DET-TRONICS®

A UTC Fire & Security Company

Instructions 95-8522

Volumetric IR Process Gas Monitor
PIRVOL Series

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INSTRUCTIONS

Volumetric IR Process Gas Monitor

PIRVOL Series

APPLICATION

PIRVOL Infrared Process Gas Monitors provide continuous measurement of hydrocarbon vapors in the range of 0 to 90% by volume. The PIRVOL-LT model provides an analog 4 to 20 milliampere signal output that is proportional to methane vapor concentrations from 0 to 90% by volume, while the PIRVOL-VR model provides an analog 4 to 20 milliampere signal that is proportional to propane from 0 to 90% by volume. All PIRVOLs are designed for use in extractive vapor sampling systems where the vapor concentration is likely to be above the lower flammability limit (LFL).

Typical applications for PIRVOL-LT include natural gas and oil well mudlogging, or coalbed methane collection systems. In both cases, methane-laden vapor samples are extracted from a tank or process area and analyzed by PIRVOL-LT to determine the methane concentration level. Typical applications for the PIRVOL-VR include gasoline transfer vapor recovery systems, where the vapor recovery processor or vent is monitored for efficient vapor recovery and control.

All PIRVOL models are CSA certified for use in Class I, Division 1, Groups B, C and D; and Class I, Division 2, Groups A, B, C and D areas. They are fitted with a sealed sampling cup with compression-type 0.25 inch o.d. tubing fittings for easy integration into a vapor sample extraction system.

FEATURES

- Routine calibration not required.
- Continuous self-test automatically indicates a fault or fouled optics condition.
- Performs well in the presence of high concentrations or constant background levels of hydrocarbons and in oxygen depleted atmospheres.
- There are no known poisons, e.g. silicones or hydrides, that compromise the integrity of the measurement.

SPECIFICATIONS

INPUT VOLTAGE—
24 vdc nominal. Operating range is 18 to 32 vdc including ripple.

POWER CONSUMPTION (Watts)—

Input Voltage:	**18 vdc**	**24 vdc**	**32 vdc**
Nominal	3.5	4.6	6.2
Maximum	4.0	5.5	7.0

DETECTION RANGE—
PIRVOL-LT: 0 to 90% by volume methane.
PIRVOL-VR: 0 to 90% by volume propane.

DETECTABLE GASES—
PIRVOL-LT is intended for methane monitoring only, PIRVOL-VR for propane only. PIRVOL responds to most hydrocarbon gases, however, the signal processing program is only accurate for the target gas.

CURRENT OUTPUT—
Linear 4 to 23 ma current source (non-isolated). Output levels below 2.4 ma indicate calibration, fault and fouled optics conditions.

Table 1—Current Loop Output Levels and Corresponding Status Indications

Current Level	Status
23.0 ma	100% by volume
20.0 ma	90% by volume
4.0 ma	Zero gas level (0% by volume)
2.2 ma	Zero calibration in progress
2.0 ma	Span calibration in progress
1.8 ma	Calibration complete - remove gas
1.6 ma	Calibration fault
1.0 ma	Fouled optics
0.8 ma	24 vdc line low (less than 17.5 vdc)
0.6 ma	Calibrate input active at power-up (probable wiring fault)
0.4 ma	Active channel fault
0.2 ma	Reference channel fault
0.0 ma	CPU system fault, warmup

To convert PIRVOL milliampere output to % by volume gas concentration, use the following formula:

(milliamp signal – 4.0) x 5.625 = % by volume propane

Example:
(4.0 – 4.0) x 5.625 = 0%
(12.0 – 4.0) x 5.625 = 45% by volume
(20.0 – 4.0) x 5.625 = 90% by volume.

Refer to Table 1 for a detailed description of current outputs.

Maximum loop resistance: 580 ohms at +24 vdc. See Figure 1 for further information.

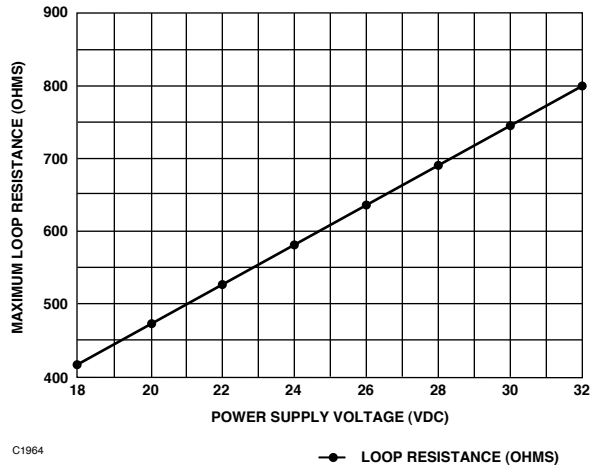


Figure 1—4 to 20 ma Current Loop Resistance

PIRVOL-LT CROSS SENSITIVITY—
PIRVOL-LT provides a linear analog 4 to 20 mA signal output in response to methane vapor concentration of 0 to 90% by volume. The presence of other hydrocarbon vapors in the sample stream will cause an increased signal output from the PIRVOL-LT. The tables below show the device output in response to other hydrocarbon vapors. All device readings are listed in % volume indicated, and all tests were performed with a methane calibrated PIRVOL-LT.

Cross Sensitivity of PIRVOL-LT to Ethane

Ethane	
% Gas	Reading
0%	0
20%	24
40%	53
60%	85
80%	115
100%	>120

Cross Sensitivity of PIRVOL-LT to Propane

Propane	
% Gas	Reading
0%	0
20%	3
40%	6
60%	9
80%	13
100%	18

Cross Sensitivity of PIRVOL-LT to Butane

Butane	
% Gas	Reading
0%	0
20%	8
40%	20
60%	38
80%	66
100%	102

Cross Sensitivity of PIRVOL-LT to Propylene

Propylene	
% Gas	**Reading**
0%	0
20%	>120
40%	>120
60%	>120
80%	>120
100%	>120

Cross Sensitivity of PIRVOL-LT to Ethylene

Ethylene	
% Gas	**Reading**
0%	0
20%	113
40%	>120
60%	>120
80%	>120
100%	>120

WIRING—

The PIRVOL has five 22 AWG wires, 20 inches (50 cm) long.

Red = + 24 volts dc
Black = – (common)
White = 4 to 20 milliampere signal output
Yellow = Calibration input
Green = Chassis ground

Power Wiring: 18 AWG minimum is recommended for power wiring. Larger diameter wire may be required to maintain a minimum of 18 vdc (including ripple) at the sensor for all operating conditions (see Figure 2). For maximum EMI/RFI protection, shielded cable is recommended.

TEMPERATURE RANGE—

Operating: –40°F to +167°F (–40°C to +75°C).
Storage: -40°F to +185°F (–40°C to +85°C).

HUMIDITY (non-condensing)—

0 to 99% relative humidity (Det-Tronics verified)
5 to 95% relative humidity (CSA verified).

RFI/EMI PROTECTION—

EN50081-1. Class B, EN50082-1 (IEC 801-2, 3, 4). Operates properly with 5 watt walkie talkie keyed at 1 meter.

ENCLOSURE MATERIALS—

Copper-free aluminum (clear anodized) enclosure.
Stainless Steel (316 electropolished) enclosure.

SAMPLE DRAW CUP—

Material: Aluminum.
Fittings: Brass.
Tubing Size: 1/4 inch O.D.

MOUNTING—

Det-Tronics junction box, available in a tall cover (with window) or a short cover version, is recommended for optimum ease of installation. PIRVOL can be threaded into any approved junction box suitable for the specific application. Junction box thread options:

- 3/4 inch NPT
- M20.

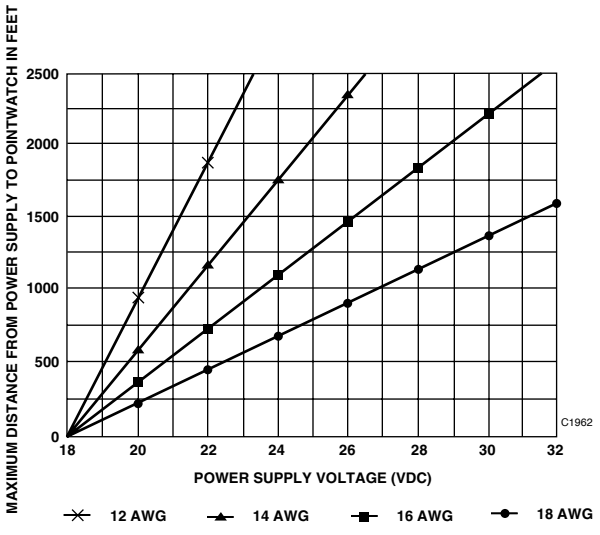


Figure 2—PIRVOL Wiring Requirements

JUNCTION BOX TERMINALS—
PIRVOL junction box terminals UL/CSA rated for 14 to 22 AWG wire; terminals DIN/VDE rated for 2.5 mm2 wire.

CERTIFICATION—
CSA: Class I, Division 1, Groups B, C and D; Class I, Division 2, Groups A, B, C and D (T3C).

DIMENSIONS—
See Figure 3 for dimensions of the PIRVOL and Figure 4 for dimensions of the PIRVOL Junction Box.

SHIPPING WEIGHT (Approximate)—
Aluminum: 1.9 pounds (0.9 kilogram).
Stainless Steel: 5.0 pounds (2.3 kilograms).

DESCRIPTION

DETECTION METHOD

PIRVOL operates on the infrared absorption principle. A beam of modulated light is projected from an internal infrared source to a reflector, which sends it back to a pair of infrared sensors. One of the sensors is designated reference and the other active, with different optical filters in front of the two sensors to make them selective to different infrared wavelengths. The reference wavelength is unaffected by combustible gases, while the active wavelength is absorbed by combustible gases. The ratio of the active to the reference wavelength is computed within the PIRVOL to determine the concentration of gas present. This value is then converted into a 4 to 20 milliampere current output for connection to external display and control systems.

CURRENT LOOP OUTPUT

During normal operation, the PIRVOL has a 4 to 20 milliampere current output that is proportional to gas concentrations from 0 to 90% by volume methane. A current output less than 4 milliamperes indicates a fault condition (see Table 1).

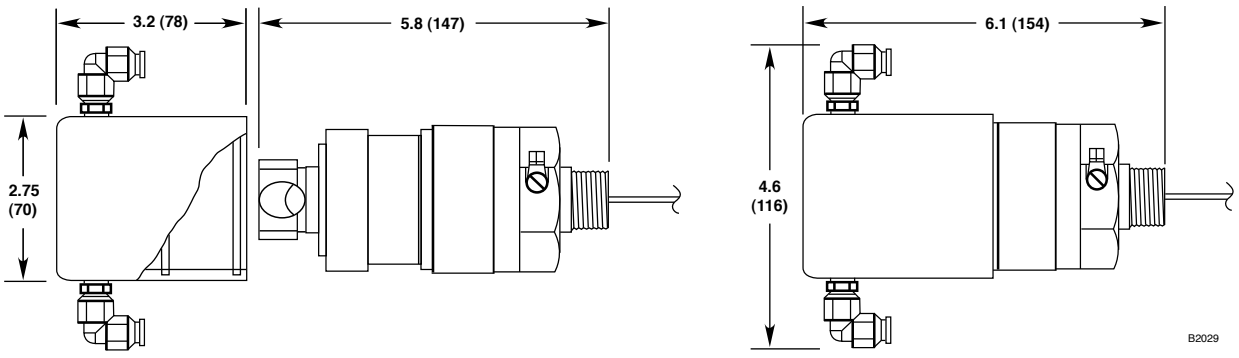


Figure 3—PIRVOL Dimensions in Inches (mm)

SIGNAL DISPLAY DEVICE

If a local or remote digital display for indication of detected gas concentration is required, it is recommended to utilize a scalable display device with a clearly marked unit of measurement in % by volume. Under no circumstances should a %LFL unit of measure display module be used to display the PIRVOL signal output.

OPERATING MODES

Warmup

When power is applied to the PIRVOL, it enters a Warmup mode (for approximately one minute) in which it performs diagnostic checks and allows the sensors to stabilize before beginning normal operation. The current output during this period is 0 milliamperes. At the end of the warmup period with no faults present, the PIRVOL automatically enters the Normal operating mode. If a fault is present after the warmup, the current output will indicate a fault.

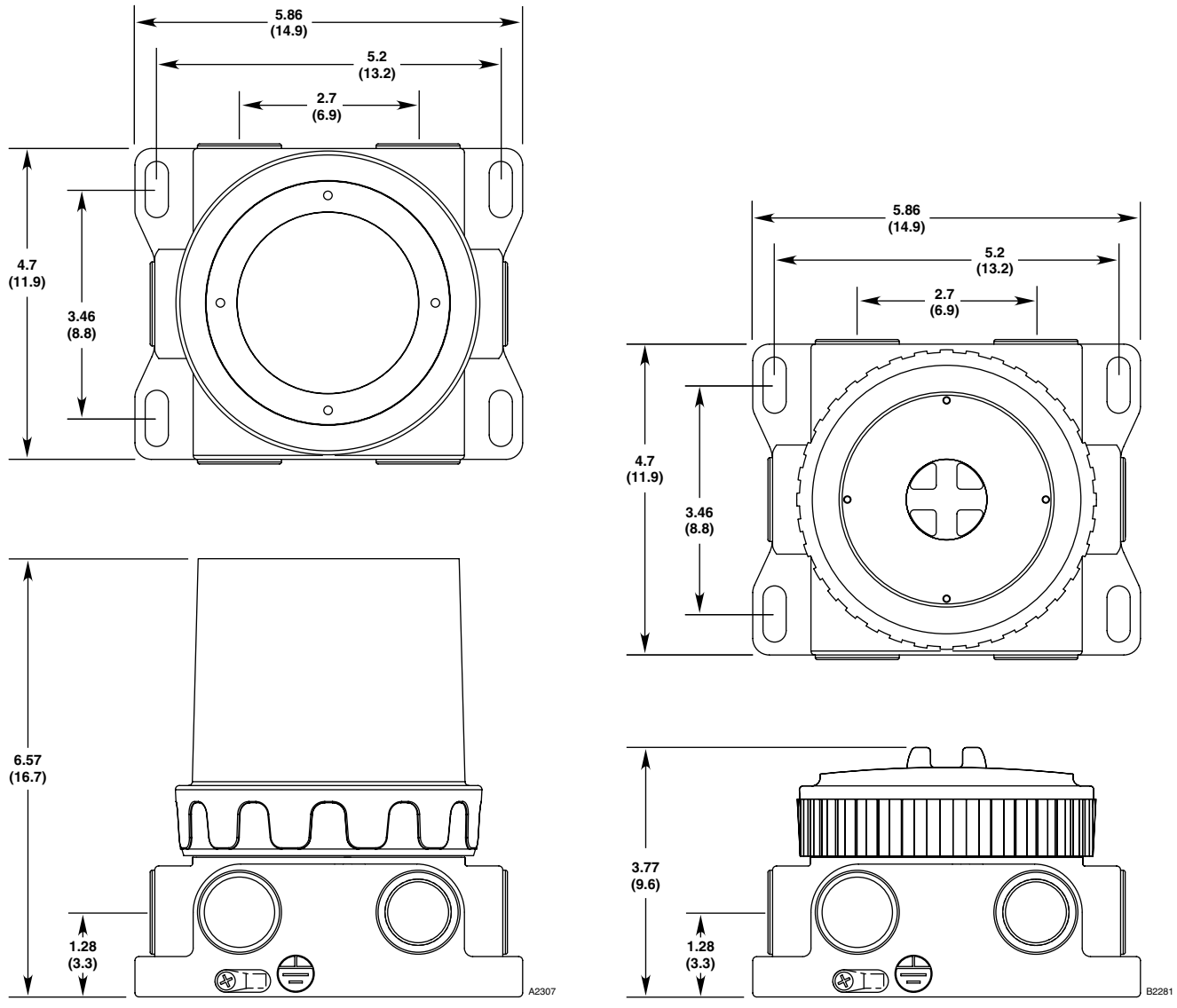


Figure 4—Junction Box Dimensions in Inches (mm)

Normal

In the normal operating mode, the 4 to 20 milliampere signal level corresponds to the detected gas concentration. The PIRVOL continuously checks for system faults or initiation of calibration, and automatically changes to the appropriate mode.

Fault

Faults detected during warmup, normal operation, or calibration are indicated by the current loop output as shown in Table 1.

Calibration

The PIRVOL-LT is calibrated at the factory for detection of methane. PIRVOL-VR is calibrated for propane. No field calibration is required under normal circumstances.

In the event the PIRVOL optics are fouled and complete optics disassembly for cleaning is required, device re-zeroing may be required after re-assembly. Refer to the "Calibration" section for details.

NOTE

A momentary connection of the calibration lead wire to DC negative (common) of the power supply initiates the zero and span calibration sequence. When wiring the PIRVOL, use care to isolate it from accidental contact with the junction box and/or other conductors.

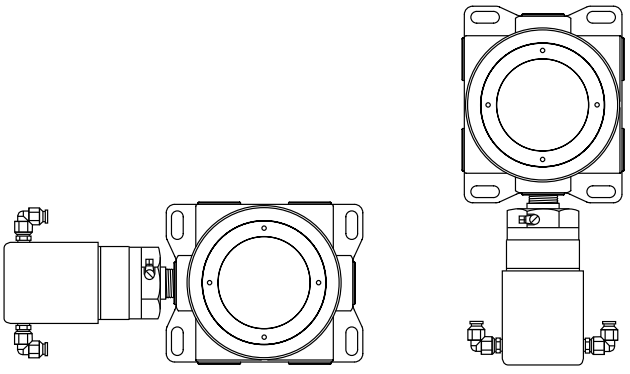


Figure 5—Recommended Orientation of PIRVOL Detector

INSTALLATION

DEVICE MOUNTING ORIENTATION

It is highly recommended that the PIRVOL be installed in the horizontal position. See Figure 5.

JUNCTION BOXES

The PIRVOL is designed to be threaded into a junction box, which is then mounted to a solid, vibration-free wall or post.

Det-Tronics offers two junction box styles for use specifically with the PIRVOL:

- Tall Cover Model (junction box cover includes a window). See Figure 6.
- Short Cover Model (junction box uses solid cover). This junction box can also be used for detector separation. See Figure 7.

GENERAL WIRING REQUIREMENTS

NOTE

The wiring procedures in this manual are intended to ensure proper functioning of the device under normal conditions. However, because of the many variations in wiring codes and regulations, total compliance to these ordinances cannot be guaranteed. Be certain that all wiring complies with applicable regulations relating to the installation of electrical equipment in a hazardous area. If in doubt, consult the authority having jurisdiction before wiring the system.

The use of shielded cable in conduit or shielded armored cable is recommended for optimum RFI/EMI protection. In applications where the wiring cable is installed in conduit, the conduit must not be used for wiring to other electrical equipment. To assure proper operation, the resistance of the connecting wire must be within the specified limits. The maximum distance between the PIRVOL and power source is determined by the power supply capability and wire size. See Figure 2 to determine the proper wire size and maximum wiring distance allowed.

It is important that moisture not be allowed to come in contact with the electrical connections of the system.

The use of proper piping techniques, breathers, glands, and seals are required to prevent water ingress and/or maintain the explosion-proof rating.

Figure 6—Tall PIRVOL Junction Box with Window

Figure 7—Short PIRVOL Junction Box

WIRING PROCEDURE

IMPORTANT

Do not apply power until the wiring procedure is complete and has been verified.

1. Locate the sensor where it will be accessible for maintenance. Excessive heat or vibration can result in premature failure of any electronic device and should be avoided if possible.

2. The junction box should be electrically connected to earth ground.

3. Figure 8 shows typical wiring for stand alone operation. Figure 9 shows typical wiring for PIRVOL with Det-Tronics supplied junction box. Figure 10 shows the wiring terminals located inside the junction box. The PIRVOL wiring color code is:

Red lead	=	+24 volts dc
Black lead	=	– (common)
White lead	=	4 to 20 ma signal output
Yellow lead*	=	Calibration input
Green lead	=	Chassis ground

   * If the calibration wire (yellow lead) is not being used, do not connect this wire to ground. Trim excess length and insulate wire so no shorting can occur.

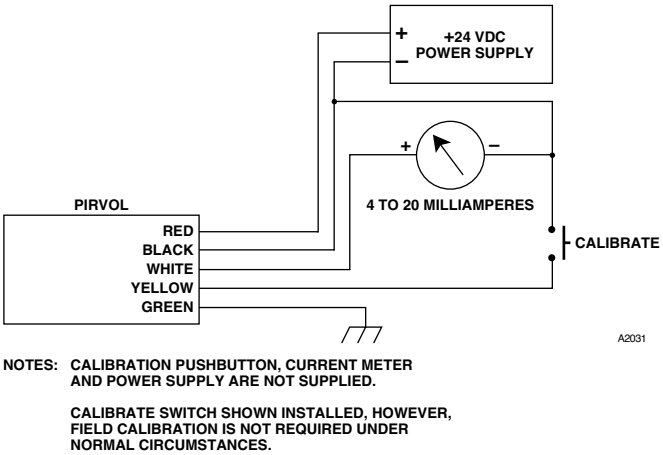


Figure 8—Typical PIRVOL Wiring, Stand Alone Configuration

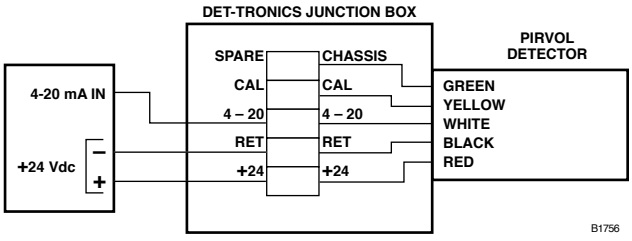


Figure 9—Typical PIRVOL Wiring, with Det-Tronics Junction Box

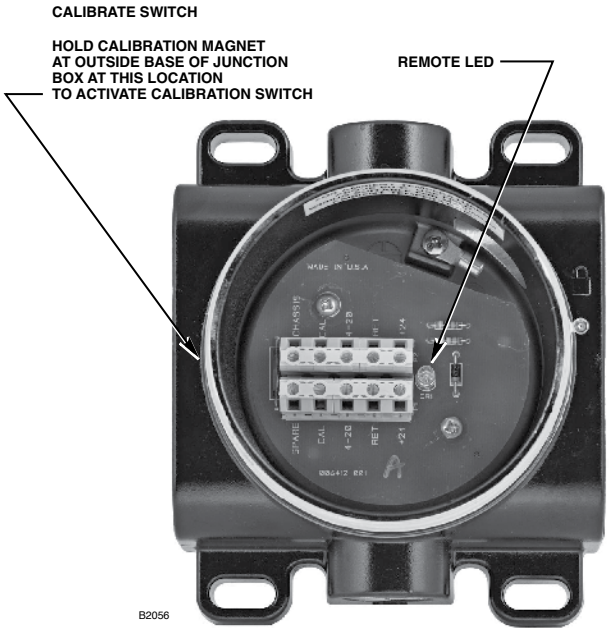


Figure 10—Junction Box Terminals and Calibration Switch

DETECTOR SEPARATION (OPTIONAL)

In applications where the PIRVOL must be installed in a different location from a control device (such as a transmitter), a junction box must be installed at the PIRVOL location to make the electrical connection. Refer to Figure 11 for a typical separation diagram.

Wiring Requirements for Detector Separation

Shielded four wire cable is recommended for connecting the PIRVOL junction box to the transmitter. Cable with a foil shield is recommended. The shield of the cable should be open at the PIRVOL junction box and connected to earth ground at the transmitter junction box. Ensure that the shield wire is clipped short and insulated with electrical tape to prevent accidental grounding at the open end.

The maximum distance between the PIRVOL junction box and the transmitter is limited by the resistance of the connecting wiring, which is a function of the gauge of the wire being used.

NOTE

It is important to maintain a minimum of +18 volts dc (including ripple) at the PIRVOL. When determining the appropriate wire size for the installation, refer to Figure 2. Be sure to take into account the distance from the power supply to the PIRVOL or to the transmitter and then to the PIRVOL to ensure that the power requirements are met.

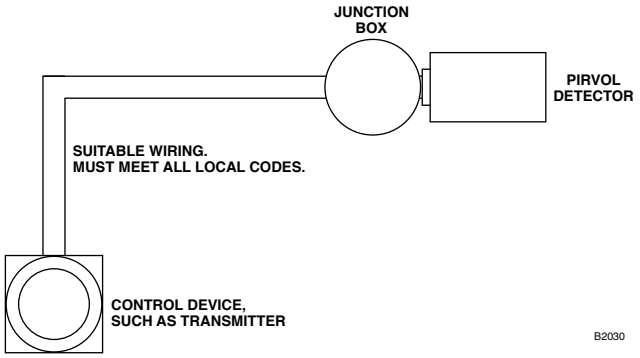


Figure 11—Detector Separation

Mounting and Connecting Procedure for Detector Separation

The PIRVOL junction box can be mounted to a wall or post, or it can be suspended by the conduit if this does not result in excessive vibration. The junction box should be electrically connected to earth ground.

1. Lubricate the sensor threads with low vapor pressure silicone grease, then install the sensor in the conduit entry of the junction box. It should be tight to ensure an explosion-proof installation, however, do **not** overtighten.

2. Connect the PIRVOL wires to the terminal strip in the junction box.

3. Connect the cable leadwires from the transmitter to the same terminals inside the separated junction box. **Do not** ground the shield at the junction box. Ground the sensor wire shield at the transmitter end only.

4. Check the connections inside the junction box and place the cover on the junction box.

5. Mount and wire the transmitter as described in the instruction manual provided by the manufacturer.

STARTUP PROCEDURE

NOTE

Caution should be exercised when applying this and any electronic device to explosive vapor extraction and measurement applications. Typical hazards in these applications include small fitting vapor leaks, resulting in dangerous gas concentrations near or within the system enclosure. Any spark or arc may result in a fire or explosion in these conditions. Always inspect all fittings for leakage before commissioning, and always remove power from all electronic devices before performing maintenance on the vapor extraction system tubing, fittings, and hardware.

1. Inhibit the output loads that are actuated by the system to prevent activation of these devices.

2. Check that the PIRVOL has been wired properly.

3. Apply power to the system and allow the PIRVOL to operate for a minimum of 2 hours, then check zero and verify gas response.

4. Place the system in normal operation by reactivating the output loads.

TROUBLESHOOTING

Refer to Table 2 to isolate and correct malfunctions with the PIRVOL.

MAINTENANCE

It is recommended to have spare IR Modules on hand (see "Spare Parts" section). Use Table 2 to isolate and correct malfunctions.

IMPORTANT MAINTENANCE NOTES

• Hydrocarbon-based grease emits hydrocarbon vapors, which will be measured by PIRVOL, resulting in elevated gas concentration readings. ***Use only silicone-based grease (not hydrocarbon-based grease) when lubricating threads on the PIRVOL and associated junction box.*** *A suitable grease is listed under "Spare Parts" in the Ordering Information section of this manual.*

• It is recommended to keep spare IR modules (See "Spare Parts" section) for field replacement in the event of a malfunction.

Table 2—Troubleshooting Table

Current Level	Status	Corrective Action
2.4 to 3.9 ma	Negative Zero Indication	*NOTE:* This fault can be caused by the presence of background gas during calibration. Ensure that background gas is not present and recalibrate the unit. If fault does not clear, perform disassembly and cleaning procedure, then recalibrate. If fault still does not clear, replace electronics assembly.
1.6 ma	Calibration fault	Make sure that the calibration gas being used matches the Gas Selection Switch setting. If these match and the fault is still present, perform disassembly and cleaning procedure, then recalibrate.
1.0 ma	Fouled optics	Perform disassembly and cleaning procedure, then recalibrate.
0.8 ma	+24 vdc line low (less than +17.5 vdc)	Ensure that input voltage is correct and that power connections are good. If fault does not clear, replace the electronics assembly.
0.6 ma	Calibrate input active at power-up	Ensure that calibration line is not shorted and that the calibration switch is open. If fault does not clear, replace the unit.
0.4 ma	Active channel fault	Replace electronics assembly.
0.2 ma	Reference channel fault	Replace electronics assembly.
0.0 ma	CPU system fault, warmup	Ensure that power is applied and that the warmup period is complete (1 minute). If fault does not clear, replace the unit.

DISASSEMBLY AND CLEANING PROCEDURE

The PIRVOL should be inspected periodically to ensure that its performance is not impaired by fouled optics or by clogging of the sample draw cup or hydrophobic screen. Inspection and/or periodic maintenance involves three different areas.

IMPORTANT

Remove power before disconnecting and removing the PIRVOL for maintenance.

Sample Draw Cup. Perform a visual inspection of the sample draw cup and associated plumbing, and clean as required. External filtration of sample stream is recommended.

Hydrophobic Screen. The flow of gas through the screen can be inhibited by an accumulation of mud or other contaminants. To inspect the hydrophobic screen, disassemble the PIRVOL as described below. If the screen appears to be fouled, replace it.

Optics. Cleaning of the optical surfaces is required only if an optical fault is indicated (1.0 milliampere current output signal from the PIRVOL). This procedure is most easily accomplished on a bench.

Required materials: Clean, flat work surface, foam tipped swabs (no cotton), isopropyl alcohol, screwdriver.

CAUTION

The PIRVOL contains semiconductor devices that are susceptible to damage by electrostatic discharge. An electrostatic charge can build up on the skin and discharge when an object is touched. Therefore, use caution when handling the device, taking care not to touch electronic components or terminals. If the electronics assembly is removed, it should be placed in an anti-static bag or box while stored or transported. A static safeguarded work area is highly recommended (if available) for disassembly and cleaning of the PIRVOL.

1. Remove the sample draw cup from the front of the PIRVOL. See Figure 12.

2. Perform a visual inspection of the sample draw cup and associated plumbing, and clean as required. Also inspect the two O-rings inside the sample draw cup and clean, lubricate or replace as required.

3. Loosen the two captive screws on top of the mirror assembly (Figure 12) and remove the mirror assembly and hydrophobic screen from the electronics assembly.

4. Thoroughly douse the interior of the mirror assembly as well as the foam tipped swab with isopropyl alcohol. Use the swab to gently cleanse the surfaces of the reflecting mirrors inside the mirror assembly. After cleaning with the swab, flush out the mirror assembly using a liberal amount of isopropyl alcohol. Tip the mirror assembly with mirror openings downward to remove accumulated isopropyl alcohol and particle contaminants. Repeat the alcohol flush to remove any remaining contaminants. Allow the mirror assembly to air dry in a dust-free location.

IMPORTANT

Do not insert any sharp object into the mirror assembly. Scratching of the mirrors will void the PIRVOL warranty. Do not use cotton tipped swabs or buds as they are likely to leave fiber residue.

5. Clean the two windows on the electronics assembly using the procedure described above. When the mirror assembly and electronics assembly are thoroughly dry, proceed with re-assembly.

6. Slide a new hydrophobic screen over the end of the mirror assembly, then carefully seat the mirror assembly and hydrophobic screen against the base of the electronics assembly. Be careful not to crumple or fold the hydrophobic screen.

7. Tighten the two captive screws on the top of the mirror assembly. Tighten the screws evenly. Do not over-tighten (6 inch-pounds recommended).

8. Slide the sample draw cup back onto the PIRVOL.

9. Check for leaks around the PIRVOL sample draw cup.

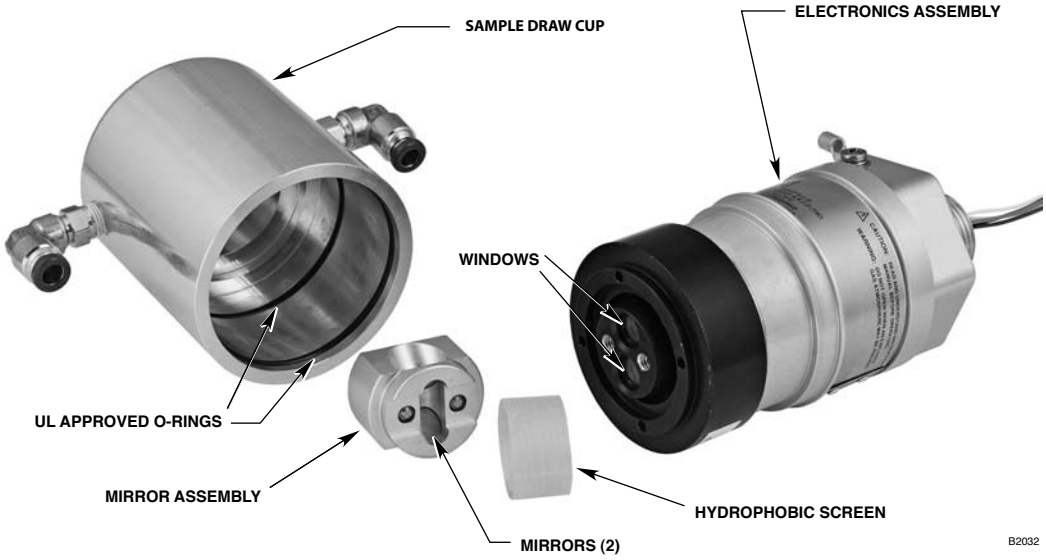


Figure 12—PIRVOL Disassembly for Cleaning

CALIBRATION

In the event the PIRVOL optics are fouled and complete dis-assembly is required for cleaning, a zero calibration of the device may be required. This procedure ensures the signal output level is at 4 milliamperes, and does not require application of span gas.

NOTE

Zero drift will be indicated by a constant offset in one direction either above or below 4 milliamperes. The presence of background gas would be indicated by a small but constantly changing output.

IMPORTANT CALIBRATION NOTES

Ensure that the detector has been operating for at least two hours before calibrating.

Do not open the explosion-proof enclosure when power is applied to the system unless the appropriate permits have been procured.

Calibration Procedure

To perform a zero calibration of the PIRVOL, follow the sequence described in Table 3.

NOTE

The calibration sequence is initiated by momentarily connecting the calibration lead to the negative lead (common) of the power supply using either the Cal Magnet or an external switch. If the Det-Tronics junction box with magnetic Cal Switch is being used, this is accomplished by holding the Cal Magnet near the side of the junction box for one second. The location of the Cal Switch is shown in Figure 10. An alternate way of accomplishing this is to install a pushbutton switch between the yellow lead and the power supply common.

Factory calibration is recommended for complete device calibration. Contact Det-Tronics for additional information.

Table 3—Calibration Sequence

Description	Current	LED	Operator Action
Normal operation/no gas present	4.0 ma	Off	If the possibility of background gases exists, purge the sensor with clean air to ensure accurate calibration.
Initiate calibration	2.2 ma	On steady	Initiate the calibration sequence by holding the calibration magnet against the side of the junction box or activating the external calibrate pushbutton for one second.
Zero calibration complete	2.0 ma	Flashing	Re-apply magnet (or activate switch) for one second. Span calibration is not required. Device will revert to live operation using new zero level and original span level from factory calibration.
Calibration fault indication	1.6 ma	Off	See Troubleshooting Table.
NOTE: Failure to re-apply magnet to set zero level will result in Fault status if span gas is not applied. Span gas is typically applied at the factory only.			

To convert PIRVOL milliampere output to % by volume gas concentration, use the following formula:

(milliamp signal – 4.0) x 5.625 = % by volume propane

Example:

(4.0 – 4.0) x 5.625 = 0%

(12.0 – 4.0) x 5.625 = 45% by volume

(20.0 – 4.0) x 5.625 = 90% by volume.

DEVICE REPAIR AND RETURN

The PIRVOL Process Monitor is not designed to be repaired in the field. If a problem should develop, first carefully check for proper wiring. If it is determined that the problem is caused by a mechanical or electronic failure, the device must be returned to the factory for repair.

Prior to returning devices or components, contact the nearest local Detector Electronics office so that a Service Order number can be assigned. A written statement describing the malfunction must accompany the returned device or component to expedite finding the cause of the failure.

Pack the unit or component properly. Use sufficient packing material in addition to an anti-static bag or aluminum-backed cardboard as protection from electrostatic discharge.

Return all equipment transportation prepaid to the factory in Minneapolis.

ORDERING INFORMATION

PIRVOL DETECTORS

Refer to the PIRVOL OS Matrix.

IR MODULE ONLY

(Without cup, for field replacement only)

Part Number	Description
007129-005	Aluminum, 3/4 inch threads
007129-007	Aluminum, M20 threads
007129-006	Stainless Steel, 3/4 inch threads
007129-008	Stainless Steel, M20 threads.

JUNCTION BOXES

Short Cover Junction Box (solid cover, with 2 or 5 ports)

Part Number	Description
006414-001	3/4 inch entries (2)
006414-002	20 mm entries (2)
006414-016	3/4 inch entries (5)

Tall Cover Junction Box (with window), with 2 ports

Part Number	Description
006414-003	3/4 inch entries (2)
006414-004	20 mm entries (2)

SPARE PARTS

Part Number	Description
007128-001	Sample Draw Cup with O-Rings and Fittings
007128-002	O-Ring Kit (UL)
006297-003	Hydrophobic Screen
006680-001	Silicone Grease

ASSISTANCE

For assistance in ordering a system to meet the needs of a specific application, contact:

Detector Electronics Corporation
6901 West 110th Street
Minneapolis, Minnesota 55438 USA
Operator: (952) 941-5665 or (800) 765-FIRE
Customer Service: (952) 946-6491
Fax: (952) 829-8750
Web site: www.det-tronics.com
E-mail: detronics@detronics.com

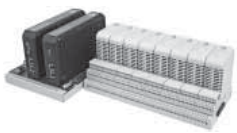
PIRVOL OS Matrix

MODEL	DESCRIPTION							
PIRVOL	Infrared Hydrocarbon Process Monitor							
	TYPE	APPLICATION						
	LT	Light Hydrocarbon						
	VR	Vapor Recovery						
		TYPE	ENCLOSURE MATERIAL					
		A	Aluminum					
		S	Stainless Steel					
			TYPE	THREAD TYPE				
			3	3/4" NPT				
			2	M20				
				TYPE	SAMPLING CUP W 1/4" TUBING COMPRESSION FITTINGS			
				A	With Sampling Cup			
				B	Without Sampling Cup (replacement part only)			
						TYPE	APPROVALS	
						C	CSA	
						D	CSA and CENELEC	

X3301 Multispectrum
IR Flame Detector

PointWatch Eclipse®
IR Combustible Gas Detector

Eagle Quantum Premier®
Safety System



Eagle Logic Solver
Safety System

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