Quick Start Guide
00825-0100-4036, Rev AB
October 2023

Rosemount™ 936

Open Path Toxic Gas Detectors

ROSEMOUNT™

EMERSON.

Legal notice

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

Glossary and abbreviations

Abbreviation	Meaning
Analog video	Video values are represented by a scaled signal.
ATEX	Atmosphere explosives
AWG	American wire gauge
BIT	Built-in test
Digital video	Each component is represented by a number representing a discrete quantization.
DSP	Digital signal processing
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
HART®	Highway addressable remote transducer communication protocol
IAD	Immune at any distance
IECEx	International Electrochemical Commission explosion
IP	Internet protocol
IR3	Refers to the three infrared sensors
LED	Light-emitting diode

Abbreviation	Meaning
LNG	Liquefied natural gas
mA	MilliAmps (0.001 amps)
Modbus®	Master-slave messaging structure
N/A	Not applicable
NPT	National pipe thread
NTSC	National Television System Committee (a color encoding system)
PAL	Phase alternation by line (a color encoding system)
PN	Part number
ppm	Concentration in parts per million. Defines the amount of gas molecule parts per million molecules of atmospheric
ppm.m	Integral of concentration in ppm units times the distance in meters.
RFI	Radio frequency interference
RTSP	Real time streaming protocol
SIL	Safety integrity level
UNC	Unified coarse thread
UV	Ultraviolet
Vac	Volts alternating current
Vdc	Volts direct current
µm	Micrometer

Contents

1 Installation instructions

1.1 General considerations

1.1.1 Personnel

Only employ suitably qualified personnel who are familiar with the local codes and practices and trained for gas detection maintenance.

Ensure that wiring is only performed and supervised by someone with knowledge of electronics and, in particular, wiring installation.

1.1.2 Required tools

Install the device using the following general purpose common tools and equipment.

Table 1-1: Tools

Tool	Function
Alignment kit	Provides tools to install fine alignment tool.
Hex key 8 mm	Mounts the detector on the tilt mount.
Hex key 3/16-in.	Aligns the detector.
Hex key 5/16-in.	Screws ¾ stop plug.
Flat screwdriver 4 mm	Connects ground terminal.
Flat screwdriver 2.5 mm	Connects wires to the terminal block.

1.1.3 Site requirements

When installing the Rosemount 936, take into account the weight of the monitored gas compared to that of the surrounding air and the individual site requirements.

Ensure that the site selected gives the detector a direct view to the source. The mounting point for each item should be secure and stable with minimal vibrations. Mount the equipment in a position where it cannot be knocked out of alignment and is guarded from physical impact.

1.1.4 Source and detector

Select the appropriate detector for the length of open path to be monitored.

To allow for aging of the source and a reduction of the ultraviolet (UV) signal due to adverse weather, we recommend using a detector that is not at the limit of its operating range.

Install the detector at a distance of not more than 75 percent of the specified operating distance from the source. In severe weather conditions, such as offshore oil production and exploration, reduce this distance to 50 percent.

Keep the path between the source and detector clear of any obstacles that might hinder the free movement of air in the protected area or block the UV beam.

1.1.5 Tips for gas detector locations

To provide the best detection coverage, install the detector:

- Below potential leak source for gases heavier than air.
- Above potential leak sources for gases lighter than air.
- Near to leak sources along the expected leak trajectory, taking into account prevailing wind directions.

NOTICE

For optimal performance, avoid placing the detector in locations frequently covered by steam.

1.1.6 Separation distances

To avoid crosstalk between adjacent open path gas detector (OPGD) systems where transmitters are installed on the same side, keep the

relevant separation distance between the neighboring OPGD systems according to the installation lengths as listed in Table 1-2.

Table 1-2: Minimum Separation Distances

Installation line of sight distance	Minimum separation
33 ft. (10 m)	3.3 ft. (1 m)
66 ft. (20 m)	5 ft. (1.5 m)
98 ft. (30 m)	6.5 ft. (2 m)
131 ft. (40 m)	11.5 ft. (3.5 m)
164 ft. (50 m)	15 ft. (4.5 m)
197 ft. (60 m)	16.5 ft. (5 m)

1.1.7 Wiring

For wiring, use color-coded conductors or suitable wire markings or labels.

- The wire cross-section must be between 28 to 14 AWG (0.5 mm^2 to 2.5 mm^2).
- Select the wire gauge based on the number of detectors used on the same loop and the distance from the control unit. The maximum number of wire connections in one terminal is two wire cross-sections, each 1 mm^2.
- To fully comply with electromagnetic compatibility (EMC) directive and protect against interference caused by radio frequency interference (RFI) and electromagnetic interference (EMI), the cable to the detector must be shielded, and the detector must be grounded. Ground the shield at the detector end.

1.2 Preparations for installation

It is important to ensure that installation complies with local, national, and international regulations and norms as applicable to gas detectors and approved electrical devices installed in hazardous areas.

1.2.1 Equipment

The system should include the following (in addition to the Quick Start Guide):

Figure 1-1: Box Contents

Commissioning kit (not pictured)

A. Source and detector
B. Tilt mounts

- Detector unit: 936R1T2XXXX
- Source unit: 936TXT00XXXX
- Two tilt mount bases
  - One base is used for the detector.
  - One base is used for the ultraviolet (UV) source.

The commissioning kit (for $H_2S/S0_2$ or NH_3) includes:

- Magnetic mode selector
- Handle for cover opening
- Alignment tool kit
- Function check filter: for $H_2S/S0_2$ or NH_3

Other accessories are available, per customer request:

- Pole mount (U-bolt 5-in.)
- Pole mount (U-bolt 2–3-in.)
- RS-485 harness kit
- HART® hand-held harness kit
- Protective cover

1.2.2 Required tools

Install the device using the following general purpose common tools and equipment.

Table 1-3: Tools

Tool	Function
Alignment kit	Provides tools to install fine alignment tool.
Hex key 8 mm	Mounts the detector on the tilt mount.
Hex key 3/16-in.	Aligns the detector.
Hex key 5/16-in.	Screws ¾ stop plug.
Flat screwdriver 4 mm	Connects ground terminal.
Flat screwdriver 2.5 mm	Connects wires to the terminal block.

1.3 Certification instructions

⚠ WARNING

Do not open the detector, even when isolated, in a flammable atmosphere.

⚠ WARNING

The cable entry point may exceed 182 °F (83 °C).

Take suitable precautions when selecting the cable.

- Only suitably certified cable entry devices or conduit shall be used for connections, and unused openings shall be blanked off using suitably certified stopping plugs.
- The marking of the equipment is:
  Ex II 2(2) G D
  Ex db eb ib [ib Gb] IIB+H2 T4 Gb
  Ex tb IIIC T135 °C Db
- The equipment may be used with flammable gases and vapors with apparatus groups IIA and IIB + H2 T4 in the ambient temperature range: -67 °F (-55 °C) to 149 °F (65 °C).
- Installation shall be carried out by suitably trained personnel in accordance with the applicable code of practice, e.g., EN60079-14:1997.

- Connections to the intrinsically safe (I.S.) port on the side of the detector enclosure should be made using equipment that maintains the intrinsically safe levels of protection.
- Inspection and maintenance of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice, e.g,. EN 60079-19.
- The certification of this equipment relies upon the following materials used in its construction:
  - Enclosure: 316L stainless steel
  - Windows: sapphire glass
  - Seals: EPDM
- If the equipment is likely to come into contact with aggressive substances, then it is the operator's responsibility to take suitable precautions to prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised.
  - Aggressive substances: For example, acidic liquids or gases that may attack metal or solvents that may affect polymeric materials.
  - Suitable precautions: For example, regular checks as part of routine inspections or establishing from the material's data sheets that it is resistant to specific chemicals.
- The output of the optical radiation source with respect to explosion protection meets Exception 3 from the scope of UL 60079-28.

1.3.1 Intrinsically safe (I.S.) outputs

Intrinsically safe outputs through the I.S. ports have the following parameters:

Parameter	Channels						
	LED 1	**LED 2**	**HART® connection**	**RS485+**	**RS485-**	**5 V**	**All combined**
Uo	6.51 V	6.51 V	6.51 V	6.51 V	6.51 V	6.51 V	6.51 V
Io	68.5 mA	68.5 mA	68.5 mA	68.5 mA	68.5 mA	68.5 mA	689.5 mA
Po	111.5 mW	111.5 mW	111.5 mW	111.5 mW	111.5 mW	111.5 mW	111.5 mW
Ci	0 µF	0 µF	0 µF	0 µF	0 µF	0 µF	0 µF

Parameter	Channels						
	LED 1	LED 2	HART® connection	RS485+	RS485-	5 V	All combined
Li	0 µH	0 µH	0 µH	0 µH	0 µH	0 µH	0 µH
Co	22 µF	22 µF	22 µF	22 µF	22 µF	22 µF	22 µF
Lo	7.5 mH	7.5 mH	7.5 mH	7.5 mH	7.5 mH	514 µH	96.9 µH

Note
Co @ 6.6 V is 22 µF, as per Table A.2 of IEC 60079-11:2011. Lo is calculated based on 1.5 times current for IIC, 40 µJ using E = 0.5 *$(LI)^2$

1.3.2 Special conditions for safe use from ATEX IECEx certificate

The dimensions of the flameproof joints differ from the relevant minimum or maximum values required by Table 2 of IEC/EN 60079-1: 2007 for IIB + H_2, as detailed in Table 1-4.

Table 1-4: Flamepaths

Flamepath description	Type of joint	Minimum width "L"	Maximum gap "i_c"
Cylindrical section of spigot (both ends of Ex d compartment)	Cylindrical	NaN in. (NaN mm)	NaN in. (NaN mm)
NaN in. (NaN mm) diameter window fitted against enclosure	Flanged	NaN in. (NaN mm)	NaN in. (NaN mm)
1.6-in. (39.5 mm) diameter window fitted against enclosure	Flanged	NaN in. (NaN mm)	NaN in. (NaN mm)

- Gaps, "i_c", should not be modified to be any larger, and widths, "L", should not be modified to be any shorter than the values in Table 1-4.
- Connections to the Intrinsically Safe (IS) port on the side of the detector enclosure should be made using equipment that maintains the intrinsically safe levels of protection.
- The Um should be installed in accordance with one of the following:
  — The Um is 18 to 32 Vdc in a SELV/PELV system.

— Via a safety isolating transformer, complying with the requirements of IEC 61588-2-6 or technically equivalent standard.

— Directly connected to apparatus, complying with IEC 60950, IEC 61010-1, or technically equivalent standard.

— Fed directly from cells or batteries.

- If the product is to be used as a safety related device, then independent certification is important.

1.3.3 North American conditions of acceptability from certificate CSA 80023016

Conditions for Canadian installations

1. The dimensions of the flameproof joints are other than the relevant minimum or maximum values required by Table 2 of CAN/CSA-C22.2 No. 60079-0:19 Ed. 4 for IIB + H2, as detailed below:

Table 1-5: Flamepath dimensions

Flamepath description	Type of joint	Minimum width "L"	Maximum gap "ic"
Cylindrical section of spigot (both ends of Ex d compartment)	Cylindrical	NaN in. (NaN mm)	NaN in. (NaN mm)
NaN in. (NaN mm) diameter window fitted against enclosure	Flanged	NaN in. (NaN mm)	NaN in. (NaN mm)
NaN in. (NaN mm) diameter window fitted against enclosure	Flanged	NaN in. (NaN mm)	NaN in. (NaN mm)

Gaps shall not be machined to be any larger than the values of "ic", and widths shall not be modified to be any smaller than the values of "L" shown in Table 1-5.

2. Connections to the intrinsically safe (I.S.) port on the side of the detector enclosure shall be made via equipment which maintains the intrinsically safe levels of protection.

3. Where Um marked on the associated apparatus is less than 250 V, it shall be installed in accordance with one of the following:
   - Where Um does not exceed 50 Vac or 120 Vdc, in a SELV or PELV system or
   - Via a safety isolating transformer complying with the requirements of CAN/CSA-C22.2 No. 66.1 or technically equivalent standard or
   - Directly connected to apparatus complying with CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 61010-1 or technically equivalent standard or
   - Fed directly from cells or batteries.
4. The output of the optical radiation source with respect to explosion protection meets Exception 3 from the scope of CAN/CSA-C22.2 No. 60079-28:16 Ed.1.
5. Upon installation, remove the plastic transit plug from the cable entry and use a cable fitting or a conduit fitting with the following specification to connect the cable to the equipment:
   - Ex marking: Ex eb IIC Gb, Ex tb IIIC Db
   - Temperature rating: -67 °F (-55 °C) to 182 °F (83 °C) or better
   - Connecting thread: M25 x 1.5 or ¾-in. NPT
6. Equipment is only to be installed by manufacturer trained personnel.
7. Equipment has only been tested for electrical safety. No evaluation of functional safety and performance characteristics has been conducted.
8. The equipment shall be supplied with Limited Energy Circuit (LEC) as defined in CSA C22.2 No. 61010-1-12 or Limited Power Source (LPS) as defined in CAN/CSA C22.2 No. 60950-1.

Conditions for US installations

1. The dimensions of the flameproof joints are other than the relevant minimum or maximum values required by Table 2 of UL 60079-0:2019 Ed. 7 for IIB + H2, as detailed in Table 1-6:

Table 1-6: Flamepath dimensions

Flamepath description	Type of joint	Minimum width "L"	Maximum gap "ic"
Cylindrical section of spigot (both ends of Ex d compartment)	Cylindrical	NaN in. (NaN mm)	NaN in. (NaN mm)
30 mm diameter window fitted against enclosure	Flanged	NaN in. (NaN mm)	NaN in. (NaN mm)
39.5 mm diameter window fitted against enclosure	Flanged	NaN in. (NaN mm)	NaN in. (NaN mm)

Gaps shall not be machined to be any larger than the values of "ic", and widths shall not be modified to be any smaller than the values of "L" shown in Table 1-6.

2. Connections to the intrinsically safe (I.S.) port on the side of the detector enclosure shall be made via equipment which maintains the intrinsically safe levels of protection.
3. Where Um marked on the associated apparatus is less than 250 V, it shall be installed in accordance with one of the following:
   - Where Um does not exceed 50 Vac or 120 Vdc, in a SELV or PELV system or
   - Via a safety isolating transformer complying with the requirements of UL 5085-1 or technically equivalent standard or
   - Directly connected to apparatus complying with UL 60950-1, UL 61010-1, or technically equivalent standard or
   - Fed directly from cells or batteries.
4. The output of the optical radiation source with respect to explosion protection meets Exception 3 from the scope of UL 60079-28:2017 Ed. 2.
5. Upon installation, remove the plastic transit plug from the cable entry and use a cable fitting or a conduit fitting with the following specification to connect the cable to the equipment:

- Ex marking: Class I Zone 1 AEx eb IIC Gb, Zone 21 AEx tb IIIC Db
- Temperature rating: -67 °F (-55 °C) to 182 °F (83 °C) or better
- Connecting thread: M25 x 1.5 or ¾-in. NPT

6. Equipment is only to be installed by manufacturer trained personnel.
7. Equipment has only been tested for electrical safety. No evaluation of functional safety and performance characteristics has been conducted.
8. The equipment shall be supplied with Class 2 as defined in article 725.121 or National Fire Protection Association (NFPA) 70.

1.4 Installing conduits and cables

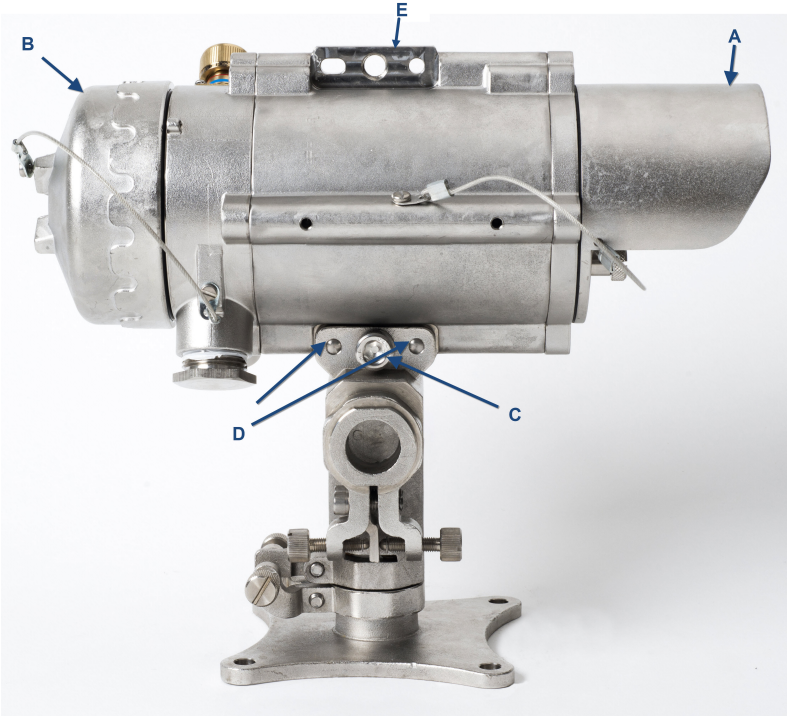
The conduit and cable installation must comply with the following guidelines:

- To avoid water condensation in the detector, install it with the conduits/cable entries facing downwards.
- Use flexible conduits/cables for the last portion connecting to the detector.
- When pulling the cables through the conduits, ensure that they are not tangled or stressed. Extend the cables about 12 in (305 mm) beyond the detector location to accommodate wiring after installation.
- After pulling the conductor cables through the conduits, perform a continuity test.

1.5 Mount detector and source to tilt mount

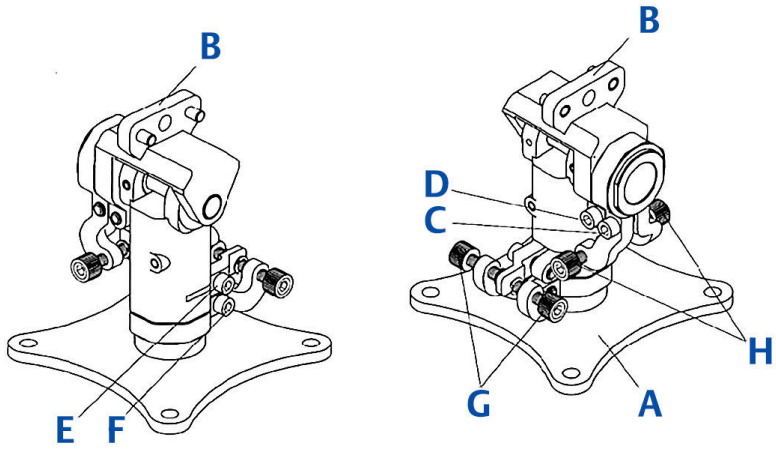
You can install the detector and source in two ways with the same tilt mount by using the upper or lower mounting access.

Figure 1-2: Mounting the tilt mount and detector using the lower mounting access



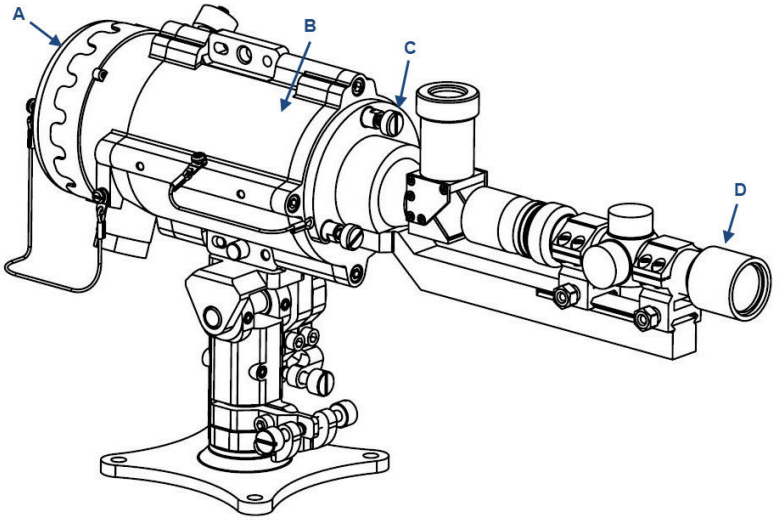
A. Front shield
B. Back cover
C. Security screw
D. Locating pins
E. Alternate mounting location

Figure 1-3: Tilt mount



A. Tilt mount holding plate
B. Transmitter or receiver holding plate
C. Vertical crude alignment tightening screw
D. Vertical fine alignment tightening scre
E. Horizontal fine alignment tightening screw
F. Horizontal crude alignment tightening screw
G. Horizontal fine alignment screw
H. Vertical fine alignment screw

Figure 1-4: Detector and tilt mount assembly using lower mounting access



A. Back cover
B. Detector
C. Alignment tool tightening bolt
D. Alignment tool

Table 1-7: Tilt mount kit

Item	Quantity	Type / model
Tilt mount	1	N/A
Screw	1	M10 x 1.5
Spring washer	1	No. 10

Prerequisites

Prior to mounting the tilt mount to a stable surface, verify that the line of site is unobstructed and corresponds to the detector's installation distance.

Procedure

1. Place the tilt mount holding plate in its designated location and secure it with four fasteners through four holes with diameters of 0.3-in. (8.5 mm).

Removing the detector for maintenance purposes does not require removing the tilt mount.

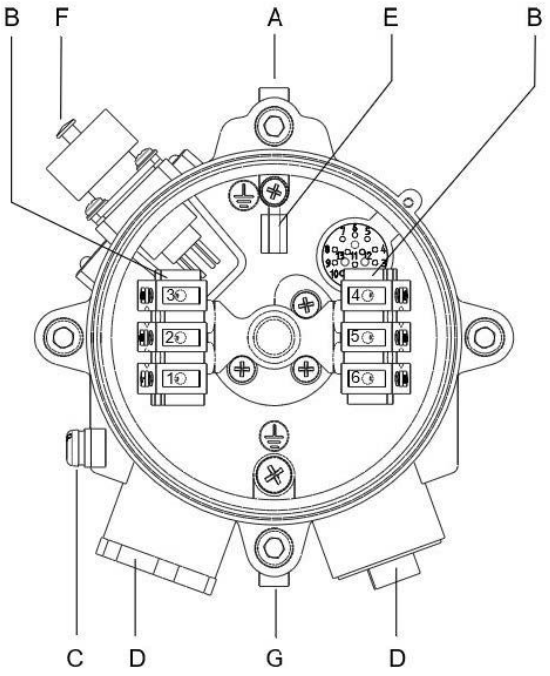
2. Place the detector with its conduit/cable inlets pointing downwards on the detector holding plate of the tilt mount.
3. Secure the detector with M10 x 1.5 screws with number M10 spring washers.
4. Secure the detector to the tilt mount using hex key number 7 for M10 x 1.5 screws.
5. Repeat steps Step 1 through Step 4 to install the source.

1.6 Install detector wiring

Procedure

1. Release the back cover secure bolt and open the detector back cover.
   The chamber is now revealed.

Figure 1-5: Detector with cover removed



A. Housing
B. Terminal board
C. Earth terminal
D. Inlet conduit
E. Internal earth connection
F. Connection to handheld unit
G. Receiver holding plate

2. Remove the protective plug mounted on the detector conduit/cable entry inlet.
3. Pull the wires through the detector inlet conduit.

4. Use a ¾-in. - 14 NPT or M25 x 1.5 conduit connection/cable gland to assemble the cable conduit to the detector.
5. Connect the wires to the required terminals according to the wiring diagrams.
6. Connect the grounding wire to the ground screw outside the detector.

   The detector must be well grounded to earth ground.
7. Place and secure the detector cover by screwing the cover and securing it using the secure bolt.

1.7 Wiring to detector terminals

The detector has six wiring terminals. Table 1-8 describes the function of each electrical terminal of the detector.

Table 1-8: Wiring terminals

Terminal number	Function
1	Power +24 Vdc
2	Return -24 Vdc
3	0–20 mA (input)
4	0–20 mA (output)
5	RS-485 (+)
6	RS-485 (-)

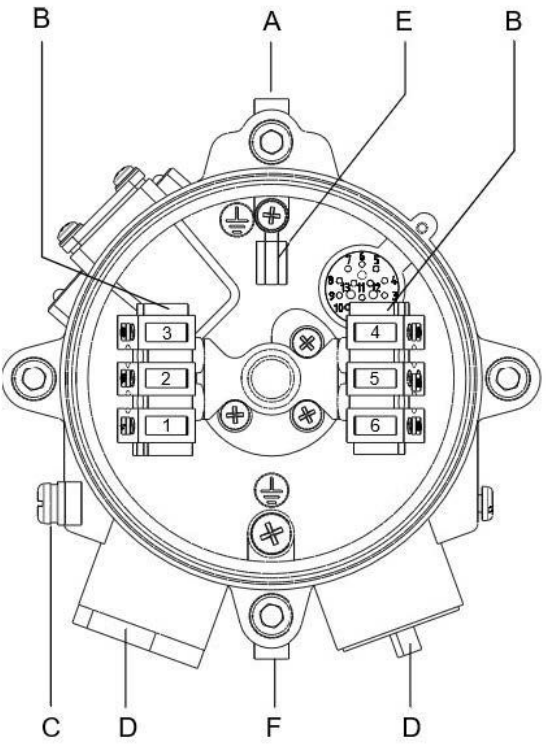
1.8 Wiring to ultraviolet (UV) source

1.8.1 Install wiring to ultraviolet (UV) source

Procedure

1. Release the back screw bolt and open the source back cover. The chamber is now exposed.

Figure 1-6: Source with cover removed



A. Housing
B. Terminal board
C. Earth terminal
D. Inlet conduit
E. Internal earth connection
F. Transmitter holding plate

2. Remove the protective plug mounted on the source conduit/ cable entry inlet and pull the wires through the source inlet. Use a ¾-in. - 14 NPT or M25 x 1.5 conduit connection/cable gland to assemble the cable/explosion-proof conduit to the detector.
3. Connect the wires to the required terminals according to the wiring diagram.
4. Connect the grounding wire to the ground screw located on the exterior of the detector.

   Ensure that the source is well grounded to earth ground.

   Note
   In case of installation in the US, use the internal grounding connection for the equipment grounding connection and the external connection for a supplementary bonding connection where local codes or authorities permit or require such connection. The external bonding conductor is manufactured from copper and is 4 mm^2 in size. Use a tightening torque of 16-in.-lb (1.8 Nm) to secure the bonding conductor.

5. Place and secure the source back cover by screwing on the cover and securing the back-screw bolt.

1.8.2 Wiring to source terminals

The source contains six wiring terminals.

Table 1-9: Flash source wiring terminals

Terminal number	Function
1	Power +24 Vdc
2	Return -24 Vdc
3	Not used
4	Not used
5	Not used
6	Not used

1.9 Align detector

Use the alignment tool to align the detector.

Perform the alignment procedure in two stages:

- Crude alignment
- Fine alignment

The alignment tool includes a periscope, consisting of a prism and an ocular, located vertical to the alignment tool assembly. This allows you to look into the opposite detector perpendicularly to the alignment when you cannot access the detector's rear. If you can access the detector's rear, you do not need the periscope. In this case, remove it by releasing the periscope fastening screw.

Note

See Figure 1-3):

Procedure

1. Make sure that the detector and flash source are installed properly.
2. Remove the front shield using the two captive screws.
3. Install the alignment tool on the detector/source front.
   See Figure 1-4.
4. Fasten the alignment tool with fastening screws.

1.9.1 Perform crude alignment

Prerequisites

Use a ¼-in. Allen screwdriver for all alignment screws.

Procedure

1. Loosen the horizontal lock screws.
2. Approximately aim the source horizontally towards the detector.
3. Tighten the horizontal lock screw adjacent to the plate.
4. Loosen the vertical lock screws.

⚠ CAUTION

If the detector is not properly supported when the lock screws are loosened, then it can fall and get damaged.

Support the detector when loosening the vertical lock screws.

5. Approximately aim the source vertically towards the detector.
6. Tighten the outer vertical lock screw.
7. Repeat this process for the detector.

1.9.2 Perform fine alignment

Refer to Figure 1-4 to see the detector with the alignment tool installed.

Procedure

1. Remove the front shield and mount the alignment tool on the front of the source using the three screws. The alignment tool is supplied in the commissioning kit.
2. Aim the source towards the detector within the horizontal access.
3. Aim the alignment tool to the center of the front window of the detector or source.

Figure 1-7: View through the alignment tool

4. Tighten the outer horizontal lock screw.
5. Aim the vertical axis.
6. Tighten the inner vertical lock screw.
7. Make sure the alignment tool cross is pointing to the detector and source center of the window.
8. Repeat Step 2 through Step 7 to align the detector.
9. Remove the alignment tool.
10. Install the front shield.

11. After you have completed the fine alignment for both the source and detector, you can turn on the power.

2 Operating instructions

2.1 Safety precautions

After powering up, the detector requires minimal attention in order to function properly, but note the following:

⚠ WARNING

After powering up, the detector requires minimal attention for proper functioning.

- Follow the manual instructions and refer to the drawings and specifications issued by the manufacturer.
- Do not open the detector/source housing while power is connected.
- External devices such as automatic extinguishing systems must be disconnected
  before performing maintenance tasks required by the warranty.

2.2 Power up

⚠ WARNING

Prior to operating or maintaining the detector, follow Safety precautions.

Procedure

1. Ensure that the source and detector are connected to power.
2. Ensure that the 4–20 mA wiring meter is connected to the detector.
3. Power up the system 18 to 32 Vdc. After sixty seconds, the current meter indicates 4 mA.

Postrequisites

After powering up, zero calibrate the system.

2.3 Verify signal

Use an RS-485 or HART® Field Communicator to verify the signal in accordance with Table 1.

Figure 2-1: Light-Emitting Diode (LED) Indication Before Zero Calibration

1. Verify LED indication.
2. Use Modbus Manager host software or HART® to verify installation parameters.

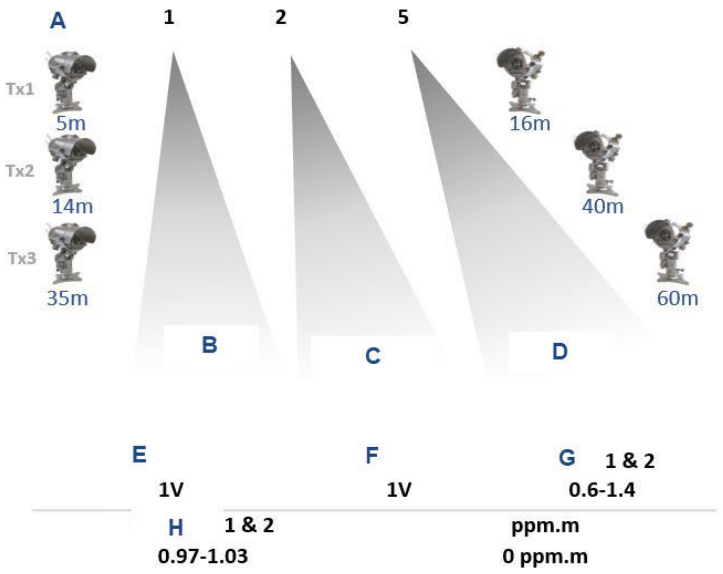
2.3.1 Signal limits

Table 2-1: Maintenance channel limits

Channel	Short range(1)		Medium range(2)		Long range(3)
	17 ft (5 m)	52 ft (16 m)	46 ft (14 m)	131 ft (40 m)	197 ft (60 m)
Reference	2 V gain 0	1.5 V gain 2	2 V gain 0	1 V gain 1	1 V gain 2
Signal 1 & 2	2 V gain 0	1.5 V gain 2	2 V gain 0	1 V gain 1	1 V gain 2
Ratio 1 & 2	0.6 to 1.4				
NQRat 1 & 2	0.97 to 1.03				
ppm.m	0 ppm.m				
Temperature	Up to 25 °C beyond ambient temperature				
Voltage	32 Vdc >> V >> 18 Vdc				

(1) The minimum distance, as defined on the model number.
(2) Half the maximum distance, as defined on the model number.
(3) The maximum distance, as defined on the model number.

Figure 2-2: Maintenance channel limits



A. Maximum gain
B. Minimum range
C. Median range
D. Maximum range
E. Reference minimum
F. Signal minimum
G. Ratio
H. NQ ratio

2.4 Zero calibrate

Prerequisites

⚠ WARNING

Only zero calibrate when:

- No combustible gases are present.
- There is a clear path between the source and the detector.
- Weather conditions are clear.
  Before zero-calibrating, align the detector precisely.

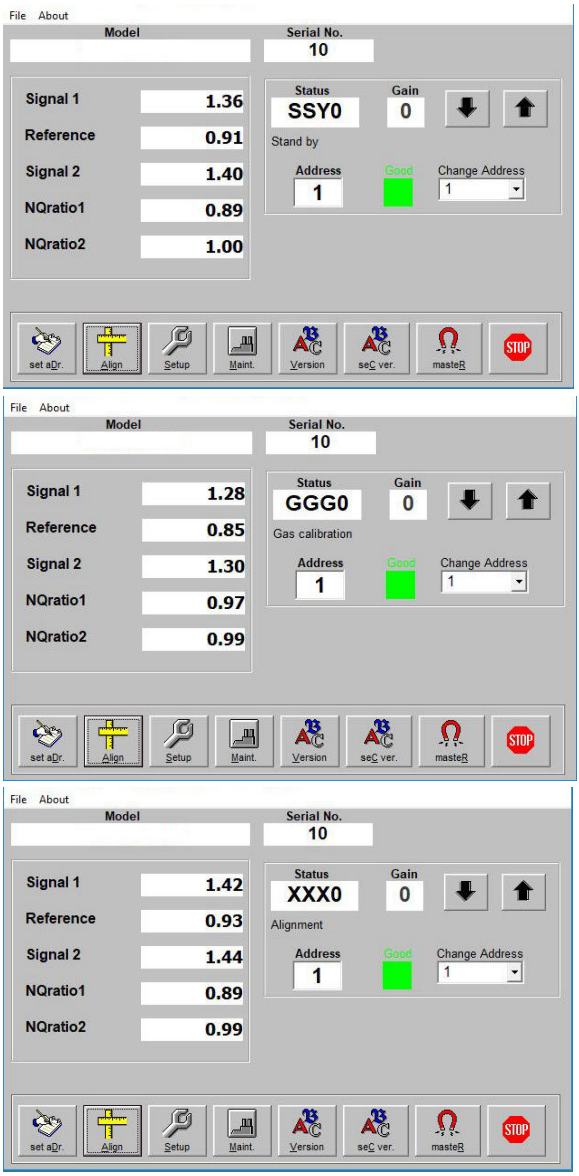
Prerequisites

Zero calibrate after any of the following:

- Installation
- Realignment
- Window cleaning
- Any change in detector or source position

Before zero calibrating, align the detector precisely.

Figure 2-3: Screens shown when zero calibrating with WinHost® software



To switch from each position (Step 1 through Step 3), use either WinHost, HART®, or RS-485.

Procedure

1. Switch from Normal to Alignment mode.
2. Switch from Alignment to Standby mode.
3. Switch from Standby to Zero Calibration mode.
   The 0–20 mA output should now be at 1 mA.
4. Wait up to sixty seconds until it switches to Normal mode.
   The detector reading is now set to Normal. The 0–20 mA output should now indicate 4 mA.

2.5

Procedure

1. Position the Warning Level check filter on the detector as shown. The check filters are provided in the commissioning kit.

   The check filter is provided in the commissioning kit.

2. Check that the detector reading is within the range specified in the factory acceptance test (FAT) certificate.
3. Remove all filters and wait 30 to 60 seconds. Then verify that the detector returns to Normal status (light-emitting diode [LED] is green and blinking, and the output is 4 mA).

3 Product certifications

3.1 ATEX, IECEx

The Rosemount 936 is approved per ATEX and IECEx certifications:

- ATEX Ex II 2(2)G D

Ex db eb ib [ib Gb] IIB+H2 T4 Gb

Ex tb [ib Db] IIIC T135 °C Db

- $T_{Ambient}$ -55 °C to +65 °C

This product is suitable for use in hazardous zones 1 and 2 with IIB+H2 group vapors present, and zones 21 and 22 with IIIC combustible dust types.

3.2 UKCA

The Rosemount 936 is approved per CSAE 21UKEX1175X:

- Ex II 2(2) G D

Ex db eb ib [ib Gb] IIB+H2 T4 Gb

Ex tb [ib Db] IIIC T135 °C Db

- $T_{Ambient}$ –55 °C to +65 °C

3.3 SIL-2

The Rosemount 936 is TUV approved for SIL-2 requirements per IEC61508.

According to SIL-2 requirements, the alert condition can be implemented by an alert signal via the 0–20 mA current loop.

3.4 TR CU (EAC) - pending

1Ex db eb ib [ib Gb] IIB + H2 T4 Gb X

Ex tb [ib Db] IIIC T135 °C Db X

3.5 Inmetro (UL)

The product complies with Inmetro approval per the following standards:

ABNT NBR IEC 60079-0

ABNT NBR IEC 60079-1

ABNT NBR IEC 60079-7

ABNT NBR IEC 60079-11

ABNT NBR IEC 60079-28

ABNT NBR IEC 60079-31

Marking:

Ex db eb ib [ib Gb] IIB+H2 T4 Gb

Ex tb [ib Db] IIIC T135 °C Db

(–55 °C ≤ Ta ≤ +65 °C)

Certificate number UL-BR 19.0276X (Rosemount) and UL-BR 22.4059X (Spectronix).

3.6 CSA C/US

The Rosemount 936 is approved per CSA C/US for hazardous and ordinary locations:

Canada

Ex db eb ib [ib Gb] IIB+H2 T4 Gb

Ex tb [ib Db] IIIC T135°C Db

T_a = -55 °C to +65 °C

USA

Class I Zone 1 AEx db eb ib [ib Gb] IIB+H2 T4 Gb

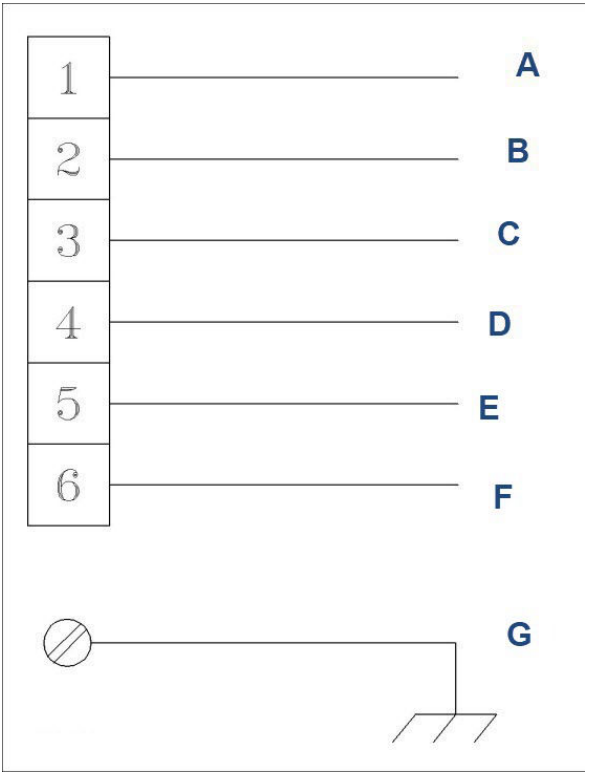
Zone 21 AEx tb [ib Db] IIIC T135°C Db

T_a = -55 °C to +65 °C

The Rosemount 936 is a "Class 1 Laser Product" per IEC 60825-1: 2014 ed. 05.

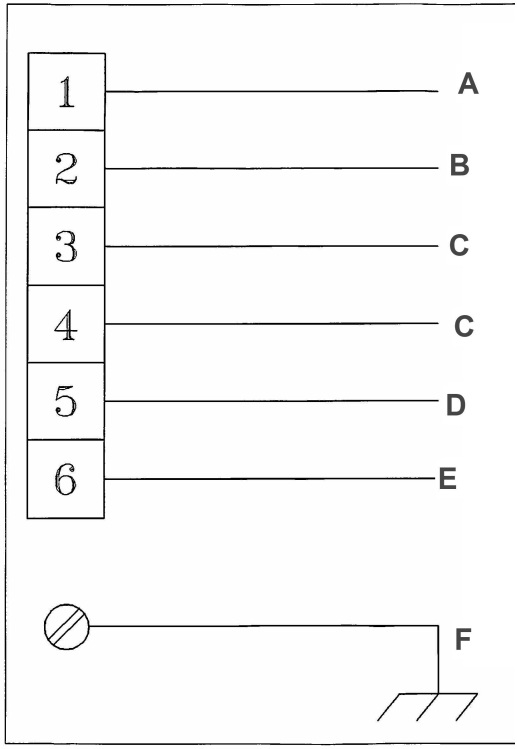
A Wiring configurations

Figure A-1: Detector Wiring Terminal



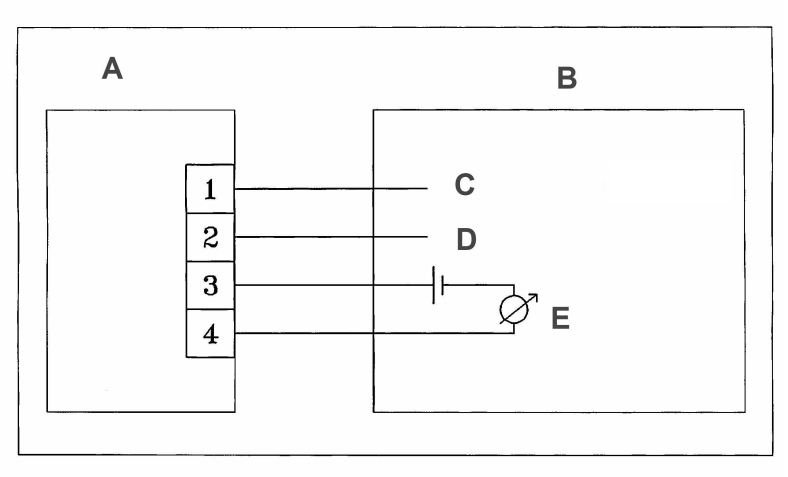
A. Power (+)
18 to 32 Vdc
B. Return (-)
C. 0-20 mA (input)
D. 0-20 mA (output)
E. RS-485 (+)
F. RS-485 (-)
G. Ground

Figure A-2: Source Wiring Terminal



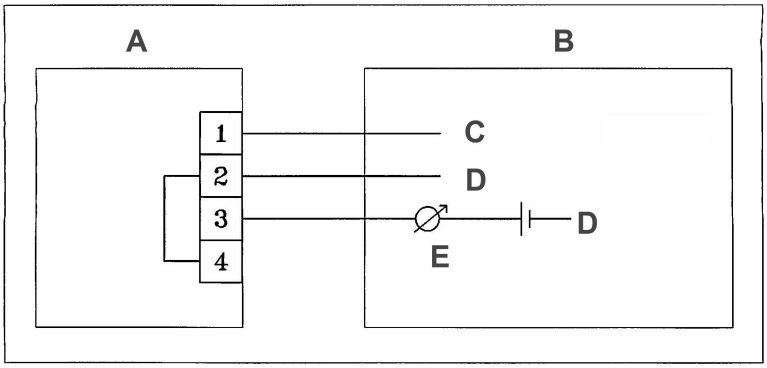
A. Power (+)
18 to 32 Vdc
B. Return (-)
C. Not used
D. Not used
E. Not used
F. Ground

Figure A-3: 0-20 mA Sink 4 Wire



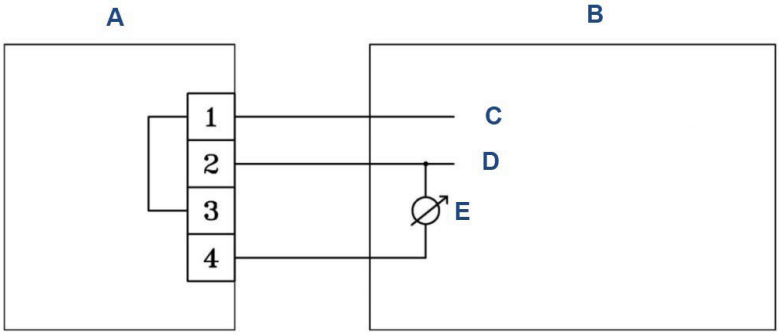
A. Detector
B. Controller
C. Input power: 18-32 Vdc
D. Return
E. 0-20 mA meter

Figure A-4: 0-20 mA Non-Isolated Sink 3 Wire



A. Detector
B. Controller
C. Input power: 18-32 Vdc
D. Return
E. 0-20 mA meter

Figure A-5: 0-20 mA Source 3 Wire



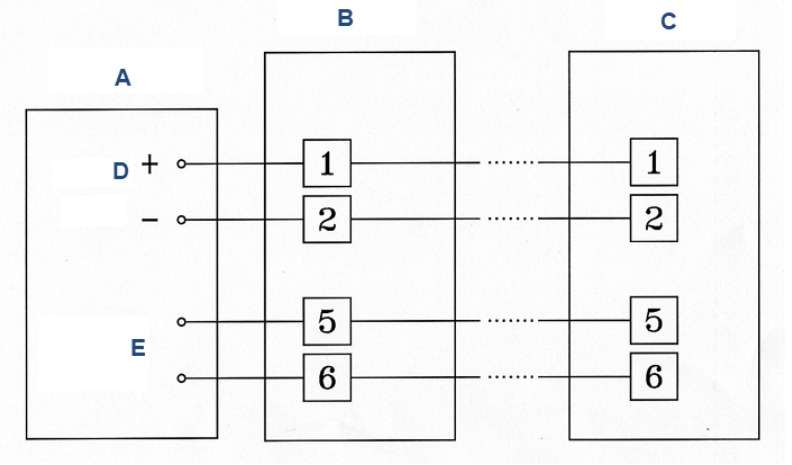
A. Detector
B. Controller
C. Input power: 18-32 Vdc
D. Return
E. 0-20 mA meter

A.1 RS-485 communication network

Using the RS-485 network capability of the Rosemount 936 detector and additional software, it is possible to connect up to 32 detectors in an addressable system with four wires only (two for power and two for communication).

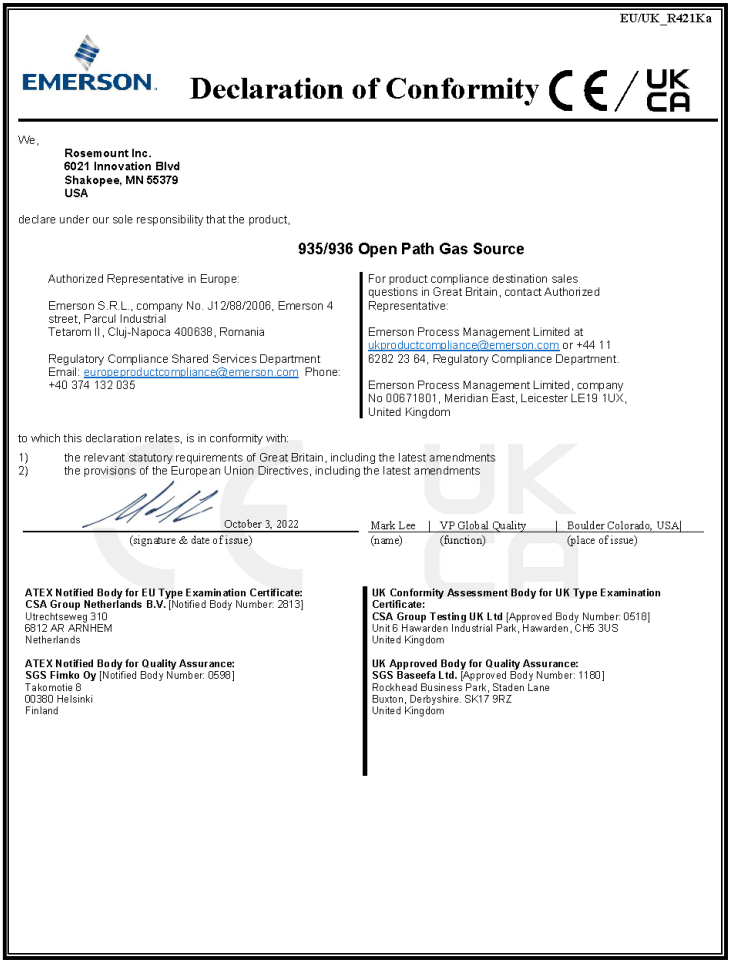
Using repeaters, the number of detectors can be much larger (32 detectors for each repeater) up to 247 on the same four wires. When using the RS-485 network, it is possible to read the detector status (Fault, Warning, and Alarm).

Figure A-6: RS-485 Networking for Wiring Option 3



A. Controller
B. First detector
C. Last detector
D. Power supply
E. RS-485 computer port

B Declaration of Conformity



EU/UK_R421Ka

EMERSON.

Declaration of Conformity CE / UKCA

We,

Rosemount Inc.
6021 Innovation Blvd
Shakopee, MN 55379
USA

declare under our sole responsibility that the product,

935/936 Open Path Gas Source

Authorized Representative in Europe:

Emerson S.R.L., company No. J12/88/2006, Emerson 4 street, Parcul Industrial Tetarom II, Cluj-Napoca 400638, Romania

Regulatory Compliance Shared Services Department
Email: europeproductcompliance@emerson.com Phone: +40 374 132 035

For product compliance destination sales questions in Great Britain, contact Authorized Representative:

Emerson Process Management Limited at ukproductcompliance@emerson.com or +44 11 6282 23 64, Regulatory Compliance Department.

Emerson Process Management Limited, company No 00671801, Meridian East, Leicester LE19 1UX, United Kingdom

to which this declaration relates, is in conformity with:

1) the relevant statutory requirements of Great Britain, including the latest amendments
2) the provisions of the European Union Directives, including the latest amendments

October 3, 2022	Mark Lee	VP Global Quality	Boulder Colorado, USA
(signature & date of issue)	(name)	(function)	(place of issue)

ATEX Notified Body for EU Type Examination Certificate:
CSA Group Netherlands B.V. [Notified Body Number: 2813]
Utrechtseweg 310
6812 AR ARNHEM
Netherlands

ATEX Notified Body for Quality Assurance:
SGS Fimko Oy [Notified Body Number: 0598]
Takomotie 8
00380 Helsinki
Finland

UK Conformity Assessment Body for UK Type Examination Certificate:
CSA Group Testing UK Ltd [Approved Body Number: 0518]
Unit 6 Hawarden Industrial Park, Hawarden, CH5 3US
United Kingdom

UK Approved Body for Quality Assurance:
SGS Baseefa Ltd. [Approved Body Number: 1180]
Rockhead Business Park, Staden Lane
Buxton, Derbyshire. SK17 9RZ
United Kingdom

EU/UK_R421Ka

EMERSON.

Declaration of Conformity CE / UK CA

ATEX Directive (2014/34/EU)
SIRA 16ATEX1224X
Ex II 2 (2) G D
Ex db eb ib [ib Gb] IIB + H2 T4 Gb
Ex tb [ib Db] IIIC T135ºC Db
Ta = -55 ºC to +65 ºC

Harmonized Standards:
EN 60079-0:2018/AC:2020
EN 60079-1:2014/AC:2018
EN 60079-7:2015+A1:2018
EN 60079-11:2012
EN 60079-28:2015
EN 60079-31:2014

EMC Directive (2014/30/EU)
Harmonized Standards:
EN 50270:2016
EN 61000-6-3:2007+A1:2011+AC:2012

RoHS Directive (Amended 2015/863/EU)
Harmonized Standards:
EN IEC 63000:2018

Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 (S.I. 2016/1107)
CSAE 21UKEX1175X
Ex II 2 (2) G D
Ex db eb ib [ib Gb] IIB + H2 T4 Gb
Ex tb [ib Db] IIIC T135ºC Db
Ta = -55 ºC to +65 ºC

Designated Standards:
EN 60079-0:2018/AC:2020
EN 60079-1:2014/AC:2018
EN 60079-7:2015+A1:2018
EN 60079-11:2012
EN 60079-28:2015
EN 60079-31:2014

Electromagnetic Compatibility Regulations 2016 (S.I. 2016/1091)
Designated Standards:
EN 50270:2016
EN 61000-6-3:2007+A1:2011+AC:2012

Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (S.I. 2012/3032)
Designated Standards:
EN IEC 63000:2018

Quick Start Guide
00825-0100-4036, Rev. AB
October 2023

For more information: **Emerson.com/global**

ROSEMOUNT™

EMERSON™