

Fixed Gas Detection 301: Troubleshooting and Maintenance



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Honeywell Analytics

Basic Maintenance and Troubleshooting

Agenda

- Support Information
- Inspections & Schedules
- Cleaning
- Calibration
- Maintenance
- Optical Devices
- Transmitters

Support Information

Customer Service: Order Status, Pricing & Availability– 800-538-0363 (option 4, then option 1)

E-mail: ha_customerservice@honeywell.com

Product Selection & Application Support – 800-538-0363 (option 4, then option 2)

E-mail: analytics.industrial.sales@honeywell.com

Technical Support – 800-538-0363 (option 4, then option 3)

E-mail: is.gas.techsupport@honeywell.com

Product Returns, Repairs, & Warranty – 800-538-0363 (option 4, then option 4)

E-mail: ha.us.service@honeywell.com

RAE Systems Technical Support - 800-538-0363 (option 1, then option 2)

E-mail: RAE-CallCenter@Honeywell.com

RAE Systems Product Repairs, & Warranty - 800-538-0363 (option 1, then option 3)

E-mail: rae-rma.us@Honeywell.com

Inspections & Schedules

- A periodic inspection schedule should be established and maintained for the lifetime of the product.
 - Establish a quarterly inspection routine:
 - The frequency of inspections may vary by application and environmental conditions at the site. Cleaner environments and applications may require less frequent inspections, while dirtier environments and applications may require more frequent inspections.
 - Keep a log of the date and time of inspections and note any irregularities.
 - Visual inspections should include:
 - Check junction boxes, cables, and wiring to ensure there are no breaks or exposed wires/conductors. Ensure the tightness of all terminal connections.
 - Check accessory items, verifying proper fit and function. Replace cracked, broken and excessively worn accessories.
 - Check sensors, ensuring the gas path is clear of obstructions and contaminants. Ensure that flame detectors have an unobstructed view of the coverage area.

Inspections & Schedules

- Periodic inspections (*continued*)
 - Bump Test Frequency:
 - 'Bump Testing' is challenging the field device with a known concentration of gas, or in the case of flame detectors, using a test lamp to verify functionality.
 - Check the specific product manual for instructions on performing a proper 'bump test'.
 - Under normal conditions the field device (sensor) should be challenged semi-annually. Again, cleaner environments and applications may require less frequent 'bump testing', while dirtier environments and applications may require more frequent 'bump testing'.
 - Keep a log of the date, time, and response of 'bump testing', noting any irregularities.

Inspections & Schedules

- Periodic inspections (*continued*)
 - Calibration Frequency:
 - Many optical and acoustic field devices do not require routine field calibration, although they may be 'bump tested' to ensure proper operation (Searchpoint Optima, Searchline Excel, Searchzone Sonik, and Flame Detectors).
 - All other field devices may require periodic calibration. Any time a 'bump test' produces results outside of the parameters specified for that specific product, a calibration should be performed. Note: even though the RAEGuard II PID is considered an optical device, a periodic calibration may be required, especially in dirtier environments and applications.
 - Keep a log of the date, time, and response of calibrations, noting any irregularities.

Cleaning

- Clean Sensors and Detectors perform better than Sensors and Detectors with dirt, contamination and/or blockage.
 - Visual inspections should ensure that sensors have a gas path that is clear of obstructions and contaminants and that flame detectors have an unobstructed view of the coverage area.
 - If dirt, contaminants or blockage of sensors and/or flame detectors is observed, it will be necessary to clean the associated field device to ensure proper operation.
 - Optical and acoustical field devices must have optics/acoustics that are free of contaminants and obstructions:
 - Searchline Excel: Use an alcohol based solution and a lint-free cloth and allow the unit too see hydrocarbon-free air before returning to normal operation
 - Searchpoint Optima: Use an alcohol based solution and a lint-free cloth and allow the unit too see hydrocarbon-free air before returning to normal operation
The Remote Gassing Cell can be removed for cleaning
 - Searchzone Sonik: Use soapy water and a soft cloth
 - RAEGuard II PID: Use the recommended 'Lamp Cleaning Kit' - Additionally, inspect the inlet and outlet ports to make sure they are clean and unobstructed
 - Flame Detectors: Use an alcohol based solution and a lint-free cloth

Cleaning

- Clean Sensors and Detectors perform better than Sensors and Detectors with dirt, contamination and/or blockage.
 - The gas path for Catalytic Bead, Multi-Purpose (CB & IR), and Electrochemical Cell Sensors needs to be clear of contaminants and sources of blockage.
 - If the gas path is not clear, remove the blockage or contaminants that are inhibiting the gas path.
 - Cleaning solutions containing alcohol and other hydrocarbon based chemicals may cause the sensor(s) to go into alarm, if not inhibited. Allow the unit too see hydrocarbon-free air before returning to normal operation.
 - Transmitter displays should be visible and accessible.
 - Clean the display window if required.

Calibration

- When calibrating gas detectors:
 - Always use the proper calibration accessory(s)
 - Never use the Bump Test ports or accessory(s)
 - Always refer to the product manual for proper instructions
 - Consult Honeywell Analytics for guidance
 - Zero Calibration
 - Never assume the background is contaminant free
 - Use Zero air
 - Use a calibrated reference device (i.e. portable gas detector)
 - Span Calibration
 - When possible use the target gas
 - Consult the product manual for substitute gases
 - Consult Honeywell Analytics for guidance
 - Most gas detectors use 50% full scale gas concentrations for calibration
 - Some allow the use of 30% to 70% full scale
 - Some use 100% full scale
 - Consult the product manual for details

Calibration

- When calibrating gas detectors:
 - Always use the proper regulator when applying gas to the sensor
 - Electrochemical Cells
 - Satellite XT – 0.3 L/m
 - XNX and Series 3000 – 0.3 to 0.375 L/m
 - Midas – 0.5 L/m
 - XCD – 0.5 to 1.0 L/m
 - XCD RTD and Sensepoint Toxic – 1.0 to 1.5 L/m
 - Catalytic Bead
 - XNX (MPD CB) - 0.5 L/m
 - XCD Flammable Cat and Sensepoint Flammable – 1.0 to 1.5 L/m
 - 705 and 705HT – 1.5 L/m
 - Infrared
 - Optima Plus w/ Remote Gassing Cell – 0.3 L/m (Bump Test)
 - XCD Flammable IR and XCD IR CO₂ - 0.4 to 0.6 L/m
 - XNX MPD (IR) – 0.5 L/m
 - Optima Plus w/ Flow Housing or Gassing Cover – 2.0 L/m (Bump Test)
 - Photo Ionization Detector
 - RAEGuard II PID – Demand Flow Regulator

Maintenance

- Inspections and cleaning are forms of preventative maintenance, to ensure proper operation and longer product life
- Beyond this, sensor replacement is the most frequent maintenance task and it will vary by product – the next few slides will address sensor replacement on the following field devices/transmitters:
 - Series 3000
 - XCD
 - XCD RFD
 - XCD RTD
 - XNX
 - Sensepoint XRL
 - RAEGuard II PID

Maintenance

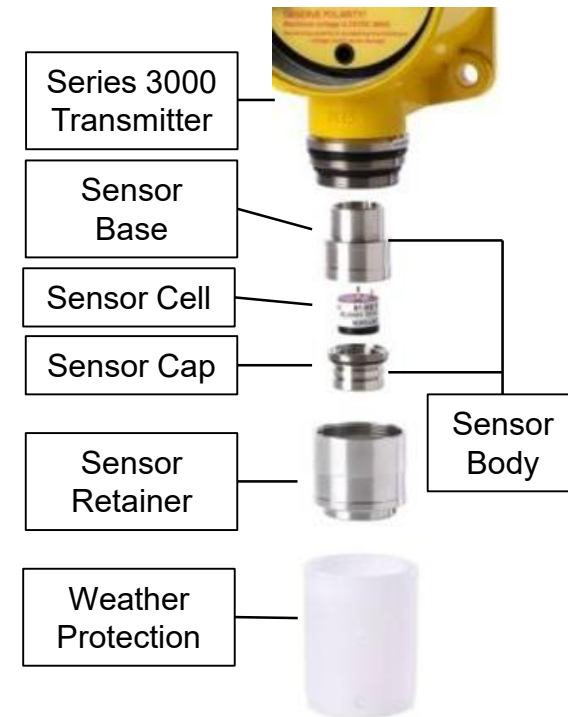
- Sensor Replacement – Series 3000

- To replace the sensor on the Series 3000 enter the 'Change Sensor' menu



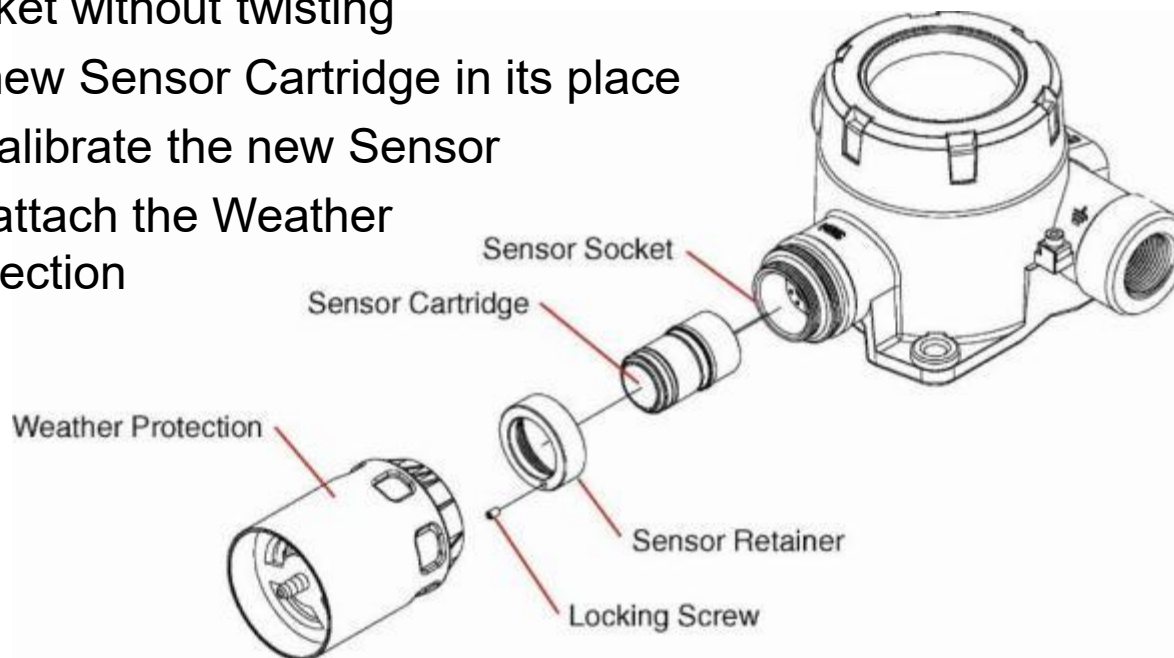
Change a sensor without causing the unit to display an F04 'no sensor detected' fault message

- Remove the Weather Protection and unscrew the Sensor Retainer
- Remove the Sensor body and unscrew the Sensor Cap
- Pull the Sensor Cell from the Sensor base and replace with a new Sensor Cell
- Screw on the Sensor Cap and plug the Sensor Body to the Series 3000 Transmitter
- Reattach the Sensor Retainer
- Recalibrate the new Sensor
- Re-attach the Weather Protection



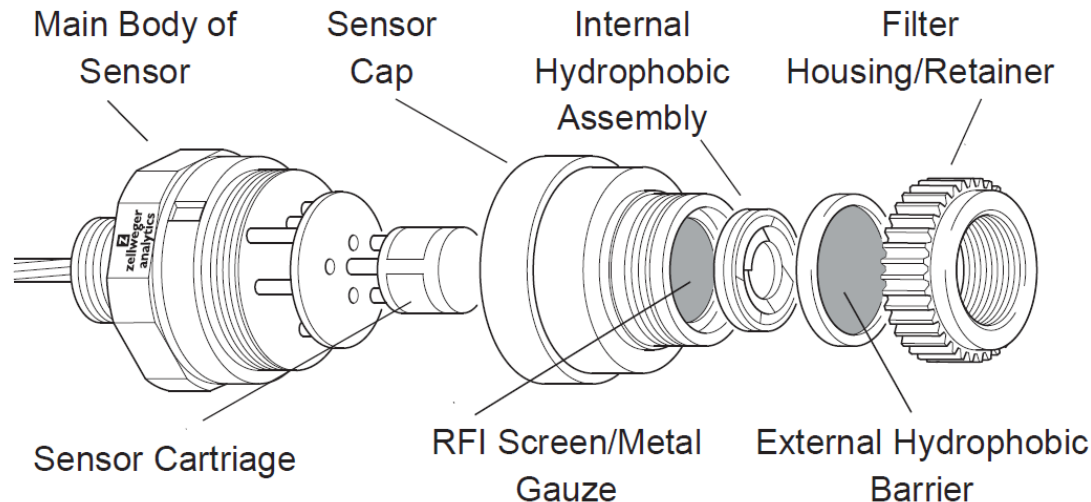
Maintenance

- Sensor Replacement – XCD Flammable Sensor
 - To replace the sensor on the XCD you must remove power from the transmitter
 - Remove Weather Protection or other accessories from sensor socket thread
 - Loosen and unscrew Sensor Retainer
 - Carefully pull old Sensor Cartridge from Sensor Socket without twisting
 - Fit new Sensor Cartridge in its place
 - Recalibrate the new Sensor
 - Re-attach the Weather Protection



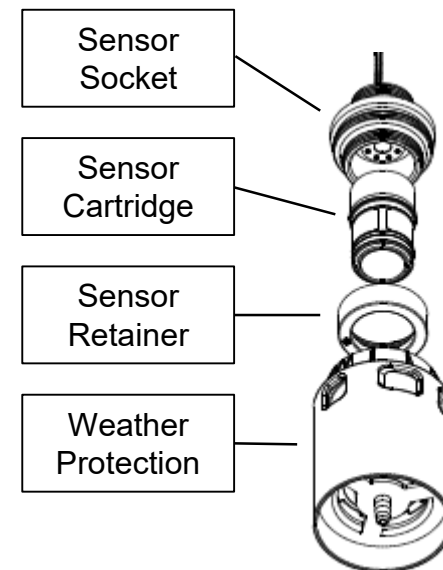
Maintenance

- Sensor Replacement – XCD Toxic/Oxygen Sensor
 - Follow the same procedure for XCD Flammable Sensor with the following exception:
 - The Sensor Cartridge can be replaced by unscrewing the Sensor Cap and carefully pulling it off of the PCB located in the Main Sensor Body



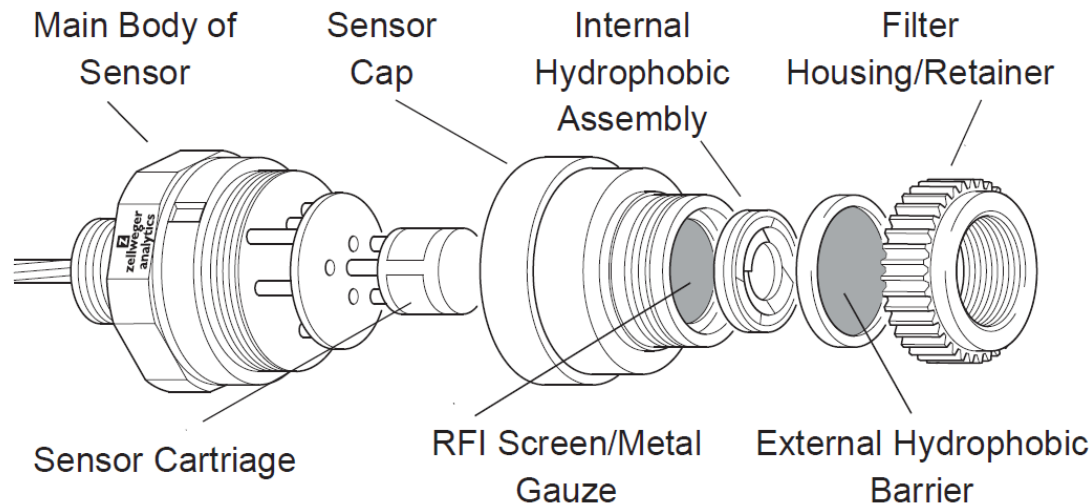
Maintenance

- Sensor Replacement – XCD RFD
 - To replace the sensor on the XCD you must remove power from the transmitter
 - Remove Weather Protection or other accessories from sensor socket thread
 - Loosen and unscrew Sensor Retainer
 - Carefully pull old Sensor Cartridge from Sensor Socket without twisting
 - Fit new Sensor Cartridge in its place
 - Recalibrate the new Sensor
 - Re-attach the Weather Protection



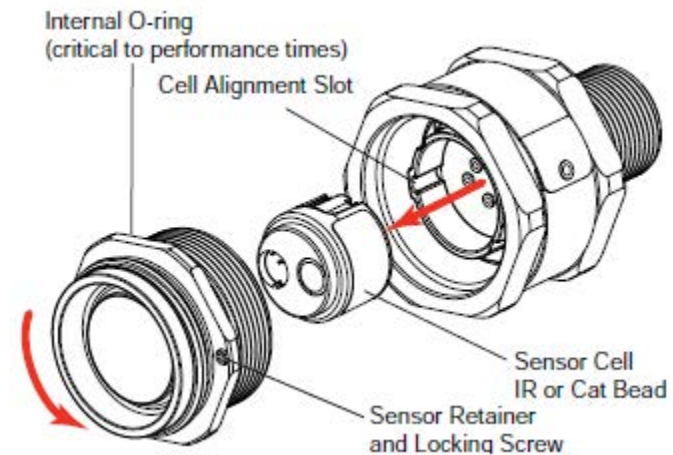
Maintenance

- Sensor Replacement – XCD RTD
 - Follow the same procedure for XCD RFD with the following exception:
 - The Sensor Cartridge can be replaced by unscrewing the Sensor Cap and carefully pulling it off of the PCB located in the Main Sensor Body



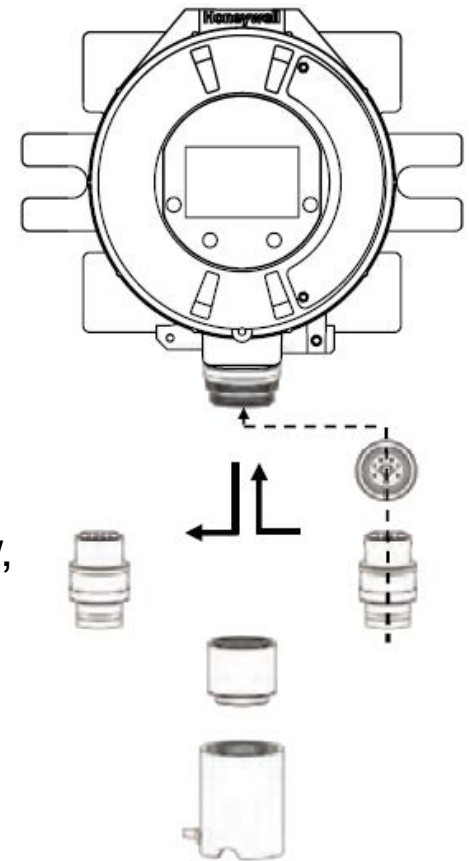
Maintenance

- Sensor Replacement – XNX with MPD Sensor
 - Verify that the label on the new sensor is the correct gas type.
 - Remove power from the transmitter.
 - Unscrew the weatherproof cover (if equipped), loosen the retainer locking screw, and unscrew the sensor retainer.
 - Remove the old sensor by pulling without twisting.
 - Slide the replacement cell into the MPD body taking care to align the tab with the alignment slot, then press the cell firmly to seat it into the body.
 - Refit the sensor retainer, tighten the locking screw and refit the weatherproof cover (if equipped).
 - Recalibrate the sensor following the procedures in Section 3.2.2. of the XNX Technical Manual



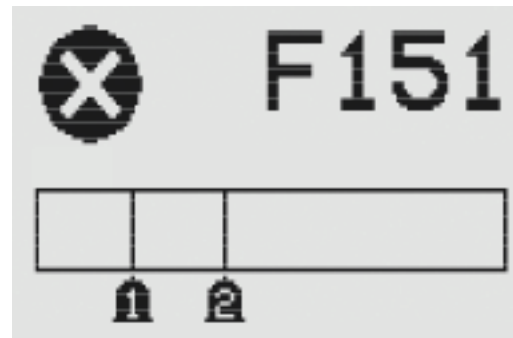
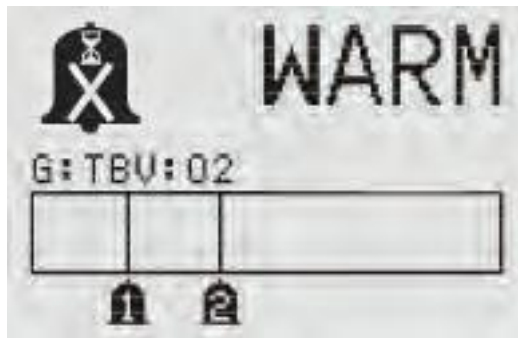
Maintenance

- Sensor Replacement – XNX with Electrochemical Cell Sensor
 - Unscrew the weatherproof cover, loosen the sensor retainer locking screw, and unscrew the sensor retainer.
 - Remove the old sensor by pulling without twisting.
 - Unscrew the sensor cap.
 - Remove the old cell by pulling without twisting.
 - Verify that the new cell is the same type as the old one.
 - Plug the new cell into the sensor, taking care to align the sensor pins with the connector holes in the PCB.
 - Refit the sensor retainer, tighten the locking screw, and refit the weatherproof cover.
 - Sensor warm-up will begin and the XNX display will alternate between two screens: “Fault 151” and “WARM.”



Maintenance

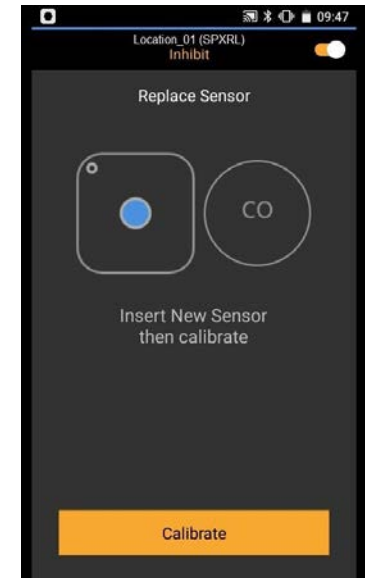
- Sensor Replacement – XNX with EC Sensor (*continued*)
 - The Sensor element can be replaced with the same or different EC Sensor type.
 - The transmitter will enter sensor warm-up mode. However, due to the change in sensor cell type, the transmitter will not enter monitor mode until the unit has been reconfigured. The display will show the sensor warm-up screen:



- Follow the procedure to accept the new sensor in Accept New Sensor Type under the Configuration Menu (section 2.5.1 of the XNX manual).
- Recalibrate the sensor (section 3.2.1 of the XNX manual).

Maintenance

- Sensor Replacement – Sensepoint XRL
 - Using the App, from the main screen, select Maintenance
 - From the maintenance screen select, Change Sensor
 - The App will prompt you to Remove the Sensor
 - On the Sensepoint XRL, loosen the Locking Screw and remove the Trim Ring
 - Unscrew the Sensor Cover, then tap next on the App
 - Remove the Sensor
 - Replace the new Sensor and re-attach the Sensor Cover and calibrate the new Sensor

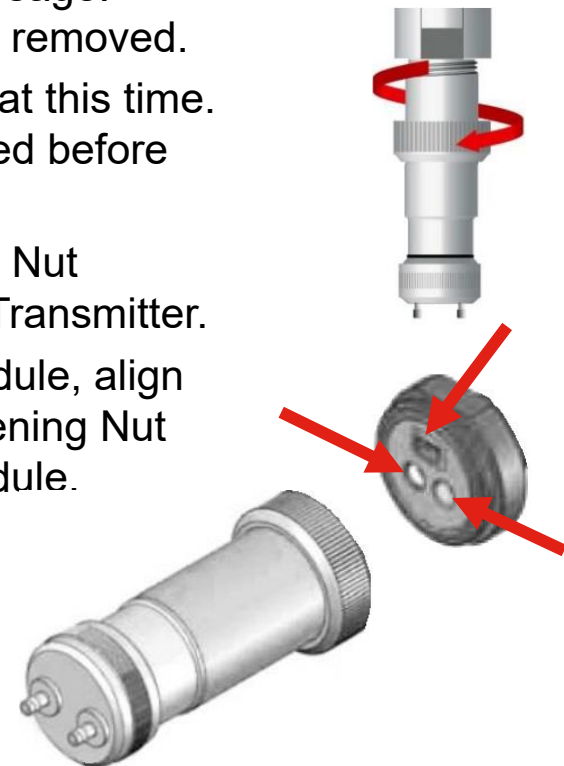
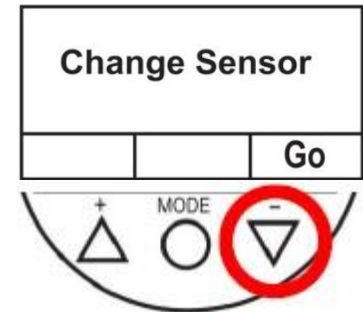


Maintenance

- Sensor Replacement – RAEGuard II PID

- To replace the DigiPID, follow these instructions:

- To remove or change the DigiPID Sensor, hold the magnetic key over the “+” symbol for 3 seconds
 - This will bring up the “Change Sensor” message. The Digi P-I-D Sensor Module may now be removed.
 - It is very important that you NOT select go at this time. Wait until the Digi PID has been reconnected before making this selection.
 - Turn the DigiPID Sensor Module Fastening Nut Clockwise to remove the Module from the Transmitter.
 - Using the replacement DigiPID Sensor Module, align the connector and ports, and turn the Fastening Nut Counterclockwise to attach the Sensor Module.
 - Select ‘Go’ by placing the magnet key over the “minus triangle”.
 - Recalibrate the DigiPID.



Optical Devices

- There are 4 product lines listed under Optical Devices:
 - Searchpoint Optima Plus
 - Point IR Hydrocarbon Gas Detector
 - Searchline Excel
 - Open Path IR Hydrocarbon Gas Detector
 - FSX Flame Detectors
 - Electro-Optical Radiant Energy Detectors

Optical Devices – Searchpoint Optima Plus

- Searchpoint Optima Plus should be inspected periodically and cleaned if necessary.
 - Inspect the Searchpoint Optima Plus unit, its junction box and cabling for any signs of physical damage.
 - Using a ½ inch / 13 mm A/F open ended spanner, unscrew the two retaining nuts and remove the Standard Weather Protection.
 - Inspect the Standard Weather Protection for damage or build up of debris / contaminants. If required, clean or replace weather protection.
 - Inspect the Dust Barrier and clean or replace if required.
 - Remove the Dust Barrier and inspect the optics.
 - Clean any dust or contaminants from the optics using mild detergent and a soft cloth or cotton bud. Do not use solvents or abrasive cleaners.
 - Replace the Dust Barrier and Standard Weather Protection.
 - Cycle the power to clear any faults or warnings that may have been generated by cleaning.

Optical Devices – Searchline Excel

- The Searchline Excel Open-Path Gas Detector requires little maintenance other than occasional cleaning.
 - Inspect the Searchline Excel units, junction box and cabling for signs of physical damage.
 - Using the SHC1 Handheld Interrogator inhibit the Searchline Excel signal output.
 - Since the signal output may vary during cleaning, due to the optical path being disturbed, it is important to inhibit the analogue output. The quickest way to inhibit the Excel output is to select DISPLAY from the Calibration menu.
 - Clean any dust or dirt from the Searchline Excel windows using soapy water and a soft cloth.
 - Using the SHC1 Handheld Interrogator release the Searchline Excel signal output.
 - The output can be released by pressing ESC followed by [Enter] on the keyboard.
 - Using the SHC1 Handheld Interrogator re-zero the unit.
 - See Appendix A of the Searchline Excel Technical Handbook for details about how to use the Interrogator.

Optical Devices – FSX Flame Detectors

- After the FS20X or FS24X Detector is installed and commissioned, there is little maintenance required.
- A complete “end-to-end” test of the entire fire detection system should be performed periodically depending on the application.
- Semi-annual or quarterly testing should be performed, using the correct Honeywell Analytics Test Lamp, to ensure the integrity of the entire fire protection system.
- Clean the detector’s window any time it is dirty or contaminated, every time the enclosure lid is handled, if the detector fails the built-in test, or if the detector fails an end-to-end test with the test lamp.
 - NOTE: FS20X will require loosening and removing one of the Grill screws located on the side of the housing lid, in order to gain adequate access to the window. Additionally, clean the side of the grill that faces the Detector window.

Optical Devices – FSX Flame Detectors

- Test Lamp Use:
 - The importance of using a remote test lamp is to ensure the Detector's optical path is not blocked, the Detector is aimed properly at the fire threat area, and the Detectors alarming circuitry and outputs (i.e. relays, 4 to 20 mA, etc.) function properly.
 - Disable the outputs (a full functional test includes activating the alarm outputs).
 - Aim the test lamp at the front of the detector (within a distance of about 10 to 25 feet and on-axis as much as possible).
 - Press and hold the test lamp's pushbutton.
 - While watching the alarm LED on the face of the detector, slowly move the test lamp's boresight to ensure that the detector receives its full intensity.
 - If the detector does not respond within thirty seconds:
 - Verify that the test lamp has been charged sufficiently.
 - Verify that the test-lamp-to-detector distance is between ten and twenty-five feet.
 - Verify that the testing technique described above has been followed. If the detector still does not respond, contact Honeywell Analytics.

Transmitters

- There are 3 product lines listed under Transmitters
 - Series 3000
 - 2 Wire Toxic Gas Detectors
 - There are 3 Warning and 11 Fault Codes
 - There are 9 menu selections for setting/selecting functions
 - XCD (including RFD and RTD)
 - Flammable and Toxic Gas Detectors
 - There are 5 Warnings and 13 Fault Codes
 - There are 16 menu selections for setting/selecting functions
 - XNX
 - Universal Transmitter for Flammable and Toxic Gas Detection
 - There are 22 Warning, 47 Fault Codes, and 68 Informational Message Codes
 - There are 15 menu selections for configuring the Transmitter
 - There are 4 menu selections for testing the field device & Transmitter
 - There are 5 menu selections for aligning/calibrating the field device

Transmitters – Series 3000

- It is recommended that the system is visually and functionally checked regularly to ensure correct operation.
- As a guide Honeywell Analytics recommend the following checks and frequency:
 - Every 3 months; Visual check of controller, detectors and installation for mechanical damage. Ensure the sensor is clear of obstruction.
 - Every 6 months; Perform a functional gas test. Adjust frequency according to site conditions.
 - Inhibit the Series 300 or disable the outputs, as a functional test will produce alarm outputs.
 - Follow the procedure for Bump Test in section 12.1 of the Series 3000 product manual.
 - 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 in section 8.2.1 of the Series 3000 product manual.
 - If reading is still inaccurate replace the sensor per section 15.1 of the Series 3000 product manual.

Transmitters – XCD (including RFD & RTD)

- Honeywell Analytics recommends that gas detectors are tested and re-calibrated on a semi-annual basis, or according to site practice.
 - If a toxic sensor is exposed to a gas concentration significantly above the measuring range it shall be calibrated as soon as possible afterwards. Typical life of a toxic gas sensor is dependent on the application, frequency and amount of gas exposure. Under normal conditions (3 monthly visual inspection and semi-annual test/recalibration), the XCD Oxygen and other toxic sensors have an expected life equal to or greater than 24 months.
 - The pellistors used in the Catalytic flammable gas sensor can suffer from a loss of sensitivity when in the presence of poisons or inhibitors, e.g. silicones, sulfides, chlorine, lead or halogenated hydrocarbons. The pellistors are poison resistant to maximize the operational life of the Catalytic flammable sensor. A typical operating life, subject to the presence of poisons/inhibitors is 36 months.
 - The NDIR (infrared) flammable gas sensor is not affected by the above-mentioned poisons and therefore has a longer life span. A typical operating life is 5 years.

Transmitters – XNX Universal Transmitter

- When servicing or replacing sensors, reduce the risk of ignition of hazardous atmosphere by declassifying the area or disconnecting the equipment from the supply circuit before opening the sensor enclosure. Keep the assembly tightly closed during operation.
- Take care when handling sensors as they may contain corrosive solutions. Do not tamper or in any way disassemble the sensor cell. Do not expose to temperatures outside the recommended range. Do not expose the sensor to organic solvents or flammable liquids
- At the end of their working lives, sensors must be disposed of in an environmentally safe manner, in accordance with local waste management requirements and environmental legislation. Sensors should NOT be incinerated as they may emit toxic fumes.
- Verify all outputs, including display, after installation, after service events, and periodically to ensure the safety and integrity of the system.
- The following procedure should be followed carefully and performed only by suitably trained personnel. A fault condition will be signaled by the sensor if it is removed with the unit under power.
- If the power-on self-test was skipped during maintenance activities, restart the transmitter.

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