Quick Start Guide

Honeywell

XNX Universal Transmitter

WARNINGS

- The XNX Universal Transmitter is certified and designed for installation and use worldwide in hazardous areas.
- Installation must be in accordance with the recognized standards of the appropriate authority in the country concerned.
- Access to the interior of the detector, when carrying out any work, must only be conducted by trained personnel.
- Before carrying out any work, ensure local regulations and site procedures are followed. 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. Keep 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. An earth/ground point is provided inside and outside the unit. The internal grounding shall be used as the primary equipment ground. 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 or in any way disassemble the sensor cells.
- Do not expose to temperatures outside the recommended range.
- Do not expose sensor to organic solvents or flammable liquids.
- At the end of their working life, 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 and returned to Honeywell Analytics clearly marked for environmental disposal.
- Electrochemical cells should NOT be incinerated as they may emit toxic fumes.

HAZARDOUS LOCATIONS INSTALLATION REQUIREMENTS (UL/CSA)

- 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 ℃, terminal block screws should be tightened to 4.5 Lb/in maximum.
- Reference XNX Control Drawing 1226E0402 for additional information regarding IS function (Local HART and EC Personality).

HAZARDOUS LOCATIONS INSTALLATION REQUIREMENTS (ATEX)

- Read and understand this manual before installation and use.
- Use only Certified M25 cable glands for installation.
- Shielded armoured cable is required for CE compliance.

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1 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.*

NOTE

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.

1.1 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.

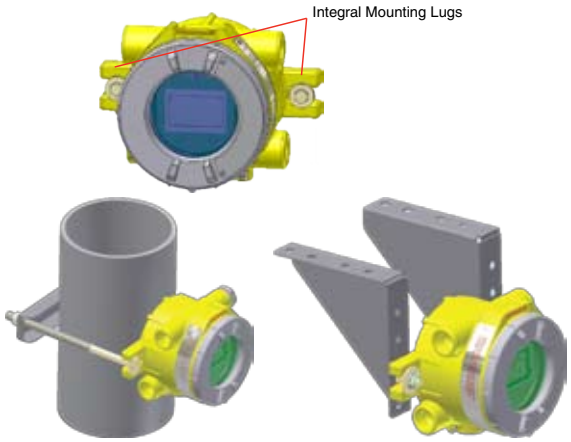


Figure 1. Integral Mounting Lugs and Optional Pipe and Ceiling Mounts

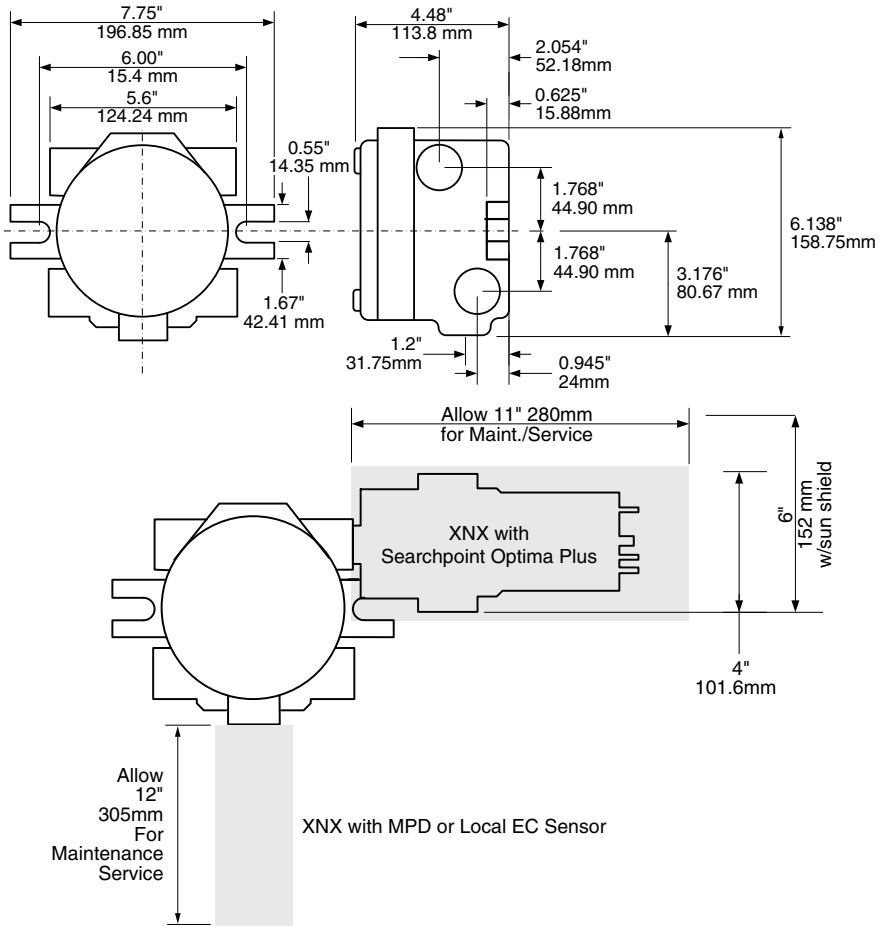
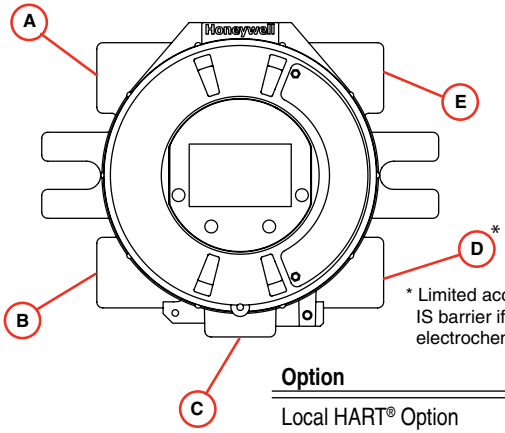


Figure 2. XNX Universal Transmitter Mounting Dimensions and Clearances

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.



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

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.

Option	Position
Local HART® 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®	Any remaining
Relays	Any remaining
Power	Any remaining

Figure 3. XNX Universal Transmitter Cable/Conduit Entry Assignments

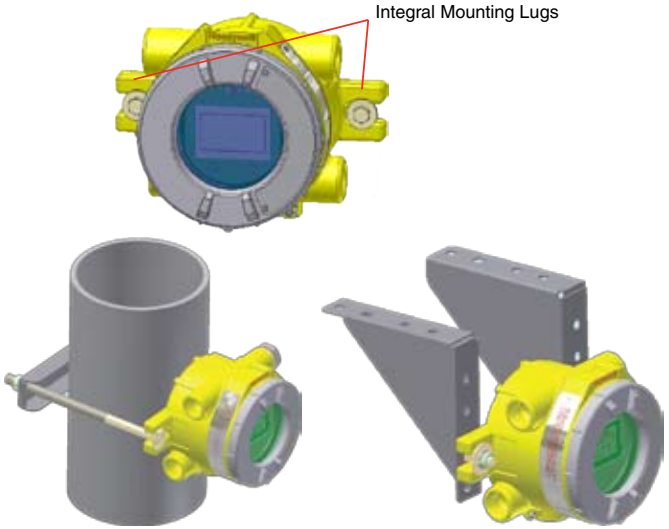


Figure 4. Integral Mounting Lugs and Optional Pipe and Ceiling Mounts

2 Wiring the XNX

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	Searchpoint Optima Plus Local/ 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	Sensepoint PPM Local/Remote
		Sensepoint HT Remote

CAUTION

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

2.1 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:

To maintain EMC integrity, wiring must be shielded by either an integral shield or run through conduit or pipe. Shield should provide 90% coverage.

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.

2.2 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

The power requirements for different transmitter configurations are:

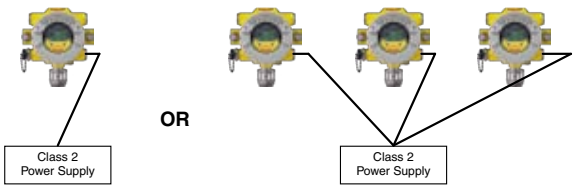
- *XNX EC (Toxic): 6.2 watts*
- *XNX mV (Catalytic): 6.5 watts*
- *XNX IR with Searchpoint Optima Plus: 9.7 watts*
- *XNX IR with Searchline Excel: 13.2 watts*

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.



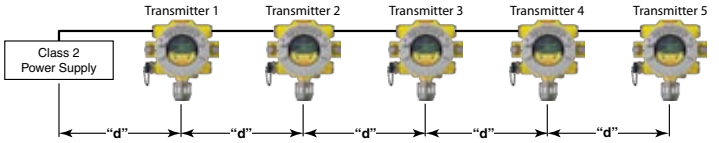
Single Transmitter Distances				
	18 AWG [1.0 mm^2]	16 AWG [1.5 mm^2]	14 AWG [2.0 mm^2]	12 AWG [3.5 mm^2]
XNX mV or EC With Sensor	1140 feet [347 meters]	1810 feet [551 meters]	2890 feet [880 meters]	4620 feet [1408 meters]
XNX IR with Searchpoint Optima Plus	660 feet [201 meters]	1060 feet [323 meters]	1690 feet [515 meters]	2690 feet [820 meters]
XNX IR with Searchline Excel	550 feet [168 meters]	890 feet [270 meters]	1410 feet [430 meters]	2260 feet [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-Chained" Transmitter Distances

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



1. *Several transmitters equally spaced from themselves and the power source.*

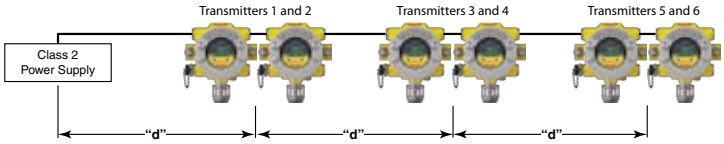
2 Transmitters - Distance "d"				
	18 AWG [1.0 mm^2]	16 AWG [1.5 mm^2]	14 AWG [2.0 mm^2]	12 AWG [3.5 mm^2]
XNX mV or EC With Sensor	380 feet [115 meters]	600 feet [183 meters]	960 feet [292 meters]	1540 feet [469 meters]
XNX IR with Searchpoint Optima Plus	220 feet [67 meters]	350 feet [106 meters]	560 feet [170 meters]	900 feet [274 meters]
XNX IR with Searchline Excel	185 feet [56 meters]	295 feet [90 meters]	470 feet [143 meters]	750 feet [229 meters]

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

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

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

2. *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"				
	18 AWG [1.0 mm^2]	16 AWG [1.5 mm^2]	14 AWG [2.0 mm^2]	12 AWG [3.5 mm^2]
XNX mV or EC With Sensor	485 feet [147 meters]	775 feet [235 meters]	1230 feet [292 meters]	1970 feet [600 meters]
XNX IR with Searchpoint Optima Plus	380 feet [115 meters]	600 feet [180 meters]	960 feet [290 meters]	1540 feet [470 meters]
XNX IR with Searchline Excel	280 feet [85 meters]	440 feet [134 meters]	700 feet [213 meters]	1130 feet [344 meters]

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

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

2.3 POD Connections

The illustration in Figure 5 details the connections available on each of the terminal blocks for each type of personality board.

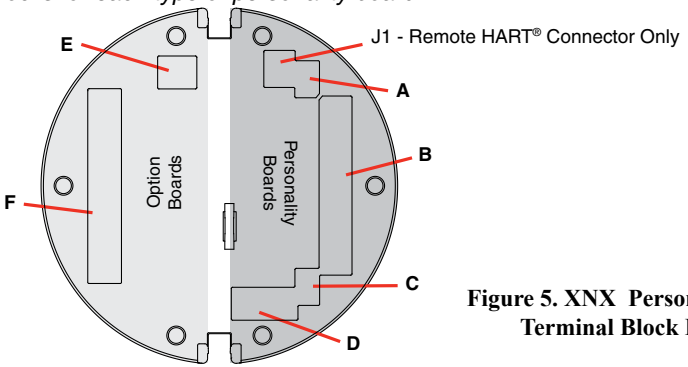


Figure 5. XNX Personality Board Terminal Block Legend

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®	SW5	Bus Loop Terminators

Table F		
Board Type	**Connection**	**Function**
Relay	TB3	Relay Output
Modbus®	TB3	Data Connection

2.4 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.

	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. For user convenience a second set of Terminals have been provided to eliminate the need for a secondary junction box in multi node systems.

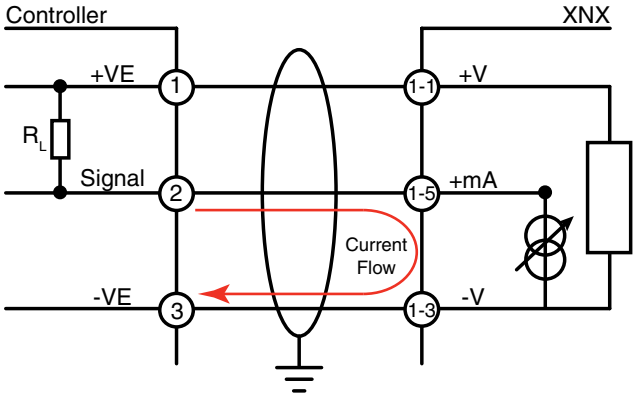


Figure 6. Sink wiring for XNX

Terminate cable screen at the detector or controller, not both.

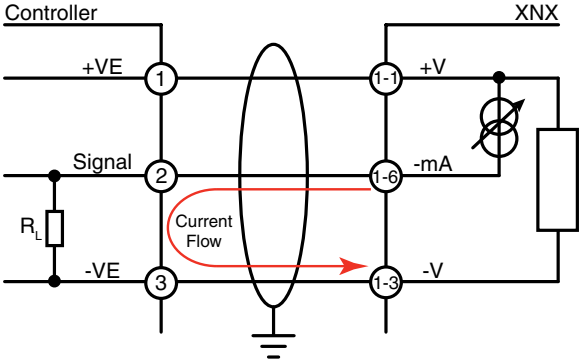


Figure 7. Source wiring for XNX

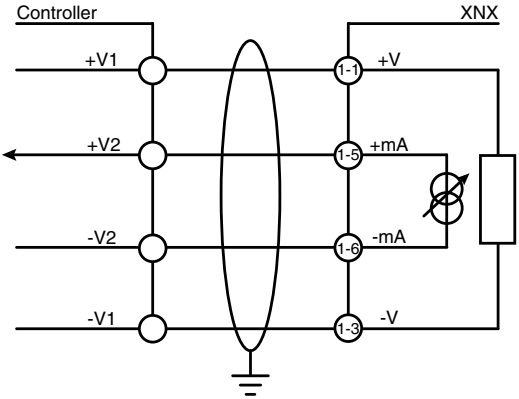


Figure 8. Isolated wiring for XNX

The XNX Universal Transmitter power consumption is dependent on the sensor and options for the specific configuration. The input voltage must be maintained at 16 to 32 volts DC for proper operation - sensor dependant.

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	13.2w	<1A, <1sec@24VDC

2.5 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. Depending on Personality and Option one to ten position terminal blocks are supplied.

Two terminal block jumpers are provided to provide an electrical connection without connection 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.

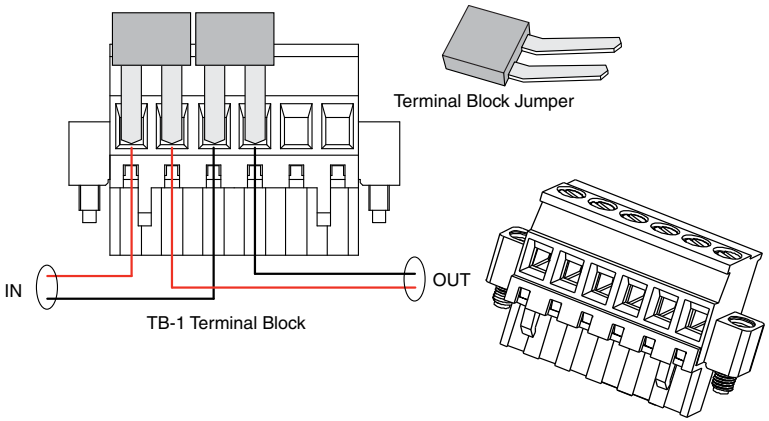


Figure 9. Pluggable Terminal Block and Terminal Block Jumper

2.6 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.

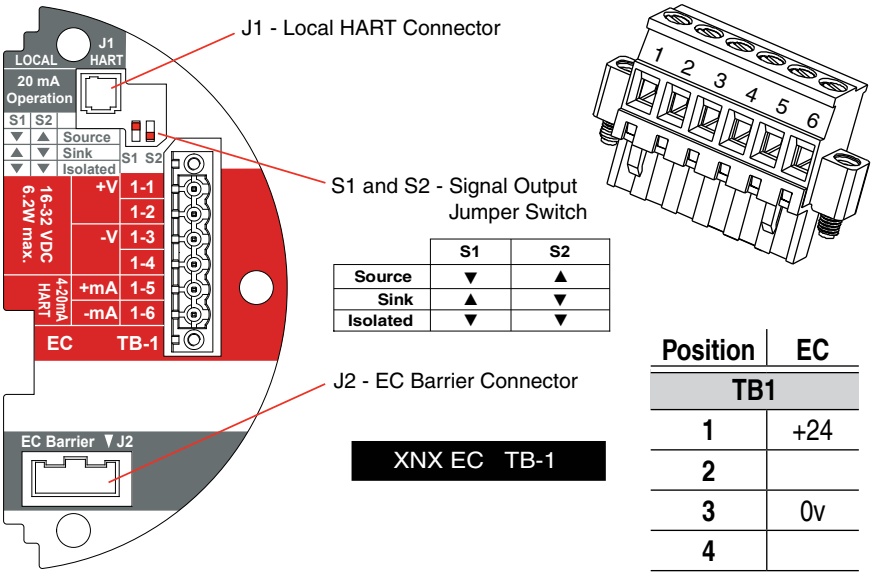


Figure 10. XNX EC Personality Board Terminal Blocks and Jumper Switches and Terminal Block Assignments

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.

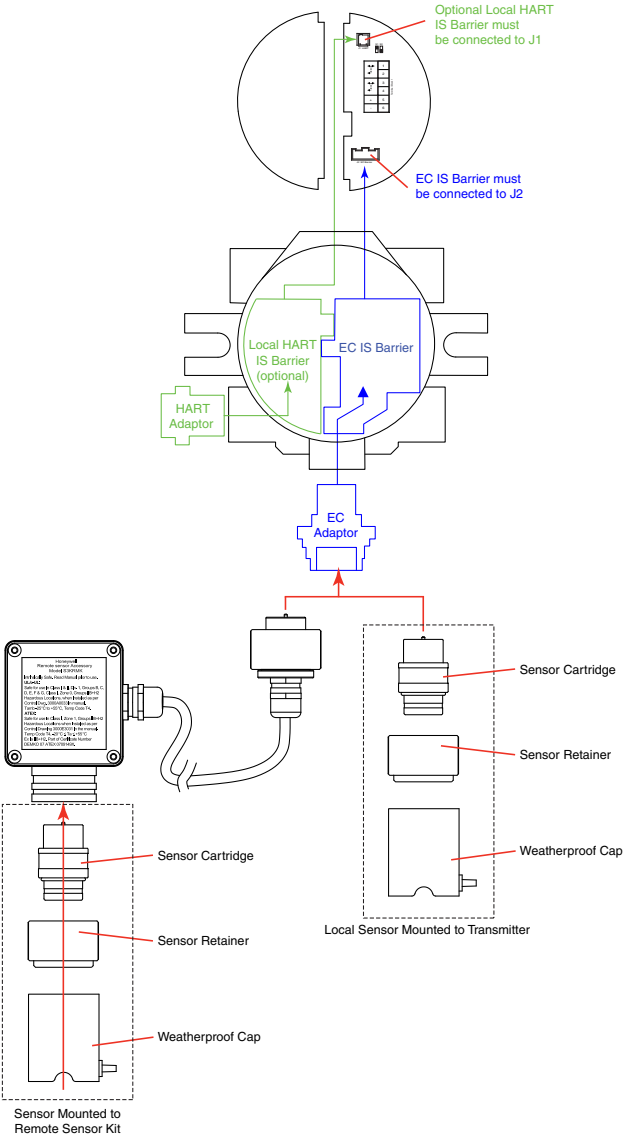


Figure 11. EC Personality Wiring

NOTE:

Reference Control Drawing 3000E3157 for install requirements on EC cells and remote mounting.

2.6.1 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 12 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 4 - Powering the XNX for the First Time.*
8. *Once the XNX has been configured, calibrate the detector following the procedures in Section 6.1 - Calibration.*

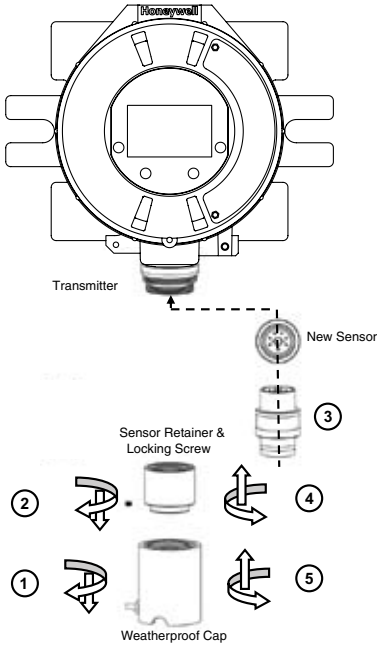


Figure 12. Installing Plug In Sensor

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.*
4. *Route the cable to the location where the remote sensor is to be mounted.*
5. *If necessary, cut the cable to the required length.*

CAUTION

Take care not to cut the cable too short. Once cut, additional lengths of cable cannot be added as this will invalidate the intrinsically safe certification. It is also recommend that a loop of cable is made at the junction box to allow slack for any future re-termination.

The enclosure of the remotely mounted 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 shall be certified in type of explosion protection flameproof enclosure "Ex e", suitable for the conditions of use and correctly installed.

6. *Mount the remote sensor junction box ensuring enough room below to fit the sensor and weatherproof cover.*
7. *Attach the cable to the remote terminal box via the gland provided.*
8. *Make the wiring connections as shown in Figure 13.*
9. *Fit the terminal box lid.*
10. *Plug the sensor into the socket at the bottom of the terminal box.*
11. *Fit the sensor retainer, tighten the locking screw and fit the weatherproof cover.*
12. *Calibrate the detector following the procedures in Section 6.1 - Calibration.*

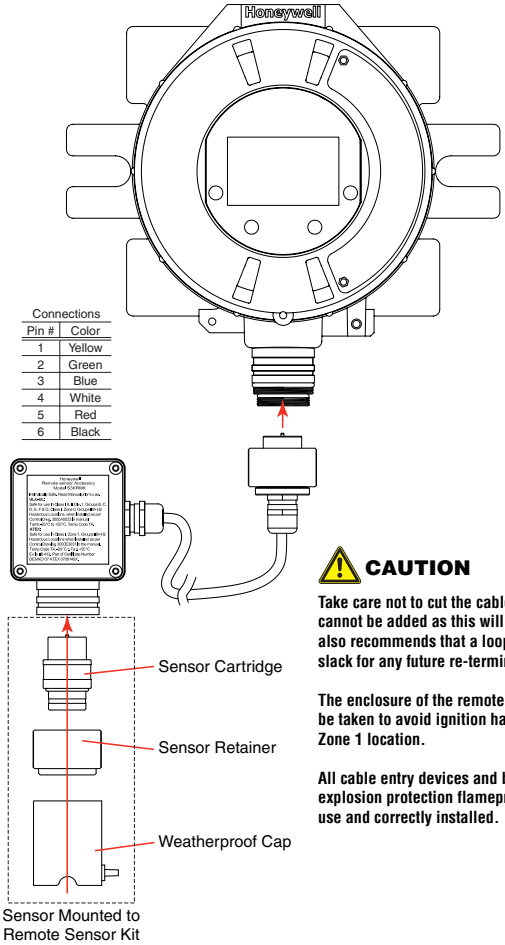


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Figure 13. Installing Remote Sensor Mounting Kit

2.7 mV Personality Wiring

XNX Universal Transmitter with the mV personality Board allows interface to a number of HA's 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 Figure 14.

Be sure wires for 4-20mA outputs are routed away from sources of noise such as relay wires.

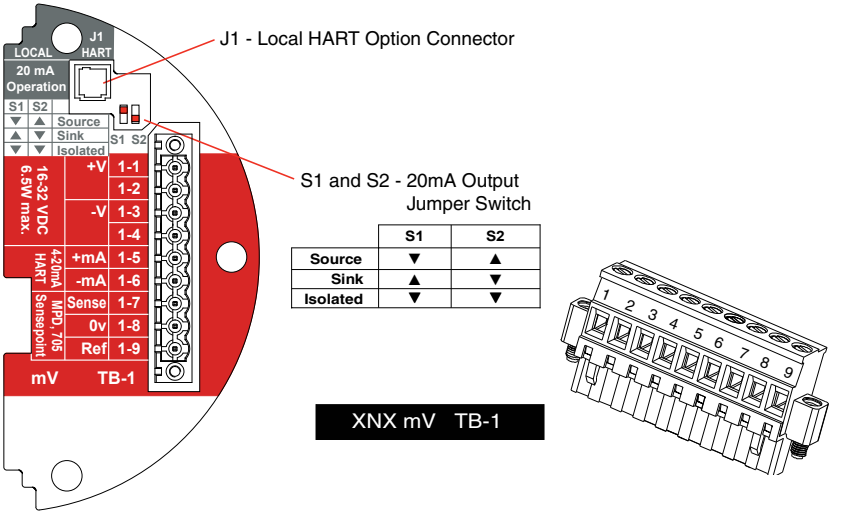
NOTE

The black and red wires from the MPD are not used with the XNX mV Personality Board. Ensure 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.



mV Sensor Type

		Catalytic Bead				MPD w/IR		
		MPD	705 705HT	Sensept Senspt HT	Sensept PPM	IR 5%		IR Flam
						CO_2	CH_4	
TB-1	**Desc.**	**Wire Color from Sensor**						
Pins 1-6		See Figure 5						
7	Sense	Brown			Red	Brown		
8	0v	White			Green	White		
9	Ref	Blue			Blue	Blue		
				Internal Ground				

Figure 14. XNX mV Personality Board Terminal Blocks, Jumper Switches and Wire Color Chart

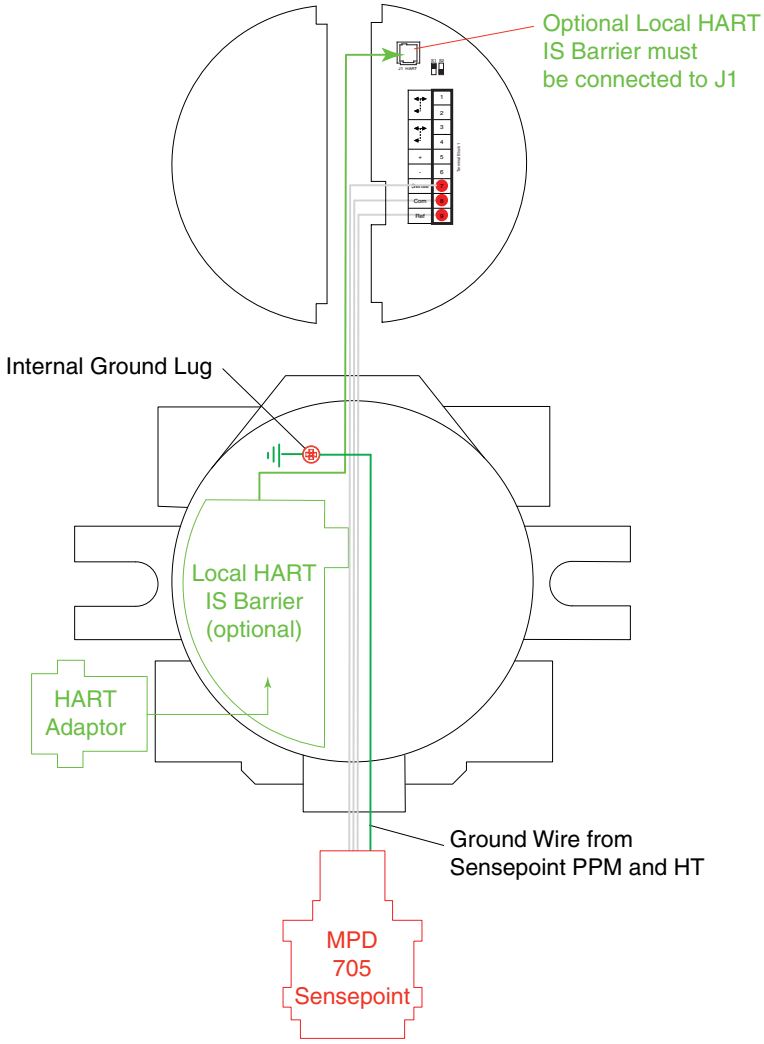


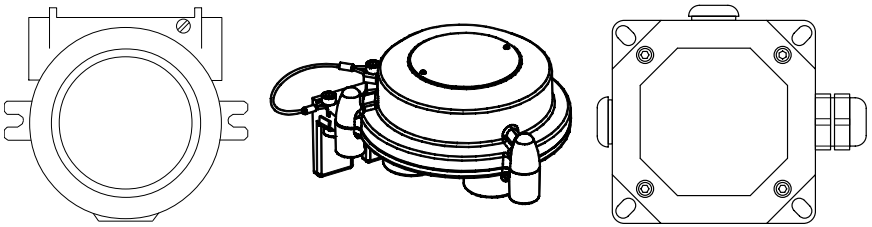
Figure 15. mV Personality Wiring

mV Remote Sensor Mounting

The sensor can be mounted remotely from the transmitter. To remotely mount the sensor, follow the procedure below.

1. *Unscrew the XNX's weatherproof cover, loosen the retainer locking screw with the supplied hex key.*
2. *Run conduit from one of the XNX's available conduit entries to the location of the remote terminal housing.*

   A Terminal Housing provides a mounting base for the sensor and contains the associated electronic circuit. The installation wiring enters the Terminal Housing via conduit.



UL/CSA Aluminum Junction Box 2441-0022 | UL/CSA Stainless Steel Junction Box 2110B2103 | ATEX/IEC Junction Box 00780-A-0100

Figure 16. Remote Terminal Housings

The distance between the XNX Transmitter and remote installation must comply with the following to insure proper operation. Distances are dependent on sensor types and the wire gauge used.

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

* Frequency of Zero calibration may increase due to the changes in wire resistance from changing temperature

3. *Wire the pluggable terminal block as shown in Figure 14 then plug the connector into the back of the mV personality board.*
4. *Mount the remote sensor junction box ensuring enough room below to fit the sensor and weatherproof cover.*
5. *Attach the conduit to the remote terminal box.*
6. *In the remote junction box, connect the wires from the XNX to the 3-way terminal block provided in the terminal enclosure.*

NOTE

The black and red wires from the MPD are not used with the XNX mV Personality Board. Ensure 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 shall be certified in type of explosion protection flameproof enclosure "Ex d" or "Ex e", suitable for the conditions of use and correctly installed

7. *Attach and wire the sensor into the terminal box.*
8. *Fit the terminal box lid.*
9. *Fit the sensor retainer, tighten the locking screw and fit the weatherproof cover (if required).*
10. *Calibrate the detector following the procedure in Section 6.1 - Calibration.*

2.8 IR Personality Wiring

Gas concentrations are read by the XNX from the Searchpoint Optima Plus or Searchline Excel 4-20mA output. A digital communication connection on TB2 provides an additional confirmation as well as diagnostic information.

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 19. 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 19 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.

2.8.1 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 19). 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 19 to set S3 and S4 to the ***SAME*** *output type that appears on the wire tag of the IR device.*

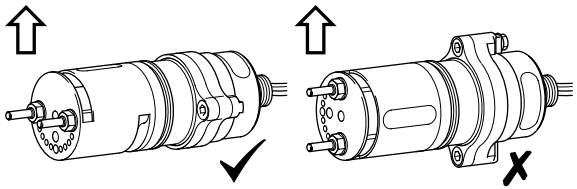
NOTE:

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 below) then tighten the lock nut to the XNX body.



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.

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. Cable length should not exceed 4000 feet.*
2. *Use 16AWG 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 mains 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.

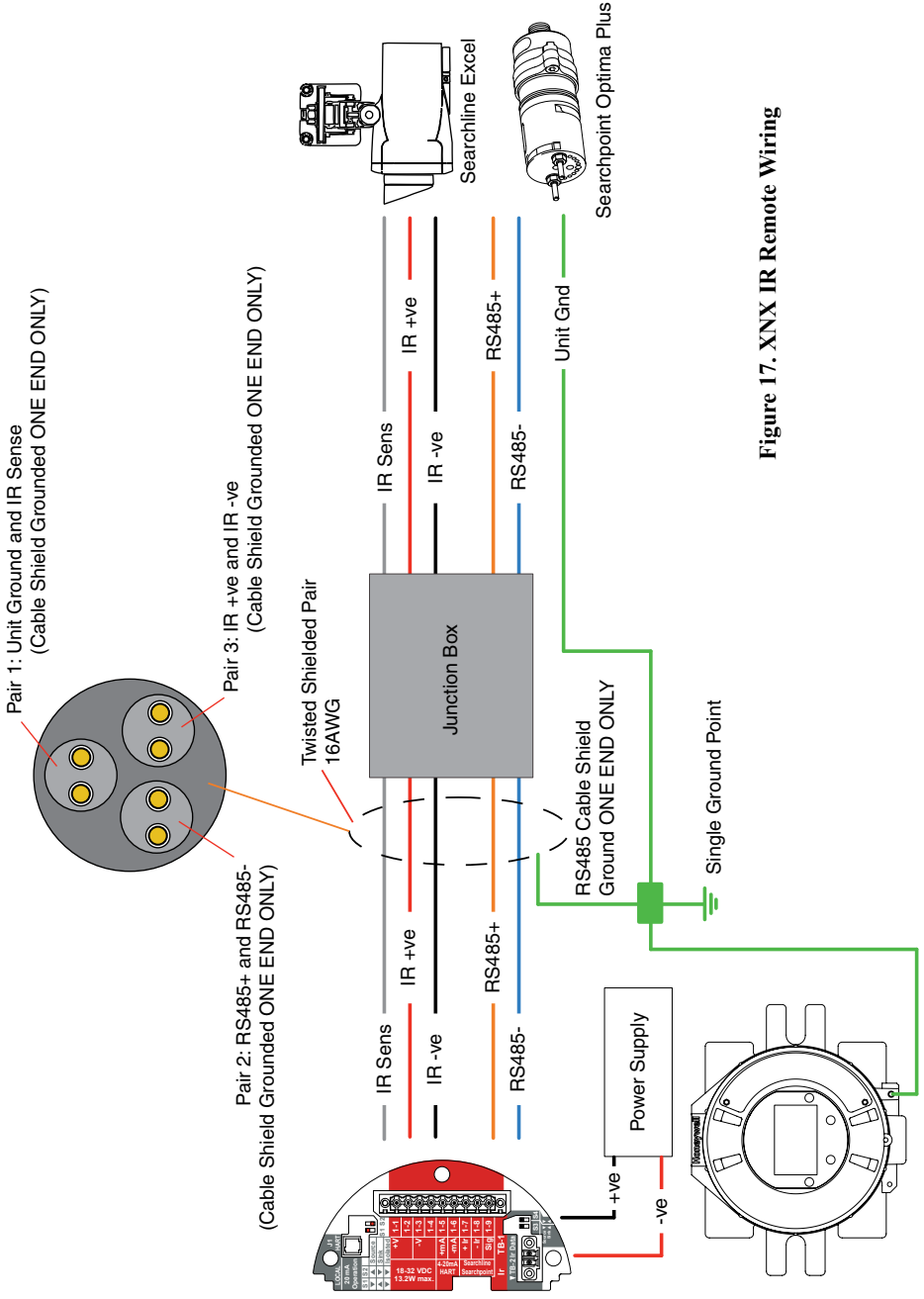


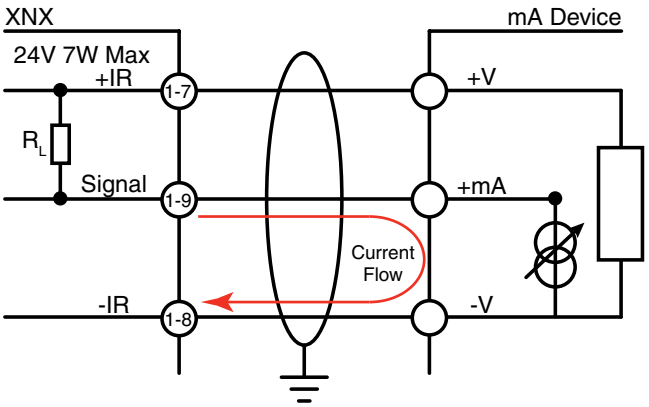
Figure 17. XNX IR Remote Wiring

2.8.2 Connecting Generic mA Device

IR personality type provides for a Generic mA input under sensor type configuration. The XNX can be used to convert the mA input to be read over HART protocol or optional Modbus 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.

XNX S3 and S4 should be in the UP position
Set mA Device and XNX to the same output type.



XNX S3 and S4 should be in the DOWN position
Set mA Device and XNX to the same output type.

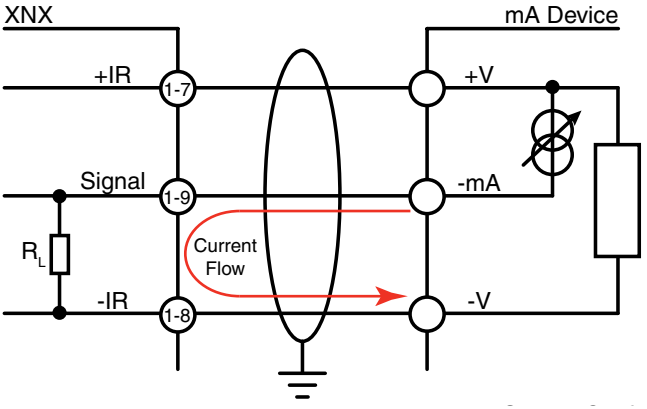
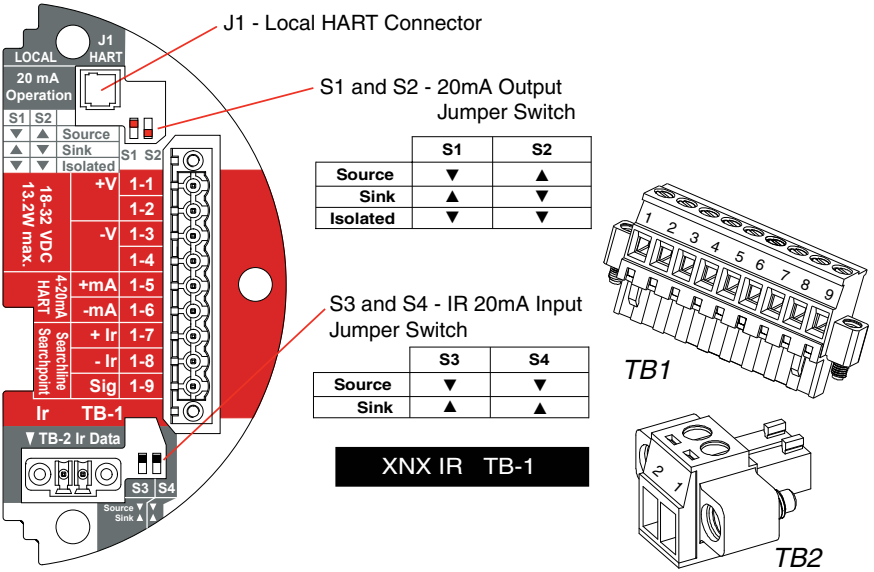


Figure 18. Generic mA Device Sink/Source Schematic



	S1	S2
Source	▼	▲
Sink	▲	▼
Isolated	▼	▼

	S3	S4
Source	▼	▼
Sink	▲	▲

TB1		
	Desc.	From Searchpoint Optima Plus Searchline Excel
1	24v	See Common Connections *Section 2.4*
2		
3	Gnd	
4		
5	20mA +	
6	20mA -	
7	24v	Red
8	0v	Black
9	Sig	White

TB2		
	Desc.	From Searchpoint Optima Plus Searchline Excel
1	Com B	Orange
2	Com A	Blue

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

Figure 19. XNX IR Personality Board Terminal Blocks, Jumper Switches and Wiring Guide

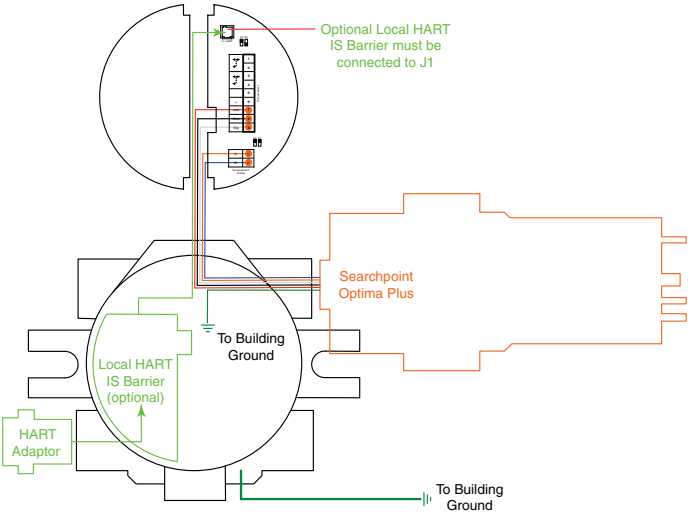


Figure 20. IR Personality Wiring - Searchpoint Optima Plus

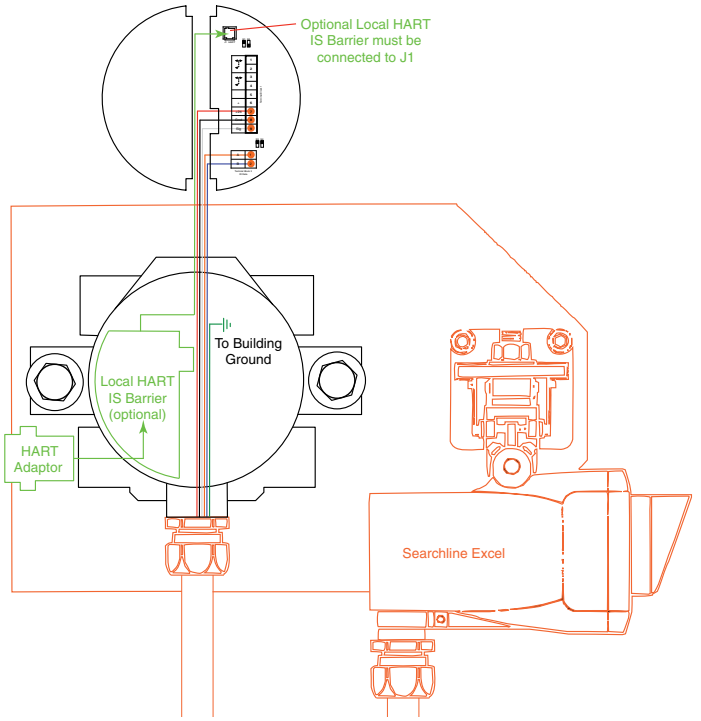


Figure 21. IR Personality Wiring - Searchline Excel

3 Options

3.1 Local HART® Handheld

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).

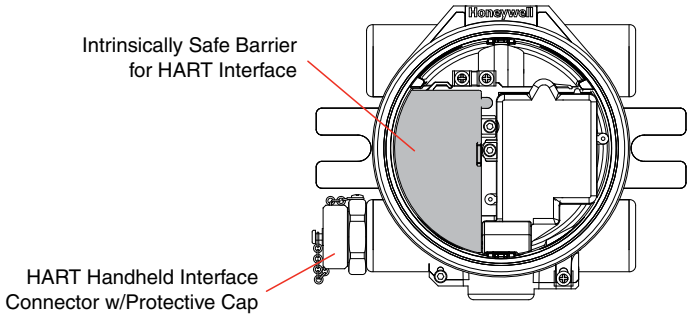


Figure 22. XNX Universal Transmitter with HART® Interface IS Barrier installed

HART® devices can operate in one of two configurations - point-to-point or multidrop.

Point-to-Point Mode

In point-to-point mode, the 4–20 mA signal is used to communicate one process variable, while additional process variables, configuration parameters, and other device data are transferred digitally via HART® protocol. The 4–20 mA analog signal is not affected by the HART® signal.

Multidrop Mode

The multidrop mode of operation requires only a single pair of wires and, if applicable, safety barriers and an auxiliary power supply for up to 8 field devices.

NOTE:

Use multidrop 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 distances.

Cable Length

Most installations are well 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 table in Figure 23 shows the affect 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.

Cable Capacitance – pf/ft (pf/m) Cable Length – feet (meters)				
Number of Network Devices	**20 pf/ft (65 pf/m)**	**30 pf/ft (95 pf/m)**	**50 pf/ft (160 pf/m)**	**70 pf/ft (225 pf/m)**
1	9,000 ft (2,769 m)	6,500 ft (2,000 m)	4,200 ft (1,292 m)	3,200 ft (985 m)
5	8,000 ft (2,462 m)	5,900 ft (1,815 m)	3,700 ft (1,138 m)	2,900 ft (892 m)
10	7,000 ft (2,154 m)	5,200 ft (1,600 m)	3,300 ft (1,015 m)	2,500 ft 769 m)
15	6,000 ft (1,846 m)	4,600 ft (1,415 m)	2,900 ft (892 m)	2,300 ft (708 m)

Figure 23. Allowable Cable Lengths for 1 mm (#18 AWG) Shielded Twisted Pair

3.2 Relays

The relay option (XNX-Relay) provides 3 form "C" SPCO contacts for alarm and fault indication. TB4 is provided as a connection to a user installed momentary switch to silence alarms remotely.

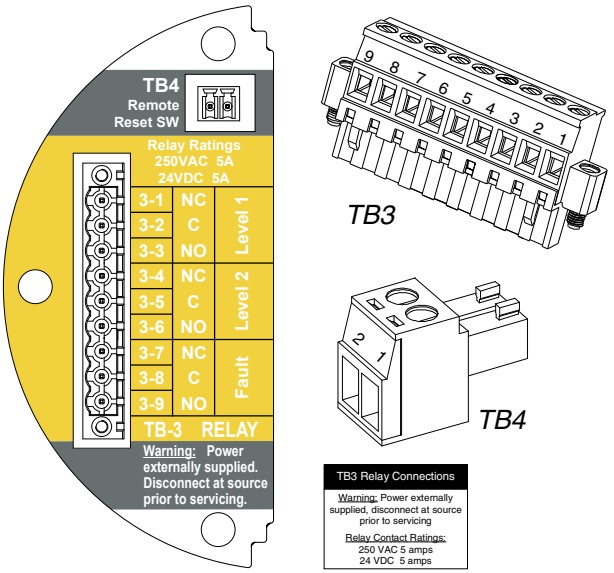
NOTE:

Relays are not available with the Modbus® option.

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.

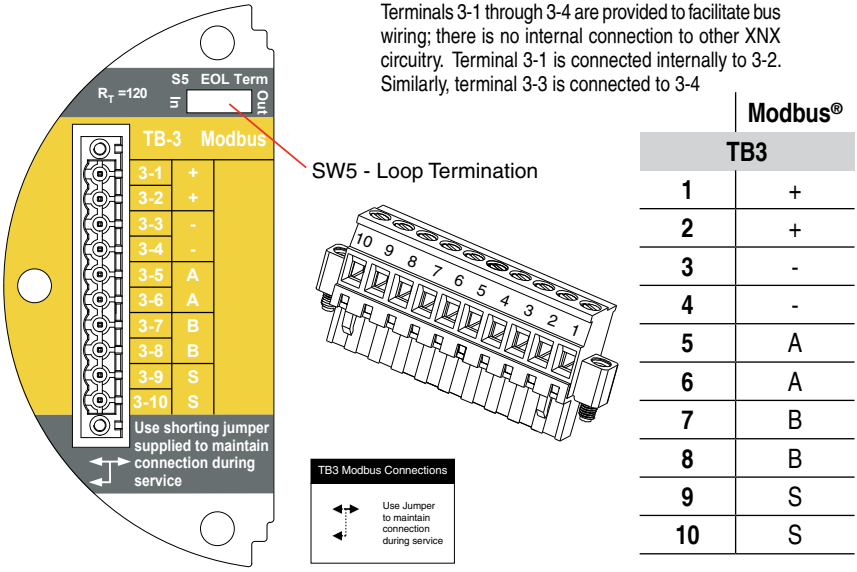


	Relay
TB3	
1	NC
2	C
3	NO
4	NC
5	C
6	NO
7	NC
8	C
9	NO
TB4	
1	1
2	2

Figure 24. XNX Relay Option Board Terminal Blocks

3.3 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.



	Modbus®
TB3	
1	+
2	+
3	-
4	-
5	A
6	A
7	B
8	B
9	S
10	S

Figure 25. XNX Modbus® Option Board Terminal Block and Jumper Switch

4 Powering the XNX for the First Time

4.1 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^3.

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_2 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.*

Figure 26. 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 9 and 10 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, be sure to perform Accept New Sensor Type before calibrating the sensor.

4.2 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 4.1.7*

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 9 and 10 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. *When the reset is complete, Set Date & Time.*
7. *Set the Path Length for the application, then align the transmitter and receiver with Align Excel.*
8. *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).*
9. *Reset any faults displayed on the XNX display. The XNX and Excel are now ready to monitor.*

4.3 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 5.1 - Controls and Navigation.

The XNX is shipped with the following settings:

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

5 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.

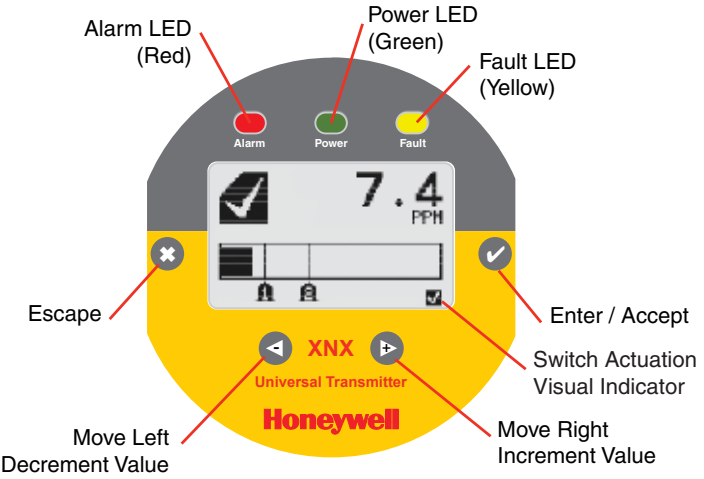


Figure 28. The XNX Front Panel Display

5.1 Controls and Navigation

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

5.2 The General Status Screen

Figure 29. The 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.

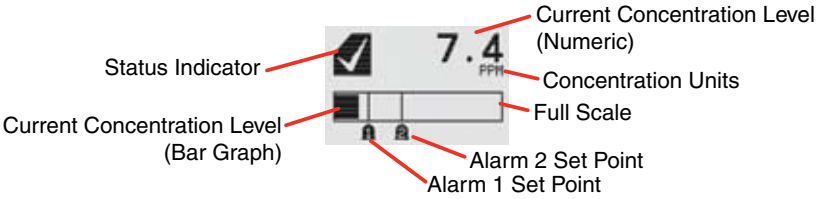


Figure 30. General Status Screen - Normal Operating Mode

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.

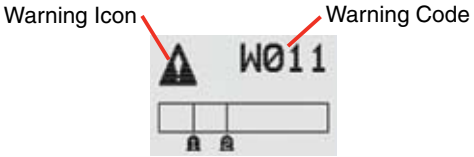


Figure 31. General Status Warning Detail

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.

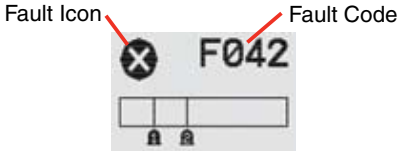


Figure 32. General Status Fault Detail

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 33. 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.

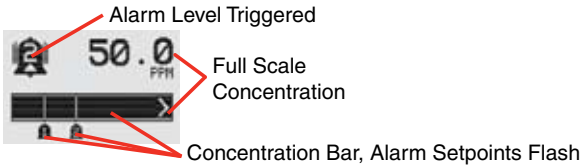


Figure 34. General Status Overrange Detail

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	

5.3 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 35. 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 36. The 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 37. 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.

5.4 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 38. General Status Screen with Unit Information

6 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 39. Gas Calibration Menu

	Gas Calibration		*Calibrate mA Output*
	Bump Test		*Soft Reset*
	Align Excel		

6.1 Calibration

CAUTION

The calibration procedure should only be performed by qualified personnel.

NOTE:

HA recommends that the maximum calibration interval be 30 days or in accordance with customer site procedures to assure the highest level of safety. Correct operation of each sensor/detector should be confirmed with test gas of known concentration before each use.

See Section 7 - XNX Electrochemical Sensor Data for Calibration Gas specifications.

6.1.1 Calibration Procedure

NOTE:

Follow the specific procedure outlined in the Operating Manual for each sensing device.

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.*

Figure 40. Gas Calibration Menu

NOTE:

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

Zero Calibration

Figure 41. Zero Calibration Screen

Figure 42. 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.

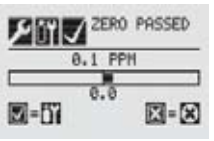


Figure 43. Zero Calibration Passed

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.*

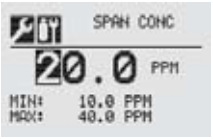


Figure 44. Span Gas Concentration Screen

5. *Select ✔ to choose the first digit and use the ◀ ▶ 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.*

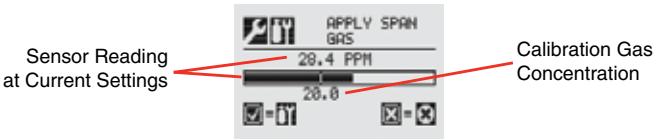


Figure 45. Span Calibration Screen

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.

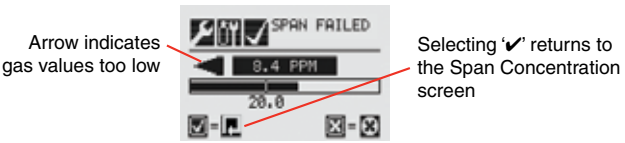


Figure 46. Span Calibration Failed

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 and turn alarm and fault inhibit off. The user can Exit and leave the XNX in inhibit mode, or do not exit.

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.

6.1.2 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_2) 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.

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 6.1.1.

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).

6.1.3 Zero and Span Calibration of XNX EC Hydrogen Sulfide (H_2S) 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 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 6.1.1:

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.*

6.1.4 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:

- *18 months for Chlorine and Chlorine Dioxide sensors.*
- *12 months for Ammonia and Hydrogen Fluoride sensors. (See Ammonia note below.)*
- *24 months for 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.

6.1.5 Zero and Span Calibration for MPD 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.

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.*

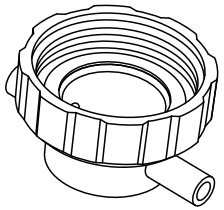


Figure 47. Flow Adaptor

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

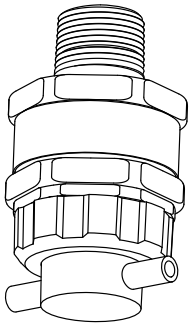


Figure 48. MPD with Flow Adaptor

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 6.1 for both Zero and Span calibrations.*
5. *Apply the target gas to the sensor. Pass the gas through the flow housing at a rate of between 0.7l/m and 1.0l/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.*

6.1.6 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 to the gas or vapor to be detected, the following cross calibration procedure should be followed:

NOTE

- Table 1 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*	Octane	3*
Ammonia	7*	Ethanol	5*	Pentane	3*
Benzene	3*	Ethyl acetate	3*	Propane	5*
Butanone	3*	Ethylene	5*	Propan-2-ol	4*
Butane	4*	Heptane	3*	Styrene	2*
Butyl acetate	1*	Hexane	3*	Tetra hydrafuran	4*
Butyl acrylate	1*	Hydrogen	6*	Toluene	3*
Cyclohexane	3*	Methane	6*	Triethylamine	3*
Cyclohexanone	<1*	Methanol	5*	Xylene	2*
Diethyl ether	4*	MIBK	3*		

Table 1. Star Rating of Gases

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 Table 1.*
2. *These values may then be used in Table 2 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	96	-		-
6*	33	41	50	62	78	98	-	
5*	26	33	40	50	63	79	100	-
4*	21	26	32	40	50	63	80	-
3*	-	21	26	32	40	50	64	81
2*	-	-	-	25	31	39	50	64
1*	-	-	-	-	25	31	39	50

Table 2. Meter Settings

NOTE

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

3. *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 Table 3. 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

Table 3. Meter Multiplication Factors

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 Table 1:* **Butane 4*** *and* **Methane 6*.**
2. *Check the meter settings for 50% LEL calibration gas in Table 2:* **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.

6.1.7 Calibrating the 705/705HT

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

6.1.8 Calibrating the Sensepoint/Sensepoint HT

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

6.1.9 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).

6.2 Functional Gas Testing (Bump Test)

WARNING

It is recommended to bump test the sensors frequently to ensure proper operation.

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.*

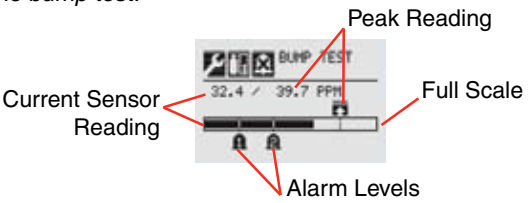


Figure 49. Bump Test Screen

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 6.1).*
3. *If reading is still inaccurate replace the sensor.*

7 XNX Electrochemical Sensor Data

Target Gas		Cartridge Part No	Maximum Range	Selectable Range	Increment	Default Range	Cal Gas Range	Cal Gas P/N	Cal Gas Description
O_2	Oxygen	XNX-XS01SS	25.0 %Vol	N/A	N/A	25.0 %Vol	20.9 %Vol	N/A	N/A
O_2	Oxygen	XNX-XS01FM	21.0 %Vol	N/A	N/A	21.0 %Vol	20.9 %Vol	N/A	N/A
H_2S	Hydrogen Sulfide (Low Low Range)	XNX-XSH3SS	15.0 ppm	N/A	N/A	15.0 ppm	5.0 to 10.0 ppm	GFV263	10 ppm H_2S
H_2S	Hydrogen Sulfide (Low Range)	XNX-XSH1SS	50.0 ppm	10.0 to 50.0 ppm	0.1 ppm	50.0 ppm	3 to 35 ppm	GFV258	25 ppm H_2S
H_2S	Hydrogen Sulfide (Low Range)	XNX-XSH1FM	50.0 ppm	10.0 to 50.0 ppm	0.1 ppm	50.0 ppm	3 to 35 ppm	GFV258	25 ppm H_2S
H_2S	Hydrogen Sulfide (High Range)	XNX-XSH2SS	500 ppm	50 to 500 ppm	10 ppm	100 ppm	15 to 350 ppm	GFV421	50 ppm H_2S
CO	Carbon Monoxide	XNX-XSC1SS	1,000 ppm	100 to 1,000 ppm	100 ppm	300 ppm	30 to 200 ppm	GFV295	100 ppm CO
CO	Carbon Monoxide	XNX-XSC1FM	1,000 ppm	100 to 1,000 ppm	100 ppm	300 ppm	30 to 200 ppm	GFV295	100 ppm CO
SO_2	Sulfur Dioxide (Low Range)	XNX-XSS1SS	20.0 ppm	5.0 to 20.0 ppm	5.0 ppm	15.0 ppm	2 to 14 ppm	Contact HA	7.5 ppm SO_2
SO_2	Sulfur Dioxide (High Range)	XNX-XSS2SS	50.0 ppm	20.0 to 50.0 ppm	10 ppm	50.0 ppm	6 to 35 ppm	GFV441	25 ppm SO_2
NH_3	Ammonia (Low Range)	XNX-XSA1SS	200 ppm	50 to 200 ppm	50 ppm	200 ppm	150 to 140 ppm	Contact HA	100 ppm NH_3
NH_3	Ammonia (High Range)	XNX-XSA2SS	1000 ppm	200 to 1,000 ppm	50 ppm	1,000 ppm	60 to 700 ppm	Contact HA	300 ppm NH_3
Cl_2	Chlorine (Low Range)	XNX-XSL2SS	5.00 ppm	N/A	N/A	5.00 ppm	2 to 3 ppm	GFV251	2 ppm Cl_2 in N_2
Cl_2	Chlorine (High Range)	XNX-XSL1SS	20.0 ppm	5.0 to 20.0 ppm	5.0 ppm	5.0 ppm	2 to 14 ppm	GFV251	2 ppm Cl_2 in N_2
ClO_2	Chlorine Dioxide	XNX-XSX1SS	1.00 ppm	N/A	N/A	1.00 ppm	0.3 to 0.7 ppm	Gas Generator	0.5 ppm
NO	Nitrogen Monoxide	XNX-XSM1SS	100 ppm	N/A	N/A	100 ppm	30 to 70 ppm	GFV216	50 ppm NO in N_2
NO_2	Nitrogen Dioxide	XNX-XSN1SS	50.0 ppm	5.0 to 50.0 ppm	5.0 ppm	10.0 ppm	2 to 35 ppm	GFV435	5 ppm NO_2
H_2	Hydrogen (Low Range)	XNX-XSG1SS	1000 ppm	N/A	N/A	1,000 ppm	300 to 700 ppm	GFV364	500 ppm H_2
H_2	Hydrogen (High Range)	XNX-XSG2SS	10,000 ppm	N/A	N/A	10,000 ppm	3,000 to 7,000 ppm	Contact HA	5000 ppm H_2 in N_2
HF	Hydrogen Fluoride	XNX-XSF1SS	12.0 ppm	N/A	N/A	12.0 ppm	4 to 8 ppm	Contact HA	5 ppm HCl in N_2
PH_3	Phosphine	XNX-XSP1SS	1.20 ppm	N/A	N/A	1.20 ppm	0.5 to 0.7 ppm	GFV405	0.5 ppm PH_3 in N_2

8 XNX Catalytic Bead and IR Replacement Sensor Cartridges

Sensor Type	Target Gas	Cartridge Part No	Maximum Range	Selectable Range*	Increment	Default Range	Cal Gas Range	Cal Gas P/N	Cal Gas Description
MPD-IC1	Carbon Dioxide	1226-0301	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_2 in Air
MPD-IV1	Methane	1226-0299	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_4 in Air
MPD-IF1	Flammables	1226-0300	100 %LEL	20 to 100 %LEL*	10 %LEL	100 %LEL	30 to 70 %LEL	GFV406	1 %VOL C_3H_8 in Air
MPD-CB1	Flammables	1226A0359	100 %LEL	20 to 100 %LEL*	10 %LEL	100 %LEL	30 to 70 %LEL	GFV352	50 %LEL CH_4 in Air

** On XNX %LEL Units carrying UL/CSA certifications, the range is not adjustable, it is fixed at 100%LEL*

9 Warning Messages

Warning				
Number	Description		Condition	Recovery
W001	XNX 24 VDC Supply Bad		DC power supply at/below 16VDC or at/above 33VDC for XNX	Check PSU start voltage, check cable loop impedance, check terminal connections.
	EC			
	mV			
	IR			
W002	XNX Temperature Warning		XNX internal temperature exceeding stated limits	Check unit location for external heat source, fit sunshade or other protection, possibly re-site unit and/or consider sampling system.
	EC	All personalities		
	mV			
	IR			
W003	Simulated Warning		Simulated warning from Alarm/Fault Simulation	See Alarm/Fault Simulation. After simulation, reset all faults and alarms before exiting 'Alarm/Fault Simulation' - the front panel LED and relays will remain in fault/warning/alarm mode until reset.
	EC	All personalities		
	mV			
	IR			

Warning

Number	Description		Condition	Recovery
W005	Sensor Temperature Warning		Sensor internal temperature exceeding limits	Check sensor location for external heat source, fit sunshade or other protection, possibly re-site sensor or consider sampling system.
	EC	Sensor Cartridge Temperature		
	mV	N/A		
	IR	Excel/Optima Temperature		
W006	Sensor Negative Drift		Sensor connected to unit has an internal 'zero' shift exceeding its stated limits	Check sensor location for external interference, check sensor for operation and re-zero where appropriate.
	EC			
	mV			
	IR			
W007	Calibration Needed Soon		Calibration interval time exceeded	Recalibrate or disable the Calibration Interval - See Calibration Interval. **NOTE:** Although the fault LED will be lit on the XNX front panel, the fault relay WILL NOT BE ACTIVATED.
	EC	All Personalities		
	mV			
	IR			
W009	Sensor 24 VDC Supply Bad		IR sensor connected has DC at or below lower limit	Correct PSU voltage, verify cable loop impedance, verify terminal connections.
	EC	N/A		
	mV			
	IR	IR Sensor Voltage - Excel/Optima		
W010	Obscured Beam or Optics		Optical sensor connected is losing/has lost IR signals	Check sensor location for external interference (obstruction in IR path), check sensor for 'dirty' windows. Check Excel alignment; transmitter operation.
	EC	N/A		
	mV			
	IR	Excel/Optima		

Warning				
Number	**Description**		**Condition**	**Recovery**
W011	Lamp Output		Optima+ sensor has an internal lamp issue	Remove sensor and return to HA for repair.
	EC	N/A		
	mV			
	IR	Optima		
W012	Excessive Float		Sensor connected to unit has an internal baseline shift exceeding its stated limits	Check sensor location for external interference, check sensor for operation and re-zero where appropriate.
	EC	N/A		
	mV			
	IR	Excel/Optima		
W013	Sensor Loop Warning		Optical sensor connected is losing/has lost mA output signals	Check supply voltage is stable, check cable loop impedance, check terminal connections. Perform soft reset on Excel (see Soft Reset).
	EC	N/A		
	mV			
	IR	Excel/Optima		
W014	Real Time Clock Error		Excel sensor has an internal real time clock error	If repeated, contact HA Service.
	EC	N/A		
	mV			
	IR	Excel		
W015	Excel Software Diagnostic		Excel sensor has an internal software error	Re-cycle Excel power and confirm 'fault cleared', if not remove and return to Honeywell for repair.
	EC	N/A		
	mV			
	IR	Excel		
W016	Installation Not Completed		Excel sensor has not completed a 'full' installation procedure	Check Excel alignment and confirm operating distance, rerun 'installation procedure'.
	EC	N/A		
	mV			
	IR	Excel		

Warning				
Number	**Description**		**Condition**	**Recovery**
W018	General Diagnostic			
	EC	All Personalities		
	mV			
	IR			
W019	Internal Power Supply Defect		5V power supply failure in Excel receiver	Remove and return to HA for repair.
	EC	N/A		
	mV			
	IR	Excel		
W020	Forced mA Timeout		XNX left in force mA mode too long	Exit Force mA mode. See Force mA Output..
	EC	All Personalities		
	mV			
	IR			
W021	Force Relay Timeout		XNX in force relay mode too long	Exit Force Relay mode. See Force Relays.
	EC	All Personalities		
	mV			
	IR			
W022	mV Sensor Calibration Needed		The mV sensor is different than current configuration; a change in target gas; change in sensor type. Calibrate before use.	After adjusting configuration, reset alarms and faults.
	EC	N/A		
	mV	mV Personality Board		
	IR	N/A		

10 Fault Messages

Fault				
Number	**Description**		**Condition**	**Recovery**
F101	Sensor Abnormal Reboot		Sensor connected has restarted	If repeated, check supply voltage, check cable loop impedance, check terminal connections.
	EC	Cartridge		
	mV	PCB Personality		
	IR	Sensor		
F103	XNX Temperature Error		The temperature of the XNX is out of range -30°c to +83°c	Check XNX location for external heat source, shade, possibly re-site XNX. See Transmitter Status.
	EC	All Personalities		
	mV			
	IR			
F104	XNX 24 VDC Supply Bad		XNX DC supply at/below 15VDC or at/above 34VDC	Correct PSU voltage, verify cable loop impedance, verify terminal connections.
	EC	All Personalities		
	mV			
	IR			
F105	XNX Internal Power Supply Diagnostic		POD power supply failure	Check Transmitter Status. Contact HA Service.
	EC	All Personalities		
	mV			
	IR			
F106	XNX Real Time Clock Failure			Reset clock, see Set Date & Time.
	EC	All Personalities		
	mV			
	IR			

Fault				
Number	**Description**		**Condition**	**Recovery**
F107	XNX Internal Failure (RAM, ROM, Switch, etc)		Corrupt program, internal RAM failure or microprocessor failure.	Contact HA Service.
	EC	All Personalities		
	mV			
	IR			
F108	XNX mA Output Loop failure		Digital diagnostic has detected an analog output problem	Check control circuit, check supply voltage is stable, check cable loop impedance, check terminal connections.
	EC	All Personalities		
	mV			
	IR			
F109	Simulated Fault		XNX has been set into 'simulation'	Exit simulation.
	EC	All Personalities		
	mV			
	IR			
F110	Sensor SW Mismatch		The XNX will not support Optima operating software below release 3.0	Contact HA Service.
	EC	N/A		
	mV	N/A		
	IR	Searchpoint Optima Plus		
F111	Negative Drift		Sensor connected to XNX has a negative drift exceeding its stated limits	Check sensor location for external interference, check sensor for operation and re-zero where appropriate, replace sensor if required.
	EC	All Personalities		
	mV			
	IR			
F112	Sensor 24 VDC Supply Bad		IR sensor connected has DC at or below lower limit	Correct PSU voltage, verify cable loop impedance, verify terminal connections.
	EC	N/A		
	mV			
	IR	IR Sensor Voltage - Excel/Optima		

Fault				
Number	**Description**		**Condition**	**Recovery**
F113	Internal 5V Power Supply Defect		Excel sensor has an internal 5 volt power supply fault	Remove and return to Honeywell for repair.
	EC	N/A		
	mV			
	IR	IR Power Supply - Excel		
F114	Optima Lamp Output		Optima+ sensor has an internal lamp issue	Remove sensor and return to Honeywell for repair.
	EC	N/A		
	mV			
	IR			
F116	Sensor Internal Failure		Optical sensor connected has an internal software fault	Remove sensor and return to Honeywell for repair.
	EC	N/A		
	mV			
	IR	Excel/Optima		
F117	Sensor Loop Failure		Optical sensor connected is losing/has lost mA output signals	Check supply voltage is stable, check cable loop impedance, check terminal connections.
	EC	N/A		
	mV			
	IR	Excel/Optima		
F118	Sensor Real Time Clock invalid		Excel sensor has an internal 'real time clock' issue	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.
	EC	N/A		
	mV			
	IR	Excel		
F119	Cartridge Failed		Internal electrical failure	Check cartridge connections, check sensor operation, fit replacement cartridge, replace personality board.
	EC	EC Cartridge		
	mV	mV Personality Board		
	IR	IR Personality Board		

Fault				
Number	**Description**		**Condition**	**Recovery**
F120	No Cartridge		No communication from sensor	Check sensor connections, check sensor operation, fit replacement sensor, replace personalty board.
	EC	No Sensor Communication		
	mV	No mV Board Communication		
	IR	No RS485 Communication		
F121	Wrong Cartridge		Gas parameters invalid	Contact HA Service.
	EC	EC Sensor Cartridge		
	mV	mV Personality Board		
	IR	N/A		
F122	DSP Problem		Optical sensor connected is losing/has lost processing signals	Check sensor location for external interference (obstruction in IR path), remove and return sensor to Honeywell for repair.
	EC	N/A		
	mV			
	IR	Excel/Optima		
F123	Sensor Temperature Error		Sensor connected to unit has an internal temperature exceeding its stated limits	Check sensor location for external heat source, fit sunshade or other protection, possibly re-site sensor and/or consider sampling system.
	EC	EC Cartridge		
	mV	N/A		
	IR	Excel/Optima		
F125	Calibration Required		Sensor connected has exceeded maximum calibration interval	Re-calibrate the sensor.
	EC	EC Cartridge		
	mV	mV Personality Board		
	IR	N/A		

Fault				
Number	**Description**		**Condition**	**Recovery**
F126	Sample Path Obscured		Optima is losing/has lost IR signals	Check sensor location for external interference, check sensor for 'dirty' windows.
	EC	N/A		
	mV			
	IR	Optima		
F127	Beam Block		Excel is losing/has lost IR signals	Check sensor location for external interference (obstruction in IR path), check sensor for 'dirty' windows. Check unit alignment.
	EC	N/A		
	mV			
	IR	Excel		
F128	Sensor Installation Checklist ot Complete		Excel sensor has not completed a 'full' installation procedure	Check Excel alignment and confirm operating distance, rerun 'installation procedure' and calibrate.
	EC	N/A		
	mV			
	IR	Excel		
F130	Option communication Failure		Internal option board not communicating with XNX.	Contact HA Service.
	EC	All Personalities		
	mV			
	IR			
F133	Low Optical Sample Signal		Excel is losing/has lost IR signals	Check sensor location for external interference (obstruction in IR path), check sensor for 'dirty' windows. Check unit alignment.
	EC	N/A		
	mV			
	IR	Excel		

Fault				
Number	**Description**		**Condition**	**Recovery**
F141	End of Cell Life		Installed sensor exceeded sensor life parameter	Fit replacement cartridge.
	EC	EC Cartridge		
	mV	mV Personality Board		
	IR	N/A		
F143	Stabilization Timeout		Sensor exceeds normal warm-up time	Cycle power, contact HA Service if problem persists.
	EC	Unstable Sensor Output		
	mV			
	IR	Sensor Exceeded Expected Stabilization Time		
F145	Reflex Failure		EC cell has reached end of life.	Fit replacement cell or cartridge.
	EC	EC Cartridge		
	mV	N/A		
	IR			
F146	General Optical Fault			Contact HA Service.
	EC	N/A		
	mV			
	IR	Excel/Optima		
F148	Option Board Failure		Internal option board hardware failure.	Contact HA Service.
	EC	All Personalities		
	mV			
	IR			

Fault				
Number	**Description**		**Condition**	**Recovery**
F149	Internal Communication Failure (mA)		Internal 4-20 mA monitoring circuit communication failure.	Contact HA Service.
	EC	All Personalities		
	mV			
	IR			
F150	mA Output Monitoring Fail		mA not producing expected levels.	Contact HA Service.
	EC	All Personalities		
	mV			
	IR			
F151	Sensor Module Type Changed		Sensor with different gas type installed or different sensor installed.	For EC: Perform Accept New Sensor function, if problem persists contact HA Service. mV/IR: Contact HA Service.
	EC	EC Cartridge w/Different Gas Type		
	mV	N/A		
	IR	Switching Between Excel and Optima		
F152	Option Module Configuration Error		Invalid substitution of option boards.	Confirm option properly installed, reconfigure unit contact HA Service.
	EC	All Personalities		
	mV			
	IR			
F153	Digital Communication Fail		Analog output of sensor is out of tolerance.	Contact HA Service.
	EC	N/A		
	mV			
	IR	Excel/Optima		

Fault				
Number	**Description**		**Condition**	**Recovery**
F154	mA Input Diagnostic Failure		Sensor not responding to diagnostic command.	Contact HA Service.
	EC	N/A		
	mV			
	IR	Excel/Optima		
F155	Generic mA Sensor Type Error		Generic mA input below 3 mA.	Check mA input wiring and device, check positions of S3 and S4. Contact HA Service.
	EC	N/A		
	mV			
	IR	Generic mA Sensor Type Error		
F156	mV Current Control Fail		Sensor installed requires supply outside of limits.	Set correct mV type (see Set mV Sensor Type), verify wiring to mV sensor, replace sensor, replace personality. Contact HA Service.
	EC	N/A		
	mV	Control Range Error		
	IR	N/A		
F157	Sensor Drift Fault		Background gas concentration present, sensor defective.	Perform zero calibration using zero air, replace sensor.
	EC	EC Sensor		
	mV	mV Personality Board		
	IR	N/A		
F158	Sensor/Personality Part Number Mismatch		Installed sensor hardware mismatches configuration.	Contact HA Service.
	EC	All Personalities		
	mV			
	IR			

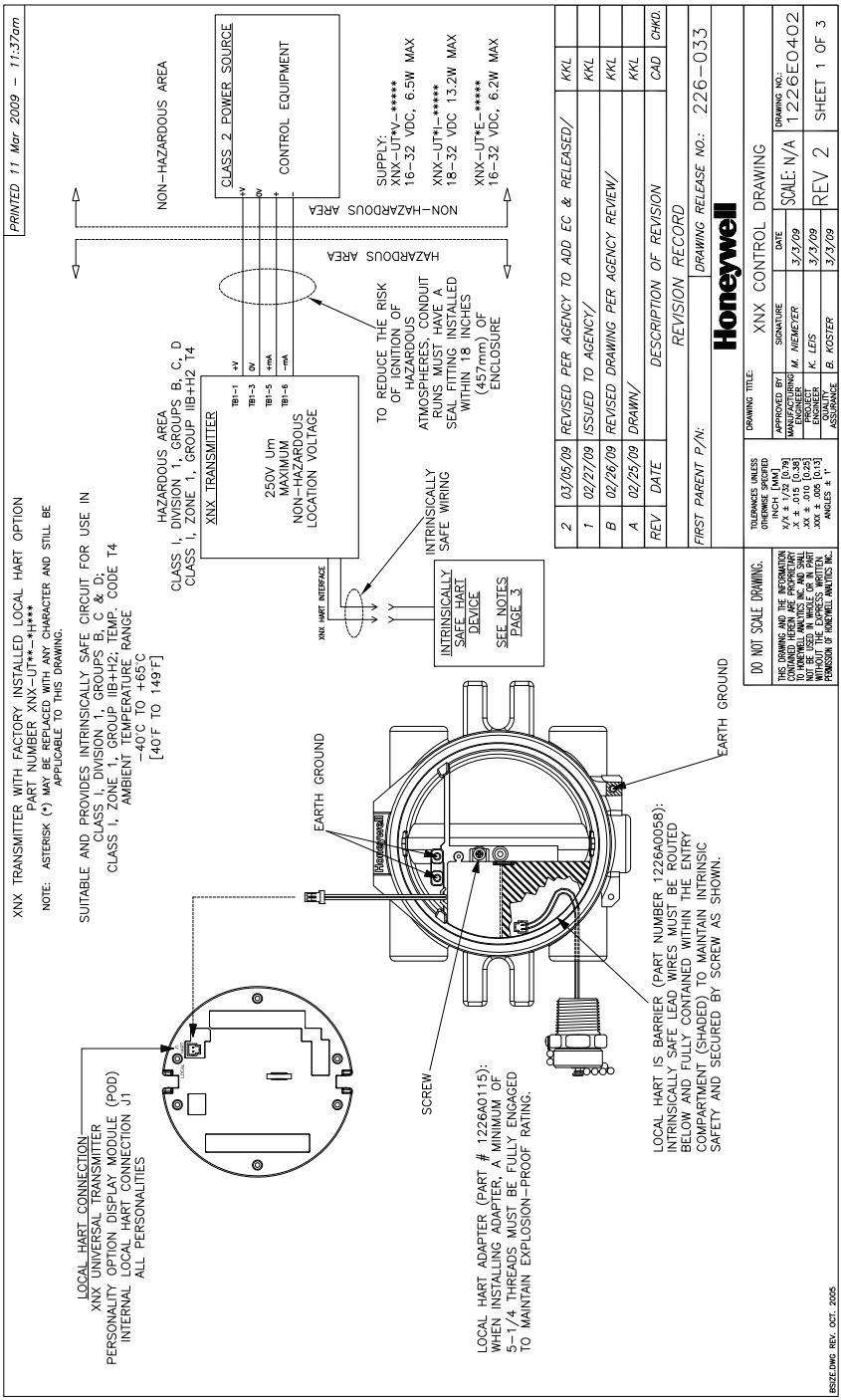
Fault				
Number	**Description**		**Condition**	**Recovery**
F159	Option Part Number Mismatch		Installed option hardware mismatches configuration.	Contact HA Service.
	EC	All Personalities		
	mV			
	IR			
F160	Hardware Diagnostic Failure		Defective EC cartridge or mV personality board.	Replace EC cartridge. Contact HA Service.
	EC	EC Cartridge		
	mV	mV Personality Board		
	IR	N/A		
F161	Fault Level mA Input Failure		IR mA input indicates sensor failure, less than 1 mA.	Check mA input wiring. Contact HA Service.
	EC	N/A		
	mV			
	IR	Excel/Optima		

11 Informational Messages

Information		
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 < Al1	Peak concentration observed
I014	Bump Test Completed Al1 < Concentration < Al2	Peak concentration observed
I015	Bump Test Completed. Al2 < Concentration	Peak concentration observed
I016	Zero Calibration Successful	N/A
I017	Zero Calibration Failed	Error code
I018	Calibrate Span Successful 1 of 2	Percent change in span factor from previous
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	Alarm Relays Configured Normally Energized	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

Information		
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	

12 Control Drawings



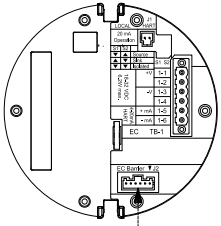
PRINTED 11 Mar 2009 – 11:37am

XNX UNIVERSAL TRANSMITTER WITH EC PERSONALITY
PART NUMBER XNX–UT*E–**NNN

NOTE: ASTERISK (*) MAY BE REPLACED WITH ANY CHARACTER AND STILL BE APPLICABLE TO THIS DRAWING.

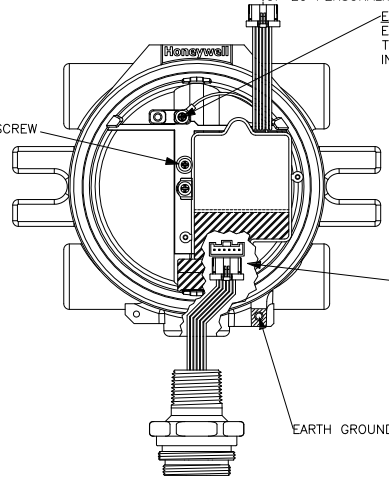
SUITABLE AND PROVIDES INTRINSICALLY SAFE CIRCUIT FOR USE IN
CLASS I, DIVISION 1, GROUPS B, C & D;
CLASS I, ZONE 1, GROUP IIB+H2; TEMP. CODE T4
AMBIENT TEMPERATURE RANGE
–40°C TO +65°C
[40°F TO 149°F]

EC ADAPTER/IS
BARRIER CONNECTIONS



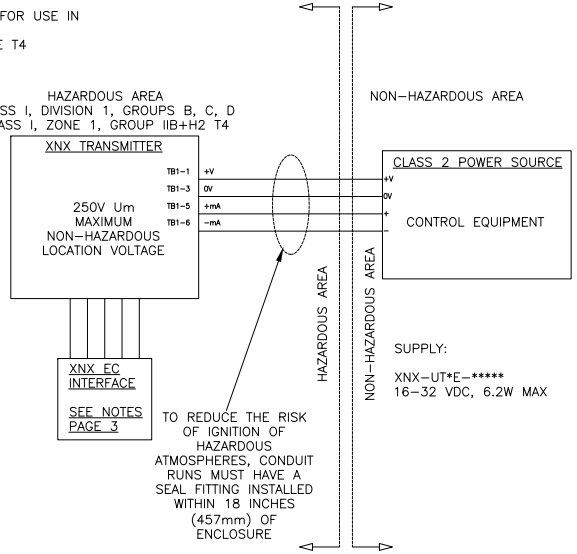
BARRIER CONNECTS TO J2
OF EC PERSONALITY PCB

EARTH WIRE (GREEN/YELLOW):
EARTH WIRE MUST BE CONNECTED
TO EARTH GROUND TO MAINTAIN
INTRINSIC SAFETY.



EC SENSOR ADAPTER

EC IS BARRIER
(PART NUMBER 1226A0057):
INTRINSICALLY SAFE LEAD WIRES MUST BE ROUTED
BELOW AND FULLY CONTAINED WITHIN
THE ENTRY COMPARTMENT (SHADED) TO MAINTAIN
INTRINSIC SAFETY AND SECURED BY SCREW AS SHOWN.



REV	DATE	DESCRIPTION OF REVISION	CAD	CHKD.
1	--/--/--	SEE SHEET 1/	---	

REVISION RECORD

FIRST PARENT P/N: | DRAWING RELEASE NO.: —

Honeywell

DO NOT SCALE DRAWING.

TOLERANCES UNLESS OTHERWISE SPECIFIED
INCH [MM]
X/X ± 1/32 [0.79]
.X ± .015 [0.38]
.XX ± .010 [0.25]
.XXX ± .005 [0.13]
ANGLES ± 1°

DRAWING TITLE: XNX CONTROL DRAWING

	APPROVED BY	SIGNATURE	DATE
MANUFACTURING ENGINEER	M. NIEMEYER		3/3/09
PROJECT ENGINEER	K. LEIS		3/3/09
QUALITY ASSURANCE	B. KOSTER		3/3/09

SCALE: N/A | DRAWING NO.: 1226E0402

REV 2 | SHEET 2 OF 3

BSIZE.DWG REV. OCT. 2005

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XNX TRANSMITTER WITH FACTORY INSTALLED LOCAL HART OPTION

1. ENTITY PARAMETERS OF XNX UNIVERSAL TRANSMITTER LOCAL HART INTERFACE

OUTPUT	INPUT
Uo = 24.15V	Ui = 21.65V
Io = 136mA	Ii = 120mA
Po = 0.82W	Pi = 1.0W
Lo = 1.4mH	Li = 0.0mH
Co = 0.122uF	Ci = 0.0uF

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

IS HART DEVICE		XNX HART INTERFACE
INPUT		**OUTPUT**
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
P max, Pi	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)
OUTPUT		**INPUT**
Voc or Vt (or Uo)	≤	V max (or Ui)
Isc or It (or Io)	≤	I max (or Ii)
Po	≤	P max, Pi
Ca (or Co)	≥	Ci + Ccable
La (or Lo)	≥	Li + Lcable

XNX UNIVERSAL TRANSMITTER WITH EC PERSONALITY

1. ENTITY PARAMETERS OF XNX UNIVERSAL TRANSMITTER EC ADAPTER

OUTPUT		INPUT
Voc or Vt (or Uo) = 5.88 V	≤	V max (or Ui)
Isc or It (or Io) = 84 mA	≤	I max (or Ii)
Po = 123 mW	≤	P max, PI
Ca (or Co) = 10uF	≥	Ci + Ccable
La (or Lo) = 1 mH	≥	Li + Lcable

XNX UNIVERSAL TRANSMITTER WITH EC PERSONALITY AND/OR LOCAL HART

1. 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.

2. THE ASSOCIATED APPARATUS MAY ALSO BE CONNECTED TO SIMPLE APPARATUS AS DEFINED 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, Ccable, PLUS INTRINSICALLY SAFE EQUIPMENT CAPACITANCE, Ci MUST BE LESS THAN THE MARKED CAPACITANCE, Ca (OR Co), SHOWN ON ANY ASSOCIATED APPARATUS USED. THE SAME APPLIES FOR INDUCTANCE (Lcable, Li AND La OR Lo, RESPECTIVELY). WHERE THE CABLE CAPACITANCE AND INDUCTANCE PER FOOT ARE NOT KNOWN, THE FOLLOWING VALUES SHALL BE USED: Ccable = 60 PF/FT., Lcable = 0.2 µH/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 504.20 OF THE NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) 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.

REV	DATE	DESCRIPTION OF REVISION	CAD	CHKD.
1	--/--/--	SEE SHEET 1/	---	

REVISION RECORD

FIRST PARENT P/N: | DRAWING RELEASE NO.: —

Honeywell

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INCH [MM]
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ANGLES ± 1°

DRAWING TITLE: XNX CONTROL DRAWING

APPROVED BY	SIGNATURE	DATE
MANUFACTURING ENGINEER	M. NIEMEYER	3/3/09
PROJECT ENGINEER	K. LEIS	3/3/09
QUALITY ASSURANCE	B. KOSTER	3/3/09

SCALE: N/A | DRAWING NO.: 1226E0402 | REV 2 | SHEET 3 OF 3

BSIZE.DWG REV. OCT. 2005

3000E3159 sht. 1

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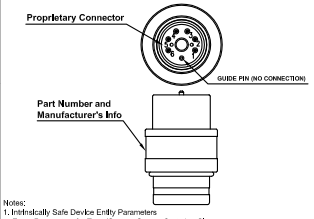
Honeywell

Toxic/Oxygen Sensor Cartridge

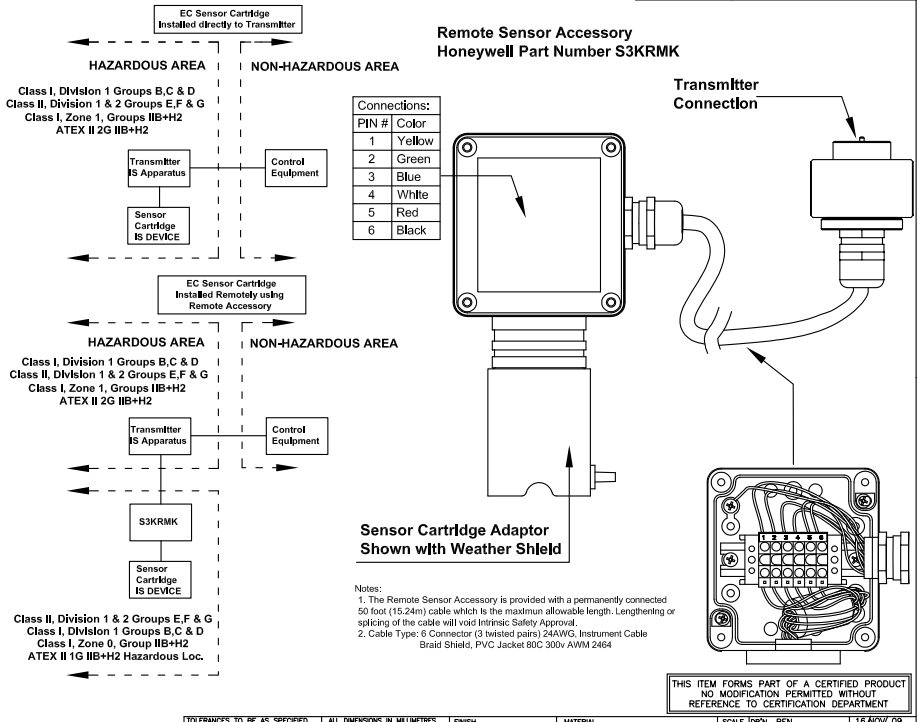


Notes:
1. Intrinsically Safe Device Entity Parameters
   Entity Parameters for Toxic/Oxygen Sensor Cartridge Only
   Ui=5.88V; Ii=0.124A; Pi=0.183W; Li=0uH Ci=5uf
   Vmax Imax Pmax Li=Lcable Ci=Ccable
   Entity Parameters for Cartridge and Remote Accessory with Cable
   Ui=5.88V; Ii=0.124A; Pi=0.183W; Li=10uH Ci=0.003uf
   Vmax Imax Pmax Li=Lcable Ci=Ccable
2. Associated apparatus output current must be limited by a resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current.
   TABLE 1:

I.S. Equipment		Associated Apparatus
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
P max (or Pi)	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

3. Selected associated apparatus must be third party listed as providing Intrinsically safe circuits for the application, and have Voc or Vt not exceeding Vmax (or Uo not exceeding Ui). Isc or It not exceeding Imax (or Io not exceeding Ii), and the Po of the associated apparatus must be less than or equal to the Pmax or Pi of the Intrinsically safe equipment, as shown in Table above.
4. Control equipment must not use or generate more than 250V rms or dc with respect to earth.
5. Associated apparatus may be in a Division 2 or Zone 2 location if so approved.
6. Associated apparatus must be installed in accordance with its manufacturer's control drawing and Article 504 of the National Electrical Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.
7. When required by the manufacturer's control drawing, 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.
8. Refer to following table for Specific Part Numbers in this listing.

Gas Type	Sensor Part No.	Gas Type	Sensor Part No.	Gas Type	Sensor Part No.
H2S(L)	[illegible]	O2	[illegible]	CO	[illegible]
H2S(H)	[illegible]	NO(L)	[illegible]	H2S(L)	[illegible]
H2S(L2)	[illegible]	NO(H)	[illegible]	H2S(H)	[illegible]
HF	[illegible]	CO(H)	[illegible]	NO	[illegible]
NO	[illegible]	CO(L)	[illegible]	HCN	[illegible]
SO2(L)	[illegible]	CO(2)	[illegible]	Cl2	[illegible]
SO2(H)	[illegible]	NO2	[illegible]	ClO2	[illegible]



Remote Sensor Accessory
Honeywell Part Number S3KRMK

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

Notes:
1. The Remote Sensor Accessory is provided with a permanently connected 50 foot (15.24m) cable which is the maximun allowable length. Lengthening or splicing of the cable will void Intrinsic Safety Approval.
2. Cable Type: 6 Connector (3 twisted pairs) 24AWG, Instrument Cable
   Braid Shield, PVC Jacket 80C 300v AWM 2464

THIS ITEM FORMS PART OF A CERTIFIED PRODUCT
NO MODIFICATION PERMITTED WITHOUT
REFERENCE TO CERTIFICATION DEPARTMENT

TOLERANCES TO BE AS SPECIFIED BELOW UNLESS OTHERWISE STATED.
DIMENSIONS: 2 DP ± 0.10 mm; 1 DP ± 0.25 mm; NONE ± 0.40 mm; ANGULAR ± 1/2°
HOLES: ø 0 to 8 +0.08 −0.0; ø 8 to 14 +0.1 −0.0; ø 14 to 25 +0.12 −0.0

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED, AND APPLY AFTER PLATING

THIS DRAWING IS TO BS 8888

REMOVE ALL BURRS AND SHARP EDGES

SURFACE TEXTURE VALUES ARE IN um Ra AND TO BS 1134

FINISH

MATERIAL

SCALE	1/1
DR'N	BEN 16/NOV/09
TITLE	XNX_ECC_CARTRIDGE_CONTROL_DRAWING
1 ISSUE	
16/NOV/09 DATE	
NEW DRAWING CHANGE	
J.T.-J.R. APPROVED BY	
3000E3159	SHT.1 OF 1
A2	

13 XNX Labels

13.1 UL Certification Labels

An explanation of the information on the XNX certification label is shown below.

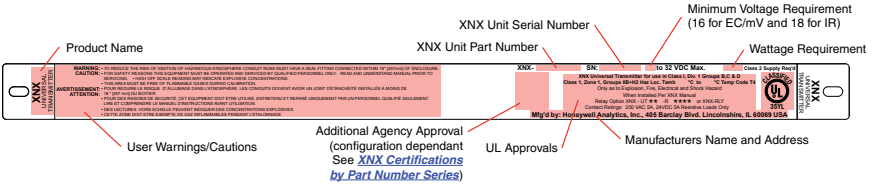


Figure 50. XNX Label for Non-IS Applications

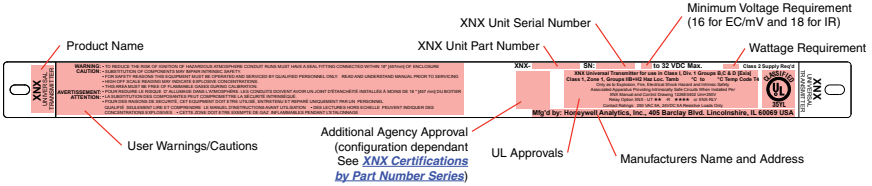


Figure 51. XNX Label for IS Applications

13.2 ATEX Certification Label

An explanation of the information on the XNX ATEX certification label is shown below.

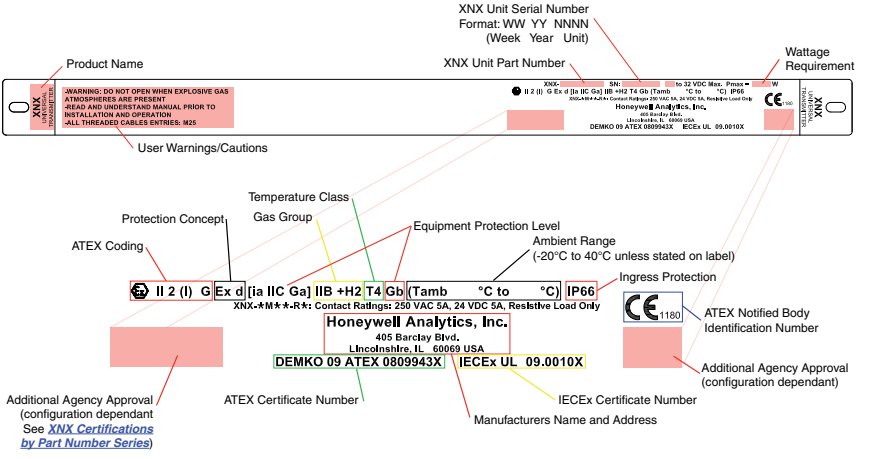


Figure 52. XNX Label for ATEX

The undersigned, representing the Manufacturer:

Honeywell Analytics Inc
405 Barclay Boulevard
Lincolnshire, Illinois 60069
USA

EC Declaration of Conformity

The Technical File is maintained at the manufacturer's location.

Hereby declares that the XNX Universal Transmitter for the detection of flammable and Toxic Gasses, Sensors identified and Interface Options conform to the relevant provisions of ATEX Directive 94/9/EC of March 23rd, 1994 and EMC Directive 2004/108/EC. Conformity has been demonstrated with reference to the following Harmonized European Standards when installed, operated, serviced and maintained in accordance with the installation/operating instructions supplied in the product documentation:

Type Approval: II2 G Ex d[ia Ga] IIB+H2 T4 Gb IP66

Standard	***Description***	***Product Part Numbers (*=all versions)***	***Notified Body***
EN 50270:2006	*Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases and oxygen*	*XNX-****-******	
EN 60079-0:2006 IEC 60079-0:5th Ed	*Electrical apparatus for Explosive gas atmospheres - General Requirements*	*XNX-AM**-******	*UL-Demko*
EN 60079-1:2007 IEC 60079-1:6th Ed	*Electrical apparatus for potentially explosive atmospheres - flameproof enclosures*	*XNX-AM**-******	*UL-Demko*
EN 60079-11:2007 IEC 60079-11:2007	*Electrical apparatus for explosive gas atmospheres, Part 11, Equipment Protection by Intrinsic Safety*	*XNX-AM*E-*HNNN XNX-AM**-*H*** XNX-LHO with XNX-AM**-*N****	*UL-Demko*
EN 60529:1991/ A1:2001	*Degrees of Protection provided by Enclosures, IP-66*	*XNX-AM**-*****	*UL-Demko*
EN 50271 Pending Q4 2009 Completion	*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*	*XNX-****-**NNN XNX-****-**CB1*	*Dekra Exam*
EN 61508 Pending Q4 2009 Completion	*Functional safety of electrical / electronic / programmable electronic safety-related systems*	*XNX-****-**NNN XNX-****-**CB1*	*TUV Rhineland*
EN 60079-29-1 Pending Q4 2009 Completion	*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*	*XNX-AM*I-**NNN with Searchpoint Optima Plus, Searchline Excel XNX-AM*V- **CB1 XNX-AM*V-**NNN With MPD-AMCB1 Or Sensepoint*	*Dekra Exam*
EN50104:2002 Pending Q4 2009 Completion	*Electrical Apparatus for the detection and measurement of Oxygen. Performance requirements and test methods*	*XNX-AM*E-**** with XNXXSO1SS O2 Cartridge*	*Dekra Exam*
EN 45544:2000 Pending Q4 2009 Completion	*Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapors. Parts 1-4*	*XNX-AM*E-**** with XNXXSH*SS, H2S cartridge, XNXXSC1SS CO Cartridge*	*Dekra Exam*

UL International DEMKO A/S
Lyskaer 8, P.O. Box 514
DK-2730 Herlev, Denmark
ID# 0539

Baseefa (2001) LDA
Address: Rockhead Business Park
Staden Lane, Buxton,
SK17 9RZ United Kingdom
Identification Number: 1180

Notified Body	***Document***	***Identification Number***
DEMKO A/S	*EC Type Examination Certificate*	*09ATEX0809943X*
Baseefa (2001) LDA	*Quality Assurance Notification*	*Baseefa ATEX 5989*

Name: Bill Koster *Signature:* Bill Koster

Position: Manager, Quality Engineering *Date:* May 27, 2009

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1998-0744 Release 4
October 2009
MAN0881_EMEAI