Xgard Bright Service Manual

Fixed Gas Detection Equipment

M079913
Issue 2 May 2024

CROWCON
Detecting Gas Saving Lives

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T4 Portable Multigas Detector

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1. Introduction

This manual is designed to provide a single source of information related to the service, calibration and repair of Xgard Bright**.**

All servicing of Xgard Bright should be undertaken with the latest version of **Xgard Bright Service Software.**

This service manual is a living document and the information is presented in an electronic format (PDF) to allow for new information/ amendments to be released via a download.

1.1 Intended audience

This Service Manual is a CONFIDENTIAL document intended to provide support to the following user groups:

- Approved Customer Service & Repair Centres
- Approved **Crowcon** Service & Repair Agents
- **Crowcon** distributors, agents and equipment providers
- **Crowcon** internal customer-facing personnel

Whilst every effort is made to ensure that all information contained in this service manual is accurate at the time of issue, full technical specifications are not necessarily included. Furthermore, **Crowcon** policy is one of continuous improvement and the right is reserved to alter details and information as the need arises. Accordingly the user should check any details and information they wish to rely on with **Crowcon** at the time of use. **Crowcon** cannot accept liability in respect of any errors, omissions herein contained or any loss or damage, malfunction or consequential loss arising from reliance upon our publication.

1.2 Xgard Bright Service

Xgard Bright Service is the PC Application used in conjunction with **Xgard Bright** to allow configuration and servicing.

This allows access to a suite of service wizards to guide and assist during the calibration, service and repair of **Xgard Bright**. **Xgard Bright Service** must be used to calibration, service and repair of **Xgard Bright**.

1.3 General Service guidelines

⚠ **IMPORTANT NOTICE TO ALL SERVICE PROVIDERS**

Crowcon Xgard Bright gas detectors are potentially life-saving safety devices and are used in potentially explosive atmospheres. Therefore, there are specific requirements related to the service, repair and general maintenance of these instruments.

Operators must be trained and deemed competent. Any operator who has been tasked with the calibration and/or repair of product received from a customer must firstly ensure that the product has not been modified in any way. Where such an instance is discovered, it should be recorded on the repair/calibration service record and the customer and **Crowcon** made aware.

Operators undertaking repairs must ensure that **Crowcon** approved or supplied parts are used and the following records are kept during repair: Records of replaced key assemblies Any test equipment used for the repair and/or calibration of equipment must be calibrated and records kept for the following:

- Method of calibration
- Calibration results
- Uncertainty of measurement
- Environmental conditions
- Date of calibration
- Signature of the person under whose authority the calibration was performed

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- A unique calibration identification or certificate of all sample gas used during repair and or calibration must be traceable to national sources and a record of the sample gas certificate of conformance or equivalent made and kept with the service record.

1.4 General Warnings

⚠️ **Only genuine Crowcon replacement parts must be used; substitute components may invalidate** certification and warranty of Xgard Bright and accessories.

⚠️ **Only use Crowcon supplied AC adaptors must be used.**

⚠️ **Only use Crowcon supplied communications cable to connect to Xgard Bright.**

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2. Service and maintenance

2.1 Service schedule

Crowcon recommends that **Xgard Bright** should be inspected and calibrated every six months to ensure the instrument remains in good working order and the measurement of gas concentration is accurate; this is in addition to regular day to day inspection by the user. Service centres should operate standardised procedures and record keeping for carrying out effective servicing, maintenance and calibration, in accordance with this manual, to ensure the continued correct operation of the instrument.

2.2 Cleaning & inspection

! **When cleaning any components of the air sampling system, do not use any solvents based on hydrocarbons (e.g. alcohol, benzene etc.) as these could contaminate the instrument and cause spurious readings. Do not use hydrocarbon based lubricants at any time.**

- Any damaged seals should be replaced.
- Ensure correct voltage level supplied to **Xgard Bright** Detector.
- Check correct operation of the detector

3. General

! **Ensure maintenance, service and calibration are carried out in accordance with the procedures in the manual and only by trained, competent personnel.**

XGARD BRIGHT is designed to require minimal service and maintenance. As with all electrochemical sensors however, these will require periodic replacement. Use only genuine **Crowcon** replacement parts, refer to Section 10 for replacement parts.

3.1 ESD warning

! **Xgard Bright contains electronic components that may be damaged by electrostatic discharge. Observe anti-static precautions before dismantling Xgard Bright, such as wearing an anti-static wrist band. Where possible avoid touching components on the Xgard Bright PCB during servicing.**

3.2 Service requirements

3.2.1 Facilities required

! **Before handling any electronic components Electro-Static Discharge (ESD) precautions must be observed.**

- The environment should be clean and free of dust and dirt that could contaminate the equipment being repaired.
- Only proper well maintained tools should be used to carry out the repairs effectively and safely.
- Only spare parts approved and supplied by **Crowcon** may be used. Failure to do so may void the warranty.
- Spare parts should be suitably stored to avoid contamination with dirt, dust and ESD.
- All spare parts should be clearly identifiable, ideally via the original packaging.

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- • The Service Provider must ensure all tools and test equipment are calibrated in line with the manufacturer's recommendations and full records retained.

- Changes or modifications not expressly approved by **Crowcon** could void warranty and the user's authority to operate the equipment and cause safety implications.

3.3 Replaceable parts

The following sub-assemblies are replaceable parts:

20	Blanking Plug
19	M4 Washer ST-ST
18	M4 Sprint Washer ST-ST
17	n/a
16	n/a
15	M4 Pan Head Screw
14	Circlip
13	Ferrite
12	Terminal PCB Assy
11	Sensor Seals
10	Wire Guide
9	Enclosure Base Assy
8	Sensor Chamber Assy
7	Sensor Assy
6	Certification Label
5	Grub Screw
4	Main PCB Assy
3	M4 Stud
2	Enclosure Lid
1	Gas label
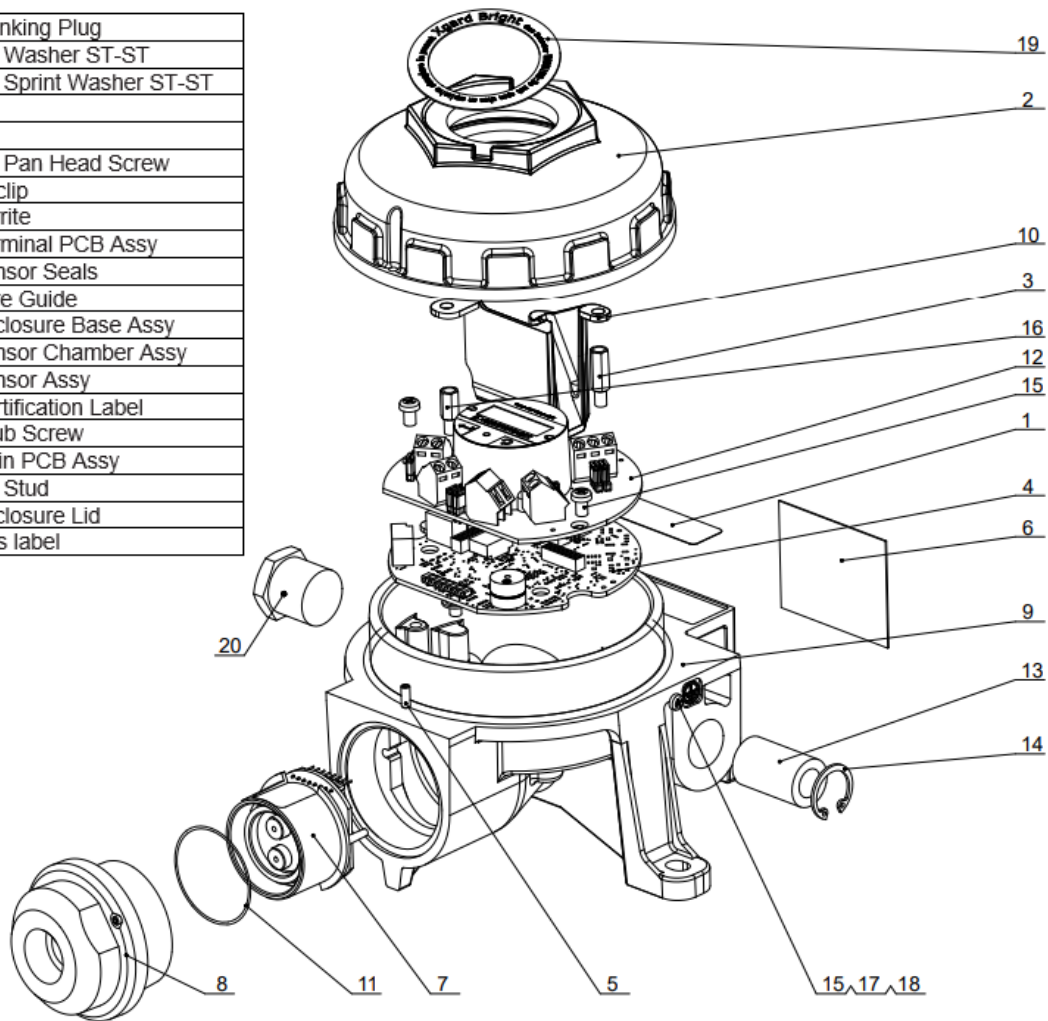
Figure 1: Aluminium Xgard Bright replaceable sub-assemblies

18	Blanking Plug
17	Main PCB Assy
16	Grub Screw
15	Sinter Housing Assy
14	Sensor Seals
13	Sensor Assy
12	M4x8 Pan Head Screw
11	M4 Spring Washer ST-ST
10	M4 Washer ST-ST
9	Enclosure Base Assy
8	Certification Label
7	Rivet
6	Gas Label
5	M4 Stud
4	Terminal PCB Assy
3	Wire Guide ST
2	Enclosure Lid Assy
1	Annular Label
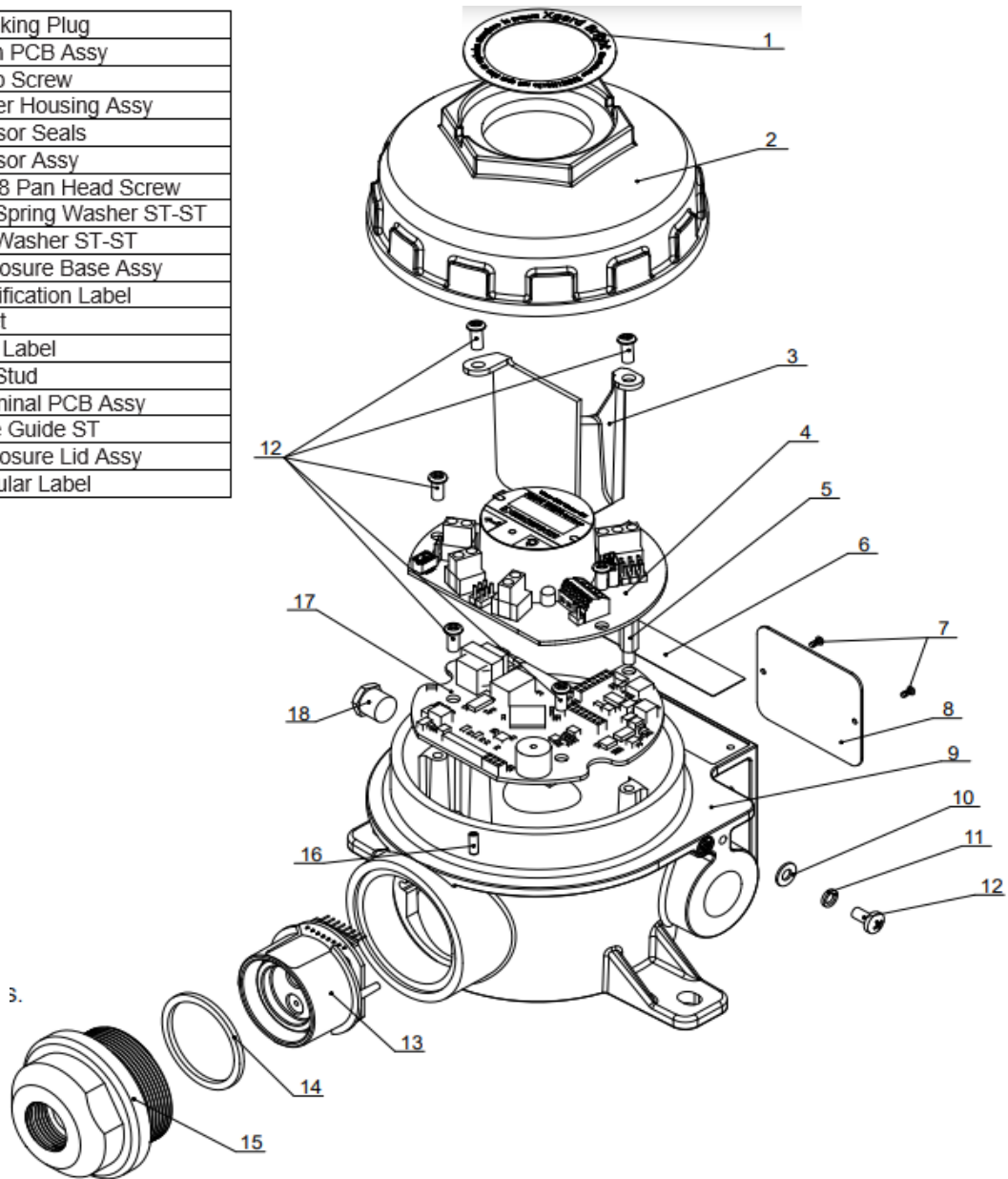
Figure 2: Stainless Steel Xgard Bright replaceable sub-assemblies

3.4 Routine parts replacement schedule

Xgard Bright parts as shown in Figure 1 should be replaced as required, however the sensor gasket should be replaced each time **Xgard Bright** is disassembled and the sensor PCB removed.

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3.5 Installation

- This manual covers the use of Xgard Bright Service software for Xgard Bright and Xsafe Bright. For detector operation instruction refer to the manual for detector operation instruction:

  Xgard Bright Manual: M079910

  Xsafe Bright Manual: M079911

- Run the setup.exe that comes with XgardBrightService.msi; you will need administrator permissions to complete the installation. Click OK when prompted with the default settings. The installation will create a shortcut on your desktop.

3.5.1 Pre-Launch Recommendations

- Before using the application for the first time it is recommended that you check the USB power settings for Windows 10. The default settings can, sometimes, result in a comms error when communicating with an **Xgard Bright** unit.

- To change the settings, please follow the instructions below:

▶ Navigate to "Edit Power Plan" via the start menu.

▶ In the window that appears, select "Change Advanced Power Settings".

If the option does not appear you do not have the appropriate privileges to make changes. In this case leave any default settings as they are:
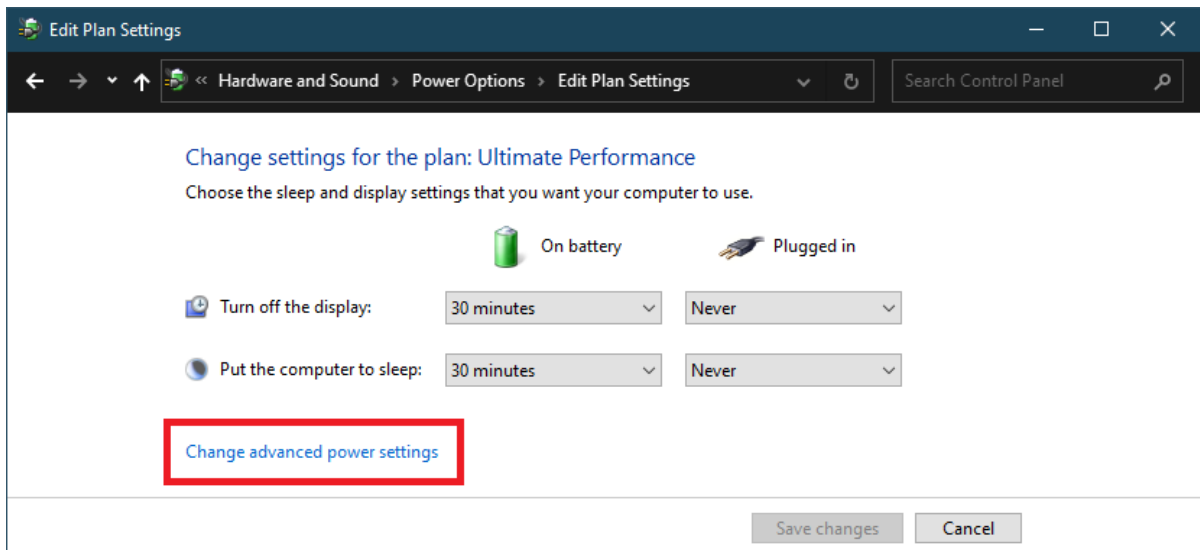
▶ When the new window appears, scroll down to "USB Settings".

▶ Expand the "USB Settings" until the "On Battery" & "Plugged In" options are available.

▶ Make sure that both options are set to "Disabled".

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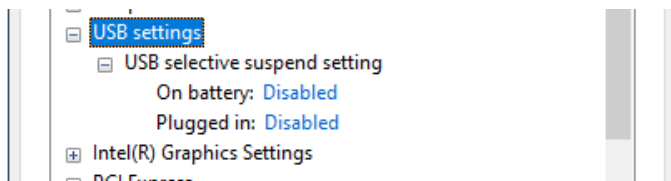
3.5.2 Communication

▶ A custom comms cable will be provided for connecting to Xgard Bright or Xsafe Bright units.

▶ This cable connects to the user's PC using the USB A connector and then to the device using the Mini B connector. Crowcon P/N: E07698.

⚠️ **Note: The "USB" style connector on the Xgard Bright does NOT implement the USB standard and as such should never be connected to a PC using a standard USB cable.**

▶ Alternatively, if the device is connected to a loop the PC can be connect to an Xgard Bright detector, using an USB-FTDI cable wire the 'orange' wire to terminal block 'A' and the 'yellow' wire to terminal block 'B' as shown in the image attached.

▶ Note that not all RS485 manufacturers agree on the polarity of the A and B signals. If the wiring does not work one way, users should switch the RS485 "A&B" wires. There is no risk in making the wrong connection. The communication settings are 9600 bps, two stop bits and no parity.

Cable required: **FTDI USB-RS485-WE**

4. Accessing Service Options

4.1 Identifying the Device

▶ Xgard Bright information can be found through the front panel, by clicking on the ↻ icon

Main screen	4-20mA value

Sensor data	Serial Number and MODBUS Address

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4.2 Manual Connection

▶ Manual is the default connection method when the application is first installed. To connect manually start the application and go to the **Comms** tab as shown here:

▶ Each line in the menu is a dropdown list:

▶ **Com Ports** will show the ports available on your machine, the other items will show a list of pre-programmed values.

▶ The number of **Slave Addresses** available are set in the **Settings** menu (see below).

▶ Select the settings for the device you wish to connect too.
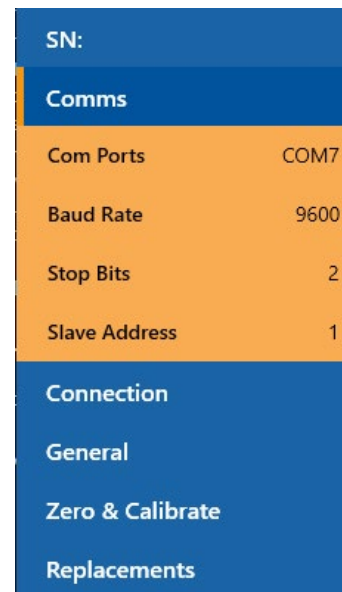
▶ Then select the **Connection** tab as shown here:

▶ Read **Xgard Bright** will read the device and populate the page with summary details, also **SN:** will show the device serial number.

▶ The other options are described in the **User Interface** section below.

Note: You must click Read Xgard to update the page you are viewing and when you swap to a different page.
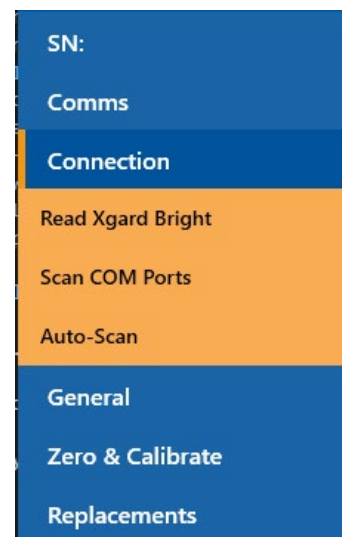
4.3 Auto-Scan Connection

▶ This connection method scans through a series of options in sequence and stops when an **Xgard Bright** is found.

▶ To open the form, Select **Settings** top-right of the application.

▶ Set **Slave Address Range** to the minimum and maximum Slave address to be scanned.

▶ Select the **Baud Rates** to try.

▶ Under **COM Ports** select the ports to try. The COM Ports listed will be the ones currently available on your machine.

▶ Any changes you make will be saved for the next session. If you select **Scan for device on start-up** the application will start an Auto-Scan immediately.

▶ To start an **Auto-Scan** go back to the **Connection** tab shown above and click Auto-Scan.

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5. User Interface Basics

There are two core parts to the application, the top menu, and the individual pages. The top menu consists of the Top Tabs, the Side Bar, and the Help and Settings menu. All of these are accessible at any point in the application and provide access to key functionality. Below is a breakdown of each section.

5.1 Top Menu

Help

► Help provides access to a short menu listing three options to the user:

    ► **Crowcon Website**, this will take you to https://www.crowcon.com/.

    ► **User Manual**, this will show this document.

    ► **About**, this will show software details including the current version.

Settings

► Settings provides access to a popup where various aspects of the software can be configured based on the user's preference and the needs of a site:

    ► **Scan for device on start-up**, which toggles functionality in the software which allows it to scan through all COM ports when launched in order to detect any connected devices.

    ► **COM Ports**, which displays a list of COM ports detected on the device and allows scanning though each port to be toggled between individually or all at once.

    ► **Baud Rates**, which displays a list of available baud rates and allows scanning for each to be toggled between individually or all at once.

    ► **Slave Address Range**, which allows the user to specify a range of slave ports when interacting with devices. This limits the number of slave ports for both the automatic scanning and the manual selection process.

🔔 Note: The slave address range also sets the range available in the Side Menu->Comms menu described below.

View

► View is a tab which allows the user to navigate to some of the key details of an Xgard Bright or Xsafe Bright device.

Maintenance

► Maintenance is the tab from where operators can perform actions related to servicing the device.
This tab serves as the hub for the most common actions required during servicing such as sensor replacement, main PCB replacement etc.

5.2 Side Menu

Under the **View** tab the following options are available.
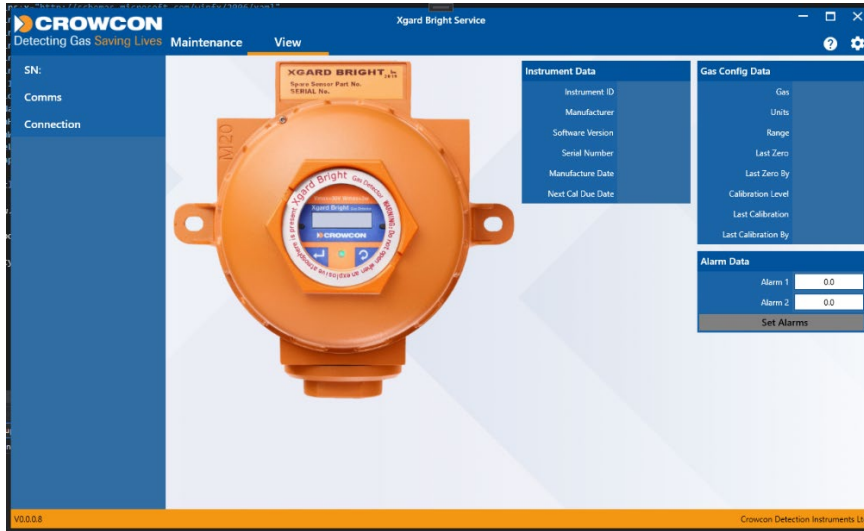
Comms

▶ **Comms** gives the user access to specify:

    ▶ COM Port

    ▶ Baud Rate

    ▶ Stop Bits

    ▶ Slave Address*

▶ These values are saved when the program is closed and are used as the defaults when the program is next opened.

*The range of slave addresses that can be selected is set by the Slave Address Range on the settings form described above

Comms	
Com Ports	COM3
Baud Rate	9600
Stop Bits	1
Slave Address	1

Connection

▶ **Connection** makes three options available to the operator:

▶ Read Xgard Bright retrieves the data stored on the connected device.

▶ Scan COM Ports detects currently active COM ports on the PC.

▶ **Auto-Scan** automatically scans through the Ports, Baud Rates, Stop Bits and Slave Addresses specified in Settings described above to find a device.

Connection
Read Xgard Bright
Scan COM Ports
Auto-Scan

General

▶ When the **Maintenance** tab is selected the following sections are available. **General** shows the basic maintenance features such as muting the device and changing the Serial Number.

▶ The Device's current behaviour can be viewed on the graph by clicking **Start Live Monitor**.

Zero and Calibrate

▶ Shows a page that displays functions which allow the user to zero/calibrate the Xgard Bright.

Replacements

▶ Shows a page that displays functions which allow the user to replace either the sensor or the main PCB.

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6. Zero & Calibration Procedures

6.1 Zero

▶ When the sensor is zeroed, either through the front panel or through the service software, the device is set to an inhibit state. This state will set the 4-20mA to 3mA.

▶ In cases whereby Xgard Bright detector is installed to a 'Control Panel', ensure panel is inhibited in order to prevent unwanted alarms.

▶ To perform a Zero through the front panel, refer to the manual for detector operation instruction:

Xgard Bright Manual: **M079910**

Xsafe Bright Manual: **M079911**

▶ To perform a zero on a device (field or production), through the service software navigate to the Maintenance tab.

▶ Select zero & calibrate page, it can be reached from the sidebar. Once there, select the type of sensor fitted in the device from the dropdown menu.

▶ Once this has been completed, click either the "Field Zero" button or the "Production Zero" button depending on what is appropriate for the situation. Note that Field Zero is not possible for an Oxygen sensor.

⚠ **Note: For MPS devices, it is critical that zero process is performed in 'clean air'. Exposure to synthetic air will result in a mis-calibrated device.**

6.2 Calibrating

▶ The calibration gas must only be applied to the sensor using Crowcon calibration adaptor C03005. For most sensors, a flowrate of 0.5 litres per minute is advised. Calibration can be performed with a suitable gas concentration from 10% of the scale range.

⚠ **For flammable gas IR detectors, methane IR measurements are calibrated using methane, but for all other flammable gas types including Butane / Pentane / LPG IR the calibration gas to be used should be Propane to calibrate Xgard Bright IR.**

⚠ For **Xgard Bright** devices fitted with MPS sensor, do not calibrate device using a standard methane cylinder **with a balance gas composition of 20.9% Vol O2 balanced in Nitrogen. This cylinder does not contain** required level of oxygen and will result in incorrect gas bump test readings. Refer to **section 6.2.2 Calibration of MPS Flam sensor for guidance on suitable gas mixtures.**

▶ The analogue output signal will be inhibited to 3mA whilst using the calibration function either from the detector UI or the Xgard Bright Service Application. In cases whereby Xgard Bright detector is installed to a 'Control Panel', ensure panel is inhibited in order to prevent unwanted alarms.

Note: This function is only available from the service application from firmware version 2.28 onwards.

▶ To perform a calibration on a device (field or production), navigate to the Maintenance tab.

▶ From the maintenance tab, select the zero & calibrate page, it can be reached from the sidebar. Once there, select the type of sensor fitted in the device from the dropdown menu.

▶ Click Read Xgard under the Connection menu.

▶ Once this has been completed, click either the "Field Calibration" button or the "Production Calibration" button depending on what is appropriate for the situation.

▶ When using either field/production calibration, enter the level of gas (ppm or %VOL) being applied from the cylinder to calibrate correctly to the level

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6.2.1 ATEX/UL Scaling

Xgard Bright Service App 1.0.1.5 or later includes updates to accommodate additional UL scaled Xgard Bright detectors.

▶ ATEX/UL toggles (where applicable) and ATEX/UL sensor type entries are used to differentiate between either certification region.

▶ For All Pellistors, Pentane IR, Butane IR, LPG IR use toggle option to switch between ATEX/UL types. Ensure this is correctly set prior to starting calibration process. Calibration Level should be entered in %Vol.

▶ Methane IR, Propane IR and MPS all use separate entries on the 'Sensor Types' drop down. Ensure this is correctly set prior to starting calibration process. Calibration Level should be entered in %Vol.

⚠️ **For sensor types with multiple entries, the Xgard Bright Service App will default to ATEX type. Ensure the correct entry is selected. Example below.**

6.2.1 LPG Calibration Tool

Xgard Bright Service App 1.0.1.5 or later includes updates to accommodate individual gas cylinder composition entries for LPG pellistor.

▶ Since LPG gas type is a 70/30 mix of both Propane & Butane gases. The Xgard Bright Service App has been updated to allow the user to enter the actual gas levels of their specific calibration mix. Calibration Level should be entered in %Vol.

⚠️ **For LPG IR detectors, the calibration gas to be used should be Propane to calibrate Xgard Bright IR.**

6.2.2 Calibration of MPS Flam Sensor

Cylinder Compositions Suitable for Calibration & Bump Test

▶ To calibrate or bump test the **Xgard Bright** MPS, only one of the following cylinder compositions must be used.

▶ Failure to use a cylinder with compositions listed below may result in an incorrectly calibrated device or an incorrect bump test reading. Scaling may be applied to MPS calibration level (%LEL) depending on ATEX or UL local directive. Defined levels below.

Quad Gas Mix – EN & ISO Concentrations

- 2.2%Vol Methane
- 18%Vol Oxygen
- 15ppm Hydrogen Sulphide
- 100ppm Carbon Monoxide
- Balanced in Nitrogen

Quad Gas Mix – EN & ISO Concentrations (Alternative Mix)

- 2.5%Vol Methane
- 18%Vol Oxygen
- 15ppm Hydrogen Sulphide
- 100ppm Carbon Monoxide
- Balanced in Nitrogen
- 2.2%Vol CH4 = 50%LEL (EN / ATEX) / 44%LEL (ISO / UL)
- 2.5%Vol CH4 = 57%LEL (EN / ATEX) / 50%LEL (ISO / UL)

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7. Performing Common Actions

7.1 Setting Alarm Levels

▶ To set the alarm levels to a custom value, navigate to the "View" tab.

▶ Click Read Xgard under the Connection menu

▶ Using the text boxes available under Alarm Data, enter the values for both alarm 1 and alarm 2. Once these are entered, click "Set Alarms". The device will then set the alarm levels. The change can be confirmed by clicking Read Xgard Bright on the Side Menu.

7.2 Changing the Serial Number

▶ To change the serial number to an alternate value, navigate to the Maintenance tab.

▶ Under the maintenance tab, select general page, it can be reached from the sidebar.

▶ Click Read Xgard under the Connection menu

▶ Using the textbox available under Set Serial Number, enter the new serial number for the device. Once it is entered, click "Set". The change can be confirmed by clicking Read Xgard Bright on the Side Menu.

7.3 Muting the Device

 The device is muted automatically during zero and calibration. It can be muted manually in the following way.

▶ To mute the unit for a set period of time, navigate to the Maintenance tab.

▶ Under the maintenance tab, select the general page, it can be reached from the sidebar.

▶ Click Read Xgard under the Connection menu

▶ Using the slider available under Mute Time, select a value between 0 - 10. This corresponds to minutes that the device will be muted for. Once a value is chosen, click mute and the device will remain silent until the time runs out or the time is set to 0.

Note: mute will also be cancelled if the device is powered off and back on again.

7.4 Setting a Custom Calibration Date

▶ To set a custom calibration date, navigate to the "Maintenance" tab.

▶ Once there, make sure that a device is connected. Enter the relevant comms details in the sidebar and use the "Read Xgard Bright" function under the Connections section on the sidebar.

▶ In the maintenance tab, make sure that the general window is displayed, it can be reached from the sidebar.

▶ Using the calendar available under Custom Cal Date, select a new calibration date for the device (limited between the current day and 2-years from the day). Once it is entered, click "Set Cal Date". The device will then set the new calibration due date and it will be shown when rereading the device.

8. Removal/Replacement Procedures

8.1 Replacing Sensor Module

This section describes the process of replacing an **Xgard Bright** sensor module a new replacement.

The process is as follows.

▶ To replace a sensor in a device, navigate to the Maintenance tab.

▶ Under the maintenance tab, select the replacements page, it can be reached from the sidebar.

▶ Make sure a device is connected and the appropriate sensor is selected in the dropdown menu. Once this has been set up, input a calibration level, and use the "Replace Sensor" button under Sensor Replacement to start the process.

▶ Follow on-screen instructions for zero & calibration process.

▶ Switch off and isolate power to the detector requiring attention, remembering to inhibit the control system as not to trigger any false alarms.

▶ Open the junction box of the detector by unscrewing the lid in an anticlockwise direction having loosened the retaining grubscrew first on aluminium enclosures).

▶ Unscrew the sensor retainer (having loosened the retaining grubscrew first on aluminium and stainless-steel enclosures). Inspect the sinter (if fitted) for dirt/debris, blockages and or corrosion. Remove the sensor module. Carefully withdraw the senor module (following ESD precautions); making sure not to damage the mating pins.

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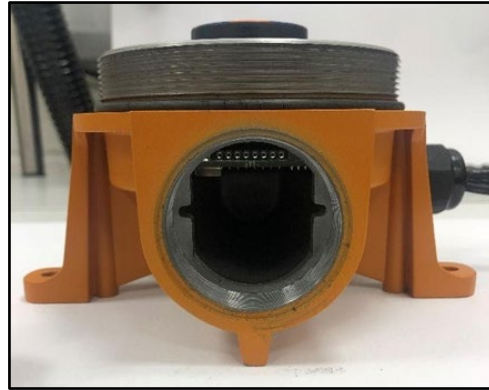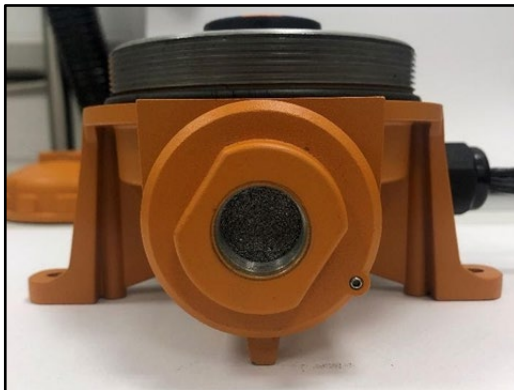
► Fit the replacement sensor module (having checked that the part number matches that stated on the detector junction box label), taking care to align the locating pins correctly with the slots in the junction box.

► Re-fit the sensor retainer (and re-secure the anti-vibration grubscrew on aluminium and stainless-steel enclosures). Inspect condition of sensor seal fitment inside sensor retainer and subsequent O-ring prior to re-assembly.
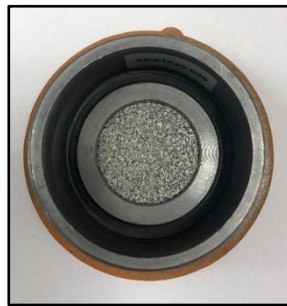
► Follow the Zero and Calibration instructions as per Xgard Bright Service PC application, ensure sensor soak times have been adhered to prior to attempting calibration process.

8.1.1 Leaded O2 to LLO2 Sensor Upgrade Process

**Please note Xgard Bright Service will need to be updated to version V1.0.1.7 or above to maintain compatibility with the new Lead Free O2 sensor*

Follow the below steps for upgrading detectors from a Leaded O2 to a Lead-Free O2 Sensor;

1) Open app and 'read' connected Xgard Bright. Should appear as the Leaded O2 Bright variant.

2) Navigate to Maintenance > Replacements screen.

3) Change 'Sensor Type' drop-down in the app to Lead-Free O2 option (Manual operation by Engineer). Control panel must be inhibited during this process/operation

4) Click the 'Replace Sensor' button.

5) Starting this operation a window will appear stating to insert new sensor module. This message is generic as per like-for-like sensor module installations and makes nor specific reference to new LLO2 module.

6) Swap-out sensor module in Bright for LLO2 type as per pop-up.

7) Sensor Reset Complete window appears, Click Ok.

8) Reading the instrument to get updated values window appears, Click Ok.

9) Click OK when gas is applied window appears, Click Cancel. Process cancelled to allow device to bias-up/stabilise. Refer technical note reference XGB013 for sensor stabilisation time.

10) Sensor Replacement failed. Click OK. Return back to Service App screen.

11) Leave device for sensor stabilisation time. As per tech note.

12) Re-use the 'Replace Sensor' function/button, though follow process fully as per on-screen prompts. Calibration process will follow.

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8.2 Terminal PCB Replacement

This section describes the process of replacing an **Xgard Bright** terminal PCB.

The process is as follows.

▶ Switch off and isolate power to the detector requiring attention, remembering to inhibit the control system as not to trigger any false alarms.

▶ Open the junction box of the detector by unscrewing the lid in an anticlockwise direction having loosened the retaining grubscrew first on aluminium enclosures). See Sensor module replacement – step 2 for illustration.

▶ Disconnect electrical and communications cabling installed to the detector via the screw terminals as highlighted below. For ease of access, remove wiring completely from detector cable entry area also. Remove all relay and sounder output wiring from the detector if applicable.

▶ Remove the 4x screws securing Terminal PCB to the detector assembly.

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▶ Withdraw the wire guide from inside of the detector.
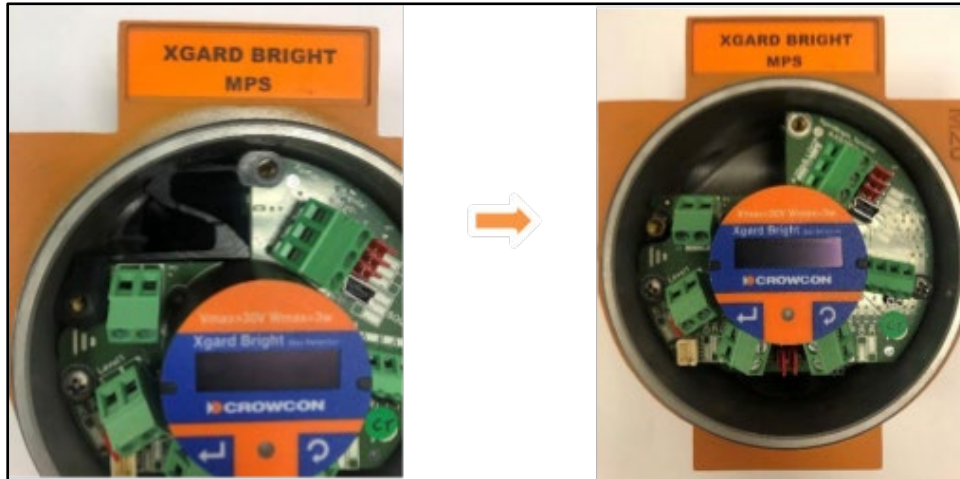
▶ Carefully remove the Terminal PCB from the detector taking care not to damage the connection on the underside.

▶ Re-fit the replacement Terminal PCB in the Bright enclosure, ensure to align the mating connection. Check the initial links (sink/source and relays) have been re-set on the replacement terminal PCB.
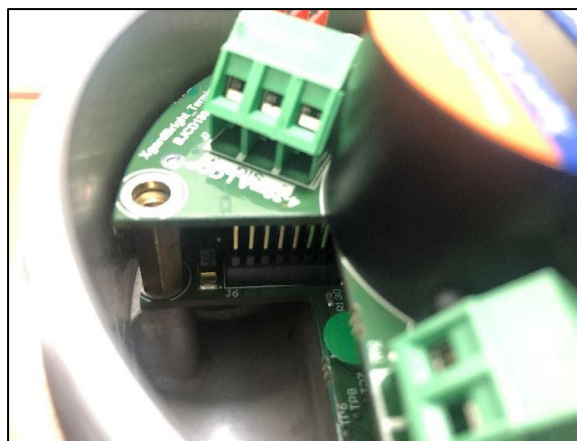
▶ Follow above steps in reverse to re-assemble device back to original specification. Re-fit the wire guide and ensure field cables are securely terminated. Re-apply power, leave for a stabilisation time of approx. 1 hr.

▶ Follow the Zero and Calibration instructions as per Xgard Bright Service PC application, ensure sensor soak times have been adhered to prior to attempting calibration process. Test all output functions are to full functionality.

8.3 Main PCB Replacement

This section describes the process of replacing an **Xgard Bright** terminal PCB**.**

The process is as follows.

8.3.1 Extracting Board Data

▶ To replace the mainboard in a device, navigate to the "Maintenance" tab.

▶ Under the maintenance tab, select the replacements page, it can be reached from the sidebar.

▶ Click Read Xgard under the Connection menu.

▶ Use the "Replace Board" button under Replace Main Board to start the process. A prompt will appear during the process informing the user when to disconnect the Xgard Bright unit and swap to the new board before reconnecting.

> ⚠ If the original board is not functional/responsive refer to the Main PCB Replacement below. Once the new board is fitted, refer to the Default Board Config under Maintenance > Replacements. Continue with the Load Default Board Config, once completed, zero and calibrate the device as normal.

8.3.2 Main PCB Replacement

▶ Switch off and isolate power to the detector requiring attention, remembering to inhibit the control system as not to trigger any false alarms.

▶ Open the junction box of the detector by unscrewing the lid in an anticlockwise direction having loosened the retaining grubscrew first on aluminium enclosures). See Sensor module replacement – step 2 for illustration.

▶ Unscrew the sensor retainer (having loosened the retaining grubscrew first on aluminium and stainless-steel enclosures). Inspect the sinter (if fitted) for dirt/debris, blockages and or corrosion. Remove the sensor module. Carefully withdraw the senor module (following ESD precautions); making sure not to damage the mating pins.

▶ Disconnect electrical and communications cabling installed to the detector via the screw terminals as highlighted below. For ease of access, remove wiring completely from detector cable entry area also. Remove all relay and sounder output wiring from the detector if applicable. See Terminal PCB replacement – step 3 for illustration.

▶ Remove the 4x screws securing Terminal PCB to the detector assembly. See Terminal PCB replacement – step 4 for illustration.

▶ Withdraw the wire guide from inside of the detector. See Terminal PCB replacement – step 5 for illustration.
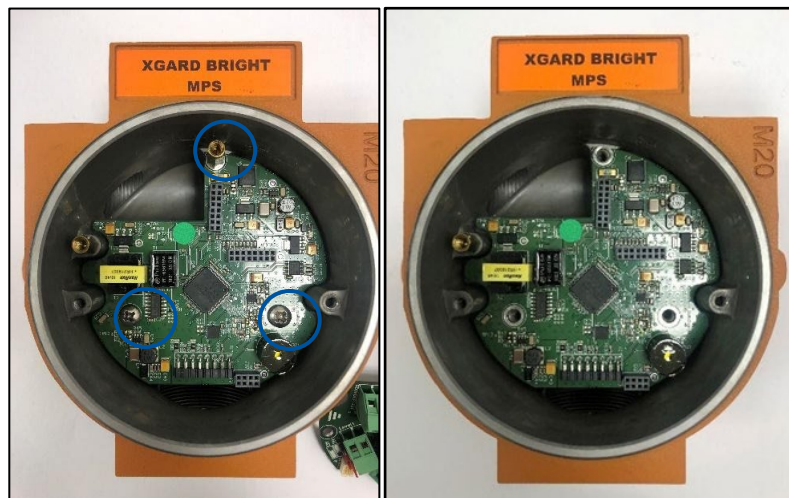
▶ Carefully remove the Terminal PCB from the detector taking care not to damage the connection on the underside. See Terminal PCB replacement – step 5 for illustration.

▶ Remove the 2x screws securing Main PCB to the detector enclosure. Using a 7mm spanner/nut runner, unscrew the top support pillar.

▶ Carefully remove the Main PCB (following ESD precautions) from the enclosure; making sure not to damage while removing.

▶ Re-fit the replacement Main PCB into the Bright enclosure and re-secure with correct hardware as initially removed. Ensure correct main PCB type has been installed back into the detector.

▶ Re-fit the replacement Terminal PCB in the Bright enclosure, ensure to align the mating connection. See Terminal PCB replacement – step 7 for illustration.

▶ Follow above steps in reverse to re-assemble device back to original specification. Re-fit the wire guide and ensure field cables are securely terminated. Re-apply power, leave for a stabilisation time of approx. 1 hr.

▶ Follow the Zero and Calibration instructions as per Xgard Bright Service PC application, ensure sensor soak times have been adhered to prior to attempting calibration process. Test all output functions are up to full functionality.

Note: Relay tests will need to be performed manually. Ensure that the relays activate at the correct gas levels.

9. Additional Servicing Information

9.1 Routine maintenance

The operational life of the sensors depends on the application, frequency and amount of gas being seen. Under normal conditions (6 monthly calibration with periodic exposure to test gas) the typical life expectancy of sensors is as follows:

- Oxygen sensors: 2+ years
- Long-Life Oxygen Sensor: 5+ years
- Flammable sensor (MPS):   10+ years
- Flammable sensor (IR):   10+ years
- Flammable gas sensor (Pellistor) :   5 years
- Electrochemical toxic gas sensors: 2-3 years

Site practices will dictate the frequency with which detectors are tested. Crowcon would recommend that detectors be gas tested at least every 6 months and re-calibrated, as necessary. To re-calibrate a detector, follow the steps given in these instructions. The calibration frequency should be increased in environments subject to extreme heat and/or dust, and where gas is frequently present.

When performing maintenance on Xgard Bright, ensure that the sensor retainer and junction box lid O-rings are present and in good condition to maintain the ingress protection of the product. Ensure grub screws are tightened after re-assembly. See the 'Spare parts and accessories' section for the part numbers of replacement O-rings.

9.2 Other Commissioning Checks

If the Xgard Bright fixed detector is connected to a control system, check:

▶ The type of cables and glands used are appropriate and correctly fitted/terminated.

▶ The earth and cable screen connections are correctly made.

▶ The detector labels are present and clearly legible.

▶ The sensor has been installed in an appropriate location for the gas to be detected.

▶ Suitable accessories have been installed.

▶ The system input dedicated to the Xgard Bright is not in fault and reads zero gas when the Xgard Bright sensor reads zero (i.e., 4mA signal check).

▶ The system input dedicated to the Xgard Bright reads full-scale gas when the Xgard Bright output signal is set to 20mA.

▶ The system input dedicated to the Xgard Bright goes into fault mode when a fault condition is present on the Xgard Bright (e.g., by removing the sensor module).

▶ Any devices connected directly to the Xgard Bright relay outputs and sounder output (if fitted) operate correctly in an Alarm or Fault condition.

▶ The detector configuration is checked and signed-off by the user.

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10. Service Spares

Part Number	Description
C01647	**Xgard Bright** Spare/Replacement M4 Earth Stud Assembly
S012501	**Xgard Bright** Main PCB Assembly with HART function
S012506	**Xgard Bright** Main PCB Assembly without HART function
M04885	**Xgard Bright** Spare Sensor Seal
S012511	**Xgard Bright** Spare Terminal PCB Assembly
M03871	**Xgard Bright** Threaded Hex Spacer 15mm (M4)
M03870	**Xgard Bright** Threaded Hex Spacer 10mm (M4)
M03760	**Xgard Bright** Spare M4 x 8 Posi Pan Head Screw (May require 7)
M03810	**Xgard Bright** M3x6 Grub Screw (Customer may require 2)
M02125	**Xgard Bright** Spare M20 to 1/2" NPT Adapter
C03756	**Xgard Bright** Cro-Mag
MIS99033	**Xgard Bright** Allen Key
S015100/S	**Xgard Bright** Spare Sensor Module Methane 0-100% LEL CH4 (Pellistor)
S015101/S	**Xgard Bright** Spare Sensor Module Oxygen 0-25% vol O2
S015142/S	**Xgard Bright** Spare Sensor Module Lead Free Oxygen 0-25%Vol
S015107/S	**Xgard Bright** Spare Sensor Module Hydrogen Sulphide 0-10ppm H2S
S015102/S	**Xgard Bright** Spare Sensor Module Hydrogen Sulphide 0-25ppm H2S
S015103/S	**Xgard Bright** Spare Sensor Module Hydrogen Sulphide 0-50ppm H2S
S015104/S	**Xgard Bright** Spare Sensor Module Hydrogen Sulphide 0-100ppm H2S
S015105/S	**Xgard Bright** Spare Sensor Module Hydrogen Sulphide 0-200ppm H2S
S015109/S	**Xgard Bright** Spare Sensor Module Carbon Monoxide 0-50ppm CO
S015110/S	**Xgard Bright** Spare Sensor Module Carbon Monoxide 0-100ppm CO
S015112/S	**Xgard Bright** Spare Sensor Module Carbon Monoxide 0-250ppm CO
S015113/S	**Xgard Bright** Spare Sensor Module Carbon Monoxide 0-500ppm CO
S015114/S	**Xgard Bright** Spare Sensor Module Carbon Monoxide 0-1000ppm CO
S015115/S	**Xgard Bright** Spare Sensor Module Carbon Monoxide 0-2000ppm CO
S015120/S	**Xgard Bright** Spare Sensor Module LPG 0-100% LEL (Pellistor)
S015121/S	**Xgard Bright** Spare Sensor Module Hydrogen 0-100% LEL H2 (Pellistor)
S015130/S	**Xgard Bright** Spare Sensor Module Pentane 0-100% LEL C5H12 (Pellistor)
S015118/S	**Xgard Bright** Spare Sensor Module Methane IR 0-100% LEL
S015122/S	**Xgard Bright** Spare Sensor Module Pentane IR 0-100% LEL
S015123/S	**Xgard Bright** Spare Sensor Module Propane IR 0-100% LEL
S015128/S	**Xgard Bright** Spare Sensor Module Butane IR 0-100% LEL
S015129/S	**Xgard Bright** Spare Sensor Module LPG IR 0-100% LEL
S015135/S	**Xgard Bright** Spare Sensor Module FLAM MPS 0-100% LEL (ATEX)
S015141/S	**Xgard Bright** Spare Sensor Module FLAM MPS 0-100% LEL (UL)
S015119/S	**Xgard Bright** Spare Sensor Module Carbon Dioxide 0-5%Vol

11. Appendices

11.1 Sensor Limitations

Detectors fitted with electrochemical toxic gas sensors may be degraded when used in ambient temperatures above 55°C, reducing life at these temperatures.. Water should not be allowed to collect on the sensors as this may impede gas diffusion. Use with care in wet or humid environments where water may condense on the sensors, and check response after use.

Persistent exposure to high levels of toxic gas can shorten the life of toxic sensors. Toxic sensors may also be cross-sensitive to gases other than their specific target gas, and hence the presence of other gases may cause the sensor to respond. If unsure, contact Crowcon or your local agent.

Use of high power radio transmitters in close proximity to the detector may exceed RFI immunity levels and cause erroneous indications. If such problems are experienced, remove antennae to a reasonable distance from the detector (e.g. 30 cm).

Standard units detect flammable gases using a catalytic flammable sensor which operates in the presence of oxygen. It is advisable to check the oxygen concentration as well as the flammable gas concentration before entering a confined space. Oxygen levels below 10% will reduce a flammable gas reading.

The performance of catalytic sensors may be permanently degraded if exposed to silicones, sulphur containing gases (such as H2S), lead or chlorine compounds (including chlorinated hydrocarbons).

Because the MPS performs an analysis of the molecular properties of a given "air" sample, large-scale fluctuations in the relative concentrations of the components in the air can affect accuracy. Normal air has an O2 concentration of 20.95% by volume. Higher ambient O2 concentrations up to ~21.8 %VOL have little to no effect on the sensor. Oxygen levels below 15% will introduce an error of up to -6%LEL, with an error increasing to approximately -12%LEL with a local O2 concentration of 5%Vol.

The MPS sensor is extremely poison resistant and unaffected when to exposed to silicones, sulphur containing gases (such as H2S), lead or chlorine compounds (including chlorinated hydrocarbons).

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11.2 MPS Operational Guidance

Please note the following guidance for correct operation of **XGARD BRIGHT** MPS;

Scenario	Do not
Calibration	Do not calibrate the device using a standard methane cylinder with a balance gas composition of 20.9% Vol O_2 balanced in Nitrogen. This cylinder does not contain required level of oxygen and will result in incorrect calibration (air indicated on cylinders is not typically atmospheric air)
Calibration	Do not calibrate with gas other than methane, within the cylinder compositions detailed.
ISO Calibrated Levels	Ensure ISO calibration level set correctly, 2.2% VOL CH_4 = 44% LEL, 2.5% VOL CH_4 = 50% LEL
EN Calibrated Levels	Ensure EN calibration level set correctly, 2.2% VOL CH_4 = 50% LEL, 2.5% VOL CH_4 = 57% LEL
Calibration	Do not perform zero with synthetic air as this will adversely affect accuracy – use ambient air only
Bump testing. If 'bump testing following operation in 'ambient air'	Do not bump test device using a standard methane cylinder with a balance gas composition of 20.9% Vol O_2 balanced in Nitrogen. This cylinder does not contain required level of oxygen and will result in incorrect gas bump test readings.

Scenario	Do
Calibration & Bump Test	Do only use cylinder compositions detailed in this technical note
Calibration	Do ensure actual level of applied calibration gas (stated on cylinder calibration certificate) is entered into calibration software for optimum accuracy
Calibration	Do use ambient clean air only to perform 'zero' - synthetic air will adversely affect accuracy
Bump Test & Calibration	Do ensure gas is applied for correct stabilisation time
Calibration	Do only use methane as calibration gas, within the cylinder compositions detailed.
Calibration & Bump Test	Do use recommended flow rate of 0.5 l/m

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12. Warranty

This equipment leaves **Crowcon**'s factory fully tested and calibrated. If within the warranty period of **two years** from despatch, the equipment which includes battery and common sensors (see sensor chart below) is proved to be defective by reason of faulty workmanship or material, we undertake at our option either to repair or replace it free of charge, subject to the conditions below.

Sensor Warranty

Sensor Type	Warranty	Expected Life
Flammable (MPS)	5 years	>10 years
Flammable (IR)	2 years	>5 years
Flammable (Pellistor)	2 years	>5 years
Long Life Oxygen	5 years	>5 years
Oxygen	2 years	>2 years
Carbon monoxide	2 years	>2 years
Hydrogen sulphide	2 years	>2 years

Warranty Procedure

To facilitate efficient processing of any claim, please visit the following web-page and provide the information listed below:

https://www.crowcon.com/help-and-advice/customer-support/warranty/

- Your contact name, phone number, address and email address.
- Identity and quantity of goods being returned, including any accessories.
- Instrument serial number(s).
- Reason for return.

You will receive a warranty reference number which must be clearly shown on the address label when the goods are returned.

The guarantee will be rendered invalid if the detector is found to have been altered, modified, dismantled, tampered with, or has not used Crowcon spares for replacement parts or has been serviced or repaired by any party not authorised and certified by Crowcon to do so.

Sensor types have individually defined warranty periods which can differ from the hardware warranty period. Crowcon reserve the right to amend warranty periods for particular applications. Sensor warranty is rendered invalid if the sensors have been exposed to excessive concentrations of gas, extended periods of exposure to gas or have been exposed to 'poisons' that can damage the sensor, such as those emitted by aerosol sprays.

Use of alternative manufacturer's sensors which have not been approved by Crowcon will invalidate the warranty of the product as a whole.

Warranty Disclaimer

Crowcon accept no liability for consequential or indirect loss or damage howsoever arising (including any loss or damage arising out of the use of the detector) and all liability in respect of any third party is expressly excluded. This warranty does not cover the accuracy of the calibration of the unit or the cosmetic finish of the product. The unit must be maintained in accordance with the instructions in this manual.

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The warranty on replacement consumable items (such as the mirror) supplied under warranty to replace faulty items, will be limited to the unexpired warranty of the original supplied item.

Crowcon reserves the right to determine a reduced warranty period, or decline a warranty period for any sensor supplied for use in an environment or for an application known to carry risk of degradation or damage to the sensor.

Our liability in respect of defective equipment shall be limited to the obligations set out in the guarantee and any extended warranty, condition or statement, express or implied statutory or otherwise as to the merchantable quality of our equipment or its fitness for any particular purpose is excluded except as prohibited by statute. This guarantee shall not affect a customer's statutory rights.

Crowcon reserves the right to apply a handling and carriage charge whereby units returned as faulty, are found to require only normal calibration or servicing, which the customer then declines to proceed with.

Product Use:

Every effort has been made to ensure the accuracy of this document at the time of printing. In accordance with the company's policy of continued product improvement Crowcon Detection Instruments Limited reserves the right to make product changes without notice. The products are routinely subject to a programme of testing which may result in some changes in the characteristics quoted. Technical information contained in this document or otherwise provided by Crowcon are based upon records, tests, or experience that the company believes to be reliable, but the accuracy, completeness, and representative nature of such information is not guaranteed. Many factors beyond Crowcon Detection Instruments' control and uniquely within user's knowledge and control can affect the use and performance of a Crowcon product in a particular application.

As the products may be used by the client in circumstances beyond the knowledge and control of Crowcon Detection Instruments Limited, we cannot determine the relevance of these to an individual customer's application. It is the clients' sole responsibility to carry out the necessary tests to evaluate the usefulness of the products and review all applicable regulations and standards to ensure their safety of operation in a particular application.

Warranty, Limited Remedy, and Disclaimer:

Unless an additional warranty is specifically stated on the applicable Crowcon product packaging or product literature, Crowcon warrants that each Crowcon product meets the applicable Crowcon product specification at the time of shipment. CROWCON MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If the Crowcon product does not conform to this warranty, then the sole and exclusive remedy is, at Crowcon's option, replacement of the Crowcon product or refund of the purchase price.

Limitation of Liability:

Except where prohibited by law, Crowcon will not be liable for any loss or damage arising from the Crowcon product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

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