

XGARD BRIGHT

Addressable Fixed Point
Gas Detector with Display

M07991/02/EN/ISSUE 7



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1. INTRODUCTION

1.1 PRODUCT OVERVIEW

The Xgard Bright is a versatile gas detector with a bright OLED display and magnetic wand for easy operation. It supports analogue 4-20mA and RS-485 Modbus signals, with optional HART interface, and includes relays for alarms or control systems. It can be equipped with various sensors, such as electrochemical, catalytic, MEMS, or infrared sensors. This manual provides essential health and safety requirements and installation instructions, please refer to the full product manual for more information.

1.2 SAFETY INFORMATION

- Xgard Bright gas detectors must be installed, operated and maintained in strict accordance with these instructions, warnings, label information, and within the limitations stated.
- Xgard Bright detectors are designed to detect gases or vapours in air. Xgard Bright detectors with catalytic or MEMS sensors are not suitable for use in inert or oxygen deficient atmospheres.
- Electrochemical cells used in toxic and oxygen versions of Xgard Bright contain small volumes of corrosive electrolyte. Care should be observed when replacing cells to ensure that the electrolyte does not come into contact with skin or eyes.
- Maintenance and calibration operations must only be performed by qualified service personnel.
- Only genuine Crowcon replacement parts must be used, substitute components may invalidate the certification and warranty of the detector.
- Xgard Bright detectors must be protected from extreme vibration, and direct sunlight in hot environments as this may cause the temperature of the detector to rise above its specified limits and cause premature failure. A sunshade is available for Xgard Bright.

NOTE: If the sinter is subjected to direct water jet the product must be bump tested with gas to ensure correct operation.

- This equipment must not be used in a Carbon Disulphide atmosphere.

WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.

- The lid on Xgard Bright must be kept tightly closed until power to the detector is isolated otherwise ignition of a flammable atmosphere can occur. Before removing the cover for maintenance, ensure the surrounding atmosphere is free of flammable gases or vapours.
- The cable gland must be installed before use and must comply with the requirements of standards EN60079-0 and EN60079-1 with minimum IP66 ingress protection.
- External earthing should be considered and installed according to these instructions before use. For use in North America, the internal grounding terminal shall be used as the equipment grounding means and that the external terminal is only a supplemental bonding connection where local authorities permit or require such a connection.
- Only the cable/wires which are specified in the user manual can be used.

ATEX/IECEX and INMETRO Certified Aluminium version:

- This detector is designed for use in Zone 1 and Zone 2 or Zone 21 and Zone 22 hazardous areas, and is certified Ex db IIC T6 Gb and Ex tb IIIC T80°C Db for operation up to 70°C (158°F).

WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD. The painted aluminium enclosure constitutes a potential electrostatic hazard and the equipment must only be cleaned using a damp cloth.

- The cable gland must be installed before use and must comply with the requirements of standards IEC 60079-0 and IEC 60079-1 with minimum IP66 ingress protection.
- The flameproof properties of the enclosure shall be maintained when an external alarm device is used.
- Unused cable entries must be sealed using an ATEX /IECEX Ex db and Ex tb certified stopping plug with minimum IP66 ingress protection.
- ATEX Certificate No.: TÜV 16 ATEX 7908 X
- IECEX Certificate No.: IECEX TUR 16.0035X
- INMETRO Certificate No.: UL-BR 26.0813X
- Marking:
Ex II 2 G Ex db IIC T6 Gb Tamb: -40°C≤Ta≤70 °C
Ex II 2 D Ex tb IIIC T80°C Db

- This detector is designed for use in Zone 1 and Zone 2 or Zone 21 and Zone 22 hazardous areas, and is certified Ex db IIC T3 Gb $-40^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$, Ex db IIC T4 Gb $-40^{\circ}\text{C} \leq T_a \leq 50^{\circ}\text{C}$ and Ex tb IIIC T80°C Db for operation up to 70°C (158°F).

WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD

- Only clean the equipment using a damp cloth.
- Operate the equipment only within certified hazardous areas.
- Ensure all earthing connections are properly installed and maintained in accordance with the product manual.
- Use an insulating object when touching the equipment to prevent electrostatic discharge.
- Perform routine cleaning and maintenance outside hazardous areas when feasible.
- Do not touch the equipment when it is in an alarm or warning state.
- Shield the equipment from direct airflow in gas atmospheres and fast-moving particles in dust atmospheres, which may cause electrostatic charging on the enclosure surface.
- The equipment is not intended to be exposed to prolific electrostatic charge-generating mechanisms.
- Use only IP65 or IP66 rated cable glands to maintain ingress protection.
- When connecting an external alarm device, ensure the flameproof integrity of the enclosure is preserved.
- Seal all unused cable entries with ATEX/IECEx certified Ex db and Ex tb stopping plugs.
- The maximum service temperature at the cable entry point is 72.15°C , and at the branching point of the conductor is 73.75°C . The end user must select appropriate cables and cable glands rated for these temperatures and the intended application.
- ATEX Certificate No.: TÜV 16 ATEX 7908 X
- IECEx Certificate No.: IECEx TUR 16.0035X
- INMETRO Certificate No.: UL-BR 26.0813X
- Marking:
Ex II 2 G Ex db IIC T3 Gb Tamb: $-40^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$
Ex II 2 G Ex db IIC T4 Gb Tamb: $-40^{\circ}\text{C} \leq T_a \leq 50^{\circ}\text{C}$
Ex II 2 D Ex tb IIIC T80°C Db

UL Certified version:

- This detector is certified to Class I, Division 1, Groups B, C and D T6; Class II Division 1, Groups E, F and G T6 for operation up to 60°C (140°F).

WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD. The painted aluminium enclosure constitutes a potential electrostatic hazard and the equipment must only be cleaned using a damp cloth.

- The gas detector shall be installed in accordance with Article 501.10 (A) of the NEC, Class, I, Division 1, wiring method and Article 502.10 (A) of the NEC, Class, II, Division 1, wiring methods. To reduce the risk of ignition of hazardous atmospheres, a seal shall be installed within 18 inches of the enclosure.
- Unused cable entries must be sealed using UL Listed plugs having the same area classification Class I, Division 1, Groups B, C and D; Class II Division 1, Groups E, F and G under CCN EBNV.
- UL Certificate No.: UL-US-L147777-0002503217530-1
- Marking:
 $-40^{\circ}\text{C} \leq T_a \leq 60^{\circ}\text{C}$
Class I, Division 1, Groups B, C, D T6
Class II Division 1, Groups E, F, G T6

1.3 STORAGE INSTRUCTIONS

Some types of sensor available with Xgard Bright have limited life when left unpowered and/or may be adversely affected by temperature extremes or environmental contamination. Ideal storage conditions are 20°C and 60%RH. Do not expose sensors to contaminants such as silicones, lead compounds and strong solvents such as isopropanol. It is strongly recommended detectors are installed and powered within 3 months of purchase.

1.4 PRODUCT DIMENSIONS

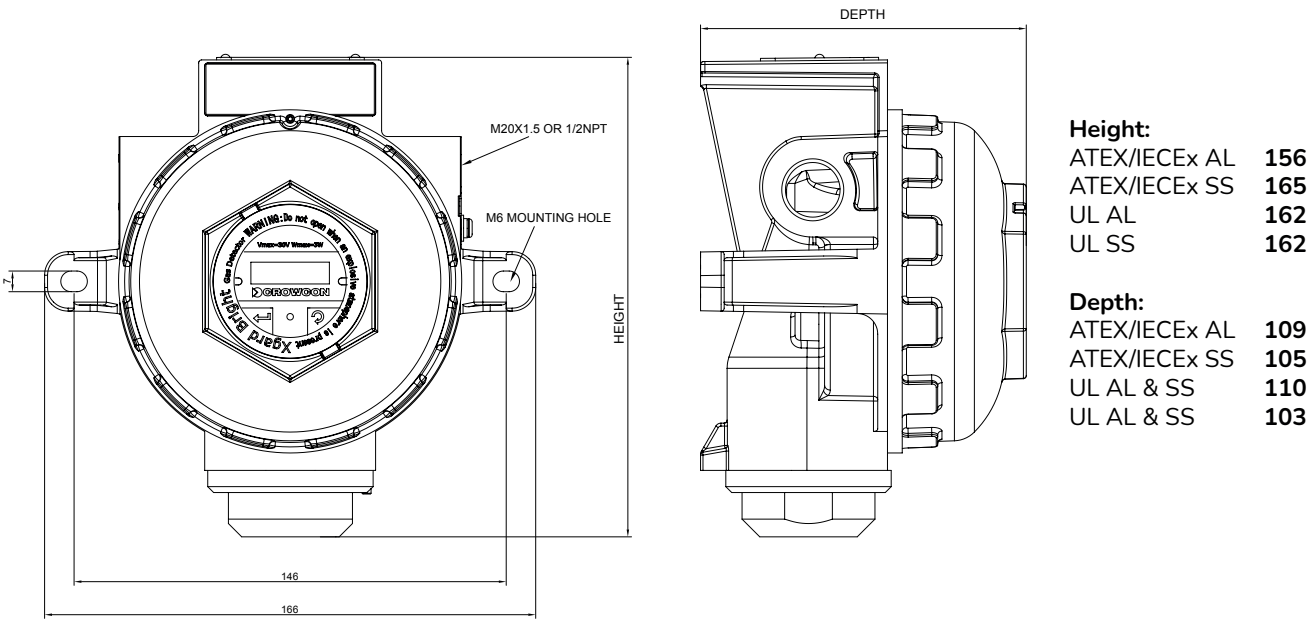


Figure 1: Xgard Bright dimensioned view - all dimensions in millimetres

1.5 EXPLODED VIEW

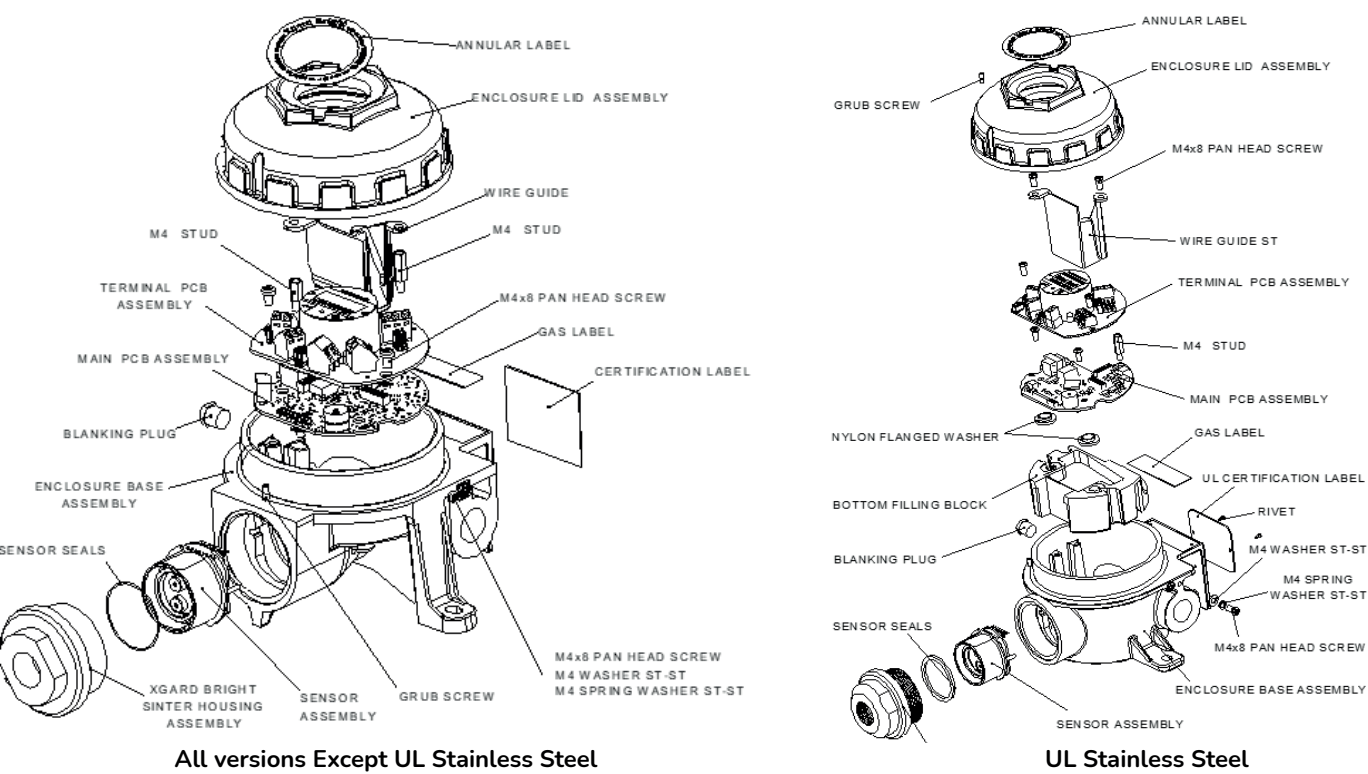


Figure 2: Xgard Bright exploded view

2. INSTALLATION

WARNING: Installation must be in accordance with the recognised standards of the appropriate authority in the country concerned. For further information please contact Crowcon. Prior to carrying out any installation work ensure local regulations and site procedures are followed.

2.1 LOCATION

To ensure optimal performance, mount the gas detector where the target gas is most likely to be present. Consider the following guidelines:

- Lighter-than-air gases: Mount detectors at high levels and use a collector cone.
- Heavier-than-air gases: Mount detectors at low levels.
- Outdoor installations: Use a spray deflector to protect detectors from rain or flooding.
- Accessibility: Ensure detectors are easily accessible for functional testing and servicing.
- Air currents: Account for natural or forced air currents; mount detectors in ventilation ducts if appropriate.
- Process conditions: Consider how process conditions (elevated temperature/pressure) may affect gas behaviour (e.g., heated butane may rise).
- Oxygen sensors: Understand the displacement behaviour of gases like CO₂, which displaces oxygen from low levels upwards.
- Similar density gases: Mount sensors at head height (approximately 1.5m) for gases with a density similar to air at 20°C.

Document all decisions regarding sensor locations. The agreement reached on the locations of sensors should be recorded.

2.2 MOUNTING

Xgard Bright should be installed at the designated location with the sensor pointing down. This ensures that dust or water will not collect on the sensor and stop gas entering the cell. Care should be taken when installing the detector to avoid damaging the painted surface of the enclosure. There are two M20x1.5 (or ½" NPT) entry ports on the base. One entry port will be used for power supply input during normal operation. Unused port will be blocked by blind plug, or can be used to connect external alarm device or be used for connecting devices to the multi drop communications. End user will only use certified cable gland for installation.

2.3 INTERNAL ELECTRICAL CONNECTIONS

All electrical connections for the Xgard Bright are made via the screw terminal block in the enclosure base, marked '+', 'Sig', and '-'. Ensure correct polarity when connecting to control equipment. The device is factory set as a 'current sink' but can be changed to 'current source' by moving the links on the terminal PCB from 'SINK' to 'SOURCE'. Relays indicate Fault, Level 1 alarm, or Level 2 alarm, with Alarm relays normally de-energised and the Fault relay normally energised (failsafe). Contacts can be switched from Normally Open (NO) to Normally Closed (NC) by adjusting the adjacent link. Ground the enclosure base and cable armour at the control panel to limit radio frequency interference, ensuring grounding is done in a safe area to avoid earth loops.

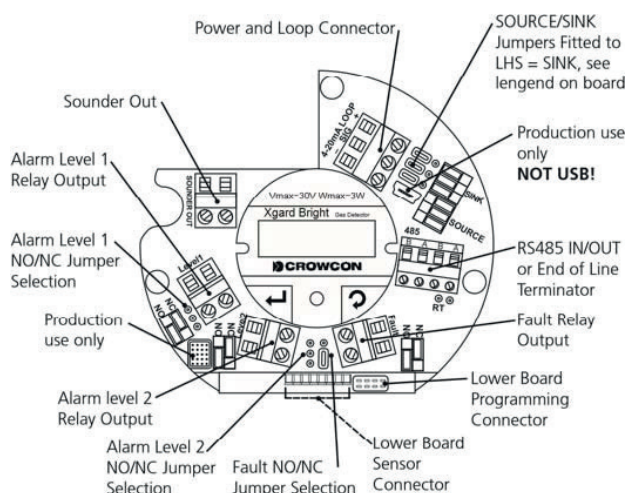


Figure 3: Internal electrical connections

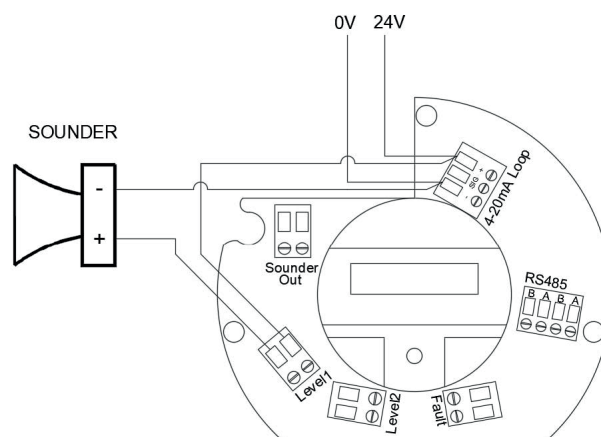


Figure 4: Sounder/Relay wiring

Sounder terminals provide an open-collector output for triggering alarms, activated by a voltage equivalent to the detector's supply (24Vdc nominal, minimum 12Vdc). Devices up to 250mA can be connected. RS-485 terminals enable communication with a Modbus Master device using Modbus RTU protocol, alongside the 4-20mA signal for data transmission or multi-dropping detectors on a network. Refer to the 'Xgard Bright Modbus Instructions' for detailed connection and data format information.

WARNING: The mini USB socket is not for customer use; connecting it to a computer may cause damage.

Sounders connected to the Sounder Out port require a supply voltage above 12Vdc. Alternatively, connect local sounders via the Alarm 1 relay. For control system connections, use the 4-20mA 'Signal' wire. In stand-alone mode, set the SINK/SOURCE links as specified. Xgard Bright supports HART Protocol Revision 7 for integration with Asset Management Systems or HART-enabled communicators. HART detectors can be multi-dropped on a common cable in a daisy chain configuration, with unique addresses set using a HART host. Detectors with non-zero HART addresses maintain a signal current output of 4mA (loop disabled).

2.4 GENERAL CABLING REQUIREMENT

Ensure cabling meets local standards and the detector's electrical requirements. Use explosion-proof glands or steel conduit if standards are met. Xgard Bright requires a Class 2 DC supply of 10-30V, up to 100mA, with a minimum of 10V at the detector considering voltage drop. For example, a 24V supply at the control panel guarantees 18V minimum, allowing a maximum loop resistance of 80 Ohms. A 1.5mm² cable typically supports runs up to 3.3km. Refer to Table 1 for maximum cable distances based on cable parameters. Acceptable wire cross-sectional area is 0.5 to 2.5mm² (20 to 13 AWG), with a maximum cable diameter Figure 3 Internal electrical connections Figure 4 Sounder/Relay Wiring of 15mm. Use actual cable parameters for precise calculations.

C.S.A.		RESISTANCE (OHMS PER KM)		MAX. DISTANCE (KM)
mm²	AWG	Cable	Loop	
1.0	1.7	18.1	36.2	2.2
1.5	1.5	12.1	24.2	3.3
2.5	1.3	7.4	14.8	5.4

Table 1: Maximum cable distance for typical 3 core cables

For 4-20 mA Current Loop

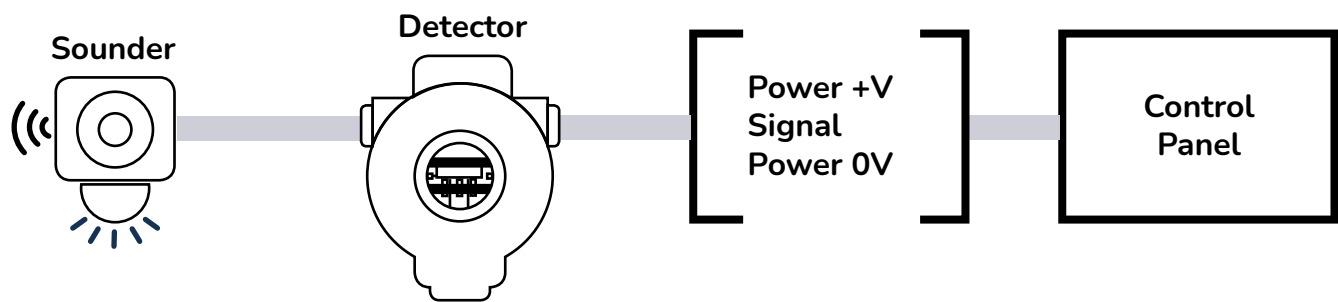


Figure 5: Typical 4-20 mA connection

The Xgard Bright supports 4-20 mA current loop and HART connections, allowing for the connection and powering of accessory beacons or sounders, subject to current consumption, cable resistance, and panel voltage.

Example Calculation 1

For point-to-point connection with a sounder consuming 250mA, using 1.5mm² cable and a controller output of 18V:

- Cable resistance: 12.1Ω/km (24.2Ω round trip)
- Minimum voltage: 10V
- Total current (Catalytic): 0.345A
- Maximum distance: 0.958 km

For 4-20 mA Current Loop

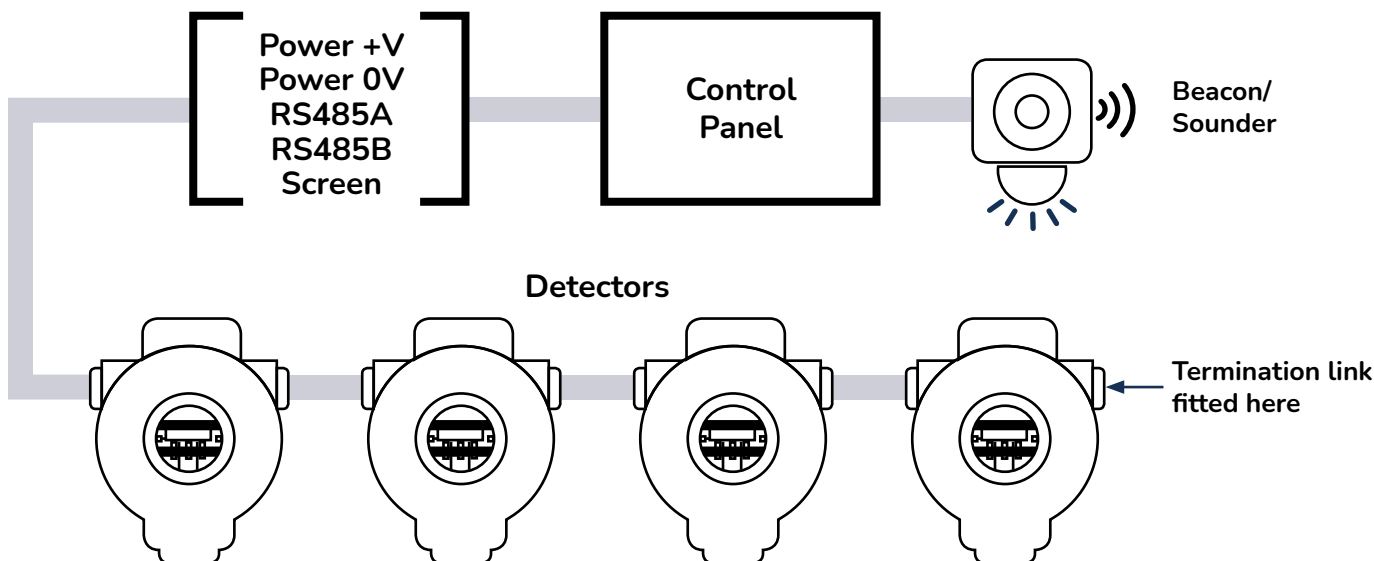


Figure 6: Multi-drop Modbus connection

The Xgard Bright supports multidrop communication to an addressable control panel. Due to the current consumption of multiple detectors, avoid powering accessories via detector outputs. Each detector must be configured with a unique node address. Connections: Four connections are required: 24V/0V DC power supply, and RS-485 A and B terminals. Use large cross-sectional area cable for power and twisted pair screened cable for RS-485 signals. Earth the screen at the control panel only.

Cable Length Calculation:

- Ensure voltage does not fall below 10V at the last detector.
- Calculate voltage drop for each detector hop based on current draw and cable resistance.
- Example: With 18V controller output, 12.1Ω/km cable resistance, 20m between detectors, and 70mA current draw.
- Maximum detectors: 21.

For larger networks or long cable runs, use thicker cables or additional power supplies placed locally around the installation.

2.5 EARTHING REQUIREMENTS

Earth terminals are located outside the Xgard Bright enclosure near the top-right cable entry and inside near the left-hand sounder out cable connector. Bond the enclosure to earth using the external earth lug or the internal earth point if an earth cable is provided. Tighten the grounding terminal connection to 10Nm using an M4 x 6mm screw, plain washer, and star/lock washer. Use earthing cables with a cross-sectional area of 4mm² (AWG 10 in the USA) or greater. In North America, use the internal grounding terminal as the primary grounding means, with the external terminal as a supplemental connection if permitted.

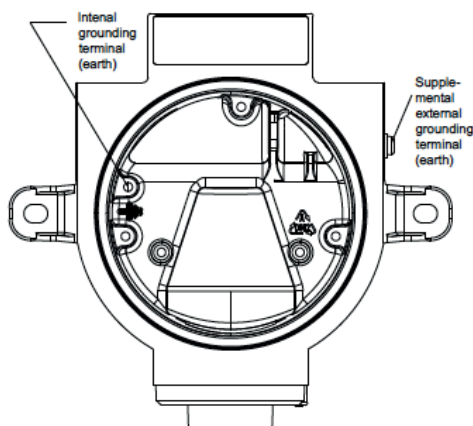


Figure 7: Earthing connection on aluminium enclosure

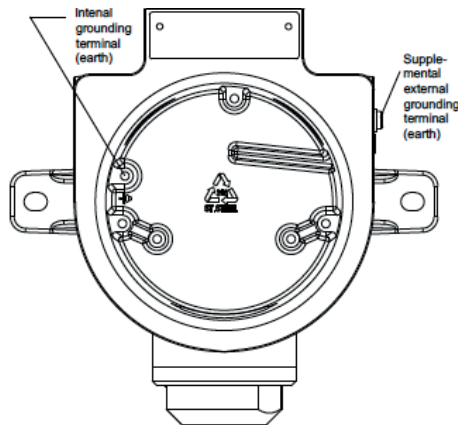


Figure 8: Earthing connection on stainless steel enclosure

2.6 CABLE GLANDS

Unarmoured Cable

- Allow sufficient cable length, fit shroud if needed, and pass the cable through the gland.
- Screw the gland entry into the Xgard Bright cable entry. Hold the gland entry in position with two spanners and tighten the middle nut until resistance is felt. Turn the middle nut a further half to one full turn to complete the inner seal.
- Hold the middle nut in position and tighten the backnut until resistance is felt. Turn the backnut a further half to one full turn to complete the outer seal.

Armoured Cable

- Strip the cable's armoured layer and remove the filler to expose the armour/braid.
- Push the cable through the armour spigot, spread the armour/braid over the spigot, and position the armour clamping ring.
- Remove the inner seal from the entry, place the entry over the spigot, and move the middle nut to meet the entry.
- Hold the entry in position with a spanner and hand tighten the middle nut. Turn the middle nut a further half to one full turn with a spanner.
- Unscrew the middle nut and inspect the clamping. If not clamped, repeat assembly.
- Refit the inner seal, replace the entry, and reassemble the middle nut. Tighten the middle nut by hand and then with a spanner for 1 to 4 turns until fully tight.

NOTES:

- Follow the cable gland manufacturer's instructions.
- Use ATEX and IECEx certified Exd Flameproof glands.
- Ensure glands have a minimum ingress protection rating of IP66.

3. OPERATION

WARNING:

Prior to carrying out any work ensure local regulations and site procedures are followed. Never attempt to open the detector or enclosure base when flammable gas is present. Ensure that the associated control panel is inhibited so as to prevent false alarms.

3.1 OPERATION PANEL

The Xgard Bright features an OLED screen, a tri-colour status LED, and two magnetically operated Hall Effect switches. The screen displays white characters on a black background, visible even in bright sunlight.

The tri-colour LED indicates:

- Green:** Normal operation
- Orange:** Fault condition
- Red:** Detector in alarm

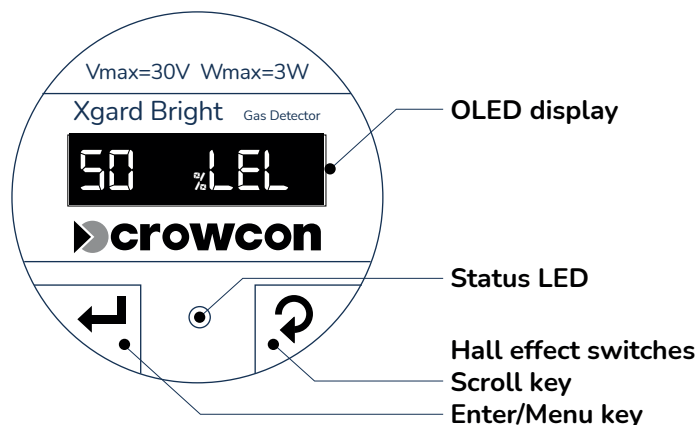


Figure 9: Xgard Bright operation panel

3.2 KEY OPERATION

Keys respond based on the duration held:

Short-time action: Magnet applied and removed within 2 seconds.

Long-time action: Magnet held for more than 2 seconds, indicated by a short beep.

3.3 START-UP

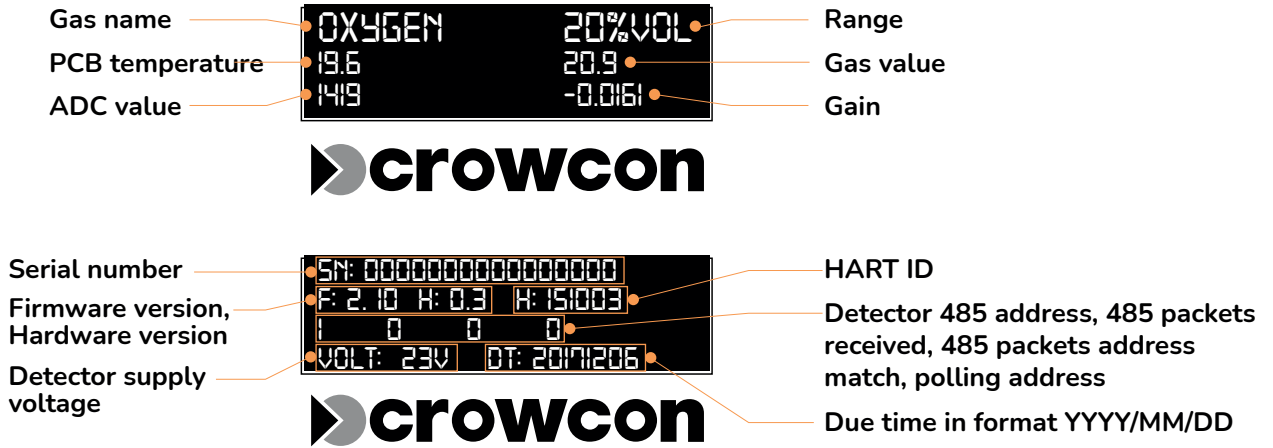


Figure 10: Gas status screen

Upon powering up, the Xgard Bright performs diagnostic checks, displaying the Crowcon logo for 10 seconds, followed by a 120-second warm-up status. Successful diagnostics lead to the gas status screen. Sensors require 10-30 minutes to stabilise, with biased sensors needing up to 3 hours. After power losses:

≤120 seconds: 2-hour stabilisation
>120 seconds: 3-hour stabilisation



Figure 11: Start up & warm up

3.4 MENU FUNCTIONS

Use the magnetic wand to access the menu from the gas display screen. Enter the password '0000' to navigate the menu:

- Zero:** Zero the sensor
- Cal gas:** Calibrate the sensor
- To main menu:** Return to the main gas screen
- Set Alarm 1:** Adjust the first alarm threshold
- Set Alarm 2:** Adjust the second alarm threshold
- Chn/Eng:** Switch between Chinese and English display
- Set 485 Addr:** Set the node address for Modbus operation
- Test Relay:** Adjust the analogue output signal

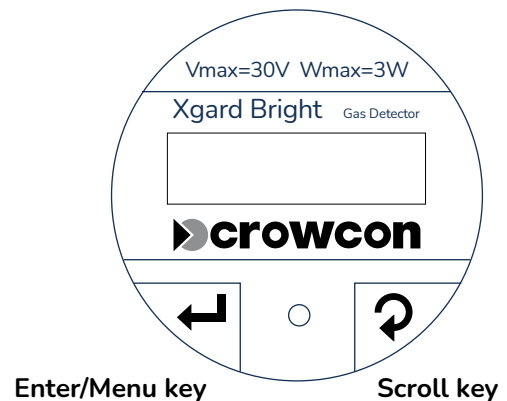


Figure 12: Xgard Bright interface

3.5 ZEROING

Purge the sensor with appropriate gas before zeroing. Zeroing should be done in clean air. Press 'Next' to zero the sensor, and 'OK' to return to the main menu.



Figure 13: Zero calibration start screen

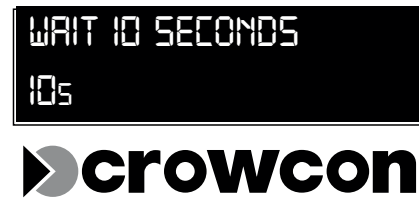


Figure 14: Zero calibration wait screen

3.6 CALIBRATION

Select 'Cal gas' from the main menu, adjust the value to match the calibration gas concentration, and press 'Mark' when stable.

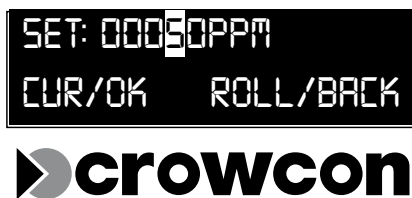


Figure 15: Calibration level screen



Figure 16: Calibration completion screen

3.7 STANDALONE OPERATION

If not connected to a control system, configure a loopback of the analogue signal to clear the fault state:

- **External Loopback:** Fit a 6k8Ω resistor between 'SIG' and '+' or 'SIG' and '-' terminals.
- **Internal Loopback:** Set the SINK/SOURCE jumper links as per the diagram.

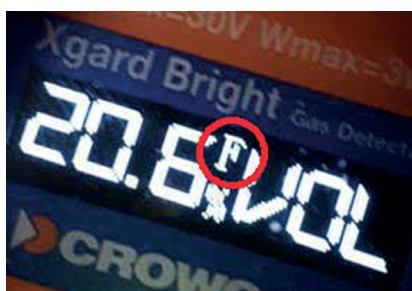


Figure 17: Fault Indication on screen

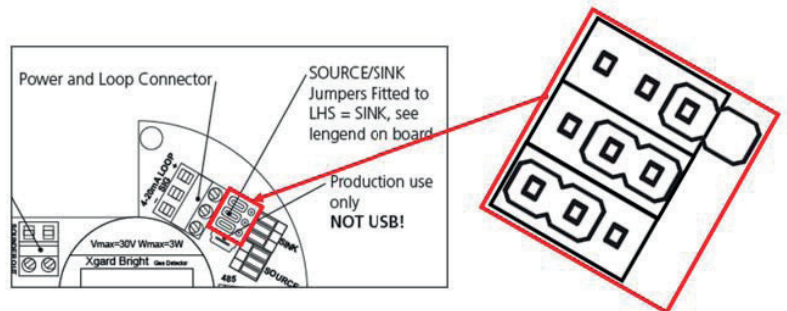


Figure 18: Link settings for standalone mode

WARNING: The analogue output is disabled in internal loopback mode. Use external loopback if analogue output is required.

4. SPECIFICATIONS

ENCLOSURE MATERIAL	ADC 12 aluminium alloy or 316 stainless steel
SIZE	Aluminium Enclosure: 156 x 166 x 109 mm (6.1 x 6.5 x 4.3 inch) Stainless Steel Enclosure: 165 x 166 x 105 mm (6.1 x 6.5 x 4.1 inch)
WEIGHT	Aluminium enclosure ATEX/IECEX: 1kg (2.2 lbs) UL: 1.5 kg (3.31 lbs) Stainless Steel enclosure ATEX/IECEX: 3.1 kg (6.8 lbs) UL: 3.5 kg (7.72 lbs)
CABLE GLAND ENTRY	2x M20 or 2x ½" NPT Stopping plug fixed to the ley-side entry by default
OPERATING VOLTAGE	12V - 30V DC
POWER	<3W
OUTPUT	3-wire 4-20mA (Sink or Source) RS-485 Modbus RTU HART (Optional)
RELAY	Alarm 1, Alarm 2, Fault (SPDT Contacts. Rated 1A, 24Vdc)
SOUNDER OUT	High Side Switch (24V nominal, 12V minimum, 700mA max load)
OPERATING TEMPERATURE	ATEX/IECEX: -40°C to +70°C (-40°F to 158°F) UL: -40°C to +60°C (-40°F to 140°F)
OPERATING HUMIDITY	0 to 95% RH (non-condensing) Contact Crowcon for sensor operating temperature and humidity ranges.
INGRESS PROTECTION	IP65/66, EN 60529
EMC COMPLIANCE	EN50270

5. WARRANTY

Equipment leaving our factory are fully tested and calibrated. If within the warranty period of 2 years from despatch, the Xgard Bright transmitter is proved to be defective by reason of faulty workmanship or material, we undertake at our discretion either to repair or replace it free of charge. Sensor module warranty periods are stipulated on GEN067 warranty periods technical note. Please refer to the full product manual for more information.

Warranty Procedure

To facilitate efficient processing of any claim, please visit:
www.crowcon.com/support/warranty/

For warranty and technical support enquiries please contact:

Telephone: +44 1235 557711

Email: technicalsupport@crowcon.com

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