Foxcroft Series FX-1500v4

Toxic Gas Detectors

Single Channel Model FX-1500v4

Two Channel Model FX-1502v4

Operating Manual

Document OM1500v40318

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Introduction

The Foxcroft Equipment & Service Co. Inc. Series FX-1500v4 is a fixed position monitoring system designed to detect and alarm to toxic gases or low oxygen levels in ambient air. It can be supplied as either a single or dual sensor system that simultaneously displays each independently operating sensor channel. Audible and visual alarm notification is included for each active sensor channel.

The Series FX-1500v4 detector consists of one or two electrochemical gas sensors in wall mount enclosures that are placed in a potentially hazardous area, connected by 4-conductor shielded cable to a remote main display unit typically wall mounted in a separate safe area.

The electrochemical gas sensing cell generates a voltage that is converted to a 4-20mA signal by an analog circuit board. The signal is transmitted to the detector main display unit, which translates the signal to parts per million (ppm) or percentage volume of oxygen reading and displays the concentration. **The gas sensor and its signal output are not controlled, manipulated or changed by the detector software or hardware.**

The Series FX-1500v4 can be supplied with any combination of the following gas sensors, gas alarm trip levels below are fixed to prevent tampering, non-standard ranges and trip levels are available. Values are in PPM except Oxygen:

Gas Sensor	Standard Range	Caution	Warning	Danger
Chlorine	0-10 ppm	0.3	0.5	1.0
Sulfur Dioxide	0-10 ppm	0.5	1.0	3.0
Ammonia	0-100 ppm	25	35	50
Oxygen	0-25%	19.5%	18%	16%
Carbon Monoxide	0-500 ppm	20	35	50
Chlorine Dioxide	0-1 ppm	0.05	0.1	0.3
Hydrogen Sulfide	0-10 ppm	0.5	1.0	3.0
Ozone	0-2 ppm	0.03	0.05	0.1
Nitric Oxide	0-50 ppm	10	15	25
Nitrogen Dioxide	0-10 ppm	0.5	1.0	3.0
Hydrogen Cyanide	0-10 ppm	0.5	1.0	3.0
Hydrogen Chloride	0-10 ppm	0.5	1.0	3.0

Warnings, Limitations

WARNING: NEVER attempt to calibrate a chlorine gas sensor with bleach, pool chlorinating chemicals, or by producing chlorine gas with a mixture of bleach and an acid. Any sensor adjustment made with such gases or fumes, or without the proper known concentration of gas will cause the sensor to not alarm at all or to alarm at incorrect and unsafe levels. This can create a life threatening situation in which the detector may not alarm during a chlorine gas leak.

Warning

If the alarm buzzer sounds a loud pulsating sound and you are not testing the gas detector, it has sensed a gas leak. The alarm buzzer is warning of a possibly serious situation and it requires your immediate attention.

Warning

All functions of this gas detector must be checked and verified on a regular basis.
The ability for the gas sensor to sense toxic gas or low oxygen levels must be verified on a regular basis. It is recommended that the gas sensor be tested by means of a **certified gas standard** at least once **every six months.**

Warning

If the FX-1500 is altered in any way the warranty will be voided.
Example; drilling additional holes in the enclosure to mount conduits, changing operating range of the gas sensor and altering the gas alarm trip points.

Warning

Never disconnect an electrically powered gas detector to stop nuisance alarms. The source of the problem must be corrected.

FX-1500 Gas Detectors are not foolproof. Like all other electronic devices, the FX-1500 Gas Detectors have limitations. Detectors cannot be expected to sense a dangerous toxic gas leak or low oxygen levels if the cavity is blocked by debris or the detector is tampered with by personnel.

The FX-1500 has a limited life. This equipment contains many parts. Just as with any other device any one of these parts could fail at any time. Therefore, you must test your detector on a regular basis. Be sure to have it repaired or replaced when it fails to test properly. In no case should the detector be used for more than 10 years. All functions of this detector must be checked and verified on a regular basis. Even the ability of the sensor must be verified by means of a **certified gas standard** at least 2 times a year.

Series FX-1500-v4 & FX-1502-v4 Gas Detector

FX-1500v4 SINGLE CHANNEL

FX-1502v4 DUAL CHANNEL

Detector Component Description

The detector includes three alarm set points which are not adjustable to prevent tampering or accidental setting to an improper and possibly unsafe level. Upon sensing a gas concentration at an alarm set point the detector will display the concentration, output the concentration via the 4-20 mA output, display a bar that is color coded to each alarm set point, display the sensor / alarm status in text, sound the integral audible buzzer (at the danger level only) and energize the appropriate relays that have been assigned.

Following is a description of the system's major components.

Remote Main Display Unit

The remote main display unit consists of a wall mount NEMA 4X enclosure which houses a main circuit board, a universal voltage input 24VDC power supply, a 6 amp fused power input module, a card containing 10A Form C relays and a 4.3" full color glass LCD touch screen display and instrument interface.

Main Circuit Board

The main circuit board is microprocessor based and operates on 24 VDC. It is not possible to make any field adjustments or repairs to the circuit board.

WARNING:

The main circuit board is susceptible to damage by static electricity. You must take precautions to discharge static electricity from your body or prevent static discharge before making any wiring connection to the circuit board.

The circuit board's processor does not control the gas sensor in any way, nor does it change the sensor output signal in any way; it simply receives output from the sensor, displays the concentration, retransmits the output via 4-20mA without manipulation, and controls the alarm functions.

Being a multi-purpose circuit board, there are input / output terminals and some onboard relays present that are inactive when the board is used as a gas detector.

All terminals accept 18 to 22 AWG wire.

Onboard 1A Control System Relays

The onboard 1A control system relays are unpowered when the detector is not in alarm state. The onboard relays are rated as follows: form C, coil 5VDC, resistive load 1A @ 24VDC, 0.5A @125 VAC

WARNING:

- The 1A relays are intended for connection to low voltage circuits only (<30V) to provide a signal to control systems, the relays do not have the capacity to turn on fans or other equipment. Use the separate 10A relays to switch external equipment.

Detector Component Description

WARNING:

- The relays are not fused. Any external load connected to the relay must have a current limiting device installed to limit current to the relay to less than 1 amp.

4-20mA Output

A single 4-20mA retransmission output (into 750 Ohms maximum, diode protected to 50VDC) is provided for each measurement channel as standard. Even though (4) current output terminals are present, only one or two will be active depending on the detector model. The high quality current generator chips used produce an output accurate to about 1 micro amp (μA, or 0.001 milliamps), as such, no trimming of the current output is necessary.

WARNING:

DO NOT APPLY POWER TO THE CURRENT LOOP. The external device to be connected to the detector's current output must have an isolated current input to prevent ground loop formation, which can damage the detector electronics.

Remote Reset

Terminals (with a jumper) are provided to connect a normally closed (NC) remote reset switch. Remove the jumper to connect a remote switch. **The jumper must be in place if a switch is not attached.**

Power Supply & Fuse

NOTE: bypassing the power entry module and wiring directly to the power supply will VOID THE WARRANTY.

The detector uses filtered power from a switching 24VDC power supply that accepts universal voltage input from anywhere in the world, 86-264 VAC 47-63Hz. Power consumption is less than 10 watts.

To maintain power filtering and meet safety protocols, there are no direct field connections available to the power supply. A 6A fused power input module with IEC 60320 C14 socket, on/off switch and power filtering is prewired to the power supply in our factory.

The 6A fuse holder is located between the on off switch and cord socket on the face of the power input module. The 5 x 20mm fast acting glass tube fuse is Bussmann # GMA-6-R. See photo page 36.

A 2-meter long power cord with IEC 60320 C13 & NEMA 5-15P connectors is provided that plugs into a standard NEMA 5-15R receptacle.

Detector Component Description

Battery Power

For battery powered operation the detector requires (2) high quality deep cycle 12 volt DC batteries wired in series to power the 24VDC electronics AND a DC volt meter to monitor battery output. Battery terminal voltage must not fall below the minimum 20VDC required to energize the 10A alarm relays. Applying 120V AC line power to the battery powered detector will destroy the electronics and void the warranty.

10 Amp Relay Card

Each FX-1500v4 single channel detector includes a separate card containing (4) 10A Form C relays. Each FX-1502v4 dual channel detector includes a separate card containing (8) 10A Form C relays, four for each channel.

The 10A relays are unpowered when the detector is not in alarm state; they energize upon reaching an alarm set point. The relays are rated as follows: form C, coil 24VDC, resistive load 10A @125 VAC, 7A @ 24VDC, 7A @ 240VAC

WARNING:

- The 10A relays are not fused. Any external load connected to the relay must have a current limiting device installed to limit current to the relay to less than 10 amps.

Relays #3 & #4 by default are not adjustable; they trip at the Danger level and are latching (they must be reset or de-energized manually). Relays #1 & #2 are assignable to any alarm set point and can be configured as auto reset (non-latching) or manual reset (latching); they may also be left unassigned.

Touch Screen Display & Interface

The 4.3” LCD full color glass touch screen functions as both a display and an instrument interface for setup and use.

The concentration(s) displayed is produced from the mA output of the gas sensor. The microprocessor converts the mA output to a part per million or % Oxygen value based on the operating range of the sensor. Accordingly, displayed readings are not adjustable; resetting the detector will not correct invalid displayed readings. If you believe the displayed concentration to be incorrect, the sensor must be checked and either calibrated or replaced.

Onscreen buttons are provided to silence the audible alarm, reset the alarm relays, and configure the alarm relays. There are no longer any jumpers or switches to manipulate on the circuit board.

A clamp-on ferrite bead is attached to the display cable in the main enclosure to prevent electromagnetic interference with the onscreen display. This must not be removed.

Detector Component Description

TOUCH SCREEN WARNING:

- Avoid operating with hard or sharp material such as a ball point pen or a pencil, use a polyacetal pen (tip R0.8mm or less) or a finger tip.
- The display must not be exposed to direct sunlight.
- The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface
- Do not wipe the screen with a dry cloth. Use only a soft cloth dampened with water to clean the screen, other chemicals may damage the screen.
- An Acrylic screen protector may be used to protect the screen from scratches.
- Liquid crystal is poisonous. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

Gas Sensor

The electrochemical gas sensor is prewired and housed in a 4" x 4" enclosure mounted to a 7" square wall mounting plate.

The enclosure includes an LED indicator that illuminates red when the Danger alarm is tripped and a normally closed pushbutton to test the sensor circuitry.

Note: this test button does not test the gas sensor's ability to detect toxic gas or low oxygen levels.

The sensor is connected at the factory to the remote main display unit with 4-conductor shielded cable, typically 25 feet long unless specified otherwise up to 2,000 feet.

The sensor transmits a 4-20mA signal to the remote main display unit, which converts the signal into a gas part per million concentration reading or percentage of volume of Oxygen.

Contents, Serial Number

Unpacking

After unpacking, it is recommended to save the shipping carton and packing materials if the instrument must be stored or re-shipped. Inspect the equipment and packing materials for signs of shipping damage. If there is any evidence of damage, notify the delivery carrier immediately.

The shipping container consists of the following:

1 - FX-1500v4 Single Channel Gas Detector remote display unit with separate gas sensor in housing with cable, wired to the remote display or FX-1502V4 Dual Toxic Gas Detector remote display unit with (2) separate gas sensors in housings with cable, wired to the remote display

WARNING:

- **The gas sensor has a 6 month shelf life if stored unpowered.**
- The gas sensor housing is shipped with a piece of cardboard taped over the sensing chamber of the gas sensor; it must be removed prior to placing the detector in operation.

1 - Calibration Nose

1 - Calibration Nose O-Ring

2 - Calibration Nose Caps

1 - Set of Four Mounting Feet with Four Screws

1 – Detachable power cord, 2-meter long, with IEC #320-C13 and NEMA 5-15 connectors

1 - Instruction Manual

1 - Calibration Manual

Serial Number

The detector serial number label is located on both the inner and outer right hand side of the remote display enclosure. A label is also located on the sensor housing.

The detector serial number is also displayed on the “Test” screen, along with the software version number and the display software version number. These numbers are required in the event service is needed.

The gas sensor has a separate serial number. It is included on the label that contains the detector serial number. It is also located on a label on the sensor itself, as well as on the “Sensor Life” screen. This number is also required in the event of sensor service or replacement.

Installation, Mechanical

Sensor Placement Guidelines

The FX-1500v4 Gas Detector is a fixed, single point type that can only sense toxic gas or oxygen that diffuses into the sensing chamber of the gas sensor.

Proper placement of the sensor in the potential hazard area is essential to the operation of the series FX-1500v4 gas detectors. Improper location can cause alarm delay or failure to warn of hazardous conditions. There are various factors to consider in placing the gas sensor.

One of the main factors is the weight of the gas being monitored relative to the weight of ambient air. Generally, gases that are lighter than air such as ammonia should be located near the ceiling, or in some applications in the breathing zone 4-6 feet from the floor. Gases that are heavier than air such as chlorine or sulfur dioxide should generally be placed 6”-12” from the floor.

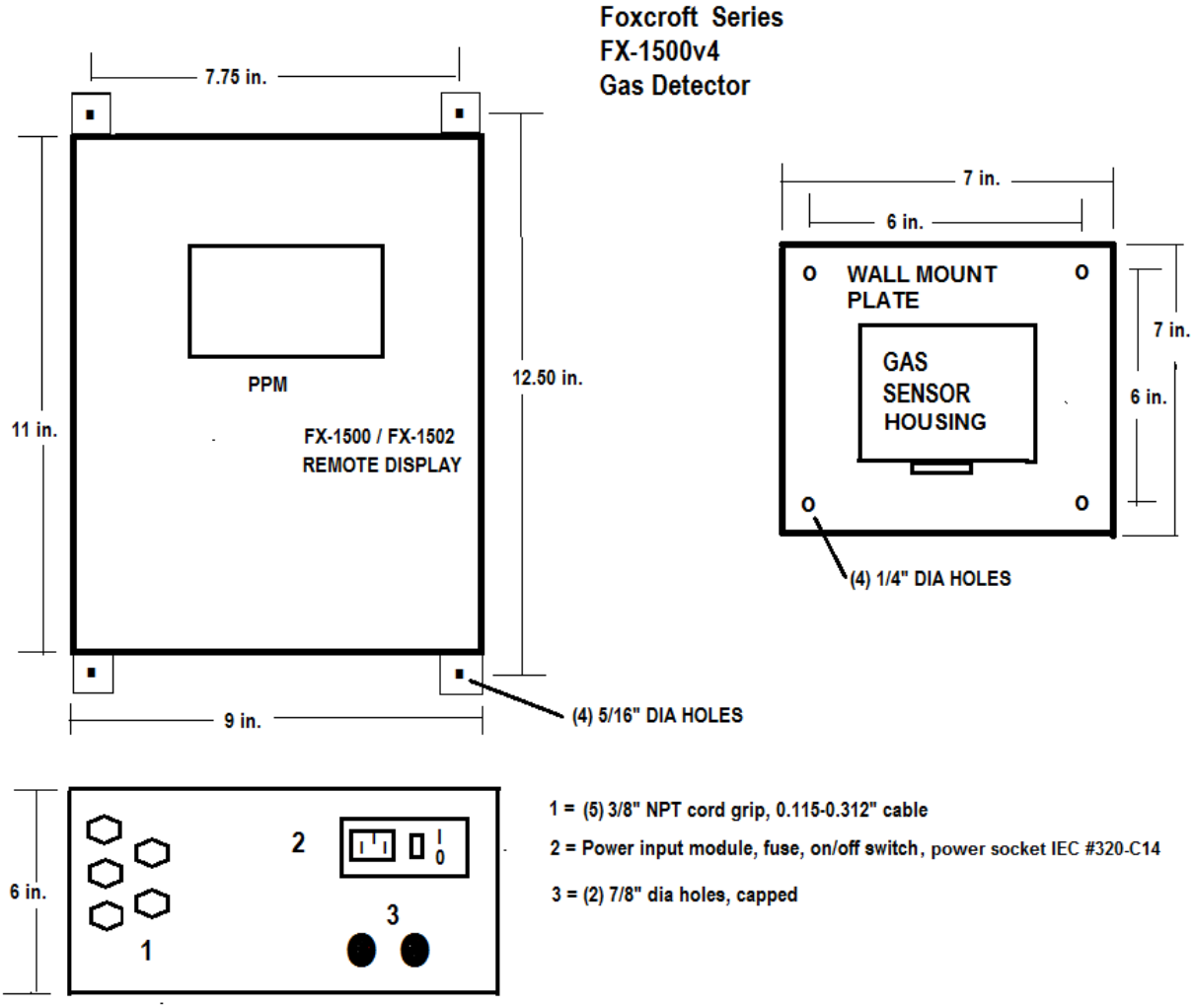
Air flow patterns and the size of the room to be monitored must be considered in addition to the vertical placement of the sensor. It’s possible that air flow patterns or lack of ventilation may carry heavier gases such as chlorine to a higher level such as the breathing zone. It’s possible that one sensor may not provide sufficient protection.

- Locate the sensor with the sensing chamber opening pointing down near the gas source where the normal air flow pattern will carry the gas to the sensor.
- Do not install in dusty or dirty areas. Dust and dirt can build up in the sensing chamber, making it overly sensitive. Dirt can block openings to the sensing chamber and keep the gas detector from sensing toxic gas or low oxygen levels.
- Do not install in areas of wash down. The gas detector should not be washed with water or mounted in areas where water is used for cleaning.
- Take into account ventilation air flow patterns, the gas sensor may not detect a gas leak in the room in which it’s mounted due to air flow patterns.
- Do not mount the sensor in a “dead air” space such as a corner.
- Do not install near fresh air vents, next to doors or drafty areas, failure to detect gas and excessive sensor drift can occur.
- If installing in an outdoor area, the detector should be protected from direct contact with the elements and the sensor should generally be placed downwind of the potential gas source. More than one system may be needed to efficiently protect some outdoor locations.
- Do not install in insect-infested areas. If insects enter a sensing chamber, they may cause a nuisance alarm. Also they can block the sensing chamber and prevent toxic gas or oxygen from entering the chamber.
- Never mount the FX-1500 Gas Detector in direct sunlight.

Installation, Mechanical

The remote monitor unit should be located outside of the potential hazard area at a height and location that is clearly visible. Place on a wall that is not subject to vibration or shock.

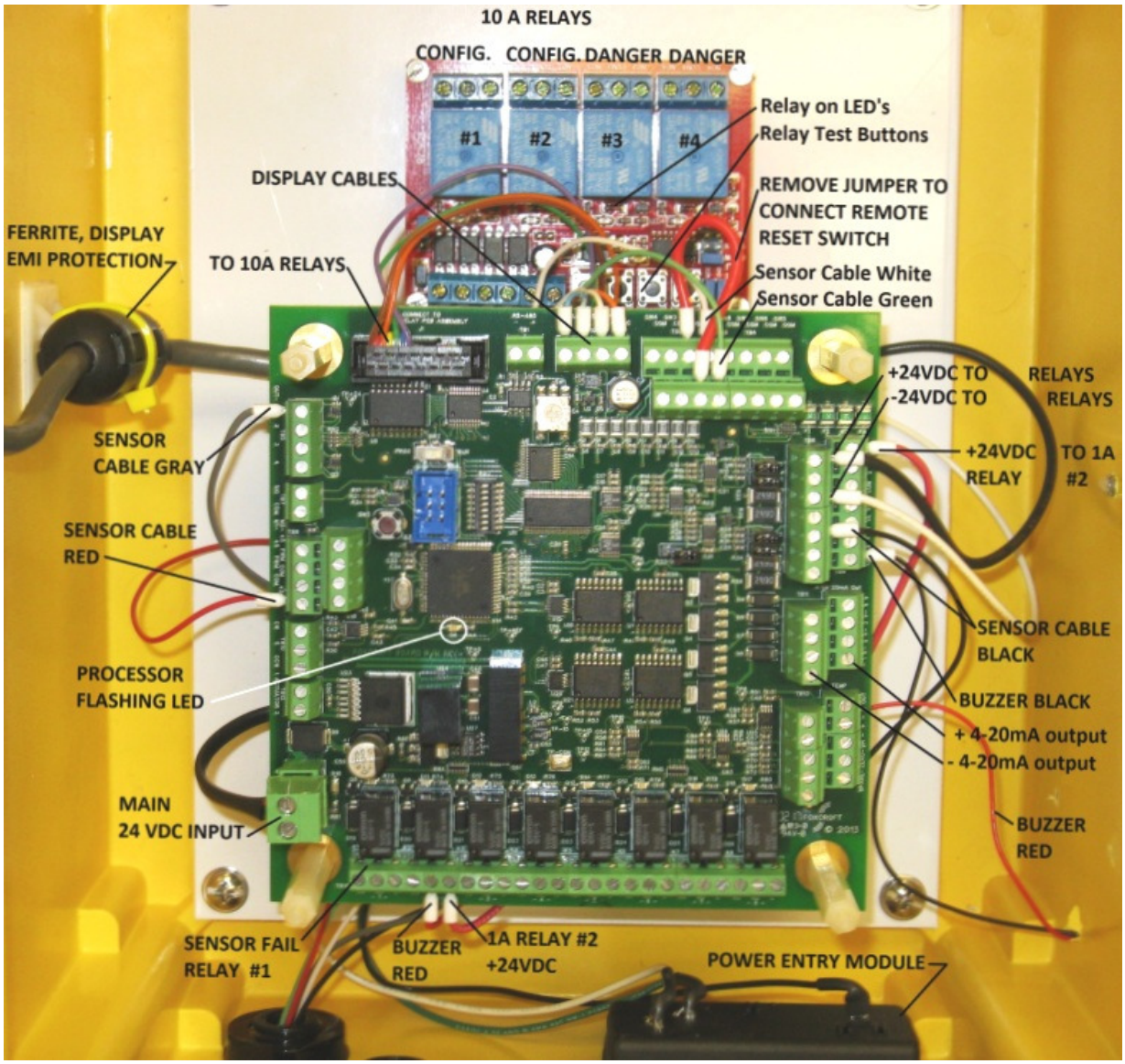
1. Attach the wall mounting feet to the rear of the enclosure using the supplied 5/16”-18 x 3/8” flat head screws.
2. If needed to route sensor cable through conduit, disconnect the sensor cable from the circuit board, be sure to first discharge any static electricity by touching a grounded metal object, by wearing a static preventive wrist band, or other static discharge preventive measures.
3. Attach the remote main display monitor to the wall.



4. Mount the sensor housing near the potential leak source; taking into account the location of a potential leak, weight of the target gas and air patterns (see page 12).

Installation, Wiring

FX-1500 Single Channel Connections

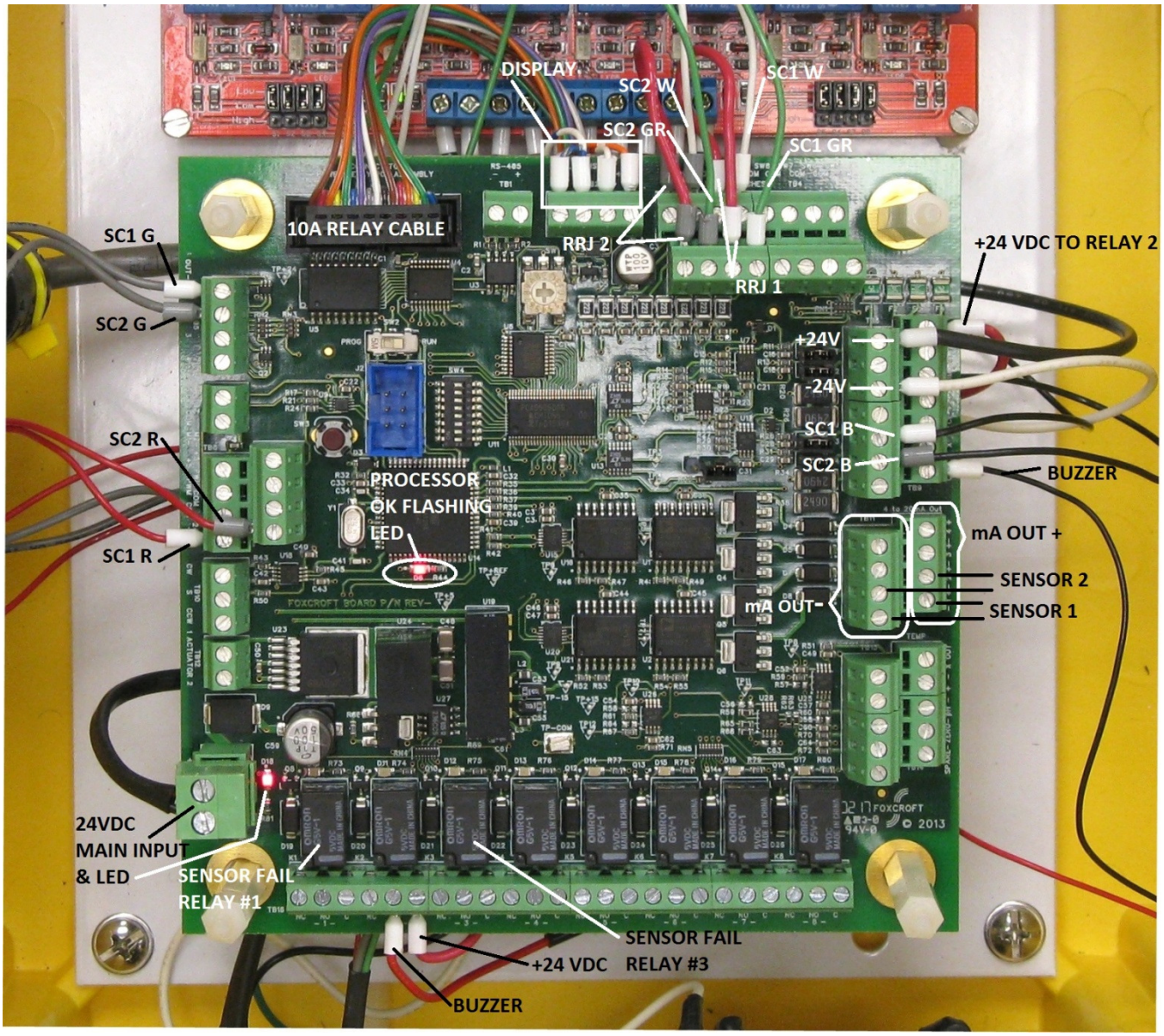


CAUTION: the printed circuit board is sensitive to Electro-Static Discharge. It can be irreparably damaged by static electricity, causing partial or total operational failure. *Before touching the circuit board touch an earth grounded metal surface such as the detector's power supply guard, a metal pipe or conduit to discharge any static electricity from your body, or* wear an anti-static wrist strap connected to an earth ground.

CAUTION: CONNECT mA OUTPUT TO **ISOLATED** EXTERNAL INPUTS ONLY. DO NOT APPLY POWER TO THE mA LOOP.

Installation, Wiring

FX-1502 Dual Channel Connections



See page 17 for 10A relay details

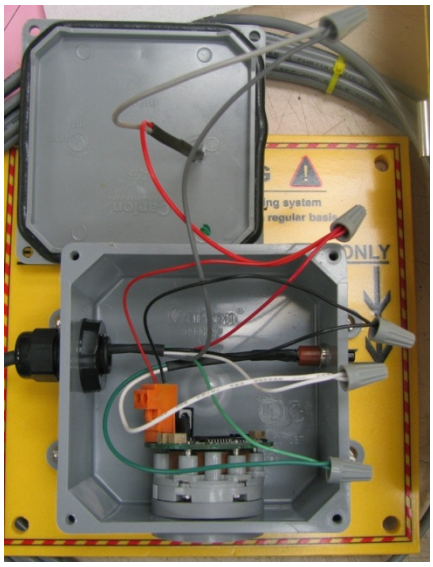
Installation, Wiring

FX-1502 Dual Channel Connections

CONNECTION	DESIGNATION
Sensor Channel 1, wires with white ferrules	**SC1G**ray (shield), **SC1R**ed, **SC1B**lack, **SC1W**hite, **SC1GR**een
Sensor Channel 2, wires with gray ferrules	**SC2G**ray (shield), **SC2R**ed, **SC2B**lack, **SC2W**hite, **SC2GR**een
+24 VDC power to 10A relays	+24V
-+24 VDC power to 10A relays	-24V
+24 VDC to 1A relay #2	+24 VDC to 1A relay #2
+24VDC input to relay #2	+24VDC
Remote Reset Jumper, channel 1	RRJ1
Remote Reset Jumper, channel 2	RRJ2
Touch screen display	Display
Buzzer black conductor on TB9 #1	Buzzer
Buzzer red conductor to NO terminal relay #2	Buzzer
Sensor Fail relay, channel 1, 1A	Sensor Fail Relay #1
Sensor Fail relay channel 2, 1A	Sensor Fail Relay #3
Main 24VDC input from power supply with LED on indicator	24VDC main input
Flashing LED indicates processor is functioning	
Channel #1 mA output	Neg to inner block #TB11 #1, Pos. to outer block #1
Channel #2 mA output	Neg to inner block #TB11 #2, Pos. to outer block #2
mA output #3 & #4 are inactive	

Sensor Housing Wiring

If a shorter cable is needed, make adjustment from the sensor housing end, not the main display control board. Connections to the sensor cable are color coded; simply match conductor colors.



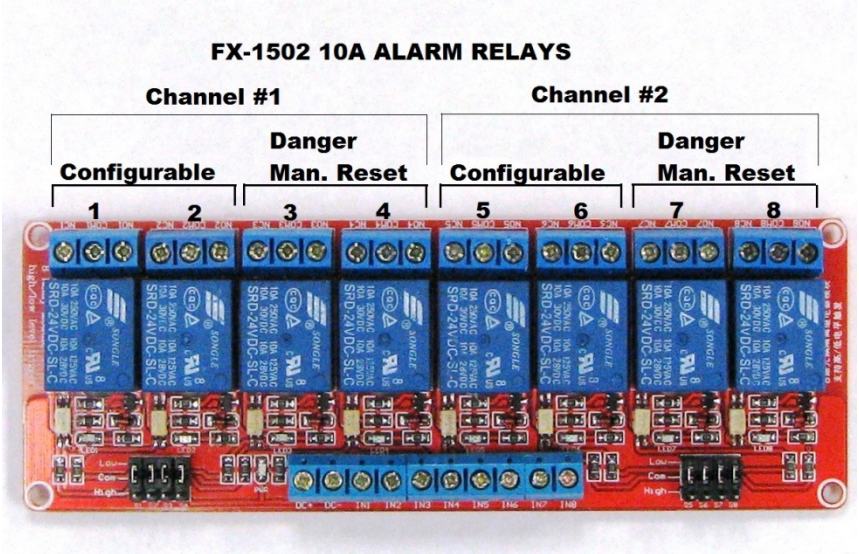
Installation, Wiring

WARNING: Make all connections before you apply power to the detector.

1. **Sensor Cable**: To route the sensor cable through metal conduit, disconnect the sensor cable in the sensor housing, not from the circuit board in the main enclosure. Remove the cover from the sensor housing, and loosen the cable grip nut on the side of the housing. Remove the wire nuts that join the sensor cable to the color coded sensor housing wiring, and pull out the sensor cable. Reverse these steps to re-connect after the cable is installed in conduit.
    a. **Caution:** Do not route sensor or 4-20mA signal cable in the same conduit as power or high voltage cables to prevent interference with the signal.
2. **4-20mA Output Signal Cable Wiring:** Connect 4-20mA signal cable as shown in the photo on page 15 & chart page 16. The top two mA output terminals are inactive as standard.

    Warning: DO NOT APPLY POWER TO mA output. The external device to which the 4-20mA output is connected must have an isolated input to prevent a ground loop which can damage the detector electronics.

3. **Relay Wiring:** Route cables for the alarm relays through the included cord grips and wire to the 10A relays as either normally open or normally closed as required. Relays #3 & #4 are set as Danger, manual reset and are non-adjustable. Relays #1 & #2 are configurable as auto reset at any alarm set point or manual reset at the Danger set point.
    a. **Warning:** Note that the alarm relays are not fuse protected. You must install a current limiting device to limit current to the relays to less than their resistive current rating.



    b. You may decide to not connect the relay cables to the detector at this point to avoid possible false alarms at your control system during the warm up period.

Installation, Wiring

4. **Sensor Fail Relays:** Sensor fail alarm uses the 1A signal relays on the main circuit board. Relay #1 at the far left of the bottom edge of the board is used for single channel detectors and for channel #1 in dual channel detectors. Relay #3, the third relay from the left, is used for channel #2 on dual channel detectors.
5. **Power:** Simply plug the supplied power cord into the power input module on the right underside of the enclosure, and then into a standard NEMA 5-15R wall receptacle. There is no need to select the power input voltage due to the detector's universal voltage input power supply.

6. **Remote Reset:** A Normally Closed (NC) remote reset switch may be connected. If not used the factory installed jumpers must be left in place for the detector to work. As the detector circuitry is a supervised alarm system that sends current to assure the loop is closed, a normally open switch cannot be used.

Startup

1. **Power Up:** Turn on power to the detector using the rocker switch on the power input module. You will see a Foxcroft splash screen as the detector takes 60 seconds for warm up before the home screen is displayed. "System Warm-Up" will display during this time.

2. **4-20mA Output Scaling:** No field configuration is required. The mA output is scaled automatically when the detector operating range is set at the factory. The output is accurate to about 1 micro amp. The external device connected to the detector must be scaled to match the sensor operating range.

3. **Alarm Relay Configuration:** Relays #3 & #4 are factory set as manual reset, latching, to alarm at the Danger set point and cannot be changed. By default relay #1 is configured as non-latching auto reset to alarm at the Caution level. Relay #2 is configured as non-latching to alarm at the Warning level. Configure alarm relays #1 and #2 if desired by first touching the Setup button on the home screen to navigate to the Setup page, then touch the Relays button.
    a. Simply touch the square gray button that matches the relay behavior and alarm set point desired; it will turn green to indicate your selection. Simply touch another button if you decide to change one or both relay configurations.
    4. If you have a two channel detector repeat the procedure above for channel #2.

    Tip: If you think the caution alarm level may trigger nuisance alarms, do not assign a relay to this level

    a. **Test The Circuitry For Sensor Connectivity And Alarm Functions.** From the Home screen touch the Setup button, from the Setup page touch the test button. Tap the test button to the right of the test status field. The buzzer should sound, verify the relays are energized (the LED's below each relay configured to alarm at the Danger level should illuminate red, and the local LED on the sensor housing should illuminate red.

   b. If any of these alarm notifications do not occur during the test, check and correct the wiring to the circuit board. Simply resetting the detector will have no effect on alarm notification. Note that all sensor and switch inputs are normally closed so that any break in the circuitry will be detected.

5. Repeat the test above for the second channel if you have a 2-channel detector.

6. **Sensor Warm Up & Acclimation:** The gas sensor requires a warm up and acclimation period during which the sensor may drift and set off false alarms until it stabilizes. Allow the sensor to warm up for about 20 minutes. Allow 1 to 12 hours depending on conditions and the sensor type for the sensor to fully stabilize and acclimate to the environment before calibrating or putting the detector into service.

7. **Calibration Check:** Although every gas sensor is tested and calibrated before shipment, differences in air pressure, temperature and relative humidity at the installation site may cause the zero point and alarm trip points to shift slightly.

   Ideally the sensor after acclimating should be fully calibrated to your local conditions by adjusting the zero point if necessary and applying a low level target calibration gas that matches the range of your detector and adjusting the sensor as required. At minimum you must verify that the gas sensor(s) responds to gas by performing a bump test with gas. See the calibration section for the procedure for instructions.

8. After calibration and testing the detector is operational.

Operation, Screen Navigation

The 4.3” glass LCD full color touch screen functions as both a display and an instrument interface for setup and use. All manual input is performed by using the screen generated buttons. Touch the active buttons with your finger to navigate to the desired screen, **do not use hard objects such as pens etc.**

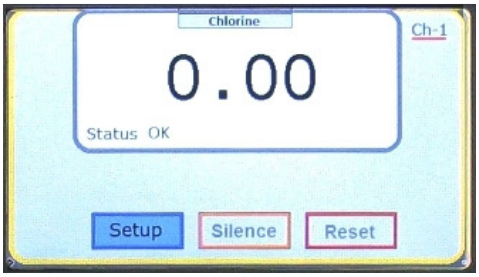
Home Screen

On the home screen the normally white 1” high x 2-1/2” wide status field shows the gas being monitored, its concentration and text status message. The status field also functions as a high visibility visual alarm indicator; it will change color depending on the alarm setpoint: OK – white, Caution – yellow, Warning – orange, Danger – red, Sensor Fail – blue.

The balance of the home page includes the channel number being monitored, active buttons to silence the alarm buzzer and reset the relays, as well as a button to access the setup menu.

Note that the Silence and Reset buttons have gray centers under normal conditions, and will turn a solid color under Danger alarm condition. After a button is pressed it will turn gray again (reset is possible only if the actual alarm condition is resolved).

The flashing light in the lower left corner indicates that the microprocessor is working. The light will stop flashing or disappear upon processor failure.



For two channel detectors the screen is split to show all of the information above for each measurement channel, which operate completely independently of each other. The status fields in the FX-1502v4 are 1-1/8” high x 1-3/4” wide.

Upon startup or power restore the detector will take 60 seconds for sensor warm up before displaying the home screen. During this time “System Warm-Up” will be displayed.

Operation, Screen Navigation

SETUP SCREEN

A set up screen is provided for each measurement channel and provides active buttons which you tap to with your fingertip to access the screens designated:

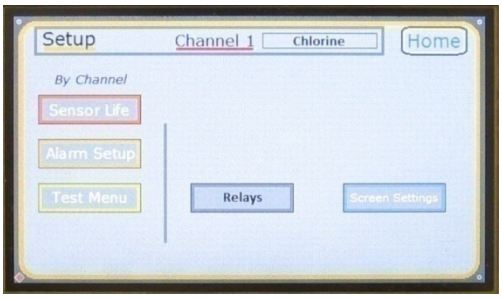
Sensor Life

Alarm Setup

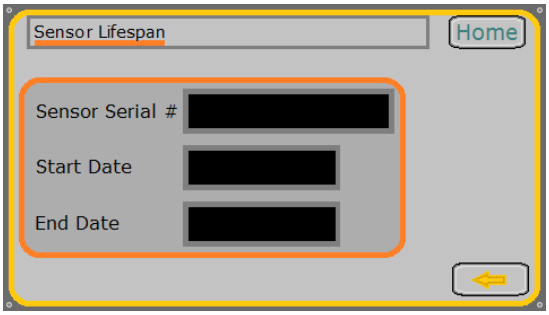
Test

Relays

Screen Settings



Sensor Life Screen



By pressing the “Sensor Life” button you will see the sensor serial no, the sensor life start date and expiration date (two years).

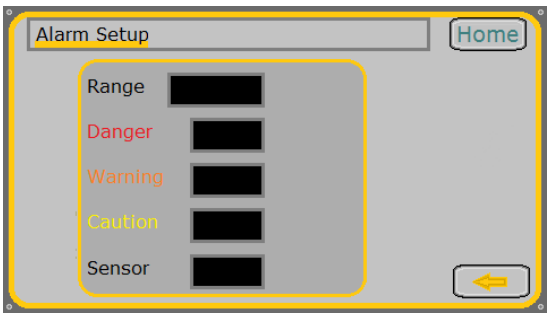
The data can be changed at sensor replacement by touching each data field. Using the keypad that appears, enter the data in the prescribed format:

Serial Number: 13 digits including the leading zero, with no spaces or punctuation marks.

Date: 2 digits each for month, day, year, separated by periods then press enter. For example: May 9, 2017 enter 05.09.17.

Press the return arrow to go back to the Setup Screen, then the Sensor Life Screen and select the other data fields to be edited.

Alarm Setup Screen



Alarm Setup screen shows the gas sensor operating range and preset alarm trip levels. These are all display values only and are not configurable in the field.

Non-standard operating ranges and alarm set points are available at the time of order or by returning the detector to the factory. Additional costs will apply.

Operation, Screen Navigation

Test Screen

The Test Screen provides a test button to check the sensor circuitry, the local sensor LED, the audible buzzer and relay actuation. **THE TEST BUTTON DOES NOT TEST THE GAS SENSOR'S FUNCTIONALITY OR ITS ABILITY TO DETECT GAS.**

Simply tap the button to toggle the test on or off or press a remote reset button if one is connected.

The test screen also displays the detector serial number, the software version, and the display software version. These numbers are required for service.

10A Relays Screen

The relays screen displays the default configuration of the configurable 10A Form C alarm relays #1 & #2 and provides a means to edit their configuration.

Form C relays #3 & #4 are factory set as manual reset (latching) and to energize at the danger alarm set point. They are not adjustable. These relays will remain energized until the Reset button is touched.

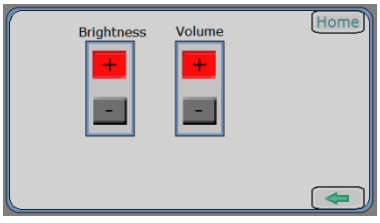
Relay #1 is factory set for non-latching operation and to alarm at the Caution alarm set point. Relay #2 is factory set for non-latching operation and to alarm at the Warning alarm set point. To avoid possible nuisance alarms simply assign the relay to danger.

Relays #1 & #2 can be reconfigured to auto reset (non-latching) at any alarm set point or manual reset (latching) at Danger alarm set point by simply tapping the desired button. The button will turn green upon selection.

Note that non-latching relays will automatically reset (de-energize) when the measured concentration falls below the designated alarm set point. Latching relays must be manually reset (de-energized) by touching the reset button.

The latching relay can only be reset after the measured concentration falls below the designated alarm set point. If you touch the reset button while the concentration is at or above the alarm set point the detector will remain in alarm and relays will remain energized until safe levels are measured.

Screen Settings Screen



The Screen Settings screen allows you to adjust screen brightness and screen volume (not the alarm buzzer volume).

Normal Operation and Alarm Conditions

Normal Operation

NOTE: The gas sensor and its signal output are not controlled, manipulated or changed by the detector software or hardware.

Under typical conditions, the status field in the home screen will be white and will display the gas concentration measurement from the gas sensor. The displayed measurement is delayed by about 2 seconds; neither the displayed value nor the delay is field adjustable. The Status message will display OK if gas levels are zero or below alarm set points.

Upon sensing a gas leak, a text description of the alarm type will be displayed along with the gas concentration, the audible alarm will sound only at the Danger alarm level, the relays will energize as configured, the status field will change color as each gas alarm set point is reached, the local LED on the gas sensor enclosure will illuminate red at the Danger level only.

Alarm Conditions

The series FX-1500v4 includes three gas alarm set points and a sensor fail alarm set point:

Caution: a low level alarm set point to provide advanced warning of a low level leak.

Warning: an alarm set point set to OSHA, NIOSH and ACGIH recommendations.

Danger: an alarm set point set to OSHA, NIOSH and ACGIH recommendations.

Sensor Fail: to indicate loss of signal from the sensor (3.84mA or less) for at least 30 seconds.

NOTE: Alarm notifications cannot be caused by a software malfunction. An alarm signals a potentially dangerous condition. You must determine the cause of the alarm and take appropriate action. Attempting to reset the gas detector by powering off and on will not stop or reset an alarm notification or correct a dangerous condition or component failure.

Caution Alarm

When this alarm set point is reached the status field will continue to display the measured concentration from the sensor, the status field color will change from white to yellow, the Status message will display “Caution”, and any relay configured to alarm at this level will energize. The buzzer will not sound. By default the relay if assigned will auto reset, or de-energize, when levels fall below the alarm set point.

If you think the caution alarm level may trigger nuisance alarms, do not assign a relay to this level.

Warning Alarm

When this alarm set point is reached the status field will continue to display the measured concentration from the sensor, the status field color will change to orange, the Status message will display “Warning”, and any relay configured to alarm at this level will energize. The buzzer will not sound. By default the relay if assigned will auto reset, or de-energize, when levels fall below the alarm set point.

Normal Operation and Alarm Conditions

Danger Alarm

When this alarm set point is reached the status field will display the measured concentration from the sensor, the status field color will change to Red, the Status message will display “Danger”, manual reset relays #3 and #4 will energize, any additional relay configured to alarm at this level will energize, the piezo buzzer will sound, and the LED on the local sensor housing will illuminate red. The Silence button will turn solid orange, and the Reset button will turn solid red. Local test button and remote test are both locked out and unavailable.

Note: In a danger alarm condition you cannot leave the main home screen until the alarm condition is resolved, at which point the danger alarm can then be reset.

Attempting to reset the gas detector by powering off and on will not stop or reset an alarm notification; the detector will return to the danger alarm state upon power restore or system reset if gas concentrations are in fact detected as being at or above the alarm level.

If a sensor fail alarm occurs during a danger alarm, the detector will only display the danger alarm notification. In this instance, after the danger condition is resolved and the danger alarm is reset, the sensor fail alarm will indicate if sensor outputs at 3.84mA or less after exceeding a 30 second time limit.

> **Note:** In some cases of sensor failure the current output can raise up to maximum, in which case the danger alarm will trip even though no gas is present.

The piezo buzzer may be turned off using the Silence button on the home screen.

When the measured concentration falls below the alarm set point any non-latching relays will automatically reset (de-energize) and the status field will return to its normal color and status message.

Latching relays must be manually reset using the Reset button, which will also silence the buzzer.

> **Note:** Latching relays can only be reset after the measured concentration falls below the danger alarm set point. If you press the Reset button while in Danger alarm mode while actual gas concentrations are at or above the danger alarm set point the alarm notifications will remain and the relays will remain re-energized. You cannot leave the main home screen until the alarm condition is resolved; once done the danger alarm can be reset.

Sensor Fail Alarm

The sensor fail alarm indicates the loss of signal output, either temporary or permanent, from the sensor for a minimum of 30 seconds. Signal loss can be caused by sensor failure, breakage in the normally closed sensor circuitry, or temporary signal loss below 3.85mA caused by normal sensor drift.

> **Note: Sensor signal loss is not produced or controlled by the detector electronics or software.** In some cases of sensor failure the current output can raise up to maximum, in which case the danger alarm will trip even though no gas is present.

Normal Operation and Alarm Conditions

Sensor Fail Alarm

During normal operation an electrochemical gas sensor can drift up or down in response to changes in temperature, humidity or air pressure. Drift can also occur if the sensor is directly exposed to wind or air flow.

To avoid nuisance alarms caused by a temporary brief reduction in signal, the detector will behave as follows:

If sensor output is between 3.99mA to 3.85mA for any period of time the display will show a negative number, the status field remains white, the sensor fail relay will not energize. If the current rises back above 4mA, zero or positive numbers will be displayed.

If the current rises above the 3.85mA threshold before the 30 second time limit elapses the counter will reset. The home screen will display negative numbers until sensor output reaches 4mA, at this point zero or positive numbers will be displayed.

Sensor Fail Alarm

The sensor output must be at or below 3.84mA continuously for 30 seconds or more before the sensor fail alarm will trip. In this mode the status field will turn blue, the concentration will display as “XXXX”, the status message will read Sensor Fail, and the 1A alarm relay will energize. The buzzer will not sound.

> **Note:** the Test button and Remote Test are locked out during sensor fail mode

If a sensor fail alarm occurs during or after a danger alarm, the detector will only display the danger alarm notification. In this instance, after the danger condition is cleared and the danger alarm is reset, the sensor fail alarm will indicate after the 30 second time limit.

> **Note:** If sensor output rises back up to 4mA after a sensor fail alarm has occurred the 1A relay will automatically reset, but the blue status field will remain until cleared manually by touching the reset button. The alarm cannot be reset manually until sensor output reaches 4 mA. This is intended to alert personnel that the sensor may need service or replacement in the near future.
>
> **Note:** While the detector is displaying negative readings or in Sensor Fail mode all gas detection capability, alarm indications and relays remain fully functional.

Sensor Fail Alarm with Oxygen Sensors

The Sensor Fail alarm is not available with Oxygen sensors because the Oxygen and Sensor Fail alarms both trip in the same sensor output range. Given the possibility of being unable to *positively* distinguish between the two alarm types due to sensor drift or environmental factors, it’s prudent to assume a sensor output of 4 mA or less signifies an Oxygen deficiency. If testing with a separate instrument demonstrates safe Oxygen levels then the sensor functionality can tested and the sensor replaced if needed.

Gas Sensors

General Information

The responsiveness of electrochemical sensors will vary with environmental conditions. Sensor response may be higher or lower depending on actual environmental conditions.

Gas Exposure

The electrochemical gas sensors used in FX-1500v4 gas detectors are strictly designed and intended for occasional intermittent exposure to the target gas. Under no circumstances will the sensor survive continuous exposure to target gas. The only exception to this is Oxygen sensors.

Sensor Serial Number and Date Code

Each gas sensor has an eight digit serial number followed by a 3 digit date code. The first two digits of the date code signify the month, the third is the year of shipment from the factory.

Humidity

Gas sensors are relatively unaffected by humidity if conditions are not condensing within a range of 15% to 90% RH. The sensor will show a transient response to rapid changes in humidity which should go away after 30 seconds.

The gas sensor includes an aqueous electrolyte and a porous diffusion barrier. The means the sensor can both absorb water from the atmosphere and dry out. At continuous operation at high temperatures and 90%-100% RH the sensor can become prone to leakage as the free space in the sensor slowly fills with water. The sensor can gradually be restored to balance without permanent damage by exposure to lower relative humidity.

Likewise, continuous operation at 0-15%RH will cause the sensor to dry out, which can cause the acid electrolyte to attack the seals. This occurs if the volume of electrolyte decreases by more than 40%. If not left in this condition too long the sensor can be restored by exposing the sensor to RH humidity above 15%.

Temperature

Both the baseline (zero point) and output span are affected by temperature. The baseline approximately doubles with every 10°C increase in temperature. The output span will increase slightly up to about 10% before leveling off with gradual increase in temperature. A transient spike can occur with rapid changes in temperature; this should go away after 30 seconds.

Maximum Overload

The gas sensor maximum overload rating, for chlorine it is 250 ppm, is specified in terms of maintaining a linear response over a 10-minute exposure and recovering quickly. At higher levels the sensor will progressively become more non-linear and take increasingly longer to recover as the sensing electrode is unable to consume all the gas diffusing to it.

If the gas level is increased even further gas will build up inside the sensor and diffuse into the internal spaces where it may interact with the reference electrode, altering its potential. If this happens the sensor may take several days to recover once placed in clean air.

Sensor Zero Point Drift

Over time all gas sensors will experience a shift of the zero, or reference point. When this happens the gas concentration readings will also shift accordingly, producing inaccurate readings.

Note that sensor responsiveness will vary with environmental conditions.

Typically gas exposure mentioned throughout this document refers to the target gas, however exposure to interfering gases can cause similar effects as target gas exposure.

Causes of gas sensor zero point drift include:

- Chemical degradation of the sensor over time.
- Temperature, affecting both the span and zero point
- Repeated use in extreme high or low temperature or humidity conditions, or environments with high levels of airborne particles. Temperatures above the rated limit stress the seals, which will cause electrolyte leakage.
- Exposure to high levels of gas, or exposure to concentrations that exceed the range of the sensor.
- Low level gas exposure for extended periods of time.
- Continuous exposure to solvent vapors or highly corrosive gases.
- Rough handling or jolting of the sensor and electronics

Exposure to these conditions may damage the sensor to the point that it can no longer operate properly over its full range or be able to calibrate properly.

Calibration

Calibration Frequency

The only way to guarantee that an instrument will detect gas accurately and reliably is to test it with a known concentration of gas. Regular testing and calibration is the only way to be certain that a detector is fully functional.

A calibration or gas sensor can only be as accurate as the test gas used to perform the calibration.

1. The gas sensor should undergo a sensor response, or bump test, at least once per month. If the sensor fails the bump test then full calibration is required.
2. The gas sensor should undergo a full calibration at least once every 6 months and after the sensor detects a gas leak.

   NOTE: A sensor may require more frequent calibration depending on the effects of local conditions such as temperature, humidity, presence of gas or vapors that can poison the sensor, or by local regulations.

3. It is important to keep a log of sensor tests, calibrations and results.

CAUTION: Although it is common for operators to test chlorine sensor response with bleach, pool chlorinating chemicals, or by producing chlorine gas by mixing bleach with an acid, doing so risks exposing the gas sensor to excessively high concentrations that can damage the gas sensor.

WARNING: NEVER attempt to calibrate a chlorine gas sensor with bleach, pool chlorinating chemicals, or by producing chlorine gas with a mixture of bleach and an acid. Any sensor adjustment made with such gases or fumes, or without the proper known concentration of gas will cause the sensor to not alarm at all or to alarm at incorrect and unsafe levels. This can create a life threatening situation in which the detector may not alarm during a chlorine gas leak.

Calibration

Setting the Zero Point

The gas sensor zero point will drift over time with changes in temperature, humidity and after a gas leak.

The shift may only be off only slightly or enough to trigger the cell failure or caution alarms. If this has happened to your gas detector, and the reading (or alarm) is stable, you can usually correct the problem with a slight zero adjustment. If the reading is erratic, either there is a gas leak that the sensor is picking up, or the detector is in need of service. Chlorine sensors are stated to have a maximum zero drift of -0.2 ppm equivalent at +20°C to +40°C.

The zero adjustment is done on the sensor itself in ambient air free of the target gas or any interfering gases. Be sure that you don't have any minor gas leaks that would affect the zero setting before performing this adjustment.

The room where the gas sensor is mounted and where the zero point is adjusted should not contain any other forms of chlorine, including calcium hypochlorite, sodium hypochlorite, or various cleaning chemicals and solvents that may or may not contain chlorine. The gas sensor is extremely sensitive and will pickup these sources of chlorine, which will offset the zero calibration to an incorrect value.

To Set the Zero Point:

You will need a millivolt meter, the blue test connector with leads shipped with your detector and a flat blade jeweler's screwdriver. The detector should be powered up. You may also use the detector display for calibration.

1. Remove the cover from the gas sensor enclosure. You may leave the sensor in the housing or remove it for easier access by unscrewing the mounting ring and pulling the sensor out of the enclosure.

   NOTE: Use the orange connector or the gray plastic sensor body to handle the gas sensor. Do not handle the sensor using the mA transmitter circuit board to avoid damage to the board by static electricity.

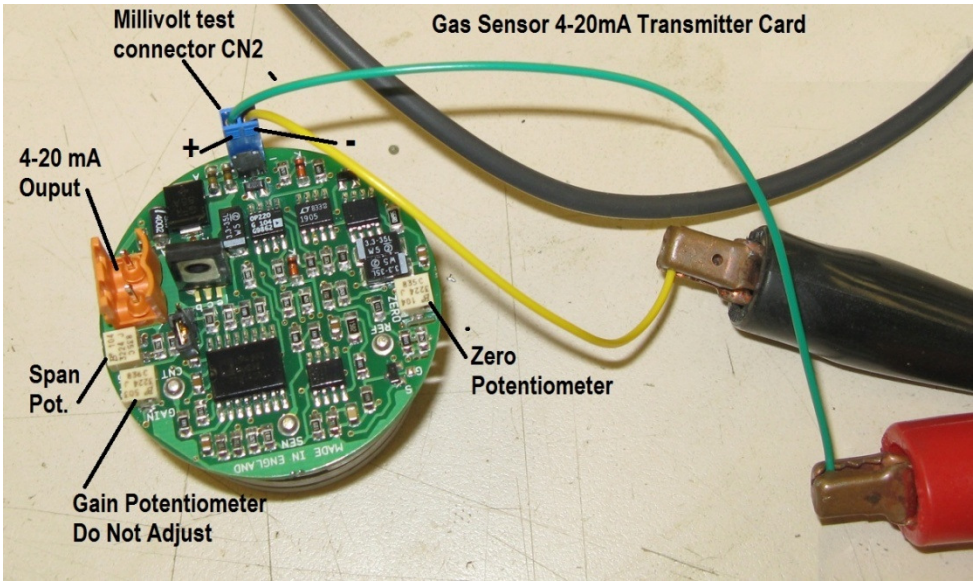
CAUTION: the printed circuit board is sensitive to Electro-Static Discharge. It can be irreparably damaged by static electricity, causing partial or total operational failure. You must take the following precautions before *touching or making any connections to the circuit board.*

Before touching the circuit board touch an earth grounded metal surface such as the detector's power supply guard, a metal pipe or conduit to discharge any static electricity from your body, or wear an anti-static wrist strap connected to an earth ground.

Calibration

To Set the Zero Point:

2. Ensure the sensor is warmed up and free from the target gas being measured either by purging the sensor with an inert gas, in ambient air free of the target gas or any interfering gases, or by blanking the sensor from the atmosphere with the calibration nose supplied and the caps in place.
3. Locate the blue millivolt test connector CN2 on the sensor transmitter circuit board.



4. Plug the supplied test connector into the circuit board connector CN2. If you don't have the connector, insert to wire leads into the millivolt connector, observe polarity when connecting your meter. If you only have a D.C. milliamp meter, disconnect the negative lead of the 4-20 millamp signal wire and connect the meter in series with the wiring loop (again, observe polarity when connecting the meter). Zero ppm always equals 4mA.
5. In ambient air, the zero reading should be 40 millivolts or 0.0 on the FX-15000 series display. If it's not, adjust the zero potentiometer with the jeweler's screwdriver until the correct reading is displayed.
6. The potentiometer is a multi-turn unit, and there is some signal dampening in the circuit, so the signal change may not fully stabilize until after you make the adjustment.
7. Do not adjust the span or gain potentiometers. Span calibration requires a gas standard calibration kit. <u>The gain is factory set and should never be adjusted.</u>

Calibration

Full Calibration, Toxic Gas Sensors

1. Make sure the zero point is set accurately, if not set the zero point as stated above.
2. Insert the calibration nose completely into the sensing chamber of the gas sensor, making sure the O-ring is seated properly to isolate the sensor from the atmosphere.
3. Remove the sealing caps from the calibration nose. One port on the calibration nose is used for gas inlet, **the other port must be left open as a vent.** Either port can serve as an inlet or vent.
4. Install the Teflon tubing connected to the gas regulator supplied with the calibration kit onto the calibration nose.

   Warning: The gas regulator and tubing must be dedicated to one type of gas only, do not use a regulator and tubing for chlorine that was used on sulfur dioxide or ammonia, or vice versa.

5. Apply target calibration gas with a known concentration that matches the operating range of the sensor and detector and wait until the readings stabilize on the detector display. The reading will initially go down for several seconds before rising due to differences in humidity and pressure between the gas in the cylinder and the gas sensor.
6. Allow five minutes, sometimes slightly less, for the readings to stabilize.

Calibration

Full Calibration, Toxic Gas Sensors

7. Adjust the span potentiometer on the gas sensor until the correct reading is shown on the display.
8. You may also calibrate by using a millivolt meter:
9. Connect the meter leads, observing polarity, to millivolt test connector CN2.
10. Apply the target gas to the sensor and allow the readings to stabilize as described above.

The correct voltage output for the target gas being used is determined as follows:

(16 x gas concentration) / range of sensor + 4 x 10mV

a. *Example: Calibrating a hydrogen sulfide sensor to a range of 0-50ppm using a calibration gas concentration of 20ppm:*

(16 x 20) / 50 + 4 + 10 = 104 mV

11. With the correct reading displayed on the detector calibration is complete, re-assemble the detector.

    Caution: Be sure to remove the calibration nose before placing the detector into service. **Never operate the sensor with the calibration nose inserted.**

    Caution: If the sensor or detector will not allow you to fully adjust the displayed concentration to match that of the calibration gas then you must replace the gas sensor.

Full Calibration, Oxygen Sensors

Calibration should be carried out in ambient air, and is done simply by adjusting the span potentiometer until a reading of 20.9% on a scale of 0-25% is displayed on the LED display.

Sensor Fail Alarm with Oxygen Sensors

The Sensor Fail alarm is not available with Oxygen sensors because the Oxygen and Sensor Fail alarms both trip in the same sensor output range. Given the possibility of being unable to *positively* distinguish between the two alarm types due to sensor drift or environmental factors, it's prudent to assume a sensor output of 4 mA or less signifies an Oxygen deficiency. If testing with a separate instrument demonstrates safe Oxygen levels then the sensor functionality can tested and the sensor replaced if needed.

Oxygen sensors alarm as concentrations, and therefore sensor output, decreases. A 4 mA Oxygen sensor output corresponds to 16% Oxygen by volume, which is the Danger alarm trip point.

Calibration

Sensor Response (Bump) Test

Important

The sensor response test, also known as a “bump” test, is only used to test the gas sensor’s ability to respond to a gas leak. This test is not a calibration. Sensor response, or bump tests should only be done with a known target concentration gas.

Note that the Industrial Safety Equipment Association (ISEA) defines a bump test as follows:

Functional (bump) test – A means of verifying calibration by using a known concentration of test gas to demonstrate that an instrument’s response to the test gas is within acceptable limits.

It is **very important** that this test sets off all the alarms and that the target concentration gas level is displayed on the LED display.

Full calibration is required if the test fails to set off alarms and the target concentration gas level is not displayed on the LED display.

1. The Remote alarm unit must be at zero on the LED display.

2. Install the calibration nose in the collar plug; be sure the nose is sealed properly and is isolated from the atmosphere.

3. Connect the target calibration gas sample tubing to the nose.

4. Apply target calibration gas with a known concentration, the sensor should begin to alarm within 20 seconds.

5. Wait for a stable reading to be obtained and compare it to the concentration on the calibration gas cylinder. The known target gas concentration level should be indicated on the LED display and all the alarms should be set off including the buzzer.

7. If the target calibration gas level is indicated on the LED display and the alarms are set off including the buzzer, test is complete.

8. Remove calibration nose, LED display should zero in a few minutes. Reset danger alarm.

9. If the target calibration gas level is not indicated on the LED display and or fails to set off all alarms a full calibration is required.

Gas Sensor Replacement

Electrochemical Cell Only

Sensor replacement in the FX-1500v4 Gas Detector is easily done with minimal tools.

Tools Required:

- Small Jeweler's Screwdriver
- Slotted or Phillips Screwdriver
- Needle nose Pliers

1. Disconnect the AC power from the detector.

2. Remove the sensor enclosure from the wall.

3. Remove the front cover of the sensor enclosure.

4. Carefully pull off the orange wire connector.

5. Flip the enclosure so that you can see the bulk head nut (see page 33 for diagram). Place the tips of a pair of needle nose pliers in the two holes of the sensor bulk head nut. Turn the ring counterclockwise to loosen the ring, and remove the entire sensor from the enclosure.

6. The transmitter PC board is mounted to the sensor with disconnect pins. Hold the PC board by the edges and carefully pull the board off of the sensor.
7. Remove and discard the 3 mounting screws. They are metric. The new sensor will come with 3 new #2-56 screws that match the thread inserts in the new sensor. Keep the collar, membrane, and o-rings. They will be used to mount the new sensor.

8. Install the collar, membrane, and o-rings on the new sensor, using the screws that came with the new sensor.

9. Remove the shorting wire from the gold pins on the new sensor, and carefully line up the 3 gold pins on the new sensor with the (3) sockets on the bottom of the transmitter board. Press evenly on the board until it fully seats on the gold pins.

10. Installation of the completed sensor/transmitter assembly is the reverse of its removal.

11. After completing the sensor replacement procedure, power-up the gas detector and allow it to stabilize for twenty minutes or so (some sensor gas types take up to 24 hours to stabilize). The display should show 0.0 ppm +/-0.1 ppm. If the display is off by more than 0.2 ppm, or the cell failure/problem light is blinking, the sensor requires a full sensor calibration.
12. Perform a full calibration, including the zero point calibration.

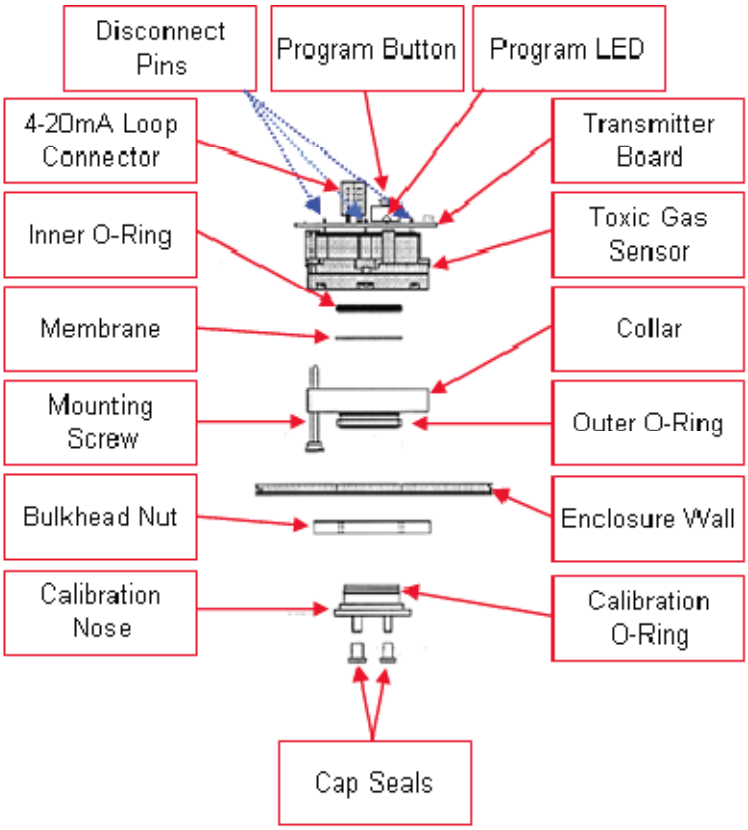
Gas Sensor Replacement

Sensor with 4-20mA Transmitter Board

Tools Required:

- Slotted or Phillips Screwdriver
- Needle nose Pliers

1. Disconnect the AC power from the detector.
2. Remove the sensor enclosure from the wall.
3. Remove the front cover of the sensor enclosure.
4. Carefully pull off the orange wire connector.
5. Flip the enclosure so that you can see the bulk head nut. Place the tips of a pair of needle nose pliers in the two holes of the sensor bulk head nut. Turn the ring counterclockwise to loosen the ring, and remove the entire sensor from the enclosure.
6. Reverse this procedure to install the new sensor with transmitter board.



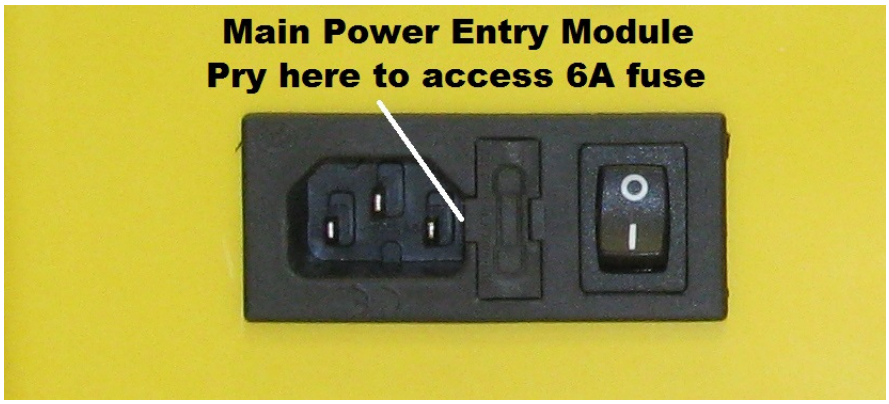
Gas Sensor Replacement

Sensor with 4-20mA Transmitter Board

1. After a sufficient warm up period check the zero point of the sensor and adjust if needed.
2. Conduct the sensor response test. If the sensor fails this test a full calibration is required.

Fuse Replacement

1. Turn off power using the power entry switch.
2. Unplug the power cord.
3. Using a small flat blade screwdriver, pry the tab on the left side of the fuse compartment straight down.
4. Replace the fuse, and reverse the procedure to reinstall.



Technical Data, Specifications

Gas Sensor

3-Electrode, electrochemical fuel cell

Response Time (T90)

<60 Seconds at 20°C. Typically <8 seconds to full alarm

Accuracy: 0.1 PPM (@20 degree C)

Resolution: 0.1 PPM

Long-term Sensitivity Drift: <2% signal loss per month

Temperature Range: -20°C to +50°C (-4°F to 122°F)

Humidity Range: 15 - 90 % (non-condensing)

Three Gas Alarm Levels, Non-Adjustable

Danger, Warning (set at OSHA, NIOSH and ACGIH recommendation), Caution. Non-standard alarm levels and operating ranges available optionally

Sensor Fail Alarm

Indicates loss of sensor input >30 seconds or a break in the sensor circuit

Visual Concentration, Status & Alarm Indication

3/8" high numeric concentration display. Both text description and color coded 1" x 1.75" minimum alarm status fields for each gas alarm level and sensor fail. White=OK, Yellow=Warning, Orange=Red, Sensor Fail=Blue, Red LED on the local sensor enclosure.

Audible Alarm Notification: 100 dB piezo buzzer

Separate Silence & Reset Buttons

Displayed on the touch screen to silence the buzzer, reset the relays and alarm status if gas is below alarm levels.

Operating Voltage: Filtered 24VDC

Power Supply

88-264 Volts AC, 50/60 Hz input, switching, 2.2A, 52.8W, no voltage selection is required

24VDC battery powered optional, 20VDC minimum to energize relays

Power Connection

6A fused IEC #320-C14 inlet power input module, includes detachable 2-meter power cord with IEC #320-C13 and NEMA 5-15 connectors

Power Consumption: <10 watts

Display

4.3" Resistive full color glass LCD touch screen, 480 x 272 screen resolution, 4MB flash memory, rated 1 million touches on any one point. Adjustable brightness. Weather resistant sealing.

Sensor Cable

25-feet standard, up to 2,000 ft available, 22Ga, 4-conductor shielded cable

4-20 mA Retransmission Output

(1) 4-20mA for each channel, auto scaled to sensor range, into 750 Ohms max, diode protected to 50VDC, 2-wire

Technical Data, Specifications

Relay Configuration

Configure via touch screen pushbutton without reference to lookup tables, without DIP switch or jumper setting, and without detector disassembly.

Gas Alarm Relays

(4) 24VDC Form C per each measurement channel. 10A @125 VAC, 7A @250VAC; 7A @ 28VDC resistive.

(Two are factory-set Danger & manual reset, two are totally configurable as manual or auto reset to any alarm level)

Sensor Fail Relays

(1) 5 VDC Form C per each channel, 1A @24VDC resistive , auto reset

Alarm Setup

Onscreen page display of default gas alarm levels

Gas Sensor Life Display

Onscreen display of sensor life start and expiration dates

Remote Silence, Reset, Test Buttons

Onscreen buttons for each channel to silence buzzer, reset relays and test sensor circuitry. Test button does not test gas sensing ability of the sensor

Local Test Button

Normally closed switch on local sensor enclosure to test sensor circuitry, does not test gas sensing ability of the sensor

Serial Output

RS-485 serial port (inactive as standard)

Remote Reset Input provided to reset the detector using a remote NC switch

Screen Settings

Onscreen adjustment of screen volume and brightness

Microprocessor Controlled Electronics

Remote Main Enclosure

Indoor or outdoor wall mount NEMA 4X, 9” wide x 11” high x 6” deep; spacious for ease in wiring. Sunscreen recommended for the display for outdoor mounting.

Local Sensor Enclosure

NEMA 4X, 4” x 4” on 7” square wall mount plate

Battery Powered UPS

A separate external battery backup / UPS is available for power loss or for locations with unreliable power.

Part #FX-BB110

Sun / Weather Guard

A sun / weather guard is available to protect the touch screen which can be damaged by exposure to direct sunlight.

Part #FX-1500SG

Order Numbers

Single channel model FX-1500v4-X

Dual channel model FX-1502-X-X

X=gas sensor order code

Contact, Return Policy

Customer Service Department

If you need spare parts, assistance in troubleshooting, or repair service, please contact Foxcroft Customer Service at:

Foxcroft Equipment and Service, Co. Inc.

2101 Creek Road, P.O. Box 39

Glenmoore, PA 19343

Tel: (800) 874-0590
(610) 942-2888
Fax: (610) 942-2769
Email: sales@foxcroft.com
Website: www.foxcroft.com

Customer Repair / Returns Policy

All systems returned for repair or replacement must be freight prepaid and include the following information:

1. A clearly written description of the malfunction.
2. Name of person to contact and the phone number where they can be reached.
3. Proper return address for shipping system back. Include preferred shipping method.
4. A purchase order if the system is out of warranty to cover costs of repair.
5. A Return Material Authorization Number (RMA) is required before shipping any products for service. Call telephone number above to receive a RMA number.

NOTE: *Returns will only be held at Foxcroft for 90 days. If a decision is not made regarding the repair, the product will be returned.*

Product Warranty

Foxcroft Equipment & Service warrants all products obtained hereunder to be free from defects in material and workmanship for a period of one year from the date of shipment. In the event of a product failure or defect requiring warranty repair, the customer must obtain an RMA number by calling 1-800-874-0590, before returning the product, at the customer's expense to Foxcroft for repair. Warrantor (Foxcroft Equipment and Service) will repair the unit, without charges for parts, labor and return freight.

Foxcroft Equipment & Service is not responsible for damage to its products through improper installation, maintenance, act of God, use or attempts to operate such products beyond their functional capacity, intentionally or otherwise, or for any unauthorized repair.

Buyer agrees to hold Foxcroft Equipment & Service harmless from all claims for damages arising out of injury or death to any person or damage to any facility, or any other property, or loss of use of any such property, whether such person or property is on or off the installation or activity site for which the equipment or material furnished hereunder is destined and whether such damage, loss destruction or loss of use, injury or death results directly or indirectly from a nuclear incident or for any other cause.

Statements and instructions set forth herein are based upon the best information and practices known to Foxcroft Equipment & Service but it should be assumed that every acceptable safety procedure is contained herein. Of necessity this company cannot guarantee that actions in accordance with such statements and instructions will result in the complete elimination of hazards and it assumes no liability for accidents that may occur.

Serial Number Label for FX-1500v4 / FX-1502v4

Toxic Gas Detector

Foxcroft Equipment & Service Co. Inc.

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