PQ Series Safety Instructions for hazardous area

READ THIS INSTRUCTION FIRST

To avoid serious or fatal personal injury or major property damage, read and follow all safety instruction in this manual. If you require additional assistance, please contact Prosense.

DO NOT REMOVE COVER WHEN ENERGISED!
ELECTROSTATIC HAZARD - CLEAN ONLY WITH A DAMP CLOTH!

Safety instruction for hazardous area installation

Prosense PQ series gas detectors are projected and built according to ATEX Directive 2014/34/EU with reference to standard EN 60079-0, EN 60079-1. "**ATEX**", by the French "**AT**mosphere **EX**plosible", provides the technical requirements to be applied to equipment intended for use in potentially explosive atmospheres. The scope of directive is to remove technical barriers to trade between Member States of the European Community. The Prosense PQ series gas detectors must be installed and maintenance according to the suitable standards for electrical application in potentially explosive atmospheres (example: EN 60079-14, EN 60079-17 or other national standards).

Read this instruction first and keep this instruction manual always available.

The following instructions apply to equipment covered by ATEX certificate number:
1. Prosense PQ series gas detectors may be installed in hazardous area with flammable gases, vapors, and mist, group II, category 2G, maximum superficial permissible temperature 70°C.
Device category 2G, Identification II 2G
Ex db IIC T6 Gb (Tamb = -20 °C : +70 °C)
It means:  (European Community logo for ATEX applications) – group II (potentially explosive atmospheres – surface application – OTHER than mines)

Category 2G (G => Gas) – Zone 1 and Zone 21
Ex db => protection mode: explosion proof enclosure
IIC => define kind of gases
T6 Gb => Temperature class -- Maximum allowable surface temperature.
IP 65 => Mechanical protection degree – protection against solid, dust and liquid.

2. Suitably trained personnel shall carry out installation in accordance with applicable code practice.

3. The electrical devices must be grounded using their grounding connections. The grounding connection must be ATEX certified, suitable for the application required, substances, maximum superficial temperature, ambient temperature.

4. The user should guarantee periodical cleaning of the places were dust can storage to avoid the paling up to 5 mm.

5. The user should not repair this equipment.

6. The user should guarantee the keeping of the safety characteristic of the device after maintenance of repairing.

7. If the equipment is likely to come into contact with aggressive substances, it is responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised. Aggressive substances: example Acids, liquid, gases with can affected metals

8. To guarantee the respect of the protection degree cable glands, blanking elements and thread adapters shall be certified Ex components according to protection "db" and a blanking element shall not be used with an adapter.

9. Sinter replacement shall be done by an approved technical service personal according to PQ series user manual "Sinter replacement" procedure (PRS-UM-PQ-EN-Rev.02-10.2018 page 44).

10. Oring is made of Silicone and continuous operating temperature is -50C to 105C

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11. If temperature exceeds 70ºC at entry or 80ºC at branching point use suitably rated cable and cable glands or conductors in conduit.

12. Thickness of outer painting is between 40 µm – 180 µm.

13. Maximum power consumption of the detector with optional boards installed is Pmax=4W where Imax=335mA and Vmax=24VDC.

14. All electrical connections should be made in accordance with any relevant local or national legislation, standards or codes of practice. Prosense detectors can operate between 12 - 24 VDC. The connection socket located on main board as given in diagram 8 and details given in below table:

Output	Usage
V +	Power input (+) 12VDC – 24VDC
V -	Power input (-) 12VDC – 24VDC
S	Current Output Signal (4mA – 20mA)

Detector output ports and their usage

The detector designed to give 4 - 20 mA current output signal. It is also possible to get voltage output via using an additional resistor. Below table 3 gives recommended resistor specifications to get correct voltage output from detector depending of the power source level:

Detector Power VDC	Resistor	Signal level (4mA – 20mA)
12 VDC – 24 VDC	250 Ω, tolerance %1	1 VDC – 5 VDC
12 VDC – 24 VDC	500 Ω, tolerance %1	2 VDC – 10 VDC

Detector power and the output resistor

User should consider the cable lenght when performing installation in the field. The Prosense detector requires a power supply between 12VDC and 24VDC. Make sure that a minimum 12 VDC supply available at the detector entrance and consider the voltage drop due to cable resistance in case of long distance applications. Typical cable data is given below for detector with relay module:

Cable size (cross sectional area)	Cable type nearest equivalent	Cable resistance Ω/km	Maximum Cable length (L) Meters
0.5mm2	20AWG	36.8 Ω/km	~500
1.0mm2	17AWG	19.5 Ω/km	~800
1.5mm2	16AWG	12.7 Ω/km	~1200
2.0mm2	14AWG	10.1 Ω/km	~1500
2.5mm2	13AWG	8.0 Ω/km	~1800

Typical cable details and maximum distance for cabling

15. The use of industrial grade, suitably shielded field cable is recommended. The best practices shown that, screened 3 cores (plus screen 90% coverage), suitably mechanically protected copper cable with a suitable explosion-proof gland, or ¾" NPT steel conduit, depending on the distance between signal received or control panel and detector 0.5 to 2.5 mm2 (20 to 13 AWG) conductors can give better results. Ensure the cable gland is installed correctly and fully tightened.

16. Effective Earth/Ground bonding is important to ensure good EMC and RFI immunity. The following diagrams show examples of how to earth/ground bond the cable at enclosures. The same principles apply to conduit installations. These bonding techniques provide good RFI/EMC performance. Earth/ground loops must be avoided to prevent the risk of false signal variation. The Earth Screen of the field cable should be "tied to Earth" or connected to Ground at one point only. It is common practise to adopt a STAR EARTH connection regime where all instrumentation Screens are connected at one common point. The Screen at the other end of the cable should be "parked" or terminated into a blank terminal.

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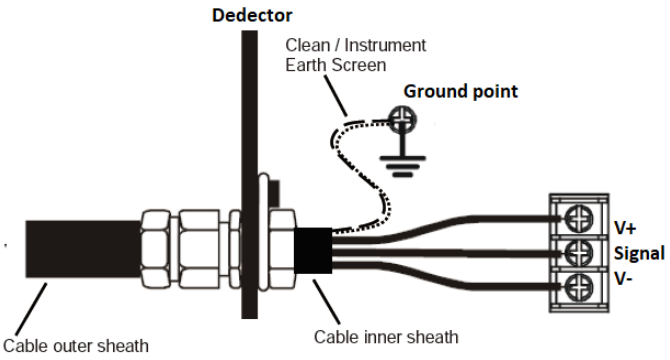
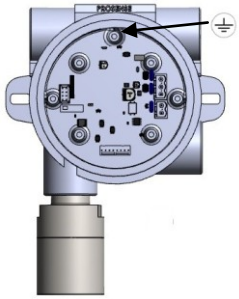


Grounding

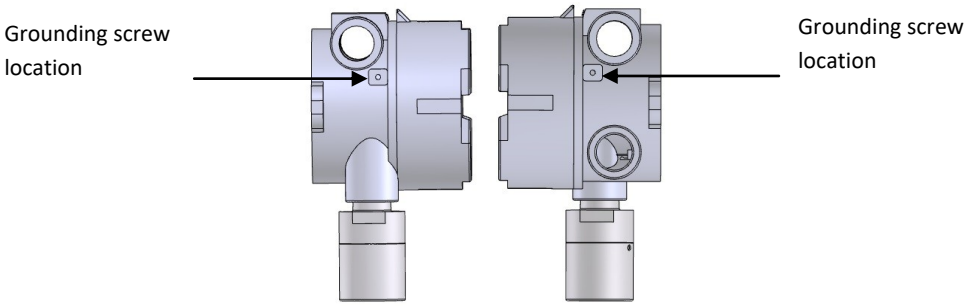
17. **Internal Ground connection:** Each detector has grounding screw which utilizes grounding for detector main PCB to detector body. The screw should be located correctly and fixed for all times. In case of any maintenance activity this screw should be checked and fixed to make sure for proper grounding.



Detector internal grounding screw location

Internal grounding screw location should be reserved for grounding cable and not used for any other purpose.

External Ground Connection: The detector body has two grounding locations as shown in Diagram. It is recommended to utilize a No 14 AWG copper, (Stranded or Solid), wire. Loosen the screw sufficiently to enable 'wrapping the wire around the screw in a "U" shape. Raise the clamp and place the wire between the clamp and ground base, lower the clamp and tighten the screw.



Detector grounding locations

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