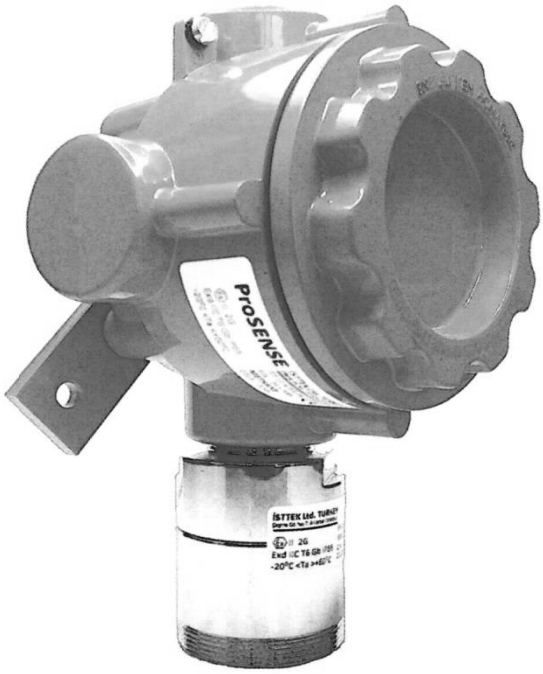
PROSENSE P Series Gas Detector
Installation and User Manual



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WARNING!

This manual must be carefully read by all persons who have or will have the responsibility for installing, using or servicing this product.

Like any equipment, this product will perform as designed only if installed, used and serviced in accordance with the manufacturer's instructions. Otherwise, it could fail to perform as designed and persons who rely on this product for their safety could suffer severe personal injury or death.

The warranties made by Prosense with respect to this product are voided if the product is not installed, used and serviced in accordance with the instructions in this user guide. Please protect yourself and other by following them.

Important Remark

The detector has been factory-tested before delivery, the commissioning after installation must include the zero- and span-adjustment. The commissioning has to be terminated by a function test of the complete gas detection system.

Contents

For Your Safety

Ensure that this Operating Manual is read and understood **BEFORE** installing / operating / maintaining the equipment. Pay particular attention to Warnings and Cautions. All document Warnings are listed here and repeated where appropriate at the start of the relevant chapter(s) of this Operating Manual. Cautions appear in the sections/sub-sections of the document where they apply.

Strictly follow the Instructions for Use

Any use of the detectors requires full understanding and strict observation of these instructions. The detector is only to be used for purposes specified here.

Maintenance

It is recommended to obtain a service contract Prosense to carry out all repairs. Only authentic Prosense spare parts should be used for maintenance. Please check “Maintenance” section for more details.

Use in areas subject to explosion hazards

Equipment or components which are used in potentially explosive atmospheres and have been tested and approved according to international or European regulations may be used only under the conditions specified here. Modifications of components or the use of faulty or incomplete parts are not permitted. In case of repairs of equipment or components, the national regulations must be observed.

Liability for proper function or damage

The liability for the proper function of the detector is irrevocably transferred to the owner or operator to the extent that the detector is serviced or repaired by personnel not employed or authorized by Prosense or if the sensing head is used in a manner not conforming to its intended use. Prosense cannot be held responsible for damage caused by non-compliance with the recommendations given above. The warranty and liability provisions of the terms of sale and delivery of Prosense are likewise not modified by the recommendations given above.

Intended Use

The P series detectors are intended to be used for stationary, continuous monitoring for combustible gas/air or vapour/air mixtures below the Lower Explosion Limit (LEL) resp. below 10 % of the LEL under atmospheric conditions. The detectors are marked by the device categories II 2G. Thus can be operated in hazardous areas with potentially explosive atmospheres of zones 1 and 2. The type of protection for gas explosion protection according to device category 2 (zones 1 or 2) is flameproof enclosure and increased safety, "d". The enclosure protection is IP 65.

According to the ATEX Directive 2014/34/EU the detector is an assembly consisting of three components (Sensor Head, enclosure and cable gland), where all these three components are type approved according to ATEX Directive 2014/34/EU and marked by the device category II 2G. Thus this detector is suitable to be operated in hazardous areas with potentially explosive

atmospheres of zone 1 and zone 2. The P series detectors comprises a gas sensor type Ex-proof (protection type flameproof enclosure d type). It must not be operated at ambient temperatures lower than –20 (°C). The maximum ambient temperature is 50 (°C) for temperature class T6.

Not to be used in oxygen enriched atmospheres

In conjunction with the central controllers Prosense detectors with preadjusted alarm thresholds audible and visible alarm devices or automatic countermeasures can be activated before the detected gases or vapours can form dangerous flammable or toxic mixtures with air.
Please be alerted in following special conditions may have impact on measuring function due to the nature of measuring method:

1. Very high gas concentrations
Infrared and Pellistor sensors used to detect flammable and toxic gases. The measuring method based on heat produced by reaction on the catalytic oxidation of a flammable gas when pellistor sensor used. In case of high gas concentrations there is not enough oxygen in the sensor to perform oxidation process correctly. Hence the measuring signal decreases at high gas concentrations and even can lead to measuring signal within the measuring range again. A connected controller must be operated with alarm devices, outputs, and alarm thresholds operating as latched if the measuring range is exceeded. In this case do not reset latching alarms without having ensured a safe condition by means of an independent gas concentrations measurement.

2. Minimum oxygen concentration
The measuring principle of heat of reaction needs a minimum oxygen concentration of 12 % by vol., otherwise the measuring values will be too low because of oxygen deficiency.

3. Long-term gassing with methane at very low temperatures
If the Prosense P series flammable gas detectors are operated applying with methane at very low temperatures, the measuring signal at longterm exposition may decrease after alarm activation and may lead to misinterpretation.
If a gas alarm occurs, necessary actions need to be taken immediately. The decrease of the measuring signal should not mean that the gas concentration has been decreased. We recommend to keep alarms on the associated controllers and not to reset these alarms without performing measurement with an independent gaz detectors to make sure conditions are safe.

Introduction

The Prosense comprises a gas detector body and a choice of sensors heads for detecting flammable gas, toxic gas and oxygen. The construction of Prosense allows it to be used in hazardous area locations; it may also be used in other areas not classified as hazardous.

Prosense detectors can be configured with a wide range of different sensors may be used to detect a broader range of target gases. The detector can be configured with optional relay board features three programmable relays for controlling external equipment e.g. alarms, sirens, valves or switches. The detector provides an industry standard 3-wire, 4-20mA source or sink output for connection to a dedicated gas detection control system or PLC.

Prosense detectors comprises of the main parts as shown below:

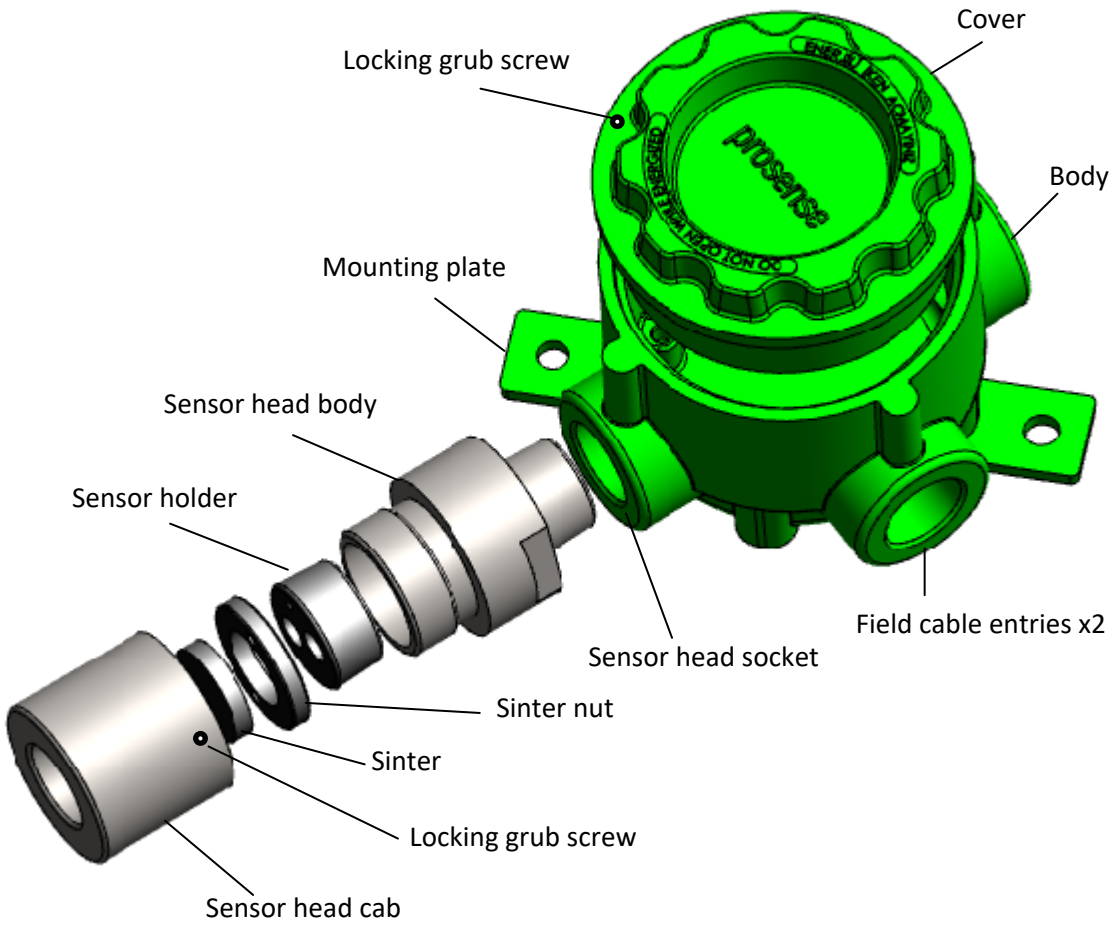

Diagram 1: Exploded view

Detector body

The detector enclosure has three threaded entries. The two cable entries either side of the upper part of the transmitter housing are for connecting the power source, signal output and relay contacts to associated signalling equipment. The bottom entry allows direct connection of the sensor socket. There is a mounting plate incorporated into the transmitter housing allowing for various mounting configuration options.

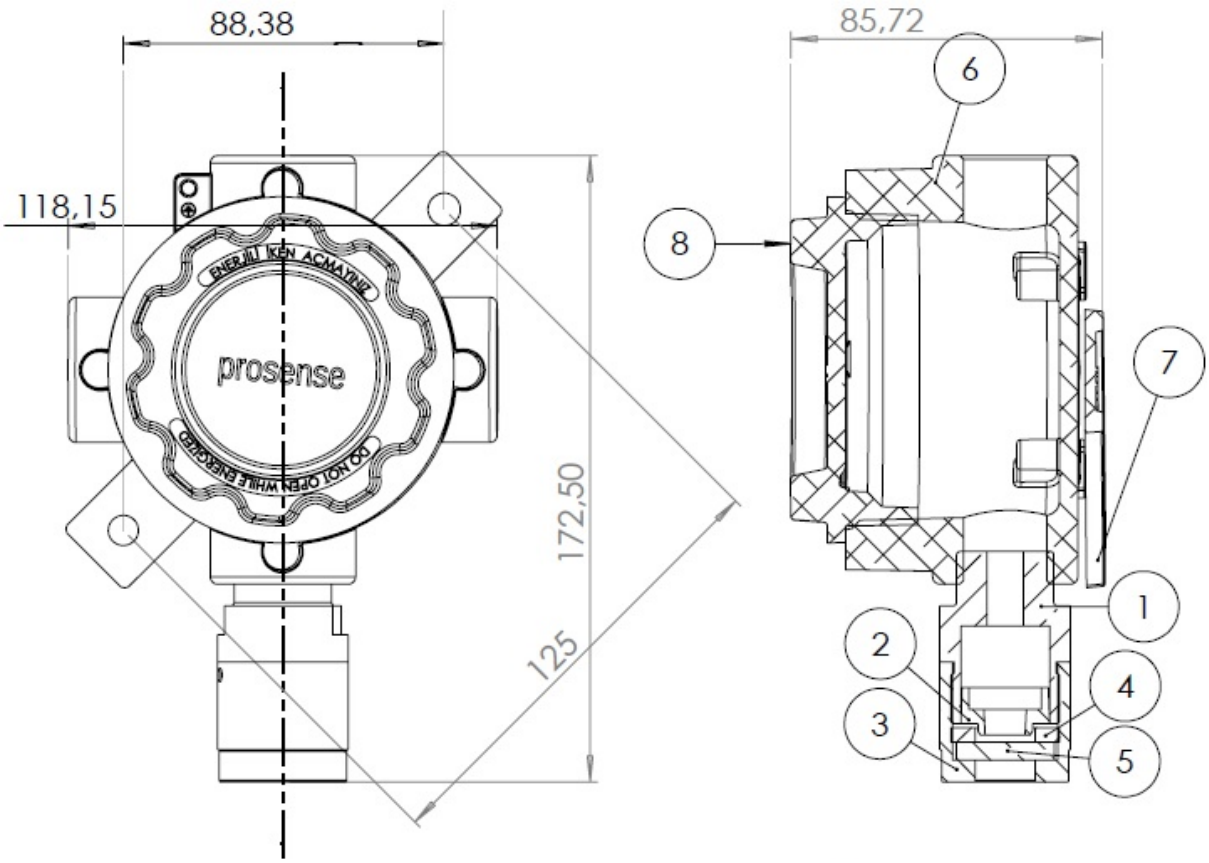

Diagram 2: Detector body and Sensor Head components

1 : Sensor head body
2 : Sensor holder
3 : Sensor head cap
4 : Sinter nut
5 : Sinter
6 : Junction box – Detector body
7 : Wall mounting adapter
8 : Junction box cover

Sensor Head:

The Prosense sensor head designed to dedect flammable, toxic gaese and oxygen. They may include NDIR infrared, pellistor or elektrocjemical sensors depending of the target gas and range.

Installation:

Gas detectors should be mounted where a potential hazard of gas is most likely to be present. The following points should be noted when locating gas sensors.

- When locating detectors consider the possible damage caused by natural events e.g. rain or flooding.
- Consider ease of access to the gas detector for functional testing and servicing.
- Consider how escaping gas may behave due to natural or forced air currents.

Note: The placement of gas detectors should be determined following the advice of experts having specialist knowledge of gas dispersion, experts having knowledge of the process plant system and equipment involved, safety and engineering personnel. The agreement reached on the location of detectors should be recorded.

Each gas has different nature depending on their density. The density of which is lower than air, such as hydrogen, methane or ammonia the sensor head must be located above a possible leak or at the highest points at which major concentrations of gas may be found. The gases and vapours with a density greater than air, the sensor head must be installed beneath a possible leak or at the lowest points at which such gases and vapours may be present.

Prosense may provide cable gland together with detector in regards to customer requests. The cable gland provided by Prosense has ATEX certification and provides at least IP65 level protection. The cable glands are only suitable for fixed installations. Cables shall be effectively clamped to prevent pulling or twisting. To provide necessary protection cable glend coupling should be fixed with 20Nm torque when used with three sealings; 18Nm when used with two sealings; 16Nm when used with one sealing. It is the final assamblers/users responsibility to ensure the threaded joint between cable gland and the enclosure meet all the requirements of the applicable standarts for the assembly. Cable gland sealings are suitable for the circular type cables. If other shaped cables will be used the sealings should be replaced with suitable ones. The cable glands provided by Prosense are suitable to use temperature range in which detector works.

Prosense may provide plugs and adaptors together with detector in regards to customer requests. The plugs and adaptors provided by Prosense have ATEX certification and provides at least IP65 level protection. These parts should be mounted to detector body in such a way that accidental rotation or loosening will be prevented. It is the final assamblers/users responsibility to ensure the threaded joint between fitting and the enclosure meet all the requirements of the applicable standarts for the assembly. For adaptors and plugs with nominal size of thread equal or lower than 25 mm aliminium alloy shall not be used. Only one adaptors permitted for each cable entry; plugs shall not be used with adaptors. The plugs and adaptors provided by Prosense are suitable to use temperature range in which detector works.

Mounting the detector:

The detector should be mounted vertically as the sensor head pointing downwards. Detector has to be mounted such that the sensor's gas entrance area.

The install location

- should be isolated from vibration, direct sun light and have temperature stability
- avoided external influences such as splashing water, oil, corrosive aerosols
- should have at least 30 cm free space beneath the sensor head to provide accessibility for calibration work.
- should be in air flow between possible leak or collection point and possible source of ignition.

Prosense do not recommend to install detectors to :

- directly above a cooking unit,
- directly above a sink unit,
- close to an extractor unit,
- outdoor without protection against the rain,
- in places where temperature is outside the admissible operating range,
- in corrosive environments,
- inside air vents.
- in environments where silicon can be found.

The Prosense detector has an independent mounting plate consisting of two mounting holes and two holes to attach to detector body. The mounting plate can be adjustable on two diagonal way on to detector body. The detector may be fixed directly to a surface mounting. Follow below steps to mount the detector:

1- Decide which diagonal way to use and adjust mounting plate on detector body if necessary.
2- Check and make sure mounting plate is completely fixed to detector body
3- Mount the detector to the surface via using two outer mounting holes on mounting plate.

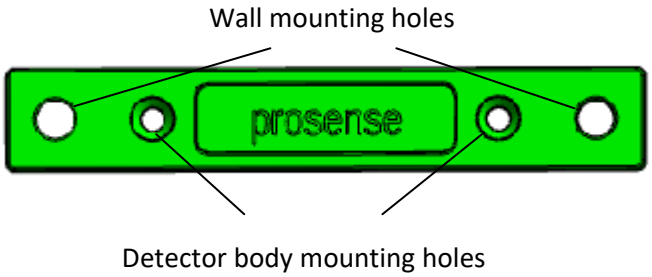

Diagram 3: Detector mounting plate

The mounting plate installed in below position at factory:

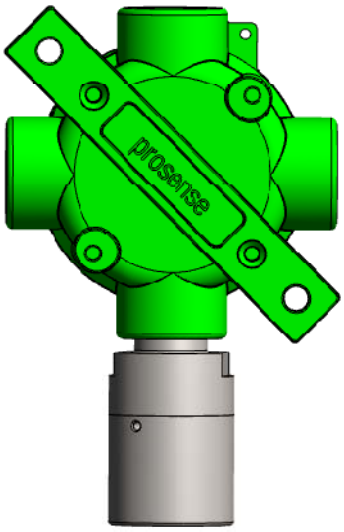

Diagram 4: Default installaton of mounting plate

Electrical connections

Caution: 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 2:

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

Tablo 1 : 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

Table 2 : Detector power and the output resistor

Please 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. The maximum loop resistance in the field cable is calculated as follows:

R loop = (V controller – V detector min) / I detector

Example;

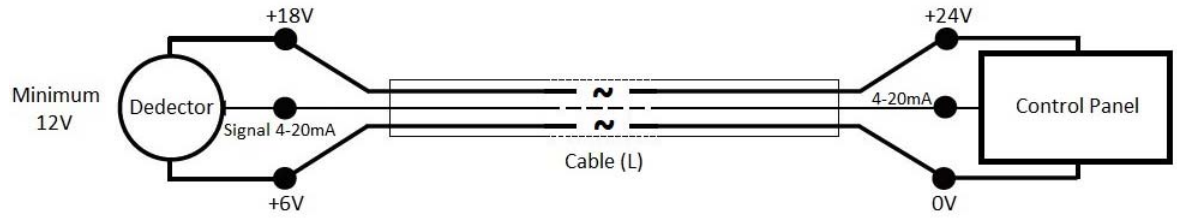

Diagram 5: Field cabling

The controller or power supply is supplying a nominal 24VDC (V controller), the detector minimum allowable voltage is 12VDC (V detector min), therefore the maximum allowable voltage drop between the controller and detector is 12VDC; this means a voltage drop of 6V in each core (V+ core and V- core). Minimum power consumption of the detector without any optional module is 1W. The current required to drive the detector at the minimum voltage is

(I = P / V) → 1.0 / 12 = 85mA (I detector).

Maximum power consumption of the detector when optional relay modules installed and all relays are active is 2.5W. The current required to drive the detector at the minimum voltage

(I = P / V) → 2.5 / 12 = 210mA (I detector).

So, the maximum field cable loop resistance (R loop) = 12 / 0.21 = 56 Ohms, or 28 Ohms per core, (allowing for component variations, losses, etc.).

The following tables show the maximum cable distances between the controller and transmitter assuming a voltage drop of 6V in each core and for different cable parameters. The tables are examples only and actual cable parameters and source power supply voltage for the application should be used to calculate the maximum cable distance allowed at the installation site. Typical cable data 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

Table 3 : Typical cable details and maximum distance for cabling

Cabling

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.

Cable and Earth/Ground regimes

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.

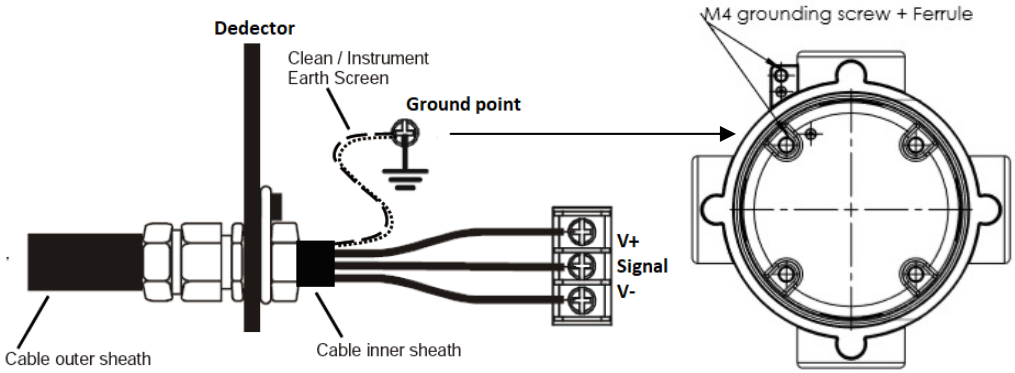

Diagram 6: Grounding

Detector grounding

Each detector has grounding screw which utilizes grounding for detector main PCB to detector body. The screw should be located correcty and fixed for all times. In case of any maintenance activity this screw should be checked and fixed to make sure for proper grounding. It is recommended to utilize a No 14 AWG copper, (Stranded or Solid), wire. The following diagrams show where to install the wire into the ground screw of the enclosure. To connect grounding wire, loosen the screw sufficiently; wrap 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.

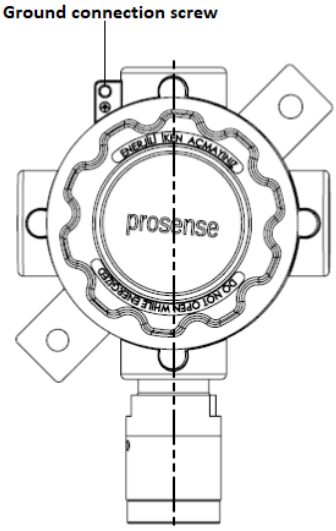

Diagram 7: Detector grounding screw

Default configuration

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

Function	Value/Setting	Meaning
Signal output	2.0 mA	Fault
	2.0 mA	Warmup
	3.0 mA	Calibration
	4.0 mA to 20.0 mA	Normal gas measurement
	22.0 mA	Maximum over range
Alarm Relay 1*	Value is gas dependant	Lower alarm level
	De-energized	Energizes on alarm
	Contact Normally Open (NO)	Closes on alarm
Alarm Relay 2*	Value is gas dependant	Higher alarm level
	De-energized	Energizes on alarm
	Contact Normally Open (NO)	Closes on alarm
Fault Relay *	2.0mA	Detector Fault
	Energized	De-Energizes on alarm
	Contact Normally Open (NO)	Closes on alarm

(*) Relays are only available with optional relay module

Table 4 : Detector default configuration details

Detector Main board and connection details given in diagram 8 :

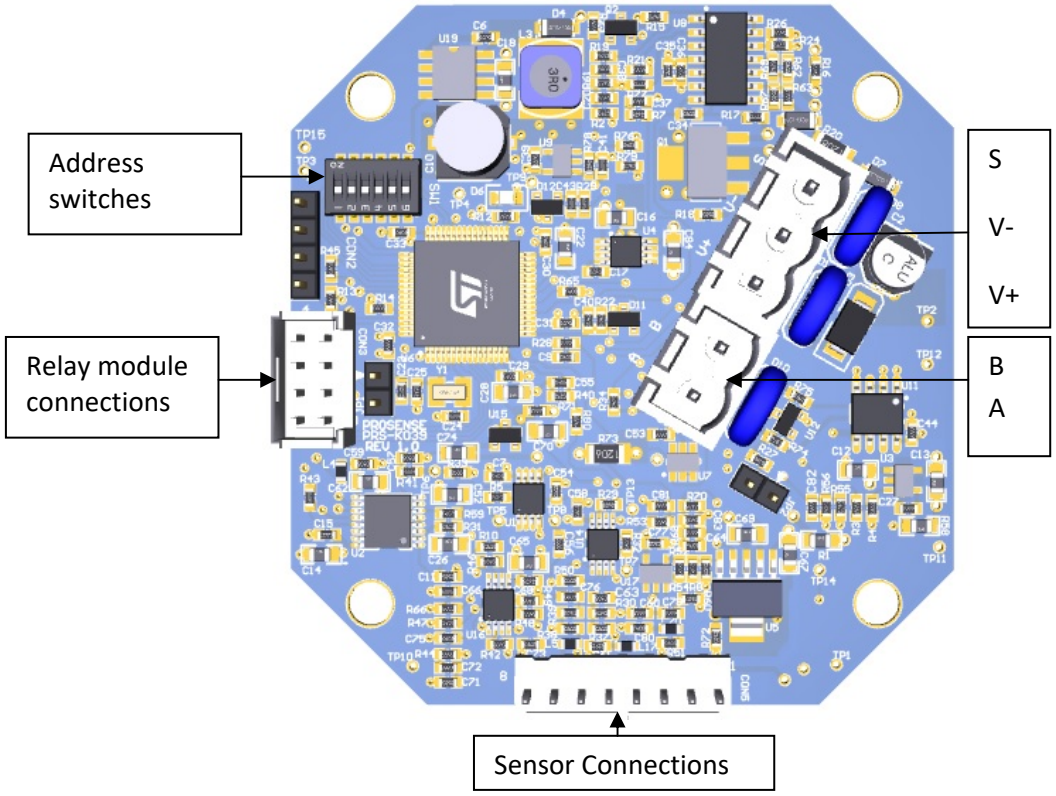

Diagram 8: Detector main board and connections

Detector has integrated RS485 Serial communication devices. Hence both digital and analog outputs are available onboard. Port definitions are given in table6:

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

Table 5 : Detector output ports and their usage

Detector Configuration

The Prosense dedecor has three different types of connection depending on installed boards:

1. Single 4-20mA output (default option)
2. RS485 Modbus serial communication output
3. 3-Relay outputs

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. We recommend to use values given in table 4 (see page 13) as cabling best practices.

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 clutching or crimping aparats are not loosen or oxidized.

If the analog output shortcut due to an error the output will be dropped to 2mA as detector has a self defending mechanism implemented. Analog output will be automatically deactivated if analog output would not be used as port left empty or no connection (or incorrect connection) made to it.

Detector RS485 serial communication:

Detector has integrated RS485 Serial communication devices. The RS485 communication AB ports are located in another socket. If only RS485 serial communication will be used connection to detector should made by 4 wire that 2 for power (V+, V-) and 2 for RS485 (A,B). If both RS485 Serial communication and analog output will be used then, 5 wire should be used (V+, V-, S, A, B). The total lenght of the connection line should not exceed 1000

meters. The wiring for detectors utilized with RS485 board should be done by using connection cable EIA RS485 2 core wires with section 0.22 / 0.35 mm2 and shielded. Nominal capacity between the wires < 50pF/m and nominal impedance 120 Ohms.

Detectors will be wired in daisy chain (bus) mode. We recommend not to use star mode connection due to negative impact of interference. Each detector should have unique address number in the chain. The detectors would not be recognised by control panel if same address given to them. Detectors can have addresses between 1 to 63. Address zero(0) is reserved. The address of detector can be adjusted via using DIP-Switch set on the board:

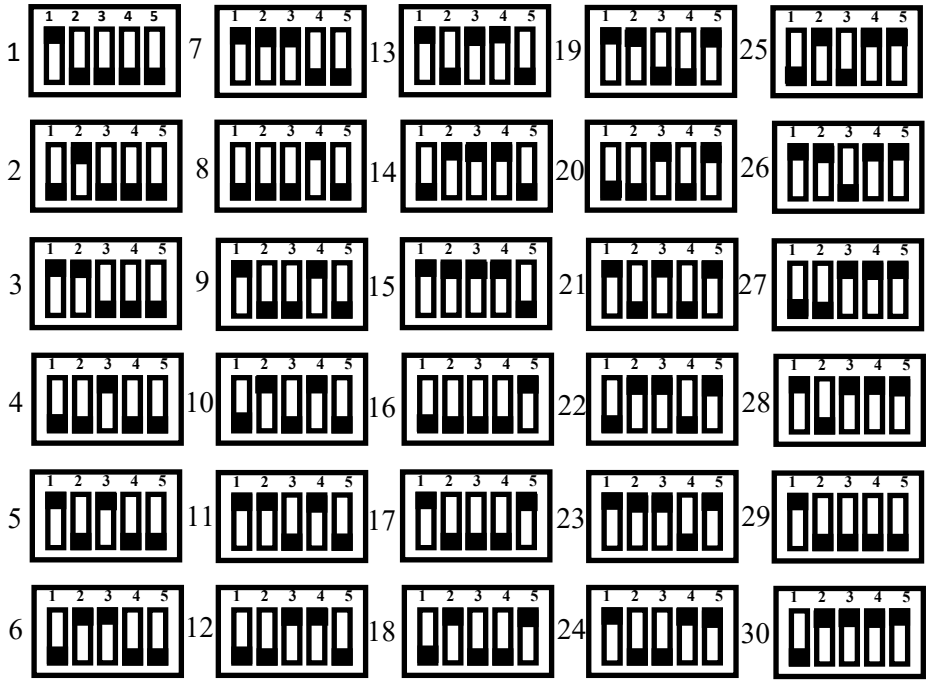

Diagram 9: RS485 Modbus serial communication address and switch position

The last detector in the chain should have 120 Ohms RS485 termination resistor. The resistor is already implemented on the board by default but not activated. User should activate the termination resistor via using the termination pin once the installation completed:

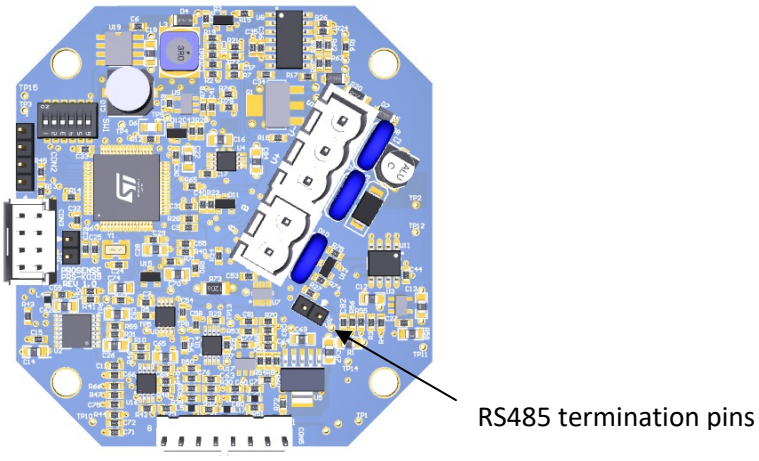

Diagram 10: RS485 Modbus serial communication module end of line jumper

The power connection we recommend to use seperate 2 wire cable with specification given earlier in this document (see Electrical Connections section at page11). Once the cabling is completed please check each detector has at least 12 VDC power.

Detector Relay module:

Prosense provides optional relay modules for Prosense detectors. The relay module details are given below:

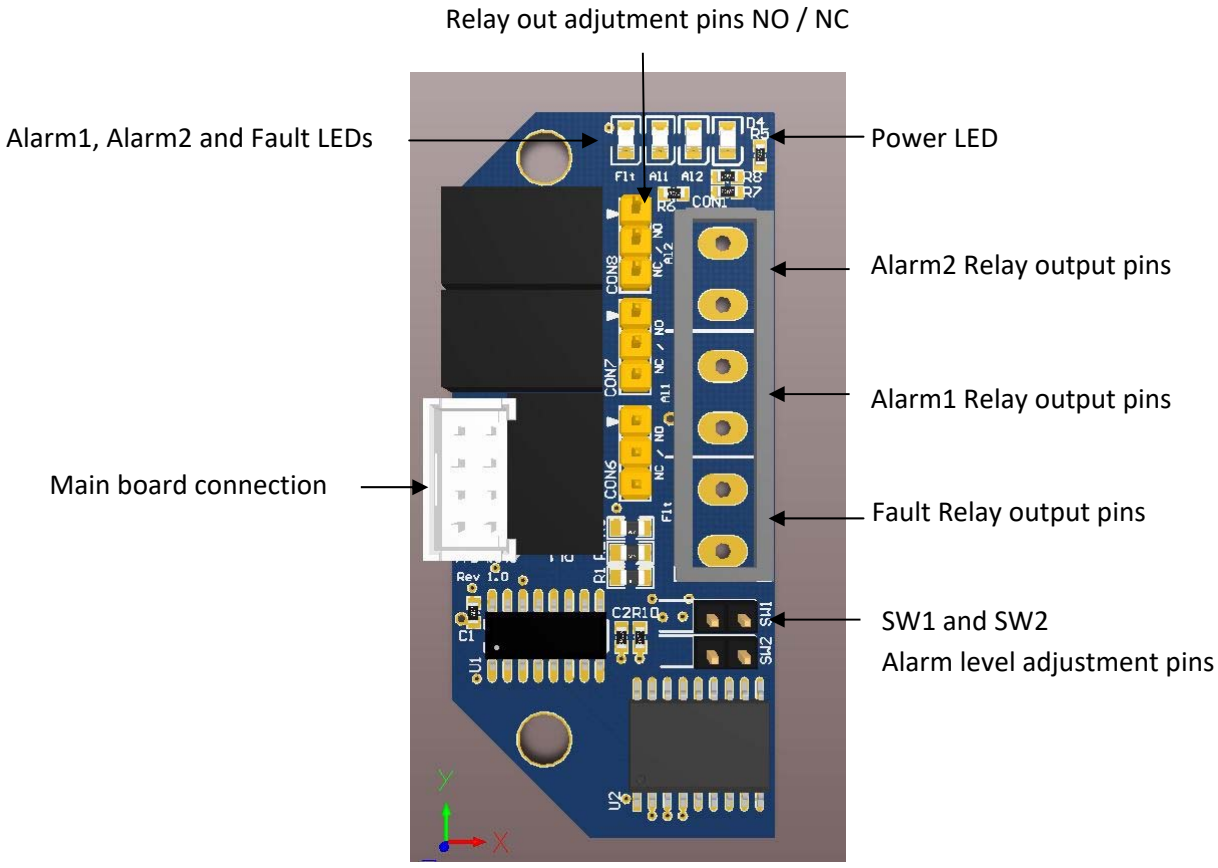

Diagram 11: Relay module

The relay board has 3 relay outputs:

Port	Usage
Fault	Fault Relay output
Al1	Alarm 1 Relay output
Al2	Alarm 2 Relay output

Table 6 : Relay module output ports and their usage

All output pins located on Prosense IR detector can be used simultanously. That means user can use all relay outputs, analog (4-20mA) output and RS485 digital output at same time if implementation equipment allows their usage.

Each relay has 3 pins to adjust how to behave in case of alarm which are

NO : Normally Open
NC : Normally Close

The relay output pin positions shown below:

	Normally Open (NO)
	Normally Close (NC)

Table 7 : Relay output pin positions

The Fault relay is set to NO (Normally Open – Energised) and energised. Hence fault relay LED is always active. It does not mean that there is a fault on detector. If the power LED is active and fault LED is off it means that there is a fault condition on the detector. The fault relay will be de-energized in case of power failure.

The alarm relays set to NO (Normally Open – De-Energised) position at factory.

The alarm levels are also adjustable via using SW1 and SW2 alarm level pins. Alarm levels are defined as percentage in LEL for flammable gases. The alarm levels can be adjusted using jumpers to switch SW1 and SW2. Possible options are given in table 9:

SW1	SW2	Al1 Level	Al2 Level
Open	Open	10 LEL	15 LEL
Open	Closed	10 LEL	20 LEL
Closed	Closed	20 LEL	25 LEL
Closed	Open	20 LEL	40 LEL

Table 8: Alarm level pin positions

Oxygen detectors:

For oxygen detectors the output values and meanings are different as oxygen is naturally available in atmosphere:

Port	Usage
Fault	Fault Relay output
AL1	Alarm 1 Relay output - Lower level for Oxygen
AL2	Alarm 2 Relay output - Higher level for Oxygen

Table 10: Realy module output meanings for Oxygen detectors

Alarm levels are also different as given in below table:

SW1	SW2	Al1 Level	Al2 Level
Open	Open	19 %vol	23 %vol
Open	Closed	19 %vol	22 %vol
Closed	Closed	18 %vol	22 %vol
Closed	Open	18 %vol	23 %vol

Table 11: Alarm level (% Vol) pin positions for Oxygen detectors

System Status

The Prosense IR detectors has one LED on main board to show actual status of the detector. In normal conditions whiel detector works properly the LED blinks with 1 second period (one blink in a second). If detecor is in fault condition LED illuminates with 250 ms period (four blinks in a second) and the detector analog output gives 2mA on S port. If detector could not get enough power (lower than 12 VDC) it will also raise fault status.

First time switch on (Commissioning)

WARNING

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 and site procedures are followed.
Ensure that the associated control panel output actuation is inhibited so as to prevent false alarms.

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

1. Remove the detector cover
2. Configure the detector's analogue output signal and power input connections done 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 luminated right after appying power.
7. Wait two minutes and confirm that LED blinking with one second period.
8. Switch Off the external power to the detector.
9. Fit the cover and make sure non of the cables cause an obstruction while fitting cover
10. Switch on external power to the detector.

Calibration

It is recommended to periodically carry out calibration to ensure correct operation. Calibration should be done by a person who trained and certified by local or international authorities.

Prosense detector calibration includes two steps which are zero and span calibration. During the calibration both steps have to be completed. Otherwise the calibration would not be saved and values invalidated by detector internal control mechanism. Detector should be powered and stabilized for at least 30 minutes before calibration. Zero calibration should be done by clean air or N2 gas depending of the detector and sensor type. Span calibration should be done by specific gas combinations and levels depending of the detector and sensor type. Please contact Prosense to get zero and span calibration gas details.

To calibrate the detector, use an appropriate span gas cylinder, constant flow regulator and Prosense Gas Cap. The flow rates used for calibration gas are as follows:

Gas	Flow rate(L / Min)
Clean air or N2 for zeroing	0.5 to 1.0
Falmmable (Catalytic)	0.5 to 1.0
O2	0.5 to 1.0
H2S	0.5 to 1.0
CO	0.5 to 1.0
H2	0.5 to 1.0
Flammable (IR)	0.4 to 0.6
CO2 IR	0.4 to 0.6

Table 9: Gas flow rates for calibration

Calibration procedure may vary depending on the Prosense detector model. If Prosense Gas Monitor software available for calibration, first enable communication between detector and computer via setting the first address switch to ON position. Then give clean air (N2 for IR sensors) gas to sensor head to perform zero. It would be better to follow the ADC value in graph to see and make sure sensor has been stabilized. Then press “Set Zero” button to start zeroing. Detector will automatically set the zero level. Following zeroing apply the span gas immediatelly. Gas concentration may vary depending of the gas and sensor type. For flammable gases with Pellistor and Catalytic sensörs 30LEL methane stabilized with clean air (O2 and N2); for flammable gases with IR sensors 50LEL methane gas stabilized with N2should be used. Apply the gas to the sensor and wait at least 2 minutes. Also monitor ADC value on graph to make sure sensor reading has been stabilized. Then press “Set Span” button to start span calibration. It is necessary to continue applying gas while detector automatically sets the span level. It may take another two minutes to complete. For more information please see the Prosense Gas Monitor software user guide.

If Prosense Gas monitor software is not available follow below procedure step by step. Otherwise the calibration would not be completed and non of the values recorded.

1- Put detector in calibration mode. To enable calibration mode the last switch on address switch board should set to ON. If it was OFF it should need to set to ON. If it was already ON it should need to set first OFF, then 10 seconds later set to ON.
2- Apply zero gas (clean air or N2 depending of the detector and sensor type) to the sensor for zeroing. The LED on main board will solid for 75 seconds and than it will return to normal speed (1 second period). Once LED returned to normal flashing speed zeroing is completed.
3- Apply span gas and wait 75 seconds.
4- Set last switch to OFF position to start span calibration.
5- Detector will set span level automatically. The LED on main board will solid for 75 seconds and than it will return to normal speed (1 second period). Once LED returned to normal flashing speed span calibration is completed.

It is not possible to perform only zero or only span calibration. It should be done in given order. Analog output will set to 3mA level during calibration steps performed, alarms and fault status or relays will be deactivated. If you wan to monitor analog output via using a multimeter you must use a resistor while serially connecting the multimeter. Otherwise detector will think someone has did short circuit on analog output hence it will enable saving mode and set output level to 2mA.

Maintenance

Proactive maintenance:

All gas detectors including both for flammable and toxic gases should have to pass a functional test and calibration every three to six months according to EN 60079-17 industiral standarts. The test results and calibration reports should be recorded in maintenance books.

Operational Life:

Flammable gas sensor made by using the pellistors that suffer from a loss of sensitivity when in the presence of poisons or inhibitors, e.g. silicones, sulphides, chlorine, lead or halogenated hydrocarbons. The pellistors are poison resistant to maximize the operational life of the Catalytic flammable sensor. A typical operating life, subject to the presence of poisons/inhibitors is 36 months.

The NDIR (infrared) flammable gas sensor is not affected by the mentioned poisons hence has a longer life span.

Typical life of a toxic gas sensor which made by electrochemical component is dependant on the application, frequency and amount of gas exposure. Under normal conditions (3 monthly visual inspection and 6 monthly test/recalibration), the Prosense Oxygen and other toxic sensors have an expected life equal to or greater than 24 months.

Servicing

Important: All replacement actions (sensor, sinter, sensor head) shall be done by Prosense service personel as it needs some special steps that should be performed in laboratory environment.

Sensor replacement:

The Flammable NDIR cells that are used with the Prosense IR Sensor Head have no serviceable parts. When they have reached the end of their operational life, simply replace the cell.

Sinter replacement:

Due to environmental conditions the metal filter - sinter at sensor head might lost permeability that could negative impact on sensor performance. For example if the installation includes cement or similar dust the sinter would be block the air/gas entry to sensor. The sinter should be checked visually and replaced if necessary. To replace sinter please check diagram-1 and follow the below procedure:

1- Power of the Prosense detector
2- Loosen the locking grub screw
3- Unscrew the sensor head cap that holds the dirty sinter
4- Screw the sensor head cap including the clean sinter
5- Fix the Locking grub screw

Sensor head replacement:

Prosense senser head is a seperate part that can be replaced in the field. The sensor head includes integrated sensor, electronic device and sinter in it. To replace sensor head:

1- Power-Off the Prosense detector
2- Disconnect sensor cables from the detector main board
3- Remove the sensor head from the body
4- Install sensor head
5- Connect the sensor cables to detector main board
6- Power-On Prosense detector
7- Leave detector working at least 4 hours in clean air environment

Important: It is necessary to perform detector calibration after sensor head replacement.

General specification

Use:

3-wire, 4-20mA analog and 2 wire RS485 digital gas detector transmitter for use with directly installed flammable gas sensors. For the protection of personnel and plant from flammable gas hazards.

Electrical Specifications:

Input Voltage Range	12 to 24VDC (24VDC nominal)
Max Power Consumption	Max 2.5 Watts. at 24VDC
Current output	4-20mA
2.0 mA	Fault
4.0 mA to 20.0 mA	Normal gas measurement
2.0 mA	Inhibit (during configuration/warming)
3.0 mA	Calibration
22.0 mA	Maximum over range
Terminals	3 x screw terminals suitable for wire diameter 0.5mm2 to 2.5mm2 (20AWG to 13AWG) for power input and analog(4-20mA) output, 2 x screw terminals suitable for wire diameter 0.5mm2 to 2.5mm2 (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). Alarm relays de-energised and fault relay energised.
Communication	RS485, Modbus RTU

Table 10: Electrical specifications

Detector Body Specifications:

Material	Epoxy painted aluminium alloy
Weight	Aluminium Alloy :1.33kg (with Sensor Header)
Mounting	Wall mounting
Entries	½ NPT and ¾ NPT (or 2 x ¾ NPT) field cable entries, ¾ NPT sensor entry

Table 11: Detector body specifications

Environmental:

IP Rating	IP65 in accordance with EN60529:1992
Operating Temperature	-20ºC to +50ºC / -4ºF to +120ºF
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 12: Environmental specifications

Warranty statement

All products are designed and manufactured to the latest internationally recognized standards by Prosense Technology under a Quality Management system that is certified to ISO 9001. As such Prosense Technology warrants its products against defective parts and workmanship and will repair or (at its option) replace any instruments which are or may become defective under proper use within 12 months from date of commissioning by an approved Prosense Technology representative or 18 months from date of shipment from Prosense Technology, whichever is the sooner. This warranty does not cover disposable batteries or damage caused by accident, abuse, abnormal operating conditions or poisoning of sensor.

Defective goods must be returned to Prosense Technology premises accompanied by a detailed description of any issue. Where return of goods is not practicable Prosense Technology reserves the right to charge for any site attendance where any fault is not found with he the equipment. Prosense Technology shall not be liable for any loss or damage whatsoever or howsoever occasioned which may be a direct or indirect result of the use or operation of the Contract Goods by the Buyer or any Party.

This warranty covers instrument and parts sold to the Buyer only by authorized distributors, dealers and representatives as appointed by Prosense Technology. The warranties set out in this clause are not pro rata, i.e. the initial warranty period is not extended by virtue of any works carried out there under.

In no event will Prosense Technology be liable for any incidental damages, consequential damages, special damages, punitive damages, statutory damages, indirect damages, loss of profits, loss of revenues, or loss of use, even if informed of the possibility of such damages. Prosense Technology's liability for any claims arising out of or related to this product will in no case exceed the order value. To the extent permitted by applicable law, these limitations and exclusions will apply regardless of whether liability arises from breach of contract, warranty, tort (including but not limited to negligence), by operation of law, or otherwise.