

Detector connections

Prosense detectors preconfigured to provide signal from analogue output depending on the detector and gas type:

Function	Value/Setting	Meaning
Signal output	2.0 mA	Fault
	2.0 mA to 2.5 mA	Warm-up
	3mA	Calibration mode
	4.0 mA to 20.0 mA	Normal gas measurement
	21.0 mA	Maximum over range

Table 1: Detector signal level details

Detector Main board and connection details given in Diagram-1:

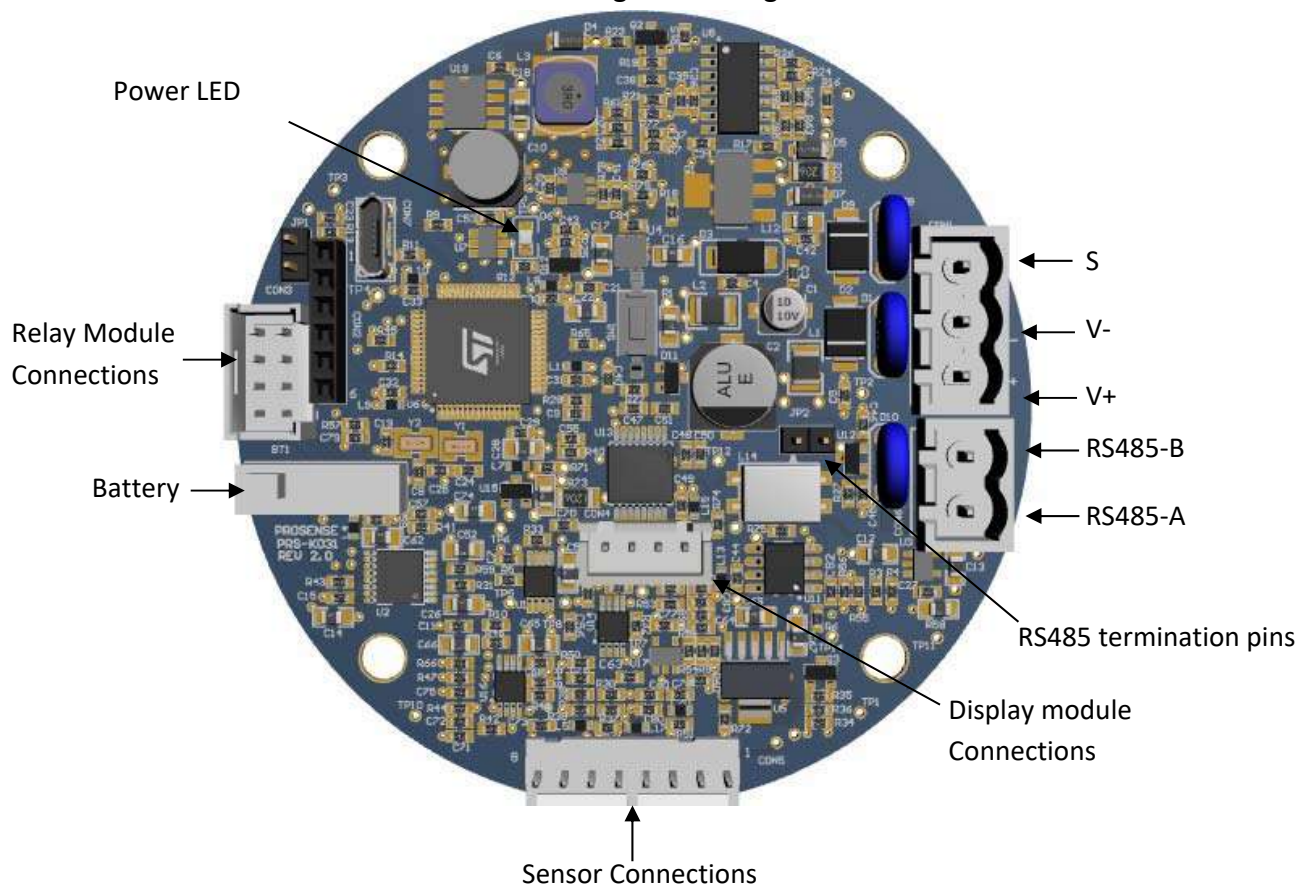


Diagram 1: Detector main board and connections

Sensor connections are input to detector main board and already connected to sensor inside the sensor head. Detector connections are listed in Table-2:

Port	Usage
V +	Power input (+) 12VDC – 24VDC
V -	Power input (-) 12VDC – 24VDC
S	Current Output Signal (4mA – 20mA)
RS485-A	Serial connection port A
RS485-B	Serial connection port B

Table 2: Detector output ports and their usage

Detector Configuration

The Prosense PQ detector has 4-20mA analogue output and RS485 Modbus serial communication output features on main board. It is possible to install optional relay module to have three relay outputs for two alarm levels and fault status.

4-20 mA output:

The default configuration provides single 4-20mA signal output. Prosense detectors can be connected to control panels on the market having 4-20mA input signal. Signal wiring from detector and the control panel should be carried out by shielded cables. Wires cross section depends on the distance between the control panel and the detector. The details given in power cabling are valid as well for signal output. Please avoid any interruption in case any junctions on wires. The shield is to be grounded from the control panel side only and never connect the shield to the detector. Please make sure clenching or crimping apparatus are not loosen or oxidized.

To get the analogue output signal correctly and constant the load resistor on S output should be between 100-500 Ohms if the power source is greater than 15VDC (15-24 VDC) at detector input. If the power source is below 15VDC (12-15 VDC) the load resistor on S output should be between 100-300 Ohms. If the load resistor below 100 Ohms the detector will behave as the S output is in short circuit status and enable the automatic output saving mode resulting with reducing signal level to 2mA.

Commissioning

WARNING: The following procedure should be followed carefully and only performed by suitably trained personnel.

The following procedure requires the detector cover to be removed while carrying out supply voltage checks. Therefore, the appropriate permits to work should be sought in preparation. Prior to carrying out any HOT WORK ensure local security and site procedures are followed. Ensure that the associated control panel output actuation is inhibited so as to prevent false alarms. Follow below steps for commissioning:

1. Remove the detector cover
2. Configure the detector's analogue output signal and power input connections correctly
3. Check that all electrical connections are terminated correctly
4. Switch On the external power supply to feed the detector
5. Using a Digital Multi Meter (DMM), check the Supply Voltage at the terminals V+ (24V) and V- (0V), this should be a minimum supply voltage of 12VDC (Maximum supply voltage is 24VDC)
6. Check LED status on detector main board. LED will be illuminated right after applying power. LED will start blinking twice in a second during the warm-up period and analogue output signal will provide 3mA.
7. If using PQD check LCD screen. It will run self check tests and report the results. All tests should end with OK. In case of any ERROR message contact Prosense. When test

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completed LCD screen will show monitoring screen with detector information and WARMUP message on status line. The Fault LED is lit in this period.

8. Wait two minutes to complete warm-up period. If using PQD, WARMUP message will be removed from status line and fault LED gone off. The LED on main board will start blinking once in a second and analogue output signal will be 4mA.
9. Switch Off the external power to the detector.
10. Fit the cover and make sure none of the cables cause an obstruction while fitting cover
11. Switch on external power to the detector.

Electrical Specifications:

Input Voltage Range	12 to 24VDC (24VDC nominal)
Max Power Consumption	Max 4 Watts. at 24VDC
Current output	4-20mA
2.0 mA	Fault
2.0 mA to 2.5 mA	Inhibit (during configuration/warming)
3mA	Calibration mode
4.0 mA to 20.0 mA	Normal gas measurement
21.0 mA	Maximum over range
Terminals	3 x screw terminals suitable for wire diameter 0.5 mm ² to 2.5 mm ² (20AWG to 13AWG). 2 x screw terminals suitable for wire diameter 0.5 mm ² to 2.5 mm ² (20AWG to 13AWG) for RS485 digital output
Relays	3 x (1A 30VDC, 0.5A 125VAC, 0.3A 80VDC). Selectable normally open or normally closed (switch) and de-energized.
Communication	RS485, Modbus RTU

Table 3: Electrical specifications

Detector Body Specifications:

Material	Epoxy painted aluminium alloy junction box, 316 - Stainless Steel Sensor Head
Weight	Aluminium Alloy : 2kg (with Steel Sensor Head)
Mounting	Wall mounting
Entries	½ NPT and ¾ NPT (or 2 x ¾ NPT) field cable entries, ¾ NPT sensor entry

Table 4: Detector body specifications

Environmental:

IP Rating	IP65 in accordance with EN60529:1992
Operating Temperature	-20°C to +70°C / -4°F to +120°F
Operating Humidity	Continuous 20-90%RH (non condensing) Intermittent 10-99%RH (non condensing)
Operating Pressure	90-110kPa
Storage Conditions	-30°C to +70°C (-22°F to +158°F)

Table 5: Environmental specifications

SAFETY INSTRUCTIONS 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 "ATmosphere EXplosible", 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, vapours, 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 2

Ex db => protection mode: explosion proof enclosure

IIC => define kind of gases

T6 => 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, and ambient temperature.

4. The user should guarantee periodical cleaning of the places where dust can storage to avoid the piling 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. O-ring is made of Silicone and continuous operating temperature is -50C to 105C

11. If temperature exceeds 70°C at entry or 80°C 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 $P_{max}=4W$ where $I_{max}=335mA$ and $V_{max}=24VDC$.

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, grounding, cabling details are explained in this guide at relevant sections