MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

DET-TRONICS

PIR9400A3A1AW

INFRARED HYDROCARBON GAS DETECTOR

Used with the applicable PointWatch PIR9400 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Det-Tronics PointWatch PIR9400 Instructions 95-8440 revision 11.4, February 2022; specifications, installation and model matrix

DET-TRONICS

Instructions

PointWatch™ Infrared Hydrocarbon Gas Detector
Model PIR9400



Carrier

DET-TRONICS

INSTRUCTIONS

PointWatch™ Infrared Hydrocarbon Gas Detector Model PIR9400

⚠ CAUTION

Be sure to read and understand the entire instruction manual before installing or operating the gas detection system. This product is intended to provide early warning of the presence of a flammable or explosive gas mixture. Proper device installation, operation, and maintenance is required to ensure safe and effective operation. If this equipment is used in a manner not specified in this manual, safety protection may be impaired.



APPLICATION

The PointWatch™ Infrared Gas Detector Model PIR9400 is a diffusion-based point-type infrared gas detector. The PointWatch Detector is approved to provide continuous monitoring of methane gas concentration in the range of 0–100% LFL. The detector provides a 4-20 mA output signal, corresponding to the detected gas concentration. It has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

The PointWatch Detector Model PIR9400 is ideally suited for use in harsh environments and where the cost of required maintenance for conventional catalytic detectors is prohibitive. It will perform reliably in the presence of silicone and other catalytic poisoning agents and can also operate in oxygen free environments or where high background gas levels are present. There are no known poisons that affect this technology.

The PointWatch Detector is globally certified for use in Class 1, Divisions 1 and 2, and Zone 1 hazardous areas. It is also approved as a stand alone gas detector, and complies with global approvals when connected to a stand-alone approved controller for life safety. The approved Det-Tronics controllers are the FlexVu® UD10, FlexVu® UD30, Infiniti® U9500, R8471, and Eagle Quantum Premier® (EQP).

FEATURES

- Compliance to ANSI/ISA 12.13.01-2000 performance standard.
- Requires no routine calibration to ensure proper operation.
- Fail-safe operation.
- Continuous self-test automatically indicates a fault or fouled optics condition.
- Unique multi-layered filtering system protects optics from dirt and water ingress.
- Internal heating system minimizes condensation, allowing reliable operation through temperature extremes.
- There are no known poisons, e.g., silicones or hydrides, that compromise the integrity of the measurement.
- Performs well in the presence of high concentrations or constant background levels of hydrocarbons, and in oxygen depleted atmospheres.
- Standard 4–20 mA output (current source).
- Compact, lightweight, explosion-proof housing is designed for duty in harsh environments.
- Standard 0 to 100% LFL detection range.

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SPECIFICATIONS

PointWatch Gas Detector (PIR9400)

INPUT VOLTAGE—
24 Vdc nominal. Operating range is 18–30 Vdc.

POWER CONSUMPTION (Watts)—

Input Voltage:	18 Vdc	24 Vdc	30 Vdc
Nominal	3.5	4.6	6.2
Maximum	4.0	5.5	7.0

DETECTION RANGE—
0 to 100% LFL.

GASES —
The Model PIR9400 Detector is approved to Methane, but most flammable hydrocarbon vapors (ethane, ethylene, propane, butane, and propylene) are also detectable.

Methane gas detection is the factory default gas type setting. Reference the "IR Module Removal and Gas Selection" section of this manual for alternate gas type settings.

CURRENT OUTPUT (NON-ISOLATED)—
Linear 0–20 mA current source.

- 4–20 mA output indicates 0–100% LFL detection range (for linearized gases)
- 23.2 mA indicates over-range condition
- 0–2.4 mA levels indicate calibration, fault and fouled optics conditions.

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.

Table 1—Current Loop Output Levels and Corresponding Status Indications

Current Level	Status
23.2 mA	Over-range
20.0 mA	Full scale (100% LFL)
4.0 mA	Zero gas level (0% LFL)
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

NOTE

The following specifications for Accuracy, Stability and Repeatability are based on 0–100% LFL methane.

ACCURACY (Room Temperature)—
±3% LFL from 0–50% LFL, ±5% LFL from 51–100% LFL.

RESPONSE TIME (Seconds)—

	T50	T90
Multilayered aluminum weather baffle		
With hydrophobic filter	7	14.4
Without hydrophobic filter	5	10
Polyphthalamide (PPA) weather baffle		
With hydrophobic filter	6	16
Without hydrophobic filter	2	3

STABILITY—
Temperature

Zero: ±2% LFL from –40°C to +75°C (–40°F to +167°F)

Span: ±5% LFL at 50% LFL from –25°C to +75°C (–13°F to +167°F)

±10% LFL at 50% LFL from –40°C to –25°C (–40°F to –13°F).

Time (10 months) ±2% LFL (Det-Tronics verified).

REPEATABILITY (Room Temperature)—
Zero: ±1% LFL
Span: ±2% LFL at 50% LFL
(Det-Tronics verified).

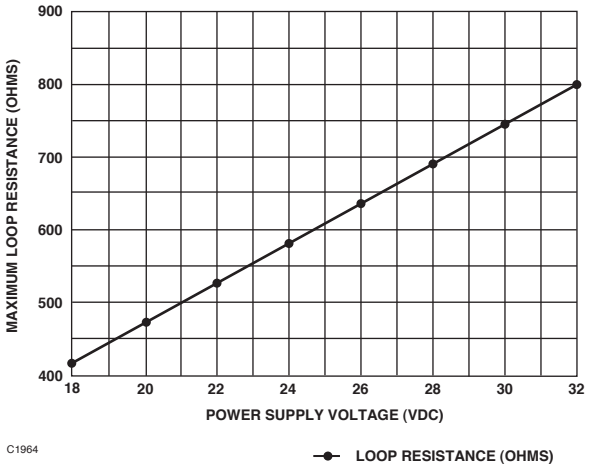


Figure 1—4 to 20 mA Current Loop Resistance

WIRING—
The PointWatch Detector has five 22 AWG wires, 20 inches long for wiring into a termination box, FlexVu UD10, UD30 or the Infiniti U9500.

Red	=	+ 24 Vdc
Black	=	– (common)
White	=	4–20 mA 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.

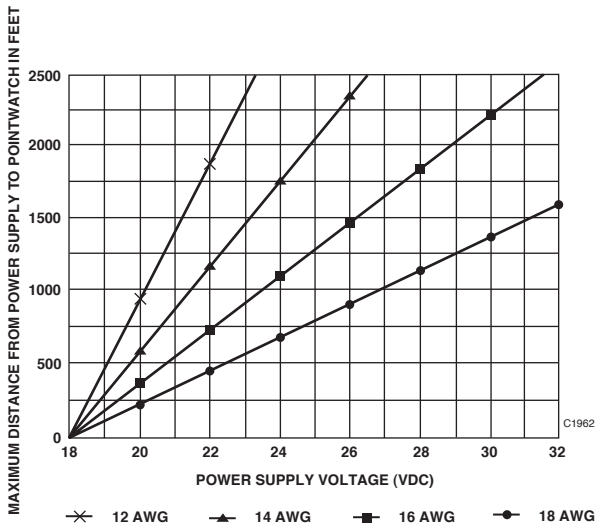


Figure 2—PIR9400 Wiring Requirements

OPERATING TEMPERATURE RANGE—
–40°C to +75°C (–40°F to +167°F).

STORAGE TEMPERATURE RANGE—
–55°C to +85°C (–67°F to +185°F).

HUMIDITY (Non-Condensing)—
0 to 99% relative humidity (Det-Tronics verified)
5 to 95% relative humidity (FM/CSA verified).

RFI/EMI PROTECTION—
Operates properly with 5 watt walkie-talkie keyed at 1 meter.

INGRESS PROTECTION—
IP66.

ENCLOSURE MATERIALS—
Aluminum (clear anodized) enclosure and weather protection baffles. Content: 0.8–1.2% Mg, 0.15–0.40% CU.

Stainless Steel (316 electropolished) enclosure, polyphthalamide (PPA) weather protection baffle.

DIMENSIONS—
See Figures 3 and 4 for the dimensions of the PointWatch Detector.

⚠ WARNING

Always ensure that the detector/termination box hazardous (classified) location ratings are applicable for the intended use.

PointWatch Termination Box (PIRTB)

INPUT VOLTAGE—
24 Vdc nominal. Operating range is 18–30 Vdc.

POWER CONSUMPTION (Watts)—
0.5 Watts Maximum

MOUNTING—
The Det-Tronics Termination Box, Model PIRTB, is recommended for optimum ease of installation and calibration of the PointWatch Detector. Depending on the specific application, the detector can be threaded into any Det-Tronics approved termination box. (Termination box spacers may be required for flush mounting. The PIRTB, FlexVu UD10, and Infiniti U9500 come standard with M25 threads, and may require a reducer when used with the PointWatch Detector). The FlexVu UD30 standard port options are 3/4 inch NPT and M20.

PointWatch Detector thread options:

- 3/4 inch NPT
- M20

SHIPPING WEIGHT (PIRTB)—

Aluminum Tall Box:	2.2 lbs (1.0 kg)
Aluminum Short Box:	2.0 lbs (0.95 kg)
Stainless Steel Tall Box:	9.5 lbs (4.3 kg)
Stainless Steel Short Box:	9.0 lbs (4.1 kg).

DIMENSIONS—
See Figure 5 for dimensions of the PIRTB.

TERMINALS—
PIRTB terminals UL/CSA rated for 14 to 22 AWG wire; terminals DIN/VDE rated for 2.5 mm^2 wire.

PIR9400 MODEL MATRIX

MODEL	DESCRIPTION
PIR9400	PointWatch Gas Detector

TYPE	MATERIAL
A	Aluminum
S	Stainless Steel (316)

TYPE	THREAD TYPE
2	METRIC M20
3	3/4” NPT

TYPE	WEATHER BAFFLE MATERIAL
A	Aluminum
P	Polyphthalamide Plastic

TYPE	HYDROPHOBIC FILTER
1	Factory-Fitted Hydrophobic Filter
2	No Hydrophobic Filter

TYPE	LEAD WIRE LENGTH
A	22 inch
B	44 inch

TYPE	APPROVALS
B	INMETRO (Brazil)
R	VNIIFTRI (Russia)
W	FM/CSA/ATEX (not CE compliant)/IECEx

APPENDIX A

FM APPROVAL

The following items, functions and options describe the FM approval.

APPROVAL

PointWatch Infrared Hydrocarbon Gas Detector Model PIR9400 Series.

Explosion-proof for Class I, Division 1, Groups B, C, D (T5) Hazardous (Classified) Locations per FM 3615.
Nonincendive for Class I, Division 2, Groups A, B, C, D (T3C) Hazardous (Classified) Locations per FM 3611.
Performance verified for 0 to 100% LFL Methane-in-air atmospheres per FM 6320, ANSI/ISA 12.13.01-2000.

NOTE

Model PIR9400 must be used in conjunction with an FM Approved control device.

PointWatch Termination Box Model PIRTB Part Number 006414-XXX.

Explosion-proof for Class I, Division 1, Groups B, C, and D (T6) Hazardous (Classified) Locations per FM 3615.
Non-incendive for Class I, Division 2, Groups A, B, C, and D (T6) Hazardous (Classified) Locations per FM 3611.

NOTE

Approval of the PointWatch Detector and termination box does not include or imply approval of the apparatus to which the PointWatch Detector may be connected and which processes the electronic signal for eventual end use.

Special Conditions of Use:

1. Approval covers us of the instruments when calibration is performed using the gas to be monitored and the highest alarm set points are preset within 10% of the calibration gas concentration.
2. The apparatus may be used with FM Approved PointWatch Termination Box Model PIRTB Series.

ATTACHMENTS/OPTIONS

Aluminum or Stainless Steel Explosion-proof Enclosure, with Aluminum or Plastic Baffle.

3/4 inch NPT and M20 Conduit Entry Thread Types. (Metric straight thread is for use in non-North American applications.)

Calibration Kit (006468-xxx)
- 50% LFL Calibration Gas (226166-xxx)
- Calibration Nozzle (102821-001)
- Regulator (162552-xxx)
- Tubing (101678-007).

CALIBRATION

The PointWatch Model PIR9400 can be calibrated as a stand-alone point gas detector.
PointWatch Termination Box Model PIRTB (006414-xxx) can be used to calibrate the PointWatch Detector.

NOTE

It is required that calibration of the PointWatch Detector be conducted as well as calibration of the system in which it is installed.

APPENDIX B

CSA APPROVAL

The following items, functions and options describe the CSA approval.

APPROVAL

PointWatch Infrared Hydrocarbon Gas Detector Model PIR9400 Series.

Explosion-proof for Class I, Division 1, Groups B, C, D (T5) Hazardous (Classified) Locations per C22.2 #30.
Nonincendive for Class I, Division 2, Groups A, B, C, D (T3C) Hazardous (Classified) Locations per C22.2 #213.
Performance verified for 0 to 100% LFL Methane-in-air atmospheres per C22.2 #152.

NOTE

Model PIR9400 must be used in conjunction with an CSA Approved control device.

PointWatch Termination Box Model PIRTB Part Number 006414-XXX.

Explosion-proof for Class I, Division 1, Groups B, C, D (T6) Hazardous (Classified) Locations per C22.2 #30.
Nonincendive for Class I, Division 2, Groups A, B, C, D (T6) Hazardous (Classified) Locations per C22.2 #213.

NOTE

Approval of the PointWatch Detector and termination box does not include or imply approval of the apparatus to which the PointWatch Detector may be connected and which processes the electronic signal for eventual end use.

Special Conditions of Use:

1. Approval covers us of the instruments when calibration is performed using the gas to be monitored and the highest alarm set points are preset within 10% of the calibration gas concentration.
2. The apparatus may be used with CSA Approved PointWatch Termination Box Model PIRTB Series.

ATTACHMENTS/OPTIONS

Aluminum or Stainless Steel Explosion-proof Enclosure, with Aluminum or Plastic Baffle.

3/4 inch NPT and M20 Conduit Entry Thread Types. (Metric straight thread is for use in non-North American applications.)

Calibration Kit (006468-xxx)
- 50% LFL Calibration Gas (226166-xxx)
- Calibration Nozzle (102821-001)
- Regulator (162552-xxx)
- Tubing (101678-007).

CALIBRATION

The PointWatch Model PIR9400 can be calibrated as a stand-alone point gas detector.
PointWatch Termination Box Model PIRTB (006414-xxx) can be used to calibrate the PointWatch Detector.

NOTE

It is required that calibration of PointWatch Detector be conducted as well as calibration of the system in which it is installed.

APPENDIX C

ATEX APPROVAL

(Not CE compliant)

ATEX CERTIFICATION

PointWatch Detector Model PIR9400

0539 ⟨Ex⟩ II 2 G
Ex db IIB + H_2 T6...T4
EN 60079-29-1
DEMKO 09 ATEX 147301X
T6 (Tamb = –55°C to +50°C)
T5 (Tamb = –55°C to +60°C)
T4 (Tamb = –55°C to +75°C)
IP66.

EN Standards: EN 50270: 2006
EN 60079-0:2012 + A11:2013
EN 60079-1: 2007
EN 60079-29-1: 2007
EN 60529: 1991+A1: 2000

Read and understand instruction manual before operating.

Special Conditions for Safe Use:
The Gas Detectors have a threaded wire feed through incorporating flying leads. This feed through is to be screwed into the cable entry opening of a suitable ATEX certified (Ex 'd' or Ex 'e') enclosure in which the flying leads are to be terminated.

In order to maintain the Ingress Protection rating IP66, the back end of the PointWatch Infrared Hydrocarbon Gas Detector Model PIR9400 with the flying lead is to be screwed into a suitable ATEX certified (Ex 'd' or Ex 'e') enclosure with an Ingress Protection rating of at least IP66.

The PointWatch Infrared Hydrocarbon Gas Detector Model PIR9400 has an ambient temperature rating for performance of –55°C to +75°C.

The PointWatch Infrared Hydrocarbon Gas Detector Model PIR9400 is to be used only in conjunction with a suitable ATEX certified combustible gas detector control unit for compliance with EN 60079-29-1 standard.

The captive front-end screws are to be tightened with 1 N·m.

Performance Testing to EN60079-29-1
The measuring function of the Model PIR9400 Gas Detector, according to Annex II paragraph 1.5.5, 1.5.6 and 1.5.7 of the Directive 94/9/EC, is covered in this Type Examination Certificate in the following configuration:

1. Sensor Termination Box (STB) and Calibration Termination Box (CTB), in combination with Det-Tronics gas detector model PIR9400 (tested with methane applied to the PIR9400), firmware 005998-005 Rev F.

Electromagnetic Compatibility (EMC)

The PointWatch Infrared Hydrocarbon Gas Detector Model PIR9400 was tested and found to be compliant with EN50270 when wired in conduit or with shielded cable. All screen drains shall be terminated to the chassis.

PointWatch Termination Box Model PIRTB

CE 0539 Ex II 2 G Ex II 2 D
Ex db IIC T5-T6 Gb EN 60079-29-1
Ex tb IIIC T85°C...T100°C Db EN 60079-29-1
DEMKO 02 ATEX 131326X
IP66.

EN Standards: EN IEC 60079-0:2018
EN 60079-1:2014
EN 60079-29-1:2016
EN 60079-31:2014
EN 60529:1991/A1 2001

Specific Conditions of Use:

Gas Atmospheres
–55°C to +60°C (T6)
–55°C to +75°C (T5)

Dust Atmospheres
–25°C to +60°C (T85°C)
–25°C to +75°C (T100°C)

All cable entry devices and blanking elements shall be certified in type of explosion protection flameproof enclosure 'd', suitable for the conditions of use and correctly installed. Unused apertures shall be closed with suitable certified blanking elements.

For ambient temperatures below –10°C and above +60°C, use field wiring suitable for both minimum and maximum ambient temperatures.

To avoid a potential electrostatic discharge (ESD), the painted surface of the junction box should only be cleaned with a damp cloth.

Performance testing to EN 60079-29-1
The PointWatch Termination Box, model PIRTB has in addition passed tests for Ingress Protection to IP66 for unclassified locations in accordance with EN 60529:1991/A1 2001.

The manufacturer shall inform the notified body concerning all modification to the technical documentation as described in Annex III to Directive 2014/34/EU of the European Parliament and the Council of 26 February 2014.

The PIRTB has been tested to the referenced performance standard in combination with the Det-Tronics gas detector model PIRECL.