 - 6           | 5.00 %Vol     | 1.00 to 5.00 %Vol             | 1.00 %Vol | 5.00 %Vol     | 1.50 to 3.5 %Vol | Contact HA  | 2.5 %VOL CO <sub>2</sub> in Air             |
| MPD-IV1                    | Methane        | 1226-0299         | 80 - 110                       | 0 - 95                                         | 0 - 6           | 5.00 %Vol     | 1.00 to 5.00 %Vol             | 1.00 %Vol | 5.00 %Vol     | 1.50 to 3.5 %Vol | GFV352      | 2.5 %VOL CH <sub>4</sub> in Air             |
| MPD-IF1                    | Flammables     | 1226-0300         | 80 - 110                       | 0 - 95                                         | 0 - 6           | 100 %LEL      | 20 to 100 %LEL <sup>3</sup>   | 10 %LEL   | 100 %LEL      | 30 to 70 %LEL    | GFV406      | 1 %VOL C <sub>2</sub> H <sub>6</sub> in Air |
| MPD-CB1                    | Flammables     | 1226A0359         | 80 - 120                       | see footnote 4                                 | 0 - 6           | 100 %LEL      | 20 to 100 %LEL <sup>3</sup>   | 10 %LEL   | 100 %LEL      | 30 to 70 %LEL    | GFV352      | 50 %LEL CH <sub>4</sub> in Air              |

<sup>1</sup>Agency approved hydrogen sensors are MPD-CB1 and 705 STD.

<sup>2</sup>When ordering replacement MPD sensor cartridges, the replacement cartridge must be the same type as factory configured. Substituting a different cartridge will void agency certification.

<sup>3</sup>On XNX %LEL units carrying UL/CSA/FM certifications, the range is fixed at 100%LEL and is not adjustable.

<sup>4</sup>Humidity: 0% to 99% RH non-condensing

## 11 Warning Messages

| Warning | Description                   | Ap-<br>plicable<br>Sensors | Latching /<br>Non-Latching | Frequency of<br>Diagnostic                                                                    | Event History<br>Data                       | Action For Resolution                                                                                                                                                                           |
|---------|-------------------------------|----------------------------|----------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| W001    | XXN 24 VDC<br>Supply Bad      | All                        | Non-latching               | 2 seconds                                                                                     | XXN supply<br>voltage x1000                 | Check wire of 24V power supply to XXN as well as power supply operation.                                                                                                                        |
| W002    | XXN Tempera-<br>ture Error    | All                        | Non-latching               | 2 seconds                                                                                     | XXN tempera-<br>ture (Celsius)              | Check location for heat sources. Fit with sunshade or other protection. Change location of XXN. Check temperature in Info->Transmitter Status to ensure temperature is being measured properly. |
| W003    | Simulated Warn-<br>ing/Fault  | All                        | Non-latching               | Enabled by<br>user                                                                            | 0                                           | Performing an alarm/fault reset will clear all simulation.                                                                                                                                      |
| W005    | Sensor Tempera-<br>ture Error | Optima                     | Non-latching               | XXN polls<br>sensor every<br>2 seconds,<br>diagnostic<br>frequency<br>controlled by<br>sensor | Sensor fault or<br>warning code<br>(Note 4) | Check location for heat sources. Fit with sunshade or other protection. Change location of XXN. Check temperature in Info->Sensor Status to ensure temperature is being measured properly.      |
|         | Sensor Tempera-<br>ture Error | Excel                      | Non-latching               | XXN polls<br>sensor every<br>2 seconds,<br>diagnostic<br>frequency<br>controlled by<br>sensor | Sensor fault or<br>warning code<br>(Note 4) | Check location for heat sources. Fit with sunshade or other protection. Change location of XXN. Check temperature in Info->Sensor Status to ensure temperature is being measured properly.      |
|         | Sensor Tempera-<br>ture Error | ECC                        | Non-latching               | 2 seconds                                                                                     | Sensor<br>temperature<br>(Celsius)          | Check location for heat sources. Fit with sunshade or other protection. Change location of XXN. Check temperature in Info->Sensor Status to ensure temperature is being measured properly.      |

| Warning | Description                 | Ap-<br>plicable<br>Sensors | Latching /<br>Non-Latching | Frequency of<br>Diagnostic                                                                    | Event History<br>Data                                                                                       | Action For Resolution                                                                                                                                                                                                                                    |
|---------|-----------------------------|----------------------------|----------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| W006    | Negative Drift              | ECC,<br>mV                 | Non-latching               | 2 seconds                                                                                     | Raw gas<br>concentration<br>of sensor                                                                       | Check sensor location for external interference. Perform zero calibration. If problem persists after zero calibration and no interference exists, replace sensor.                                                                                        |
|         | Negative Drift              | Optima,<br>Excel           | Non-latching               | XNX polls<br>sensor every<br>2 seconds,<br>diagnostic<br>frequency<br>controlled by<br>sensor | Sensor fault or<br>warning code                                                                             | Check sensor location for external interference. Perform zero calibration. If problem persists after zero calibration and no interference exists, replace sensor.                                                                                        |
| W007    | Calibration<br>Required     | All                        | Non-latching               | 2 seconds                                                                                     | Number of<br>days remain-<br>ing until<br>calibration ex-<br>pires, negative<br>= number of<br>days expired | Time since the last span calibration has exceeded a defined limit. Performing a successful span calibration will clear the condition. The limit is the user-defined calibration interval. W007 can be disabled by setting the calibration interval to 0. |
| W009    | Sensor 24 VDC<br>Supply Bad | Optima,<br>Excel           | Non-latching               | XNX polls<br>sensor every<br>2 seconds,<br>diagnostic<br>frequency<br>controlled by<br>sensor | Sensor fault or<br>warning code<br>(Note 4)                                                                 | Check wire of 24V power supply to XNX as well as power supply operation. Also check wiring between XNX and Optima/Excel.                                                                                                                                 |

| Warning | Description                | Ap-<br>plicable<br>Sensors | Latching /<br>Non-Latching | Frequency of<br>Diagnostic                                                  | Event History<br>Data                 | Action For Resolution                                                                                                           |
|---------|----------------------------|----------------------------|----------------------------|-----------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| W010    | Sensor Path Obscured       | Optima                     | Non-latching               | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4) | Check location for external interference. Check sensor for dirty windows.                                                       |
|         | Beam Block                 | Excel                      | Non-latching               | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4) | Check location for external interference or obstructions in the IR path. Check sensor for dirty windows. Check Excel alignment. |
| W011    | Sensor Internal Lamp Issue | Optima                     | Latching                   | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4) | Remove and return to Honeywell for repair.                                                                                      |
| W012    | Excessive Float            | Optima,<br>Excel           | Non-latching               | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4) | Check sensor location for external interference, check sensor for operation and re-zero where appropriate.                      |

| Warning | Description                                                                                               | Ap-<br>plicable<br>Sensors | Latching /<br>Non-Latching | Frequency of<br>Diagnostic                                                  | Event History<br>Data                 | Action For Resolution                                                                                                                                                                                                                                                                                                                                                                  |
|---------|-----------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|-----------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| W013    | Sensor Loop Failure, (Sensor is losing/has lost mA output signal. These are detected by Optima and Excel. | Optima, Excel              | Latching                   | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4) | Check that supply voltage is stable. Check wiring between Optima/Excel and XNX. Check loop impedance of wiring. Check that switches S3 and S4 are set correctly. If the switch settings need to be changed, power down the transmitter before changing the switch settings. Once the problem has been resolved, a soft reset must be performed for the Calibration menu to clear W013. |
| W014    | Sensor Real Time Clock Issue                                                                              | Excel                      | Non-latching               | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4) | Reset "date and time" in Excel, re-cycle Excel power and confirm "date and time." If not retained, remove and return to Honeywell for repair.                                                                                                                                                                                                                                          |
| W015    | Sensor Internal Failure                                                                                   | Optima, Excel              | Latching and Non-latching  | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4) | Remove and return to Honeywell for repair.                                                                                                                                                                                                                                                                                                                                             |
|         | Sensor has an internal software error                                                                     | Excel                      | Latching                   | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4) | Cycle Excel power and confirm "fault cleared." If not, replace sensor.                                                                                                                                                                                                                                                                                                                 |

| Warning | Description                            | Ap-<br>plicable<br>Sensors | Latching /<br>Non-Latching | Frequency of<br>Diagnostic                                                  | Event History<br>Data                                       | Action For Resolution                                                                                                                                         |
|---------|----------------------------------------|----------------------------|----------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| W016    | Sensor Installation Not Complete       | Excel                      | Non-latching               | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4)                       | Check Excel alignment. Perform a zero calibration.                                                                                                            |
| W018    | General Diagnostics                    | Optima, Excel              | Non-latching               | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4)                       | Check sensor connections, check sensor operation, fit replacement sensor, replace personality board.                                                          |
| W019    | Sensor Internal 5V Power Supply Defect | Excel                      | Non-latching               | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4)                       | Remove and return to Honeywell for repair.                                                                                                                    |
| W020    | Forced mA Timeout                      | All                        | Latching                   | 1 second                                                                    | Forced mA                                                   | Indicates that a forced mA condition was left on for more than 15 minutes. No action required as mA operation will be returned to normal automatically.       |
| W021    | Forced Relay Timeout                   | All                        | Latching                   | 1 second                                                                    | Forced relay status, 1=Alarm 1 on, 2=Alarm 2 on, 4=Fault on | Indicates that a forced relay condition was left on for more than 15 minutes. No action required as relay operation will be returned to normal automatically. |

| Warning | Description                  | Ap-<br>plicable<br>Sensors | Latching /<br>Non-Latching | Frequency of<br>Diagnostic                                                       | Event History<br>Data                                    | Action For Resolution                                                                                                                                                                                                                                                  |
|---------|------------------------------|----------------------------|----------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| W022    | mV Sensor Calibration Needed | mV                         | Latching                   | When user changes sensor type or gas                                             | 1=new sensor,<br>2=changed personality,<br>3=changed gas | Generated after accepting a new mV sensor or changing the mV sensor type or changing the mV gas selection. This is a warning to user that a span calibration should be performed. If a span calibration is not performed, the default calibration values will be used. |
| W023    | Low Optical Sample Signal    | Exoel                      | Non-latching               | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor      | Sensor fault or warning code (Note 4)                    | Check location for external interference or obstructions in the IR path. Check sensor for dirty windows. Check Excel alignment. Check Beam Block Low Signal Percentage setting in the transmitter.                                                                     |
| W024    | Reflex Failure Warning       | ECC                        | Latching                   | Dependent on sensor, typically 8 hours; Once fault is detected: every 15 minutes | 0                                                        | ECC sensor is nearing end of life. Replace sensor.                                                                                                                                                                                                                     |
| W025    | Safety variable fail warning | All                        | Latching                   | 2 seconds                                                                        | Note 3                                                   | Contact Honeywell Analytics Service Department.                                                                                                                                                                                                                        |

# NOTES

Note 3:

| Subtypes           | Decimal | Bit | Hex  | Description                                                                                |
|--------------------|---------|-----|------|--------------------------------------------------------------------------------------------|
| Fault 2 Event Bits | 1       | 0   | 1    | 1 = CRC error in safety critical RAM block                                                 |
|                    | 2       | 1   | 2    | 1 = Error reloading safety critical RAM block from EEPROM                                  |
|                    | 4       | 2   | 4    | 1 = Error loading data from Personality board                                              |
|                    | 8       | 3   | 8    | 1 = Excel signal level has been below the low signal level threshold for at least 24 hours |
|                    | 16      | 4   | 10   | 1 = Excel beam blocked                                                                     |
|                    | 32      | 5   | 20   | 1 = Personality board error code > 0                                                       |
|                    | 64      | 6   | 40   | 1 = Option board error code > 0                                                            |
|                    | 128     | 7   | 80   | 1 = IR mA input > 1 mA and < 3.4 mA                                                        |
|                    | 256     | 8   | 100  | 1 = IR mA input < 1.0 mA                                                                   |
|                    | 512     | 9   | 200  | 1 = IR forced 10 mA not within +/- 1 mA                                                    |
|                    | 1024    | 10  | 400  | 1 = gains from PGA don't match local copy                                                  |
|                    | 2048    | 11  | 800  | 1 = error reading or writing EEPROM                                                        |
|                    | 4096    | 12  | 1000 | 1 = ECC reflex failure                                                                     |
|                    | 8192    | 13  | 2000 | 1 = RAM test failure                                                                       |
|                    | 16384   | 14  | 4000 | 1 = Program memory CRC failure                                                             |
|                    | 32768   | 15  | 8000 | 1 = Op code test failure                                                                   |
| Fault 3 Event Bits | 1       |     |      | Interrupt integrity test failure                                                           |

Note 4:

Optima and Excel fault and warning codes are displayed in the Event History data field.

## 12 Fault Messages

| Fault | Description                                                  | Appl-<br>cable<br>Sensors | Latching /<br>Non-Latching           | Frequency of<br>Diagnostic                                 | Event History Data                                             | Action For Resolution                                                                                                                                                                                       |
|-------|--------------------------------------------------------------|---------------------------|--------------------------------------|------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F101  | Unexpected Sensor Reset                                      | All                       | Non-latching                         | ECC & mV:<br>main loop x2;<br>Optima & Excel:<br>2 seconds | Note 2. Optima or Excel: Sensor fault or warning code (Note 4) | If repeated, check supply voltage, check cable loop impedance, check terminal connections                                                                                                                   |
| F103  | XNX Temperature Error                                        | All                       | Non-latching                         | 2 seconds                                                  | XNX temperature (Celsius)                                      | Check location for heat sources. Fit with sunshade or other protection. Change the transmitter's location. Check temperature in Info-> Transmitter Status to ensure temperature is being measured properly. |
| F104  | XNX 24 VDC Supply Bad                                        | All                       | Non-latching                         | 2 seconds                                                  | XNX supply voltage x1000                                       | Check the wire of the 24V power supply to the transmitter and the power supply operation.                                                                                                                   |
| F105  | 3.3VDC Supply Bad on XNX, personality board, or option board | All                       | Non-latching                         | 2 seconds                                                  | 1=XNX,<br>2=Personality board,<br>3=Option board               | Check Transmitter Status                                                                                                                                                                                    |
| F106  | XNX Real Time Clock Failure                                  | All                       | Non-latching                         | 2 seconds                                                  | Total seconds since Jan 1, 1970                                | Either clock was incorrectly set or the battery for the clock has failed. Note: the clock will stop running on January 1, 2036.                                                                             |
| F107  | XNX Internal Failure (RAM, ROM, EEPROM, Opcode)              | All                       | Non-latching except for EEPROM error | At power up and 8 hours                                    | Note 3                                                         | Contact Honeywell Analytics' Service Department.                                                                                                                                                            |

| <b>Fault</b> | <b>Description</b>                              | <b>Appl-<br/>cable<br/>Sensors</b> | <b>Latching /<br/>Non-Latch-<br/>ing</b> | <b>Frequency of<br/>Diagnostic</b>                                          | <b>Event History Data</b>              | <b>Action For Resolution</b>                                                                                                                                                                                                                                                      |
|--------------|-------------------------------------------------|------------------------------------|------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F108         | XNX mA Output Loop Failure                      | All                                | Latching                                 | 2 seconds                                                                   | mA output error (measured mA - set mA) | Check wiring of mA output from XNX. Check that switches S1 and S2 are set correctly. Note that if F108 is not resolved quickly, an F149 (Internal Communication Failure - mA) will also be generated. When the cause of F108 is resolved, both the F108 and F149 will be cleared. |
| F109         | Simulated Warning/Fault                         | All                                | Non-latching                             | Enabled by user                                                             | 0                                      | Performing an alarm/fault reset will clear all simulation.                                                                                                                                                                                                                        |
| F110         | Sensor software mismatch                        | Optima                             | Latching                                 | Only checked at power up                                                    | Sensor firmware version x10            | Contact Honeywell Analytics' Service Department.                                                                                                                                                                                                                                  |
| F111         | Negative Drift                                  | ECC, mV                            | Non-latching                             | 2 seconds                                                                   | Raw gas concentration of sensor        | Check sensor location for external interference. Perform zero calibration. If problem persists after zero calibration and no interference exists, replace sensor.                                                                                                                 |
|              | Negative Drift; may indicate a failed IR sensor | Optima, Excel                      | Non-latching                             | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code           | Check sensor location for external interference. Perform zero calibration. If problem persists after zero calibration and no interference exists, replace sensor.                                                                                                                 |
| F112         | Sensor 24 VDC Supply Bad                        | Optima, Excel                      | Non-latching                             | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4)  | Check the wire of the 24V power supply to the transmitter and the power supply operation. Also check the wiring between the transmitter and the Optima/Excel.                                                                                                                     |

| Fault | Description                                                                                                                                                                                         | Appl-<br>cable<br>Sensors | Latching /<br>Non-Latch-<br>ing | Frequency of<br>Diagnostic                                                                       | Event History Data                       | Action For Resolution                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F113  | Sensor Internal<br>5V Power Supply<br>Defect                                                                                                                                                        | Excel                     | Non-latching                    | XNX polls sen-<br>sor every 2 sec-<br>onds, diagnos-<br>tic frequency<br>controlled by<br>sensor | Sensor fault or warning code<br>(Note 4) | Remove and return to Honeywell for<br>repair.                                                                                                                                                                                                                                                                                                                                                                                     |
| F114  | Sensor Internal<br>Lamp Issue                                                                                                                                                                       | Optima                    | Latching                        | XNX polls sen-<br>sor every 2 sec-<br>onds, diagnos-<br>tic frequency<br>controlled by<br>sensor | Sensor fault or warning code<br>(Note 4) | Remove and return to Honeywell for<br>repair.                                                                                                                                                                                                                                                                                                                                                                                     |
| F116  | Sensor Internal<br>Failure                                                                                                                                                                          | Optima,<br>Excel          | Non-latching                    | XNX polls sen-<br>sor every 2 sec-<br>onds, diagnos-<br>tic frequency<br>controlled by<br>sensor | Sensor fault or warning code<br>(Note 4) | Remove and return to Honeywell for<br>repair.                                                                                                                                                                                                                                                                                                                                                                                     |
| F117  | Sensor Loop<br>Failure, (Sensor<br>is losing/has lost<br>mA output signal.<br>These are detected<br>by Optima and<br>Excel, F161 is de-<br>tected by XNX and<br>will usually occur<br>before F117.) | Optima,<br>Excel          | Latching                        | XNX polls sen-<br>sor every 2 sec-<br>onds, diagnos-<br>tic frequency<br>controlled by<br>sensor | Sensor fault or warning code<br>(Note 4) | Check that supply voltage is stable. Check<br>wiring between Optima/Excel and the<br>transmitter. Check loop impedance of wir-<br>ing. Check that switches S3 and S4 are<br>set correctly. If the switch settings need to<br>be changed, power down the transmitter<br>before changing the switch settings. Once<br>the problem has been resolved, a soft<br>reset must be performed for the Calibra-<br>tion menu to clear F117. |

| Fault | Description                                              | Appl-<br>cable<br>Sensors       | Latching /<br>Non-Latch-<br>ing | Frequency of<br>Diagnostic                                                                       | Event History Data                       | Action For Resolution                                                                                                                                                                                                       |
|-------|----------------------------------------------------------|---------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F118  | Sensor Real Time<br>Clock issue                          | Excel                           | Non-latching                    | XNX polls sen-<br>sor every 2 sec-<br>onds, diagnos-<br>tic controlled by<br>sensor              | Sensor fault or warning code<br>(Note 4) | Reset "date and time" in Excel, recycle<br>Excel power, and confirm "date and time."<br>If not retained, remove and return to<br>Honeywell for repair.                                                                      |
| F119  | Cartridge Internal<br>Electrical Failure                 | ECC, mV                         | Non-latching                    | XNX polls sen-<br>sor every 2 sec-<br>onds, diagnos-<br>tic frequency<br>controlled by<br>sensor | Note 5                                   | Check cartridge connections, check sen-<br>sor operation, fit replacement cartridge,<br>replace personality board.                                                                                                          |
| F120  | No Sensor                                                | ECC,<br>mV,<br>Optima,<br>Excel | Non-latching                    | 2 seconds                                                                                        | Note 2                                   | Indicates a loss of communication with<br>the sensor. Check that the sensor type<br>indicated in the part number matches<br>the installed hardware. Check the wiring<br>between ECC sensors or Optima/Excel<br>and the XNX. |
| F121  | Wrong Cartridge,<br>error loading sen-<br>sor parameters | All                             | Non-latching                    | At power up<br>and when<br>cartridge is<br>changed                                               | 0                                        | Contact Honeywell Analytics' Service<br>Department.                                                                                                                                                                         |
| F122  | General Diagnos-<br>tics                                 | Optima,<br>Excel                | Non-latching                    | XNX polls sen-<br>sor every 2 sec-<br>onds, diagnos-<br>tic frequency<br>controlled by<br>sensor | Sensor fault or warning code<br>(Note 4) | Check sensor connections, check sensor<br>operation, fit replacement sensor, replace<br>personality board.                                                                                                                  |

| Fault | Description              | Applicable Sensors | Latching / Non-Latching | Frequency of Diagnostic                                                     | Event History Data                                                                    | Action For Resolution                                                                                                                                                                                  |
|-------|--------------------------|--------------------|-------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F123  | Sensor Temperature Error | Optima             | Non-latching            |                                                                             | Sensor fault or warning code (Note 4)                                                 | Check location for heat sources. Fit with sunshade or other protection. Change location of the transmitter. Check temperature in Info->Sensor Status to ensure temperature is being measured properly. |
|       | Sensor Temperature Error | Excel              | Non-latching            | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4)                                                 | Check location for heat sources. Fit with sunshade or other protection. Change location of the transmitter. Check temperature in Info->Sensor Status to ensure temperature is being measured properly. |
|       | Sensor Temperature Error | ECC                | Non-latching            | 2 seconds                                                                   | Sensor temperature (Celsius)                                                          | Check location for heat sources. Fit with sunshade or other protection. Change location of XNX. Check temperature in Info->Sensor Status to ensure temperature is being measured properly.             |
| F125  | Calibration Required     | All                | Non-latching            | 2 seconds                                                                   | Number of days remaining until calibration expires, negative = number of days expired | Time since the last span calibration has exceeded a defined limit. Performing a successful span calibration will clear the condition. The limit is the maximum calibration interval.                   |
| F126  | Sensor Path Obscured     | Optima             | Non-latching            | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4)                                                 | Check location for external interference. Check sensor for dirty windows.                                                                                                                              |

| Fault | Description                      | Applicable Sensors | Latching / Non-Latching | Frequency of Diagnostic                                                     | Event History Data                                                 | Action For Resolution                                                                                                                                                                                       |
|-------|----------------------------------|--------------------|-------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F127  | Beam Block                       | Excel              | Non-latching            | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4)                              | Check location for external interference or obstructions in the IR path. Check sensor for dirty windows. Check Excel alignment.                                                                             |
| F128  | Sensor Installation Not Complete | Excel              | Non-latching            | XNX polls sensor every 2 seconds, diagnostic frequency controlled by sensor | Sensor fault or warning code (Note 4)                              | Check Excel alignment. Perform a zero calibration.                                                                                                                                                          |
| F130  | Option Communication Failure     | All                | Non-latching            | 2 seconds                                                                   | Option module ID: 0=None, 1=Foundation Fieldbus, 2=Modbus, 3=Relay | Check that installed option matches the option indicated in the XNX part number. If the option has been changed, the new option must be set up in Information->Transmitter Data as described in the manual. |
| F133  | Not used                         |                    |                         |                                                                             |                                                                    |                                                                                                                                                                                                             |
| F143  | Stabilization Timeout            | All                | Latching                | 2 seconds                                                                   | Warm up time (seconds x100)                                        | Cycle power, contact Honeywell Analytics' Service Department if problem persists.                                                                                                                           |

| Fault | Description                                               | Applicable Sensors | Latching / Non-Latching | Frequency of Diagnostic                                                          | Event History Data                                                | Action For Resolution                                                                                                                                                          |
|-------|-----------------------------------------------------------|--------------------|-------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F145  | Reflex Failure                                            | ECC                | Non-latching            | Dependent on sensor, typically 8 hours; Once fault is detected: every 15 minutes | nA/mV                                                             | ECC sensor is no longer functioning properly. Replace sensor.                                                                                                                  |
| F146  | Unknown Sensor Failure                                    | Optima, Excel      | Non-latching            | 2 seconds                                                                        | Sensor fault or warning code (Note 4)                             | Contact Honeywell Analytics' Service Department.                                                                                                                               |
| F148  | Internal option board hardware failure                    | All                | Non-latching            | 2 seconds                                                                        | Option board error status (Note 6)                                | Contact Honeywell Analytics' Service Department.                                                                                                                               |
| F149  | Internal 4-20 mA monitoring circuit communication failure | All                | Non-latching            | 3.366 seconds                                                                    | 0                                                                 | Contact Honeywell Analytics' Service Department.                                                                                                                               |
| F150  | mA Output Monitor Communications Watchdog Error           | All                | Non-latching            | 138 us                                                                           | Communication error count                                         | Contact Honeywell Analytics' Service Department.                                                                                                                               |
| F151  | Sensor Module Type Changed                                | ECC                | Non-latching            | 2 seconds                                                                        | Module type: 0=None, 1=ECC, 2=mV, 3=Excel, 4=Optima, 5=Generic mA | For ECC: Perform Accept New Sensor function, if problem persists contact Honeywell Analytics' Service Department. For others, contact Honeywell Analytics' Service Department. |

| Fault | Description                                  | Appl-<br>cable<br>Sensors | Latching /<br>Non-Latch-<br>ing | Frequency of<br>Diagnostic                                     | Event History Data                                                 | Action For Resolution                                                                                                                                                                                                                                                                                |
|-------|----------------------------------------------|---------------------------|---------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F152  | Option Module Configuration Error            | All                       | Latching                        | Only at power up or every 125 ms when no option board detected | Option module ID: 0=None, 1=Foundation Fieldbus, 2=Modbus, 3=Relay | Confirm option properly installed, reconfigure unit.                                                                                                                                                                                                                                                 |
| F153  | Signal/Data mismatch error on IR personality | Optima, Excel             | Non-latching                    | 2 seconds                                                      | Digital sensor reading                                             | Check wiring to Optima/Excel. In particular, check the white wire between XnX and Optima/Excel. Note: power must be cycled to reset F153 after correcting the cause.                                                                                                                                 |
| F154  | mA Input Diagnostic Failure                  | Optima, Excel             | Latching                        | 5 minutes after power up and then every 8 hours                | Input mA                                                           | Contact Honeywell Analytics' Service Department.                                                                                                                                                                                                                                                     |
| F155  | Generic mA Sensor Type Error                 | Generic mA                | Non-latching                    | 2 seconds                                                      | Input mA                                                           | Indicates that mA input from sensor is less than 3 mA. Check wiring between XNX and sensor. Also check the switches S3 and S4 are set correctly. If the switch settings need to be changed, power down the XNX before changing the switch settings. If wiring and switches are okay, replace sensor. |
| F156  | mV Current Control Failure                   | mV                        | Non-latching                    | Main loop x16                                                  | constant current A/D input mV                                      | Check that correct mV sensor type is selected. Check wiring between XNX and sensor. If sensor type and wiring are okay, replace sensor.                                                                                                                                                              |
| F157  | Sensor Drift Fault                           | ECC, mV                   | Non-latching                    | 2 seconds                                                      | Current baseline                                                   | Perform zero calibration. If problem persists, replace sensor.                                                                                                                                                                                                                                       |

| Fault | Description                                     | Appl-<br>cable<br>Sensors | Latching /<br>Non-Latch-<br>ing | Frequency of<br>Diagnostic                                                  | Event History Data              | Action For Resolution                                                                                                                                                                                                                                                                                                                                                   |
|-------|-------------------------------------------------|---------------------------|---------------------------------|-----------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F158  | Sensor/Personal-<br>ity Part Number<br>mismatch | All                       | Non-latching                    | "ECC & mV:<br>main loop x2;<br>Optima & Excel:<br>2 seconds"                | Entire personality part #       | Check that installed option matches the<br>option indicated in the XNX part number,<br>check wiring to Optima/Excel.                                                                                                                                                                                                                                                    |
| F159  | Option Part Num-<br>ber Mismatch                | All                       | Non-latching                    | Only at pow-<br>erup or every<br>125 ms when<br>no option board<br>detected | Entire option part #            | Check that installed option matches the<br>option indicated in the XNX part number,<br>check wiring to Optima/Excel.                                                                                                                                                                                                                                                    |
| F160  | Hardware Diagnos-<br>tic Failure                | ECC, mV                   | Non-latching                    | Main loop x2                                                                | Gain1 high byte, Gain2 low byte | Replace defective EC cartridge or mV<br>personality board.                                                                                                                                                                                                                                                                                                              |
| F161  | mA Input Indicates<br>Fault                     | Optima,<br>Excel          | Non-latching                    | 1 second                                                                    | Input mA                        | Indicates mA input from Optima/Excel<br>is below 1 mA, indicating a fault in the<br>sensor. Any other fault will also trigger<br>this fault, so check for additional faults in<br>event history to determine specific issue.<br>If no other faults indicated, check wiring<br>between Optima/Excel and XNX. Also<br>check that switches S3 and S4 are set<br>correctly. |
| F162  | Error reloading<br>safety critical RAM<br>block | All                       | Non-latching                    | 2 seconds                                                                   | Note 3                          | Contact Honeywell Analytics' Service<br>Department.                                                                                                                                                                                                                                                                                                                     |
| F163  | Interrupt integrity<br>fault                    | All                       | Non-latching                    | Main loop                                                                   | Note 3                          | XNX will reset if more than 600,000 suc-<br>cessive errors occur.                                                                                                                                                                                                                                                                                                       |

| Fault | Description            | Appl-<br>cable<br>Sensors | Latching /<br>Non-Latch-<br>ing | Frequency of<br>Diagnostic | Event History Data                                                                                                                                                                                                                                                                                                                                                                             | Action For Resolution                                                                                                                                                                                                                                                                                                                                                       |
|-------|------------------------|---------------------------|---------------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F164  | mV sensor failure      | mV                        | Latching                        | 1 second                   | Sensor fault or warning code<br>(Note 4)                                                                                                                                                                                                                                                                                                                                                       | Check sensor connections, check sensor operation, replace sensor, replace personality board.                                                                                                                                                                                                                                                                                |
| F165  | mA Calibration failure | all                       | Latching                        | 2 seconds                  | DAC: Digital to Analog Converter (4-20 mA output)<br>ADC: Analog to Digital Converter (4-20 mA internal feedback)<br>0 OK<br>1 DAC 4 mA point is too low<br>2 DAC 4 mA point is too high<br>4 DAC 20 mA point is too low<br>8 DAC 20 mA point is too high<br>16 ADC 4 mA point is too low<br>32 ADC 4 mA point is too high<br>64 ADC 20 mA point is too low<br>128 ADC 20 mA point is too high | Indicates that 4-20 mA calibration failed and discarded. Events history parameter indicates which calibration point has failed. If 4-20 mA calibration fails with F165, no changes take place so the 4-20 mA calibration output stays as it was. Check 4-20 mA loop resistance. Repeat 4-20 mA calibration. The fault clears itself after a successful 4-20 mA calibration. |

Notes

Note 2:

| Spi Event Bits |                                     |
|----------------|-------------------------------------|
| Decimal        | Description                         |
| 1              | SPI1 Starting TX                    |
| 2              | SPI1 transmitting                   |
| 4              | falling clock edge, 0 = rising edge |
| 8              | SPI1 port open, 0 = closed          |
| 16             | SPI1 no response                    |
| 32             | SPI1 ECC no response                |
| 64             | SPI1 missing data                   |
| 128            | Not used                            |
| 256            | SPI3 Starting TX                    |
| 512            | SPI3 transmitting                   |
| 1024           | falling clock edge, 0 = rising edge |
| 2048           | SPI3 port open, 0 = closed          |
| 4096           | Not used                            |
| 8192           |                                     |
| 16384          |                                     |
| 32768          | SPI2 Starting TX                    |

Note 4:

Optima and Excel fault and warning codes are displayed in the Event History data field.

Note 3:

| Spi Event Bits |                                     |
|----------------|-------------------------------------|
| Decimal        | Description                         |
| 1              | SPI1 Starting TX                    |
| 2              | SPI1 transmitting                   |
| 4              | falling clock edge, 0 = rising edge |
| 8              | SPI1 port open, 0 = closed          |
| 16             | SPI1 no response                    |
| 32             | SPI1 ECC no response                |
| 64             | SPI1 missing data                   |
| 128            | Not used                            |
| 256            | SPI3 Starting TX                    |
| 512            | SPI3 transmitting                   |
| 1024           | falling clock edge, 0 = rising edge |
| 2048           | SPI3 port open, 0 = closed          |
| 4096           | Not used                            |
| 8192           |                                     |
| 16384          |                                     |
| 32768          | SPI2 Starting TX                    |

Note 5:

| Subtypes                  | Decimal | Description                                                |
|---------------------------|---------|------------------------------------------------------------|
| <b>ECC Fault Subtypes</b> | 1       | I2C error reading or writing EEPROM                        |
|                           | 2       | GALPAT RAM test failure                                    |
|                           | 4       | Program memory CRC failure                                 |
|                           | 8       | Opcode test failure                                        |
|                           | 16      | Can't adjust PGA or EEPROM value doesn't match digital pot |
|                           | 32      | Reserved                                                   |
|                           | 64      | Reserved                                                   |
|                           | 128     | GALPAT RAM test failure in common area                     |
| <b>mV Fault Subtypes</b>  | 1       | I2C error reading or writing EEPROM                        |
|                           | 2       | GALPAT RAM test failure                                    |
|                           | 4       | Program memory CRC failure                                 |
|                           | 8       | Opcode test failure                                        |
|                           | 16      | Can't adjust PGA or EEPROM value doesn't match digital pot |
|                           | 32      | RAM safety variable failure                                |
|                           | 64      | Interrupts integrity failure                               |
|                           | 128     | Stack overflow/underflow failure                           |

Note 6:

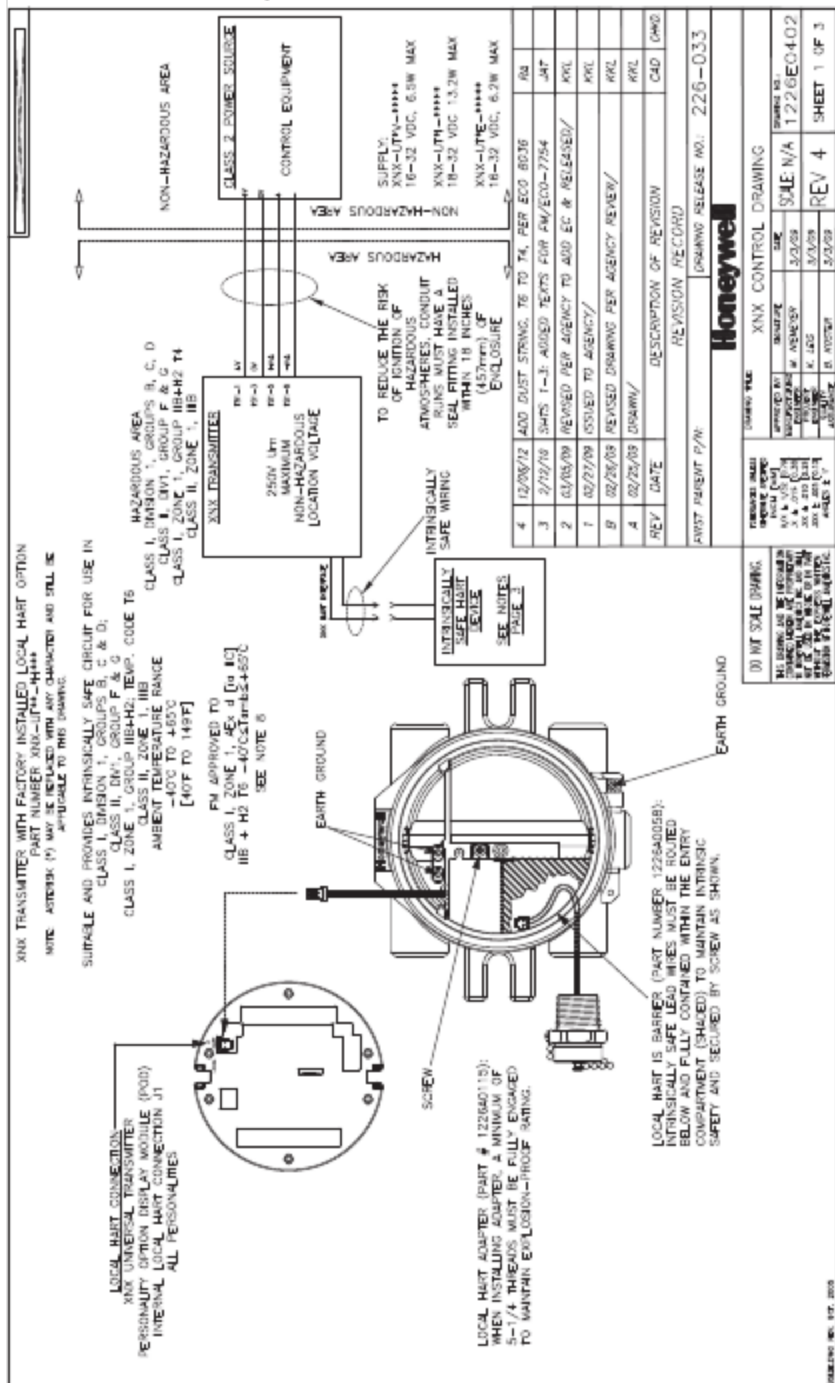
|                                        | Decimal | Description                       |
|----------------------------------------|---------|-----------------------------------|
| <b>Relay Option Board Error Status</b> | 1       | Didn't receive STX or ETX         |
|                                        | 2       | Received undefined command        |
|                                        | 4       | Exceeded maximum data bytes       |
|                                        | 8       | Write collision or buffer overrun |
|                                        | 16      | CRC error in SPI packet           |
|                                        | 32      | Stack overflow or underflow       |
|                                        | 64      | Program memory CRC error          |
|                                        | 128     | GALPAT RAM test failure           |

## 13 Informational Messages

| Number | Description                                      | Contents of Data Field                  |
|--------|--------------------------------------------------|-----------------------------------------|
| I001   | Unused                                           |                                         |
| I002   | Force Relay Mode Started                         | Bitpattern for relays. (E.G. 7.0 ==All) |
| I003   | Force Relay Mode Ended.                          | N/A                                     |
| I004   | Force mA Mode Started                            | Force current. (E.G. 20.0)              |
| I005   | Force mA Mode Ended                              | N/A                                     |
| I006   | Short-Term Inhibit Started                       | N/A                                     |
| I007   | Short-Term Inhibit Ended                         | N/A                                     |
| I008   | Long-Term Inhibit Started                        | N/A                                     |
| I009   | Long-Term Inhibit Ended                          | N/A                                     |
| I010   | mA Output Recalibrated                           | N/A                                     |
| I011   | Bump Test Started                                | N/A                                     |
| I012   | Bump Test Timed Out                              | N/A                                     |
| I013   | Bump Test Completed Concentration < AI1          | Peak concentration observed             |
| I014   | Bump Test Completed<br>AI1 < Concentration < AI2 | Peak concentration observed             |
| I015   | Bump Test Completed. AI2 < Concentration         | Peak concentration observed             |
| I016   | Zero Calibration Successful                      | N/A                                     |
| I017   | Zero Calibration Failed                          | Error code                              |
| I018   | Calibrate Span Successful 1 of 2                 | Percentchangeinspanfactorfromprevious   |
| I019   | Calibrate Span Successful 2 of 2                 | Absolute span factor                    |
| I020   | Calibrate Span Failed                            | Error code                              |
| I021   | Calibrate Span Timeout                           | N/A                                     |
| I022   | Password Changed                                 | 1,2 or 3 (access level)                 |
| I023   | Performing Soft Reset                            | N/A                                     |
| I024   | Alarms Configured Latching                       | N/A                                     |
| I025   | Alarms Configured Non-Latching                   | N/A                                     |
| I026   | AlarmRelaysConfiguredNormallyEnergized           | N/A                                     |
| I027   | Alarm Relays Configured Normally De-Energized.   | N/A                                     |
| I028   | Fieldbus Address Changed                         | New address (e.g. 15)                   |
| I029   | Fieldbus Speed Changed                           | New speed (e.g. 19200)                  |
| I030   | Sensor Type Changed                              | iCurrentCalGlobalID                     |
| I031   | Gas Selection Changed                            | iCurrentCalGlobalID                     |
| I032   | Time For Beam Block Fault Changed                | iBlockFltTime                           |
| I033   | Time For Fault Detection Changed                 | iOtherFltTime                           |
| I034   | Level For Low Signal Fault Changed               | fLowSignalLevel                         |
| I035   | Invalid Path Length Written                      | fPathLen                                |
| I036   | Path Length Changed                              | fPathLen                                |

| Number | Description                                        | Contents of Data Field              |
|--------|----------------------------------------------------|-------------------------------------|
| I037   | mA for Inhibit Changed                             | f_mA_Flt_Step[0]                    |
| I038   | mA for Warning Changed                             | f_mA_Flt_Step[1]                    |
| I039   | mA for Overrange Changed                           | f_mA_Flt_Step[2]                    |
| I040   | mA for Fault Changed                               | f_mA_Flt_Step[3]                    |
| I041   | mA for Low Signal Changed                          | f_mA_Flt_Step[4]                    |
| I042   | mA for Blocked Beam Changed                        | f_mA_Flt_Step[5]                    |
| I043   | Concentration for mA Full Scale Changed            | fDisplayRange                       |
| I044   | Instrument Id Changed                              | N/A                                 |
| I045   | Measuring Units Changed                            | iMeasurementUnits                   |
| I046   | Alarm 1 Reconfigured for Increasing Concentrations | N/A                                 |
| I047   | Alarm 1 Reconfigured for Depleting Concentrations  | N/A                                 |
| I048   | Alarm 2 Reconfigured for Increasing Concentrations | N/A                                 |
| I049   | Alarm 2 Reconfigured for Depleting Concentrations  | N/A                                 |
| I050   | Alarm 1 Value Changed                              | fAlarmThres[0]                      |
| I051   | Alarm 2 Value Changed                              | fAlarmThres[1]                      |
| I052   | Clock Set                                          | N/A                                 |
| I053   | Date Format Changed                                | iDateFormat                         |
| I054   | Sensor Boots                                       | N/A                                 |
| I055   | Unused                                             |                                     |
| I056   | Sensor RTC Adjusted                                | Error in seconds or +/-999 if large |
| I057   | Fault Set Latching                                 |                                     |
| I058   | Fault Set Non-Latching                             |                                     |
| I059   | LCD Heater On                                      |                                     |
| I060   | LCD Heater Off                                     |                                     |
| I061   | Personality Power Up                               | Sensor type                         |
| I062   | Option Power Up                                    | Option type                         |
| I063   | Loaded Same Cell                                   |                                     |
| I064   | Loaded Changed Cell                                |                                     |
| I065   | Loaded Changed Gas                                 |                                     |
| I066   | Option Type Changed                                |                                     |
| I067   | HART Address Changed                               |                                     |
| I068   | HART Mode Changed                                  |                                     |

## 14 Control Drawings





OPTION

### 1. EMPTY PARAMETERS OF XNX UNIVERSAL TRANSMITTER LOCAL HAST INTERFACE

| COMPONENT | PARAMETER                 |
|-----------|---------------------------|
| Cable     | $\alpha = 24.15^\circ$    |
|           | $\beta = 1.92\text{ m/s}$ |
|           | $\rho_a = 0.8708$         |
|           | $\rho_w = 1.0264$         |
|           | $\rho_o = 0.1228^\circ$   |
| Buoy      | $\alpha = 21.85^\circ$    |
|           | $\beta = 3.02\text{ m/s}$ |
|           | $\rho_a = 1.51^\circ$     |
|           | $\rho_w = 0.0484$         |
|           | $\rho_o = 0.048^\circ$    |

| BASIC MARKET INFORMATION |                                |
|--------------------------|--------------------------------|
| MARKET                   | OUTLOOK                        |
| 1                        | None or V (per 100)            |
| 2                        | Low or L (per 100)             |
| 3                        | Med (per 100)                  |
| 4                        | High or H (per 100)            |
| 5                        | Very High or VH (per 100)      |
| 6                        | Extremely High or EH (per 100) |
| 7                        | Very Low or VL (per 100)       |
| 8                        | Extremely Low or EL (per 100)  |
| 9                        | None or V (per 100)            |
| 10                       | Low or L (per 100)             |
| 11                       | Med (per 100)                  |
| 12                       | High or H (per 100)            |
| 13                       | Very High or VH (per 100)      |
| 14                       | Extremely High or EH (per 100) |
| 15                       | None or V (per 100)            |
| 16                       | Low or L (per 100)             |
| 17                       | Med (per 100)                  |
| 18                       | High or H (per 100)            |
| 19                       | Very High or VH (per 100)      |
| 20                       | Extremely High or EH (per 100) |

2. THE LOCAL HART DEVICE CONNECTED MUST BE THIRD PARTY LISTED AS INTRINSICALLY SAFE FOR THE APPLICATION, AND HAVE INTRINSICALLY SAFE ENTITY PARAMETERS CONFORMING WITH TABLE 1 (B) (C) (D)

| BASIC MARKET INFORMATION |                                |
|--------------------------|--------------------------------|
| MARKET                   | OUTLOOK                        |
| 1                        | None or V (per 100)            |
| 2                        | Low or L (per 100)             |
| 3                        | Med (per 100)                  |
| 4                        | High or H (per 100)            |
| 5                        | Very High or VH (per 100)      |
| 6                        | Extremely High or EH (per 100) |
| 7                        | Very Low or VL (per 100)       |
| 8                        | Extremely Low or EL (per 100)  |
| 9                        | None or V (per 100)            |
| 10                       | Low or L (per 100)             |
| 11                       | Med (per 100)                  |
| 12                       | High or H (per 100)            |
| 13                       | Very High or VH (per 100)      |
| 14                       | Extremely High or EH (per 100) |
| 15                       | None or V (per 100)            |
| 16                       | Low or L (per 100)             |
| 17                       | Med (per 100)                  |
| 18                       | High or H (per 100)            |
| 19                       | Very High or VH (per 100)      |
| 20                       | Extremely High or EH (per 100) |

## VNX UNIVERSAL TRANSMITTER WITH EC PERSONALITY

### 3.1. ENTITY PARAMETERS OF XNY UNIVERSAL TRANSMITTER FC ADAPTER

| QUALITY       | MARKET |
|---------------|--------|
| V max (per U) | 8      |
| T max (per U) | 5      |
| P max, 2)     | 6      |
| Cl + Coable   | 20     |
| L. cable      | 2      |

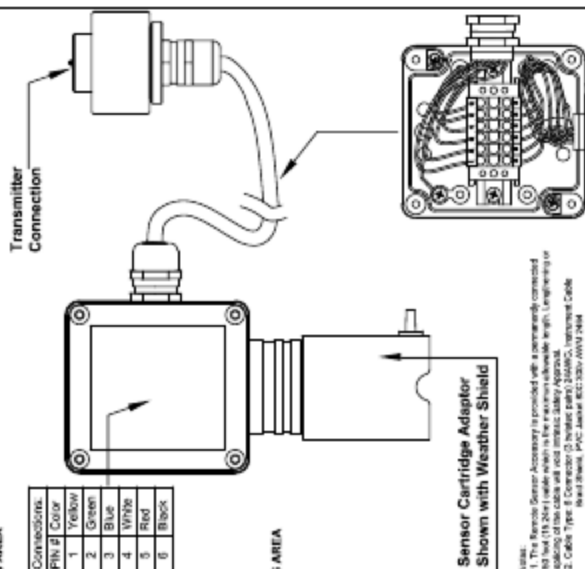
## KNX UNIVERSAL TRANSMITTER WITH EC PERSONALITY AND/OR LOCAL HART

1. THE OUTPUT CURRENT OF THE LOCAL WIND AND EOL IS BARBERS ARE LIMITED TO A RESISTOR SUCH THAT THE OUTPUT VOLTAGE-CURRENT RATIO IS A STRAIGHT LINE ORIGIN BETWEEN OPEN-CIRCUIT VOLTAGE AND SHORT-CIRCUIT CURRENT.
2. THE ASSOCIATED APPARATUS MAY ALSO BE CONNECTED TO SIMPLE APPARATUS AS DERIVED IN ARTICLE 504-2 AND INSTALLED AND TEMPERATURE CLASSIFIED IN ACCORDANCE WITH ARTICLE 504-10(B) OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70), OR OTHER LOCAL CODES, AS APPLICABLE.
3. CAPACITANCE AND INDUCTANCE OF THE FIELD WIRING FROM THE INTRINSICALLY SAFE EQUIPMENT TO THE ASSOCIATED APPARATUS SHALL BE CALCULATED AND MUST BE INCLUDED IN THE SYSTEM CALCULATIONS AS SHOWN IN TABLE 1. CABLE CAPACITANCE COEFF. PLUS INTRINSICALLY SAFE EQUIPMENT CAPACITANCE,  $C$  MUST BE LESS THAN THE MARKED CAPACITANCE,  $C_0$  (OR  $C_1$  AND  $C_2$  SHOWN ON ANY ASSOCIATED APPARATUS USED). THE SAME APPLIES FOR INDUCTANCE ( $L_0$ ,  $L_1$  AND  $L_2$  OR  $L_3$ , RESPECTIVELY). WHILE THE CABLE CAPACITANCE AND INDUCTANCE PER FOOT ARE NOT KNOWN, THE FOLLOWING VALUES SHALL BE USED:  
Cable  $C = 60$  PF/FT. Inductance  $L = 0.2$   $\mu$ H/FT.
4. THE ASSOCIATED APPARATUS MUST BE CONNECTED TO A SUITABLE GROUND ELECTRODE PER THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70), THE CANADIAN ELECTRICAL CODE, OR OTHER LOCAL INSTALLATION CODES, AS APPLICABLE. THE RESISTANCE OF THE GROUND PATH MUST BE LESS THAN 1 OHM.
5. INTRINSICALLY SAFE CIRCUITS MUST BE WIRED AND SEPARATED IN ACCORDANCE WITH ARTICLE 504-2 OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70), THE CANADIAN ELECTRICAL CODE, OR OTHER LOCAL CODES, AS APPLICABLE. REFER TO ARTICLE 504-30(B) OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) AND INSTRUMENT SOCIETY OF AMERICA RECOMMENDED PRACTICE ISA RP12.6 FOR INSTALLING INTRINSICALLY SAFE EQUIPMENT.
6. THIS ASSOCIATED APPARATUS HAS NOT BEEN EVALUATED FOR USE IN COMBINATION WITH ANOTHER ASSOCIATED APPARATUS.
7. CONTROL EQUIPMENT MUST NOT USE OR GENERATE MORE THAN 250 V RMS OR DC WITH RESPECT TO EARTH.
8. FOR USE, IN COMPLIANCE, THE ASSOCIATED APPARATUS MUST BE INSTALLED IN ACCORDANCE WITH NFPA 70, ARTICLE 505.

|                   |      |                         |                          |     |     |
|-------------------|------|-------------------------|--------------------------|-----|-----|
| REV               | DATE | DESCRIPTION OF REVISION | SEE SHEET 1/             | --- | --- |
| REVISION RECORD   |      |                         |                          |     |     |
| FIRST PARENT P/N: |      |                         | DRAWING RELEASE NO.: --- |     |     |

|                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                         |                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| DO NOT SCALE DRAWING.                                                                                                                                                                                                                                                                                                         | PLUMBING (WALL)<br>FINISHED SPRING<br>1/4" = 1' (NOT)<br>1/4" = 1' (NOT)<br>1/4" = 1' (NOT)<br>1/4" = 1' (NOT)<br>1/4" = 1' (NOT)<br>1/4" = 1' (NOT)<br>1/4" = 1' (NOT) | SHEET NO.<br>1226E0402<br>SHEET 3 OF 3             |
| THE DRAWING AND THE RECORDS<br>HEREON SHALL BE THE PROPERTY<br>OF THE DISTRICT OF COLUMBIA<br>AND SHALL REMAIN THE PROPERTY<br>OF THE DISTRICT OF COLUMBIA<br>AND SHALL NOT BE LOANED, REPRODUCED,<br>COPIED, OR IN ANY MANNER<br>USED FOR ANY OTHER PURPOSE<br>WITHOUT THE WRITTEN<br>PERMISSION OF THE DISTRICT OF COLUMBIA | DATE: 12/2/09<br>BY: J. L. LEB<br>TITLE: J. L. LEB                                                                                                                      | DATE: 12/2/09<br>BY: J. L. LEB<br>TITLE: J. L. LEB |
| SHEET NO.<br>1226E0402<br>SHEET 3 OF 3                                                                                                                                                                                                                                                                                        | DATE: 12/2/09<br>BY: J. L. LEB<br>TITLE: J. L. LEB                                                                                                                      | DATE: 12/2/09<br>BY: J. L. LEB<br>TITLE: J. L. LEB |

Remote Sensor Accessory  
Honeywell Part Number S3KRMK



1. The Barcode Sensor Assembly is provided with a permanently connected cable and has 1/4" (6.35 mm) cable which is five maximum allowable length. Engineering is responsible for the proper installation of the cable and the proper termination of the cable. The cable will void internal liability approval.

2. Cable Type: 5 Conductor (2 twisted pairs) 24AWG, minimum Cable Shield diameter, PVC Jacket IEC 60332-1/2/3/4/5/6/7/8/9/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/

| Connection: | PIN # | Color  |
|-------------|-------|--------|
|             | 1     | Yellow |
|             | 2     | Green  |
|             | 3     | Blue   |
|             | 4     | White  |
|             | 5     | Red    |
|             | 6     | Black  |

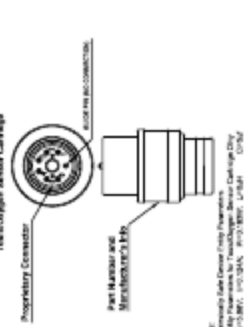
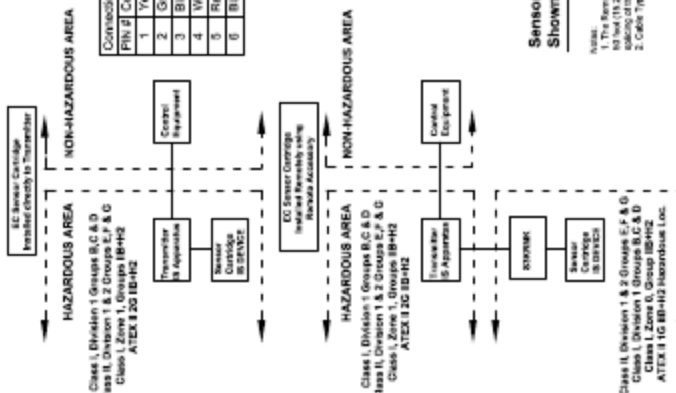


Table 1. Demographic characteristics of the study population. The data were obtained from the 2002 census of the United States. The population was divided into age groups (18-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+), race (White, Black, Hispanic, Asian, American Indian, Alaska Native, Native Hawaiian, Other), sex (Male, Female), and education level (Less than high school, High school, Some college, Bachelor's degree, Graduate degree). The data were then analyzed using chi-square tests to determine if there were significant differences in the prevalence of hypertension between the different demographic groups.

| Type | Case No.  | Case Type | Service Part No. | Gas Type | Service Part No. |
|------|-----------|-----------|------------------|----------|------------------|
| PSL  | 350001015 | Q1        | 350001015        | CO       | 350001015        |
| PSL  | 350001016 | Q1        | 350001016        | CO       | 350001016        |
| PSL  | 350001018 | Q1        | 350001018        | CO       | 350001018        |
| PSL  | 350001019 | Q1        | 350001019        | CO       | 350001019        |
| PSL  | 350001020 | Q1        | 350001020        | CO       | 350001020        |
| PSL  | 350001021 | Q1        | 350001021        | CO       | 350001021        |
| PSL  | 350001022 | Q1        | 350001022        | CO       | 350001022        |
| PSL  | 350001023 | Q1        | 350001023        | CO       | 350001023        |
| PSL  | 350001024 | Q1        | 350001024        | CO       | 350001024        |
| PSL  | 350001025 | Q1        | 350001025        | CO       | 350001025        |
| PSL  | 350001026 | Q1        | 350001026        | CO       | 350001026        |
| PSL  | 350001027 | Q1        | 350001027        | CO       | 350001027        |
| PSL  | 350001028 | Q1        | 350001028        | CO       | 350001028        |
| PSL  | 350001029 | Q1        | 350001029        | CO       | 350001029        |
| PSL  | 350001030 | Q1        | 350001030        | CO       | 350001030        |
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| PSL  | 350001032 | Q1        | 350001032        | CO       | 350001032        |
| PSL  | 350001033 | Q1        | 350001033        | CO       | 350001033        |
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| PSL  | 350001047 | Q1        | 350001047        | CO       | 350001047        |
| PSL  | 350001048 | Q1        | 350001048        | CO       | 350001048        |
| PSL  | 350001049 | Q1        | 350001049        | CO       | 350001049        |
| PSL  | 350001050 | Q1        | 350001050        | CO       | 350001050        |
| PSL  | 350001051 | Q1        | 350001051        | CO       | 350001051        |
| PSL  | 350001052 | Q1        | 350001052        | CO       | 350001052        |
| PSL  | 350001053 | Q1        | 350001053        | CO       | 350001053        |
| PSL  | 350001054 | Q1        | 350001054        | CO       | 350001054        |
| PSL  | 350001055 | Q1        | 350001055        | CO       | 350001055        |
| PSL  | 350001056 | Q1        | 350001056        | CO       | 350001056        |
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| PSL  | 350001058 | Q1        | 350001058        | CO       | 350001058        |
| PSL  | 350001059 | Q1        | 350001059        | CO       | 350001059        |
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| PSL  | 350001065 | Q1        | 350001065        | CO       | 350001065        |
| PSL  | 350001066 | Q1        | 350001066        | CO       | 350001066        |
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| PSL  | 350001068 | Q1        | 350001068        | CO       | 350001068        |
| PSL  | 350001069 | Q1        | 350001069        | CO       | 350001069        |
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| PSL  | 350001088 | Q1        | 350001088        | CO       | 350001088        |
| PSL  | 350001089 | Q1        | 350001089        | CO       | 350001089        |
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| PSL  | 350001172 | Q1        | 350001172        | CO       | 350001172        |
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| PSL  | 350001197 | Q1        | 350001197        | CO       | 350001197        |
| PSL  | 350001198 | Q1        | 350001198        | CO       | 350001198        |
| PSL  | 350001199 | Q1        | 350001199        | CO       | 350001199        |
| PSL  | 350001200 | Q1        | 350001200        | CO       | 350001200        |
| PSL  | 350001201 | Q1        | 350001201        | CO       | 350001201        |
| PSL  | 350001202 | Q1        | 350001202        | CO       | 35000120         |

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HEREIN ARE RESERVED BY  
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TECHNOLOGIES, INC. AND MUST BE  
RETURNED TO THE COMPANY  
UPON REQUEST.

|                                                                                                                                 |  |                    |           |             |           |
|---------------------------------------------------------------------------------------------------------------------------------|--|--------------------|-----------|-------------|-----------|
| <b>THIS ITEM FORMS PART OF A CERTIFIED PRODUCT<br/>NO MODIFICATION REQUIRED WITHOUT<br/>REFERENCE TO CERTIFICATION DOCUMENT</b> |  |                    |           |             |           |
|                                                                                                                                 |  | SOURCE             | DATE      | REV.        | BY        |
|                                                                                                                                 |  | 1/1                | JUNE 2008 | CONTROL_DWG | 3000E3159 |
|                                                                                                                                 |  | TITLE              | DATE      | REVISION    | BY        |
|                                                                                                                                 |  | XONE_POC_CARTRIDGE |           |             |           |
|                                                                                                                                 |  | CONTROL_DRAWING    |           |             |           |

[illegible]

|                                                                                   |                                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <p>THE UNIVERSITY OF ALABAMA<br/>JANUARY 1975</p> <p>RECEIVED<br/>JAN 19 1975</p> | <p>THE UNIVERSITY OF ALABAMA<br/>JANUARY 1975</p> <p>RECEIVED<br/>JAN 19 1975</p> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|





## NXN TRANSMITTER WITH FACTORY INSTALLED LOCAL HART OPTION

### 1. ENTITY PARAMETERS OF NXN UNIVERSAL TRANSMITTER LOCAL HART INTERFACE

| ENTITY      |             |
|-------------|-------------|
| U = 24.18V  | U = 24.18V  |
| R = 1020Ω   | R = 1020Ω   |
| P = 0.087W  | P = 0.087W  |
| U = 0.040V  | U = 0.040V  |
| C = 0.002μF | C = 0.002μF |

### 2. THE LOCAL HART DEVICE CONNECTED MUST BE THIRD PARTY LISTED AS INTRINSICALLY SAFE FOR THE APPLICATION, AND HAVE INTRINSICALLY SAFE ENTITY PARAMETERS CONFORMING WITH TABLE 1 BELOW.

TABLE 1  
NXN HART INTERFACE

| ENTITY                     |                            |
|----------------------------|----------------------------|
| V <sub>max</sub> (dc U)    | V <sub>max</sub> (dc U)    |
| I <sub>max</sub> (dc R)    | I <sub>max</sub> (dc R)    |
| P <sub>max</sub> (R)       | P <sub>max</sub> (R)       |
| C <sub>max</sub> (Capable) | C <sub>max</sub> (Capable) |
| U <sub>1</sub> (Leakage)   | U <sub>1</sub> (Leakage)   |
| WIRE                       |                            |
| V <sub>max</sub> (dc U)    | V <sub>max</sub> (dc U)    |
| I <sub>max</sub> (dc R)    | I <sub>max</sub> (dc R)    |
| P <sub>max</sub> (R)       | P <sub>max</sub> (R)       |
| C <sub>max</sub> (Capable) | C <sub>max</sub> (Capable) |
| U <sub>1</sub> (Leakage)   | U <sub>1</sub> (Leakage)   |

## NXN UNIVERSAL TRANSMITTER WITH EC PERSONALITY

### 1. ENTITY PARAMETERS OF NXN UNIVERSAL TRANSMITTER EC ADAPTER

| ENTITY                     |                            |
|----------------------------|----------------------------|
| V <sub>max</sub> (dc U)    | V <sub>max</sub> (dc U)    |
| I <sub>max</sub> (dc R)    | I <sub>max</sub> (dc R)    |
| P <sub>max</sub> (R)       | P <sub>max</sub> (R)       |
| C <sub>max</sub> (Capable) | C <sub>max</sub> (Capable) |
| U <sub>1</sub> (Leakage)   | U <sub>1</sub> (Leakage)   |

## NXN UNIVERSAL TRANSMITTER WITH EC PERSONALITY AND/OR LOCAL HART

- THE OUTPUT CURRENT OF THE LOCAL HART AND EC IS BARRIERS ARE LIMITED BY A RESISTOR SUCH THAT THE OUTPUT VOLTAGE-CURRENT PLOT IS A STRAIGHT LINE DRAWN BETWEEN OPEN-CIRCUIT VOLTAGE AND SHORT-CIRCUIT CURRENT.
- THE ASSOCIATED APPARATUS MAY ALSO BE CONNECTED TO SIMPLE APPARATUS AS DERIVED IN ARTICLE 504.2 AND INSTALLED AND TEMPORARILY CLASSIFIED IN ACCORDANCE WITH ARTICLE 504.10(B) OF THE NATIONAL ELECTRICAL CODE (NFPA 70), OR OTHER LOCAL CODES, AS APPLICABLE.
- CAPACITANCE AND INDUCTANCE OF THE FIELD WIRING FROM THE INTRINSICALLY SAFE EQUIPMENT TO THE ASSOCIATED APPARATUS SHALL BE CALCULATED AND MUST BE INCLUDED IN THE STATED CALCULATIONS AS SHOWN IN THE CALCULATED PRACTICE (ISA RP12.6) FOR INTRINSICALLY SAFE EQUIPMENT. APPARATUS MUST BE LESS THAN THE ASSOCIATED PRACTICE (ISA RP12.6) FOR INTRINSICALLY SAFE EQUIPMENT. USED THE SAME ARTICLES FOR INDUCTANCE (L) AND CAPACITANCE (C) VALUES, RESPECTIVELY, WHERE THE CABLE CAPACITANCE AND INDUCTANCE PER FOOT ARE NOT KNOWN, THE FOLLOWING VALUES SHALL BE USED:  
C<sub>max</sub> = 60 pF/FT. L<sub>max</sub> = 0.2 μH/FT.
- THE ASSOCIATED APPARATUS MUST BE CONNECTED TO A SUITABLE GROUND ELECTRODE PER THE NATIONAL ELECTRICAL CODE (NFPA 70), THE CANADIAN ELECTRICAL CODE, OR OTHER LOCAL INSTALLATION CODES, AS APPLICABLE. THE RESISTANCE OF THE GROUND PATH MUST BE LESS THAN 1 OHM.
- INTRINSICALLY SAFE CIRCUITS MUST BE WIRED AND SEPARATED IN ACCORDANCE WITH ARTICLE 504.20 OF THE NATIONAL ELECTRICAL CODE (NFPA 70), OR OTHER LOCAL CODES, AS APPLICABLE. REFER TO ARTICLE 504.30(B) OF THE NATIONAL ELECTRICAL CODE (NFPA 70) AND INSTRUMENT SOCIETY OF AMERICA RECOMMENDED PRACTICE (ISA RP12.6) FOR INSTALLING INTRINSICALLY SAFE EQUIPMENT.
- THIS ASSOCIATED APPARATUS HAS NOT BEEN EVALUATED FOR USE IN COMBINATION WITH ANOTHER ASSOCIATED APPARATUS.
- CONTROL EQUIPMENT MUST NOT USE OR GENERATE MORE THAN 250 V RMS OR DC WITH RESPECT TO EARTH.

|                      |      |                         |     |      |
|----------------------|------|-------------------------|-----|------|
| REV                  | DATE | DESCRIPTION OF REVISION | CAO | DWG. |
| ---                  | ---  | SEE SHEET 1/            | --- | ---  |
| REVISION RECORD      |      |                         |     |      |
| FIRST PARENT P/N:    |      |                         |     |      |
| DRAWING RELEASE NO.: |      |                         |     |      |

**Honeywell**

|                                                                                    |  |                                                                              |  |                                    |  |
|------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------|--|------------------------------------|--|
| DO NOT SCALE DRAWING                                                               |  | DRAWING TITLE                                                                |  | NXN CONTROL DRAWING                |  |
| PREPARED BY: [blank]<br>CHECKED BY: [blank]<br>IN CHARGE: [blank]<br>DATE: [blank] |  | DRAWING NO. [blank]<br>M. NUMBER [blank]<br>IF 2/25 [blank]<br>DATE: [blank] |  | SHEET N/A<br>REV 2<br>SHEET 3 OF 3 |  |

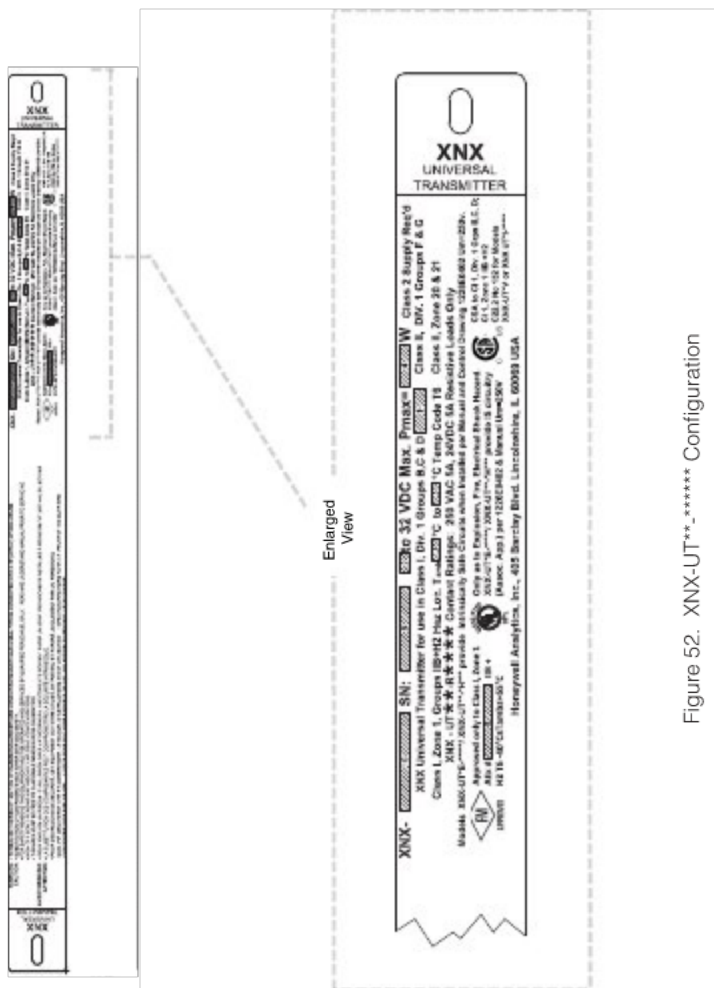
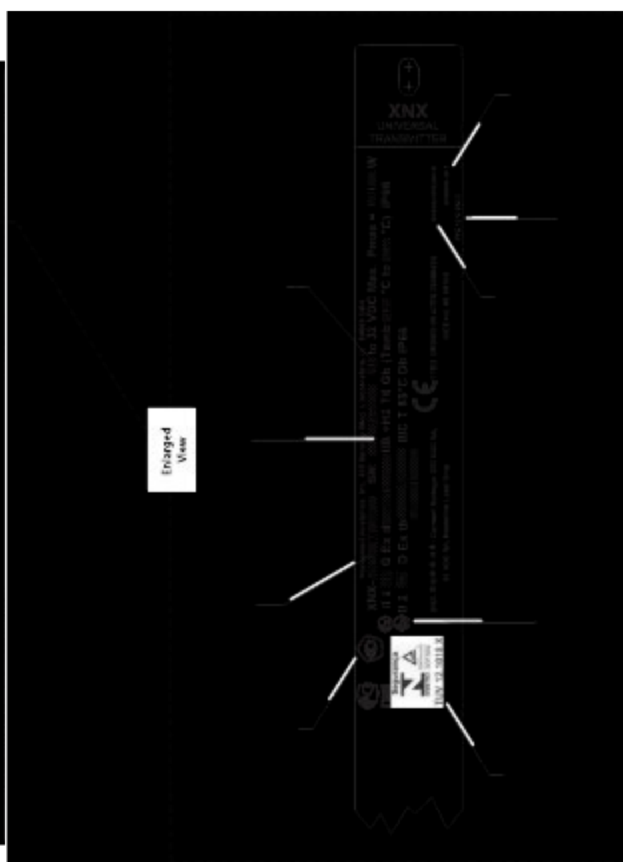


Figure 52. XNX-UT\*\*\_\*\*\*\*\* Configuration



XNX-AM<sup>®</sup>\_\*\*\*\*\* Configuration



Figure 54. XNX-BT\*\*\_\*\*\*\*\* Configuration

## 16 Specifications

| Electrical                                                                                                                                   |                                                                                                                                                                                                                                                                                                                |                                                                               |                   |
|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------|
| Operating Voltage                                                                                                                            | EC/mV: 16V to 32V (24V nominal) ** Startup/Normal values **<br>IR: 18V to 32V (24V nominal) ** Startup/Normal values **                                                                                                                                                                                        |                                                                               |                   |
| Power Consumption                                                                                                                            | Configuration                                                                                                                                                                                                                                                                                                  | Max Power                                                                     | Inrush            |
|                                                                                                                                              | XNX EC                                                                                                                                                                                                                                                                                                         | 6.2 w                                                                         | <1A, <10ms@24VDC  |
|                                                                                                                                              | XNX mV                                                                                                                                                                                                                                                                                                         | 6.5 w                                                                         | <750mA <2ms@24VDC |
|                                                                                                                                              | XNX IR (Optima)                                                                                                                                                                                                                                                                                                | 9.7w                                                                          | <1A, <10ms@24VDC  |
|                                                                                                                                              | XNX IR (Excel)                                                                                                                                                                                                                                                                                                 | 13.2w                                                                         | <1A, <10ms@24VDC  |
| Termination                                                                                                                                  | Crimp style pluggable with retaining screws, 12-28 AWG (2.5 to 0.5mm <sup>2</sup> ) with Shorting Jumpers: 14-28 AWG (2.0 to 0.5mm <sup>2</sup> )<br>NOTE: to maintain EMC integrity, wiring must be shielded by either an integral shield or run through conduit or pipe. Shield should provide 90% coverage. |                                                                               |                   |
| Signal                                                                                                                                       | Standard                                                                                                                                                                                                                                                                                                       | HART® over 3-wire 4-20mA (sink, source or isolated)                           |                   |
|                                                                                                                                              | Optional                                                                                                                                                                                                                                                                                                       | Modbus® over RS-485                                                           |                   |
|                                                                                                                                              | 20 mA                                                                                                                                                                                                                                                                                                          | HART over 3-wire 4-20mA (sink, source, or isolated) compliant with NAMUR NE43 |                   |
| Cable Ports                                                                                                                                  | 5 – (2 right, 2 left, 1 bottom) Available in ¾" NPT, or M25                                                                                                                                                                                                                                                    |                                                                               |                   |
| Recommended Cable                                                                                                                            | See Section 4.2 Distance Considerations for Installation.                                                                                                                                                                                                                                                      |                                                                               |                   |
| Construction                                                                                                                                 |                                                                                                                                                                                                                                                                                                                |                                                                               |                   |
| Material                                                                                                                                     | LM25 Aluminum, painted (SS316 painted optional)                                                                                                                                                                                                                                                                |                                                                               |                   |
| Dimensions                                                                                                                                   | 159 x 197 x 113.8 mm / 6.138 x 7.75 x 4.48 inches                                                                                                                                                                                                                                                              |                                                                               |                   |
| Weight                                                                                                                                       | 2.27 kg (5 lb) Aluminum<br>5 kg (11 lb) Stainless                                                                                                                                                                                                                                                              |                                                                               |                   |
| Mounting                                                                                                                                     |                                                                                                                                                                                                                                                                                                                |                                                                               |                   |
| XNX Enclosure                                                                                                                                | Integral Mounting Lugs for Wall- or Optional Pipe-Mount, Optional Wall/Ceiling Bracket                                                                                                                                                                                                                         |                                                                               |                   |
| User Interface                                                                                                                               |                                                                                                                                                                                                                                                                                                                |                                                                               |                   |
| Standard                                                                                                                                     | Custom Backlit LCD, magnetic wand access                                                                                                                                                                                                                                                                       |                                                                               |                   |
| Optional                                                                                                                                     | HART Handheld with IS Port                                                                                                                                                                                                                                                                                     |                                                                               |                   |
| Environmental - Operating                                                                                                                    |                                                                                                                                                                                                                                                                                                                |                                                                               |                   |
| IP Rating                                                                                                                                    | IP66                                                                                                                                                                                                                                                                                                           |                                                                               |                   |
| Temperature*                                                                                                                                 | Transmitter: -40°C to +65°C (-40°F to +149°F)                                                                                                                                                                                                                                                                  |                                                                               |                   |
|                                                                                                                                              | MPD**-CB1: -40°C to +65°C (-40°F to +149°F)                                                                                                                                                                                                                                                                    |                                                                               |                   |
|                                                                                                                                              | MPD**-I**: -20°C to +50°C (-4°F to +122°F)                                                                                                                                                                                                                                                                     |                                                                               |                   |
| Humidity                                                                                                                                     | 0 to 99% RH non-condensing                                                                                                                                                                                                                                                                                     |                                                                               |                   |
| Pressure                                                                                                                                     | 80 kPa to 120 kPa                                                                                                                                                                                                                                                                                              |                                                                               |                   |
| Air Speed                                                                                                                                    | 0-6 m/sec                                                                                                                                                                                                                                                                                                      |                                                                               |                   |
| *Operating temperatures will be limited by the sensors. See tables 6.2.2, 6.2.3, and 6.2.4 in the XNX Technical Manual for more information. |                                                                                                                                                                                                                                                                                                                |                                                                               |                   |
| Environmental - Storage                                                                                                                      |                                                                                                                                                                                                                                                                                                                |                                                                               |                   |
| Temperature                                                                                                                                  | -40°C to +65°C / -40°F to +149°F                                                                                                                                                                                                                                                                               |                                                                               |                   |
| Humidity                                                                                                                                     | 0 to 99% RH non-condensing                                                                                                                                                                                                                                                                                     |                                                                               |                   |
| Unpowered battery life: (Real Time Clock)                                                                                                    | 3 years at rated storage temperature                                                                                                                                                                                                                                                                           |                                                                               |                   |

## Hazardous Area Approvals

### XNX-UT\*\*-\*\*\*\*\*

UL Classified and CSA Listed (see notes below)  
 Class I, Div. 1 Groups B, C & D Class I, Zone 1 Groups IIB + H2  
 UL Classified  
 Class II, Div. 1 Groups F & G, Class II, Zone 20 & 21  
 FM Approvals Listed  
 AEx d IIB + H2 T6 -40 °C ≤ Tamb ≤ 65 °C  
 AEx d [ia IIC] IIB + H2 T6 -40 °C ≤ Tamb ≤ 65 °C (XNX UT\*-\*\*\*\*\* & XNX-UT\*-\*H\*\*\*\*)

### XNX-AM\*\*-\*\*\*\*\*

UL/Demko 09 ATEX 0809943X / IEC Ex UL 09.0010X  
 II 2 G Ex d IIB + H2 T6 (Tamb -40 °C to +65 °C) IP 66  
 II 2 D Ex tb IIIC T85 C Db  
 XNX-AM\*-\*\*\*\*\* & XNX-AM\*-\*H\*\*\*\*  
 II 2 (1)G Ex d [ia IIC Ga] IIB + H2 T6 (Tamb -40 °C to +65 °C) IP 66  
 II 2 (1)D Ex tb [ia IIIC Da] IIIC T85 Db

### XNX-BT\*\*-\*\*\*\*\*

UL Classified  
 Class I, Div. 1 Groups B, C & D Class I, Zone 1 Groups IIB + H2  
 Class II, Div. 1 Groups F & G, Class II, Zone 20 & 21  
 INMETRO TUV 12.1018X  
 Ex d IIB + H2 T4 Gb IP 66 ≤ -40 °C ta ≤ +65 °C  
 Ex d [ia IIC Ga] IIB + H2 T4 Gb IP 66 ≤ -40 °C ta ≤ +65 °C (XNX BT\*-\*\*\*\*\* & XNX-BT\*-\*H\*\*\*\*)  
 FM Approvals Listed  
 AEx d IIB + H2 T6 -40 °C ≤ Tamb ≤ 65 °C  
 AEx d [ia IIC] IIB + H2 T6 -40 °C ≤ Tamb ≤ 65 °C (XNX BT\*-\*\*\*\*\* & XNX-BT\*-\*H\*\*\*\*)

### NOTES:

1. The temperature class (T6) is limited to T4 when the MPD sensor is attached locally to the transmitter.
2. XNXC cartridges and Remote Mount Kit have been evaluated by Underwriters Laboratories (UL) to Canadian National Standards.
3. CSA Listing is only to Class I, Division 1 does not include Class II, Div. 1 approval
4. Peer to peer and multi-drop network (daisy chained) HART, Modbus®, and Foundation™ Fieldbus configurations have not been evaluated by CSA to the requirements of CSA 22:2 No. 152 for Combustible Gas Detection and may be used only for diagnostics and data collection.

## Performance Approvals

See section 6.3 of the XNX Technical Manual, *Certifications by Part Number*, for other approvals.

## Communication Options

|                     |                                                                                                                                                                                                                                                                                 |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relays              | Type: 3 form "C" SPCO contacts for alarm and fault indication.<br>Rating: 250 VAC, 5A/24 VDC, 5A (2 Alarm, 1 Fault)<br>A remote reset is provided to silence alarms. Foundation fieldbus, Modbus, and relay options are mutually exclusive.                                     |
| Modbus®             | Modbus/RTU over RS-485 physical layer.<br>Interface isolated; includes switchable 120 Ohm termination resistor.<br>Baud rates: 1200 to 38,400; 19,200 default. Foundation Fieldbus, Modbus, and relay options are mutually exclusive.                                           |
| Foundation Fieldbus | H1 Physical Layer.<br>31.25 kbit/s Manchester encoded signal.<br>AMIS-49200 Fieldbus MAU (media access unit).<br>SPC4-2 Fieldbus Controller.<br>Do not use Fieldbus communication in hazardous areas.<br>Foundation Fieldbus, relay, and Modbus options are mutually exclusive. |

# 17 EC Declaration of Conformity



## EC Declaration of Conformity



The undersigned of

For and on behalf of the importer

**Honeywell Analytics Inc**  
405 Barclay Boulevard  
Lincolnshire, Illinois 60069

**Life Safety Distribution AG**  
Javastrasse 2  
8604 Hegnau  
Switzerland

United States

Declares that the products listed below

### XXN UNIVERSAL TRANSMITTER

The XXN Universal Transmitter range of fixed gas detectors is used to monitor areas where flammable, oxygen deficiency and toxic gases may pose a hazard to working environments.

Are in conformity with the provisions of the following European Directive(s), when installed, operated, serviced and maintained in accordance with the installation/operating instructions contained in the product documentation:

2004/108/EC

EMC Directive

94/9/EC

ATEX Directive – Equipment for use in Potentially Explosive Atmospheres

And that the standards and/or technical specifications referenced below have been applied or considered:

| Standard                | Description                                                                                                                                                                                       | Product Part Numbers<br>("all versions")                                                                     | Notified Body |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------|
| EN 50270: 2006          | Electromagnetic Compatibility – Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen                                                                | XXN-****-*****                                                                                               |               |
| EN 60079-0: 2012        | Electrical apparatus for explosive gas atmospheres: General requirements                                                                                                                          | XXN-AM**-*                                                                                                   | UL-Demko      |
| EN 60079-1: 2007        | Electrical apparatus for explosive gas atmospheres: Flameproof enclosures "d"                                                                                                                     | XXN-AM**-*                                                                                                   | UL-Demko      |
| EN 60079-11: 2012       | Electrical apparatus for explosive gas atmospheres: intrinsic safety "i"                                                                                                                          | XXN-AM**-*HNNN, XXN-AM**-*H***, XXN-LHO with XXN-AM**-*N***                                                  | UL-Demko      |
| EN 60079-26: 2007       | Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga                                                                                                               | XXN-****-*****                                                                                               | UL-Demko      |
| EN 60079-31: 2009       | Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure "t"                                                                                                              | XXN-AM**-*                                                                                                   | UL-Demko      |
| EN 60529: 1991/ A1:2000 | Degrees of protection provided by enclosures                                                                                                                                                      | XXN-AM**-*                                                                                                   | UL-Demko      |
| EN 60079-29-1:2007      | Electrical apparatus for the detection and measurement of flammable gases - Part 4: Performance requirements for group II apparatus indicating a volume fraction up to 100% lower explosive limit | XXN-AM**-*HNNN with Searchpoint Optima Plus, XXN-AM**-*V-***CB1 XXN-AM**-*V-NNN With MPD-AMCB1 or Sensepoint | Dekra Exam    |
| EN50104:2010            | Electrical Apparatus for the detection and measurement of Oxygen. Performance requirements and test methods                                                                                       | XXN-AM**-*E-**** with XXXXSO1SS O2 Cartridge                                                                 | Dekra Exam    |
| EN 50271:2010           | Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen – Requirements and tests for apparatus using software and/or digital technologies              | XXN-AM**-*HNNN with Searchpoint Optima Plus, XXN-AM**-*V-***CB1 XXN-AM**-*V-NNN With MPD-AMCB1 or Sensepoint | Dekra Exam    |
| EN 45544:2000           | Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapors. Parts 1-4                                              | XXN-AM**-*E-**** with XXXXSH1SS, H2S cartridge, XXXXSC1SS CO Cartridge                                       | Dekra Exam    |



DECLARATION OF CONFORMITY

**Notified Body for Quality Assurance Notification::**

Baseefa Ltd  
Rockhead Business Park, Staden Lane  
Buxton, Derbyshire, SK17 9RZ.

**Notified Body Number:** 1180

**Quality Assurance Notification Number:** Baseefa ATEX 5989

**Notified Body for ATEX Examination:**

UL International DEMKO A/S

Lyskaer 8, P.O. Box 514

DK-2730 Herlev, Denmark

**Notified Body Number:** 0539

**Certificate Number:** 09ATEX0809943X

**Type Approval:** II 2 G Ex d IIB+H2 Gb IP-66, II 2 D Ex td IIIC Db, II 2 (1) G Ex d [Ia IIC] IIB+H2 Gb IP-66, II 2 (1) D Ex td [Ia Da ] IIIC Db

DEKRA EXAM GmbH  
Dinnendahlstrasse 9  
D-44809 BOCHUM, Germany  
**Notified Body Number:** 0158

**Certificate Number:** BVS 10 ATEX G 001; PFG 10 G 002 X

Year of CE marking: **2009**

Signature:



**Name:** Paul Silva  
**Position:** Regulatory Compliance Manager  
**Date:** 5<sup>th</sup> December 2012  
**Declaration Number:** XNX EC -007

Declaration of Conformity in accordance with EN ISO/IEC 17050-1:2010







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**Honeywell**

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