MERLIN GAS DETECTOR X

📖 **Installation, Operation & Maintenance**

Please read this manual carefully and retain for future use.

At S&S Northern, we supply a full range of remote gas detectors including carbon monoxide (CO), natural gas/methane (NG), hydrogen (H), oxygen (O_2) and liquid petroleum gas (LPG) that are compatible with our range of Merlin control panels.

⚠ *The information contained within this manual should be referenced for typical installation and operation only.*
⚠ *For specific requirements that may deviate from the information in this guide – contact your supplier.*

Contents

⚠ **Important Warning Statements**

Please take the time to thoroughly read this user's guide which should be retained for future reference.

The expected lifetime of gas sensor is 3-10 years upon initial power up dependant on your target gas and environmental factors.

The device will display a message to indicate this time and should immediately be replaced.
It is recommended that this device be commissioned upon installation and serviced annually.
Do not apply lighter gas or other aerosols to the device – this will cause extreme damage.
High concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements.
This device is designed to detect the gas type displayed on the screen only from any source of combustion or dangerous level. It is NOT designed to detect smoke, fire or other gases and should NOT be used as such.
This device provides early warning of the presence of gas, usually before a healthy adult would experience symptoms. This early warning is possible provided your alarm is located, installed and maintained as per this manual.
Never ignore your device when in alarm.
This device requires a continual supply of electrical power – it will not work without power.
This device should not be used to substitute proper installation, use and/or maintenance of fuel burning appliances including appropriate ventilation and exhaust systems.
This device does not prevent dangerous gasses from occurring or accumulating.
Actuation of your alarm indicates the presence of dangerous levels of gas.
Seek fresh air supply and contact your local gas emergency service should you suspect a gas leak.
This unit may not fully safeguard individuals with specific medical conditions. If in doubt, consult a doctor/physician.
Your product should reach you in perfect condition, if you suspect it is damaged, contact your supplier.

Manufacturer's Warranty

Three (3) Year Warranty: Carbon Monoxide/Liquid Petroleum/ Methane/Hydrogen Gas Detectors
One (1) Year Warranty: Oxygen Gas Detectors

Warranty coverage: The manufacturer warrants to the original consumer purchaser, that this product will be free of defects in material and workmanship for a period of three (3) years from date of purchase or one (1) years for oxygen detectors.
The manufacturer's liability hereunder is limited to replacement of the product with repaired product at the discretion of the manufacturer. This warranty is void if the product has been damaged by accident, unreasonable use, neglect, tampering or other causes not arising from defects in material or workmanship. This warranty extends to the original consumer purchaser of the product only.

Warranty disclaimers: Any implied warranties arising out of this sale, including but not limited to the implied warranties of description, merchantability and intended operational purpose, are limited in duration to the above warranty period. In no event shall the manufacturer be liable for loss of use of this product or for any indirect, special, incidental or consequential damages, or costs, or expenses incurred by the consumer or any other user of this product, whether due to a breach of contract, negligence, strict liability in tort or otherwise. The manufacturer shall have no liability for any personal injury, property damage or any special, incidental, contingent or consequential damage of any kind resulting from gas leakage, fire or explosion. This warranty does not affect your statutory rights.

Warranty Performance: During the above warranty period, your product will be replaced with a comparable product if the defective product is returned together with proof of purchase date. The replacement product will be in warranty for the remainder of the original warranty period or for six months – whichever is the greatest.

🗑 **Information on waste disposal for consumers of electrical & electronic equipment.**

When this product has reached the end of its life it must be treated as Waste Electrical & Electronics Equipment (WEEE).
Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. Please contact your supplier or local authority for details of recycling schemes in your area.

⚠ *At the end of their working life, electrochemical sensors for oxygen and carbon monoxide detectors should be disposed of in an environmentally safe manner.*
⚠ *Alternatively all detectors can be securely packaged and returned to S&S Northern clearly marked for disposal.*
⚠ *Electrochemical sensors should not be incinerated as this may cause the cell to emit toxic fumes.*

Installation

Planning

Our detectors should be installed in hazardous areas only at risk of gas leaks e.g. over boilers, valves or meters. Take in to account the design of the air flow patterns within the zone area.

Detectors should be installed in the correct orientation, as recommended by the manufacturer, and ease of access should be accounted for to allow for any bump tests, recalibration and other forms of maintenance.

Consider the coverage required and function of the area. Emphasis should be placed on airflow patterns and correct placement, not perceived detecting ranges. The target gas will only be identified when contact is made with the sensing element itself.

Maximum Gas Detectors Per Zone

Merlin 'S' panel range '1000S/ S+ / SW+ / 1500S / 2000S / S+ / SW+'	**1**
Merlin 'GDP2 & GDP4' panel range	**3**
Merlin 'GDP2X & GDPX+' panel range	**4**

⚠ *Multiple detectors may be required to adequately protect property and persons!*

⚠ *Avoid conditions of any other environmental factors that could potentially impede the accuracy and operation of the detectors such as; condensation; vibration; temperature, pressure, the presence of other gases, electromagnetic interference and draft zones!*

⚠ *The device is not intended/approved for use in potentially explosive atmospheres!*

Typical Location and Positioning

Locations for detectors will vary based on the intended application and target gas, they should be located near identified sources of a potential gas leaks/pockets where hazardous gas could quickly accumulate and areas of identified consequential risk.

The composition of the target gas and its density relative to air are used as the basis for the recommended height of sensors. Generally, the installation height of a sensor for a heavy gas (such as propane) would be close to the lowest point in the area, and for a light gas (such as methane) would be close to the highest point in the area.

These recommended heights may vary based on air flow and temperature conditions in addition to the proposed application and location – this is particularly apparent with oxygen depletion sensors, and the target gas that they are used for.

Target Gas	Typical Position
Natural Gas/Methane (**NG**)	High Level - 300mm (1ft) from ceiling
Liquid Petroleum Gas (**LPG**)	Low Level - 300mm (1ft) from ground level
Carbon Monoxide (**CO**)	Breathing Zone - 1700mm (5ft 6") from ground level
Hydrogen (**H**)	High Level - 300mm (1ft) from ceiling
Oxygen (**O₂**)	*Breathing Zone - 1000-1500mm (3 - 5ft) from ground level

* If you are installing and monitoring Oxygen depletion – consider the density of gas for its application and position the detector accordingly i.e. ground level for high density gases.

Typical Installation Arrangement

The Merlin panel should be located outside of the hazardous area that it is monitoring.
Easy accessibility is required both for status observation and alarm purposes.
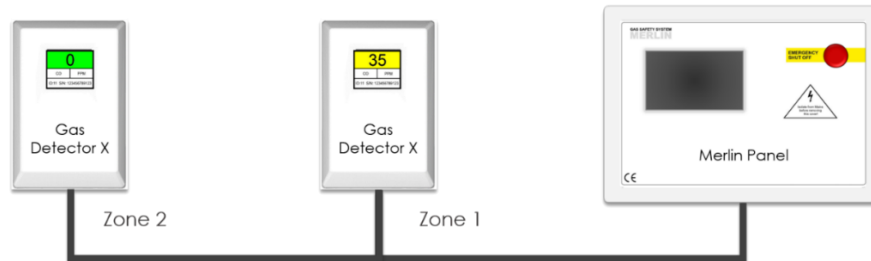
The Gas Detectors are designed around a centralised control panel of which the location also needs to be considered. The Merlin panel should be located outside of the hazardous area that it is monitoring. Easy accessibility is required both for status observation and alarm purposes.

⚠ *Where connections may exceed 100 metres from one control panel – Contact your supplier!*
⚠ *The use of sound strobes are highly recommended!*

Mounting

Unpack all the parts!
Designed for surface mounting, it must be installed by a licensed, insured contractor.
A deeper back case is supplied to accommodate wiring if required.

1. Carefully remove the rear cover from the unit by releasing the two latching clips located at the bottom of the case.
   To do this – use a small flat head screwdriver.
2. Using the rear cover - mark the screw holes to the wall.
   Ensure the wall surface is flat to prevent base distortion.
3. There are two pre-fractured areas for cable entry provided on the inside of the rear cover which may be cut away as required.
4. After executing the mounting and the connections – replace the rear cover ensuring the two clips are latched.
5. Make a note of the installation date on the label located on the side of the unit.

Latching Clips
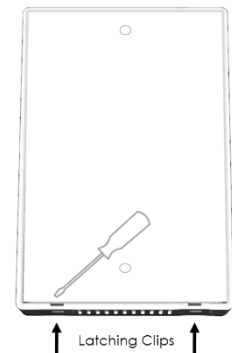
⚠ *Be careful when creating access for cables – Damage to boards will void any warranty!*
⚠ *Any damage attempting to remove the circuit board parts may void any warranty!*
⚠ *Wiring of different circuits shall be separated by means of routing, clamping or barrier!*
⚠ *If devices are not grounded, they can give false readings or become a safety hazard!*
⚠ *For MODBUS communications, a shielded cable is used!*

We recommend all Merlin gas detection equipment is commissioned by competent/trained engineers to ensure correct installation and operation.
The Merlin range of gas detectors are optimum calibrated when manufactured. However, we strongly recommend the detectors response and fault conditions are tested and validated once installed. This will ensure the equipment is performing as intended and free from unforeseen damage caused by transit/installation.

Board Connections Overview
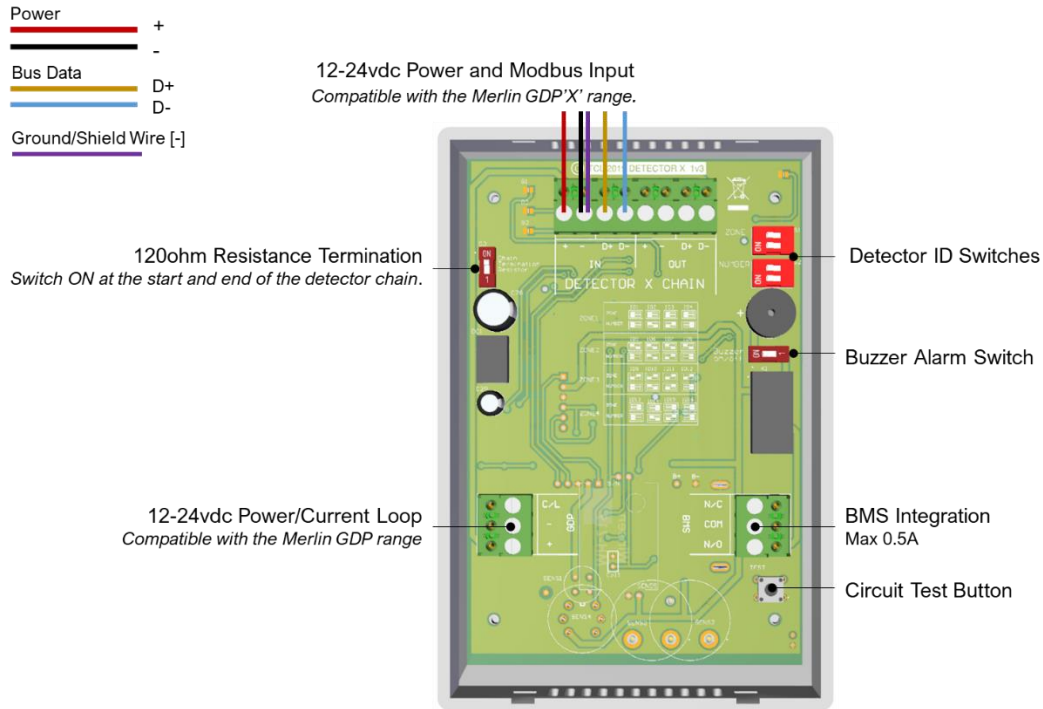
⚠ *All Class 2 wiring is to be installed within flexible tubing to maintain segregation between circuits!*
⚠ *If devices are not grounded, they can give false readings or become a safety hazard!*
⚠ *For MODBUS communications, a shielded cable is used!*

Wiring your Detector (GDP2X or GDPX+ Control Panel)

12-24VDC power and Modbus communication data cables are wired to Merlin gas detection panels – GDP2X or GDPX+. Both terminals are identified as [DETECTOR CHAIN + - D+ D-].
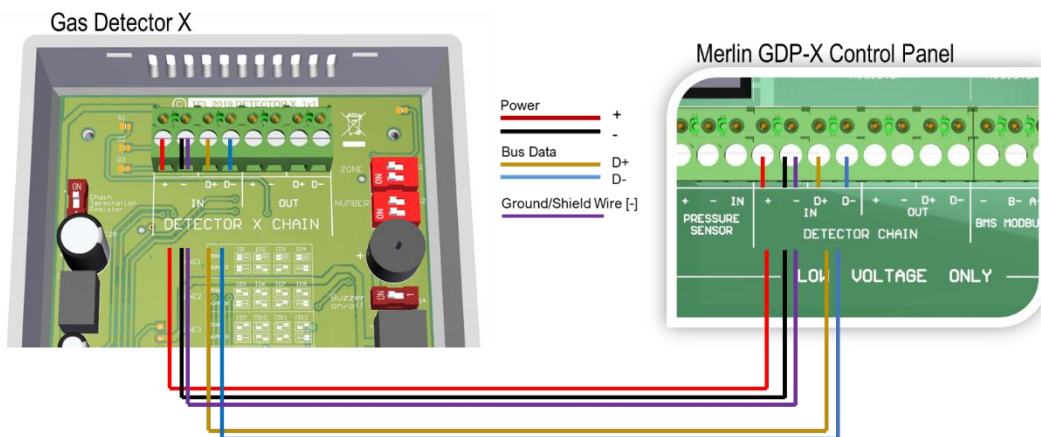
⚠ *If devices are not grounded, they can give false readings or become a safety hazard!*
⚠ *Where connections may exceed 100 metres from one control panel – Contact your supplier!*
⚠ *Ensure the termination resistance switch is turned on at each end of a chain!*

MODBUS® Connection

A shielded and twisted 2 or 4 core cable is used to wire the data terminals [D+ & D-).
Any cable with similar characteristics can be used to connect all the devices together.
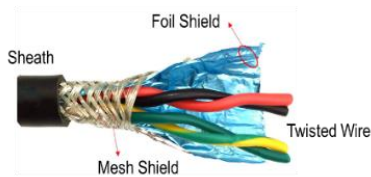
The shielding can be of 2 types: braided [mesh of thin conducting wires] or foil (consisting of a thin sheet of metal covering the twisted wires).
One example of such cable is BELDEN 3082A.

If you are encountering noise or irregular problems with a bus link, the problem is likely related to grounding, incorrect shielding or wiring mains power next to Modbus wiring.

⚠ *To ground the data cable, the shield should be connected to 'Power' [-] terminals!*

Creating a Detector Chain

Create a detector chain by connecting detectors in a parallel (daisy chain) method.
Any other way may cause issues or damage to the overall system.

**Single chain example.
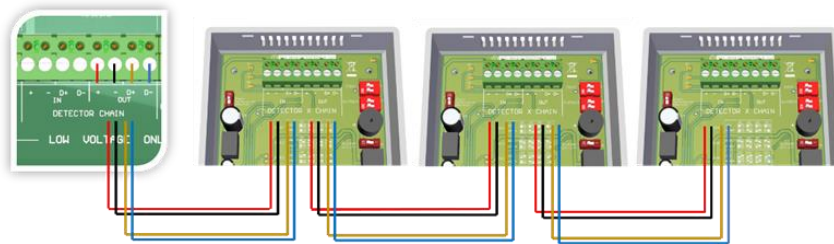
**Split chain example
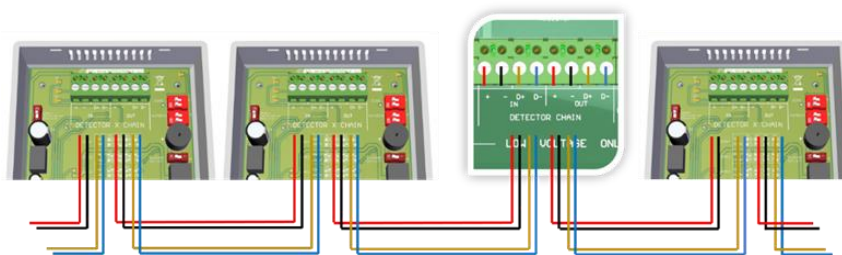
Reversing the [D+] and [D-] connections of any device can lead to the whole system to stop working owing to reverse polarity found on the terminals. In order to avoid this problem, it is recommended that the cable of same colour should be used to connect all [D+] terminals together and similarly cable of same colour to be used to connect all [D-] terminals together.

⚠ ***Where connections may exceed 100 metres from one control panel – Contact your supplier!*

Detector Chain ID Switches

When wiring multiple detectors in a chain it is important to identify each and every detector installed for the control panel to receive and display accurate data corresponding with the correct detector type.

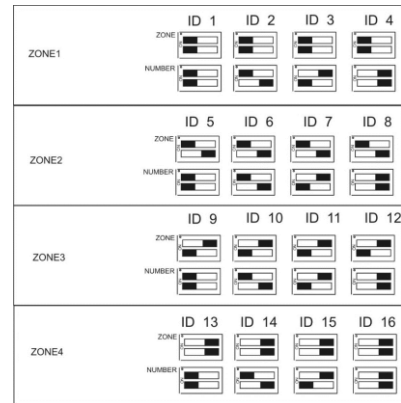The ID configuration diagram is printed onto detector boards for quick reference. All detectors are factory set to ID1.

ID Switches must be configured for each and every detector connected to receive and display accurate data!

⚠ *We recommend a plan, map and/or marking the detector enclosures detailing ID and location!*

120ohm Termination Resistance

Signal communication issues may occur where the bus length is too long, high baud rates are used or signal reflections are occurring.

To avoid this, terminating at each end of a chain may help the quality of the data signal by turning on the 120ohm terminal resistor switch.

If a split chain is used, terminate the last detector in each chain.
If a single chain is used, terminate the first device (Panel) and last device (Detector).
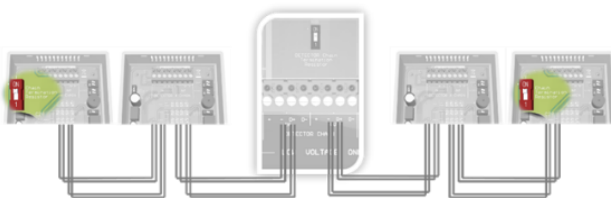
Split chain   Single chain
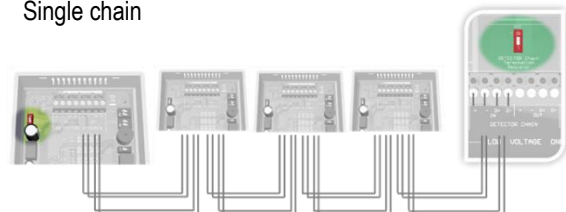
Quick Circuit Test

⚠ *Access to the interior of the control panel or detector, when carrying out any work, must only be conducted by trained personnel.*
⚠ *This does not test the gas sensing element itself.*

When the test button on the circuit board is pressed and held the detector will simulate an open circuit to ensure configured systems, outputs, alarms, indications and other external devices operate as intended in response to gas.

When the test button is released – the test sequence will terminate and return to normal operation.

Wiring your Detector (GDP2 or GDP4 Control Panel)

12-24V power supply via Power Input [+ / -] and GDP panel [GAS DETECTION ZONE] terminal.

If you are using our 'GDP' range you will need to use the [C/L] terminal as an alarm relay.

BMS terminals can be used in conjunction with other external relays that affect other devices and controls such as purge fans and audible alarms etc.

Wiring your Detector (Merlin 'S' Control Panels)
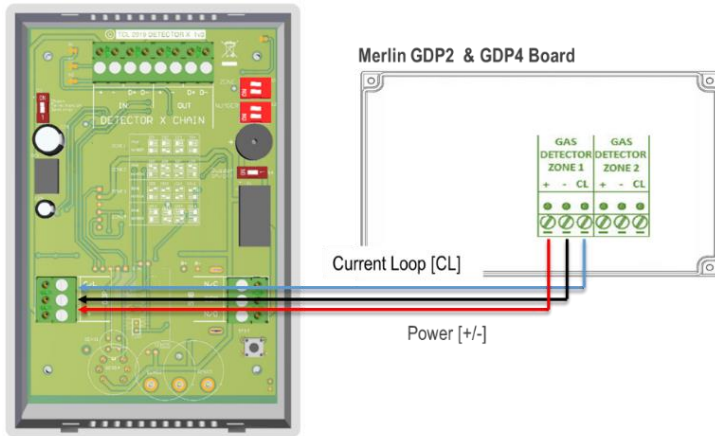
12-24V power supply via terminal: GDP [+ -] and 'S' panel [GAS DETECTOR] terminal.
Connections should be made to the BMS relay [COM] and [NC] and Panel open/close.

These are volt free connections to building management systems.
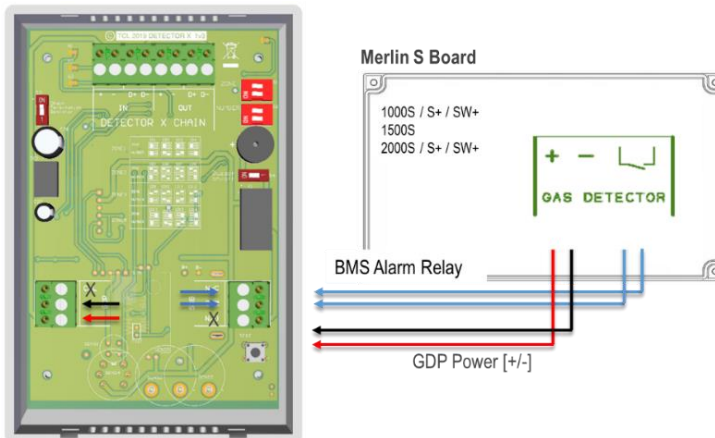
A relay will change state when in alarm or when gas is detected.

BMS terminals can be used in conjunction with other external relays that affect other devices and controls such as purge fans and audible alarms etc.

Audible Alarm Switch
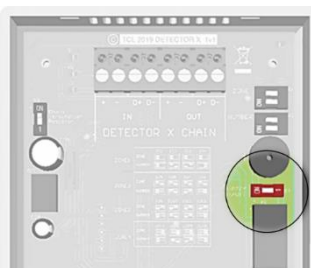
There is a switch on the detector board [Buzzer On/Off].

The user can choose whether to have an audible alarm when dangerous gas levels are detected.
The alarm will continuously sound – there are no provisions to silence the alarm, gas levels must drop to a safe value for the alarm to stop.

Factory Set Condition

Buzzer On/Off Switch	**ON**
Chain Termination Resistor	**OFF**
Detector ID Switches	**ID 1**

Quick Installation Tips

CONNECTION
The best way to connect devices in a MODBUS RTU communication is a DAISY CHAIN method.

MAXIMUM DISTANCE
You may encounter problems when powering gas sensors beyond 100 metres from one control panel, in this instance, contact your supplier.

TERMINAL RESISTANCE
Signal communication issues may occur where the bus length is too long, high baud rates are used or signal reflections are occurring. To avoid this, terminating at each end of a chain may help the quality of the data signal by turning on the 120ohm terminal resistor switch of the last device in the chain.

GROUNDING
If you are encountering noise or irregular or abnormal problems, the problem is likely related to grounding, incorrect shielding or wiring mains power next to Modbus wiring. If using a shielded cable – ensure the shielding or equivalent is wired to the 24vdc Power [-] terminal on both detectors and panels.

CABLES TO USE
For MODBUS communications, a shielded and twisted pair cable is used. The shielding can be of 2 types: braided [like a mesh of thin conducting wires] or like a foil [consisting of a thin sheet of metal covering the twisted wires].

PROTECTION
High concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements of Detectors – such as; wine; deodorants; stain removers; thinners etc.

IDENTIFICATION
Remember to individually ID each connected detector by configuring the ID switches on the circuit board. Make a plan, map and/or note of the location of all connected detectors for tracing and locality purposes.

BUZZER ALARM
There are no provisions to silence the alarm buzzer when high gas levels are detected. Gas levels must return to safe level for the buzzer to stop. The audible buzzer is optional via a switch on the circuit board.

COMMISSIONING
We recommend all Merlin gas detection equipment is commissioned by competent/trained engineers to ensure correct installation and operation. The Merlin range of gas detectors are optimum calibrated when manufactured. However, we strongly recommend the detectors response and fault conditions are tested and validated once installed. This will ensure the equipment is performing as intended and free from unforeseen damage caused by transit/installation.

Operation

Initial Power-Up (Commissioning)

On connecting power, the detector enters 'sensor stabilisation' phase for approximately 60 seconds – during this period the screen will display an 'initialisation' message indicating that the device is not yet ready for gas detection.

After the sensor has stabilised – the screen will display;

a. *Target gas.*
b. *Target gas concentration.*
c. *Target gas Measurement (parts per million or % LEL).*
d. *Unique detector serial number.*
e. *Configured ID number.*

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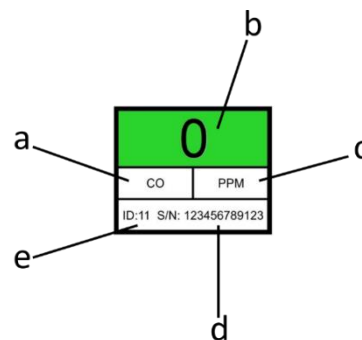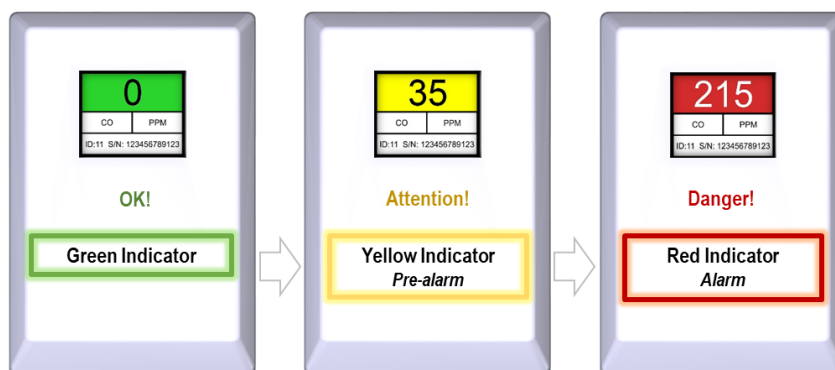
Gas Level Indication

Gas Alarm Levels

⚠ *At dangerous gas levels, the alarm will continuously sound if the buzzer dip-switch is on!*
⚠ *There are no provisions to silence the alarm buzzer when high gas levels are reached!*

GAS	PRE-ALARM State	ALARM State
Hydrogen Gas (H)	*> 8% LEL*	*> 10% LEL*
Methane/Natural Gas (NG)	*> 8% LEL*	*> 10% LEL*
Liquid Petroleum Gas (LPG)	*> 8% LEL*	*> 10% LEL*
Oxygen (O$_2$)	*18.5 – 23%*	*< 18.5% & >23%*
Carbon Monoxide (CO)	*20 PPM*	*Two (2) hours @ 20ppm* *One (1) hour @ 50ppm* *Ten (10) minutes @ 100ppm* *One (1) minute @ 300ppm*

General Maintenance

Cleaning

⚠ *High concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements – such as; wine; deodorants; stain removers; thinners!*

⚠ *Other gases and substances to avoid; Corrosives (i.e. chlorine & hydrogen chloride); Alkali metals; Basic or acidic compounds; Silicones; Tetraethyl lead; Halogens and halogenated compounds!*

Keep your gas detector in good working order - follow these basic principles;

- Remove any dust/debris from the outer enclosure regularly using a slightly damp cloth.
- Never use detergents or solvents to clean your device.
- Never spray air fresheners, hair spray, paint or other aerosols near the device.
- Never paint the device. Paint will seal vents and interfere with the device.

Manual Circuit Simulation Test

⚠ *Access to the interior of the control panel or detector, when carrying out any work, must only be conducted by trained personnel.*

⚠ *This does not test the gas sensing element itself.*

When the test button on the circuit board is pressed and held the detector will simulate an open circuit to ensure configured systems, outputs, alarms, indications and other external devices operate as intended in response to gas.

When the test button is released – the test sequence will terminate and return to normal operation.
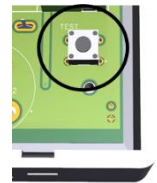
Bump Test (Gas Response Check)

What is a Gas Response Check?

Response checks are often referred to as a 'BUMP TEST'. Bump tests are important to make sure a device is able to detect a release of gas as early as possible.

The aim of the bump test is to make sure a gas detector is working at its optimum by briefly exposing the unit to a known concentration of the target gas that exceeds the highest alarm point. If the detector goes into alarm and all system outputs/relays activate, then it is working safely.

If the system fails to operate as intended in an alarm state, the gas detector must not be used until a full inspection and service has been conducted.

Why is it important?

A detector may visually appear in good working order, but its sensitivity can be inhibited by external factors. Dust, humidity, temperature fluctuations, cleaning products, contaminants or sensor drift (ageing) can cause a decline in sensitivity and eventual failure.

Regular bump tests are important to make sure the detector is able to detect a release of gas as early as possible.

How often should I Bump Test a detector?

Regular bump tests are important to make sure the detector is able to detect a release of gas as early as possible. A bump test usually takes seconds (gas type dependant) and is often completed alongside a scheduled fire alarm test, however the frequency should be determined following a risk assessment by the end user. Remember, bump testing does not remove the need to have gas detectors inspected, calibrated and serviced periodically by a trained personnel.

What equipment do I need to perform a Bump Test?

Contact your S&S Northern representative for details of suitable bump testing kits and gases.

Kits usually consist of a certified gas cylinder; flow control regulator, tube pipe and applicator cone.

A bump testing gas is usually a concentration mix that exceeds the highest alarm set-point. See below for recommended gas concentrations for bump testing your detector.

Detector	Bump Test Gas
CO - Carbon Monoxide	400 - 500ppm balance in air.
NG - Methane	0.6 - 0.8% BV (balance in air)
LPG - Liquid Petroleum Gas	0.3 – 0.4% BV (balance in air)
H - Hydrogen	5000 - 6000ppm (balance in air)
O_2 - Oxygen	15% (balance in Nitrogen).

⚠ *All certified test gases supplied by S&S Northern are classified as non-flammable and non-toxic, however, they do contain gas under pressure and may explode if heated to extreme temperatures and cause asphyxiation in high concentrations.*

How do I conduct a Bump Test?

1. Ensure you have the correct gas for the device type prior to application.
2. Screw and seal the regulator/valve into the gas cylinder outlet.
3. Once sealed, the regulator pressure gauge will indicate cylinder pressure.
4. Offer up the applicator hose/cone to lower vents.
5. Open the valve/regulator to allow the gas to be delivered at a pre-set flow rate.
7. Wait for the device to enter alarm status and energise configured outputs/relays.
    At this point…
9. Remove applicator hose/ cone and turn the gas cylinder regulator/valve off.
10. Wait for the device to return to normal.
11. Reset the system.

Apply Gas

Record your test details. (There is a provision for this in your control panel manual).

To increase reaction time, cover the escape vents at the top of the device. Alternatively, enclose the device and apply gas i.e. in an air tight bag or container.

⚠ *Always remove the regulator/valve from cylinder after use.*
⚠ *Always check cylinder pressure upon sealing valve – there may not be a sufficient amount of gas.*
⚠ *All cylinders will re-seal upon removal of the regulator/valve.*
⚠ *Always give at least five (5) minutes between testing the same unit or until gas has fully dispersed.*
⚠ *Always consider safety and use equipment in accordance with Safety Data Sheets.*

For more help and advice on bump testing – contact us.

Service & Calibration

⚠ *Access to the interior of the detector or control panel, when carrying out any work, must only be conducted by trained personnel.*

⚠ *Before carrying out any work ensure local regulations and site procedures are followed.*

⚠ *Do not tamper with or in any way disassemble the detector.*

⚠ *Do not expose gas sensors to concentrations of alcohol found in many products, these may damage, deteriorate or affect the gas sensing element – such as; wine; deodorants; stain removers; thinners.*

⚠ *Always remove the regulator/valve from cylinder after use.*

⚠ *Always check cylinder pressure upon sealing valve – there may not be a sufficient amount of gas.*

⚠ *All cylinders will re-seal upon removal of the regulator/valve.*

⚠ *Always give at least five (5) minutes between testing the same unit or until gas has fully dispersed.*

⚠ *Always consider safety and use equipment in accordance with Safety Data Sheets.*

Detector Service Message

A service screen will intermittently flash every 30 seconds after one year of operation. The detector will still operate as intended during this time. This message prompts a recommended service and calibration of the gas sensor to ensure operational accuracy.


Enter Service Mode (GDP2X & GDPX+ ONLY)

⚠ *When service mode is activated, the control panel will ignore all detector alarm states and the gas valve will remain active. The panel will return to a normal operational state after one hour of service activation unless deactivated manually by pressing the [EXIT] button on screen.*

1. Short out the unmarked service header on the control panel circuit board.
2. The screen will display [Service Mode] in the top right hand corner of the digital screen.
3. Proceed to service & re-calibrate detectors.
4. Upon completion of service and calibration – exit Service Mode and press Reset.

Service Mode will be activated for one (1) hour. If more time is necessary - exit service mode and short out the service header again. To exit service mode – press the blue [EXIT] button on screen.
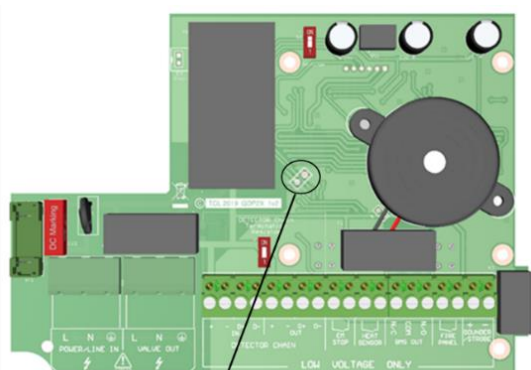
GDP2X Service Header
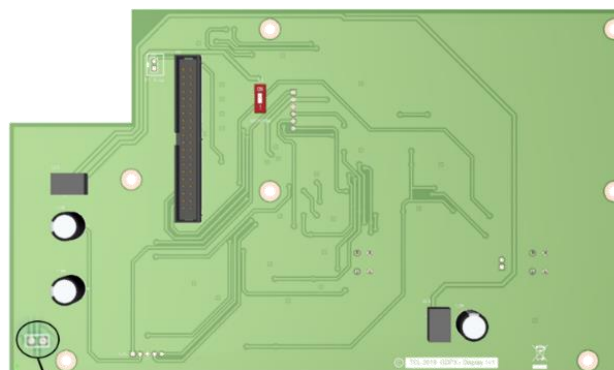
GDPX+ Service Header

Detector Calibration

⚠ *Do not conduct calibration of sensors in conditions outside any recommended ranges.*
⚠ *Use the specified calibration gas only and a fixed flow regulator.*
⚠ *Always use equipment in accordance with their safety datasheets.*
⚠ *Calibration gases must be prepared and mixed to traceable international standards.*
⚠ *Ensure you have the correct gas for the device type prior to application.*
⚠ *Screw the regulator/valve into the gas cylinder outlet.*
⚠ *Once sealed, the regulator pressure gauge (if available) will indicate cylinder pressure.*
⚠ *Always remove the regulator/valve after use.*
⚠ *All cylinders will re-seal upon removal of the regulator/valve.*
⚠ *If a gas sensor is exposed to a concentration significantly above the measuring range it should be recalibrated as soon as possible afterwards.*
⚠ *To recalibrate a detector, the following procedures and gases MUST be used.*

Why recalibrate a detector?

Detectors are pre-calibrated at the time of manufacture, therefore a re-calibration is only required periodically (annually) to compensate for its sensitivity and accuracy that can be inhibited by external factors. Dust, humidity, temperature fluctuations, cleaning products, contaminants or sensor drift (ageing) can cause a decline in sensitivity, accuracy and eventual failure.

Regular gas sensor recalibration is important to prolong the operational life and make sure the detector is able to detect a concentration of gas as accurately and early as possible. Typical accuracy of gas measurement is within 10% of the detected concentration.

How often shall I recalibrate a detector?

Calibration should coincide with the annual service message that appears on the detector after each year of service/operation. Depending on the application and environmental factors, a recalibration can be conducted at a higher frequency determined by the end user but must be executed by trained personnel.

What equipment do I need to perform recalibration?

Contact your S&S Northern representative for details of suitable calibration kits and gases.

Kits usually consist of a certified gas cylinder; flow control regulator, tube pipe and applicator cone.

⚠ *To recalibrate a detector, the following gases and concentrations <u>MUST</u> be used.*

Detector Type	Calibration Gas	Recommended gas flow rate
CO - Carbon Monoxide	*120ppm* balance in air.	Typically 0.3 L/Min @ 70bar
NG - Methane	*0.5% BV* (balance in air) 10% LEL	
LPG - Liquid Petroleum Gas	*0.2% BV* (balance in air) 10% LEL	
H - Hydrogen	*4000ppm* (balance in air) 10% LEL	
O₂ - Oxygen	*If no residual gas is present then the background air can be used to perform calibration.*	

⚠ *All certified test gases supplied by S&S Northern are classified as non-flammable and non-toxic, however, they do contain gas under pressure and may explode if heated to extreme temperatures and cause asphyxiation in high concentrations.*

How do I Calibrate a Detector

⚠ *Access to the interior of the detector or control panel, when carrying out any work, must only be conducted by trained personnel.*

⚠ *Before carrying out any work ensure local regulations and site procedures are followed.*

⚠ *Do not tamper with or in any way disassemble the detector.*

⚠ *Do not expose gas sensors to concentrations of alcohol found in many products, these may damage, deteriorate or affect the gas sensing element – such as; wine; deodorants; stain removers; thinners.*

1. Ensure Service mode has been activated on the control panel.
2. Carefully remove the back cover to access the circuit board and gas sensor.
3. **Reset Detector** by shorting out the 1st and 3rd ICSP pins.
4. **Calibrate**
   a) Short out the [Cal1] header to enter calibration mode during the initial warm up period.
   b) Offer up the applicator hose/cone to the gas sensor.
   c) Open the valve/regulator to allow the gas to be delivered at a pre-set flow rate.
   d) The screen will display a 'SUCCESSFUL' text when the calibration is complete.
   e) Remove applicator hose/cone and turn the gas cylinder regulator/valve off.
   f) On the control panel – exit Service Mode and press Reset.

   At this point, when the system and detector returns to a normal operating state!

5. **Reset Service Message** annual reminder by shorting out the unmarked header.
6. Carefully replace the back cover.

Reset Detector   **Calibrate**   **Reset Service Message**

ICSP Pins

[Cal1] Header

Unmarked Service Header
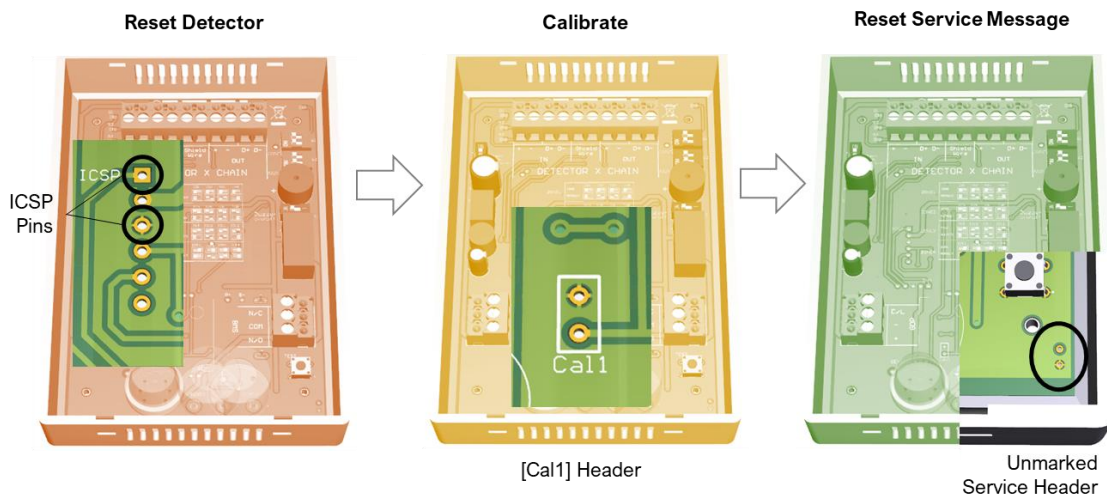
Failed Calibration

Do not reset the service message should the calibration process fail.

If recalibration is unsuccessful a screen text 'Failed' will appear. Continue calibration procedure to reinstate system, the detector will return to normal as it was pre-service and calibration.

⚠ *Check that the correct gas and concentration has been applied and contact us immediately.*

Gas Sensor Types & Reaction Times

The time for gas sensors to react to their target gas will vary dependant on the type of gas detector/gas sensing element. You should always refer to the appropriate specification for information including sensor type and alarm levels i.e. electro-mechanical sensors (such as Carbon Monoxide) will react to its target gas slower than semi-conducting sensor types (such as methane, LPG and Hydrogen).

Gas sensor locations.
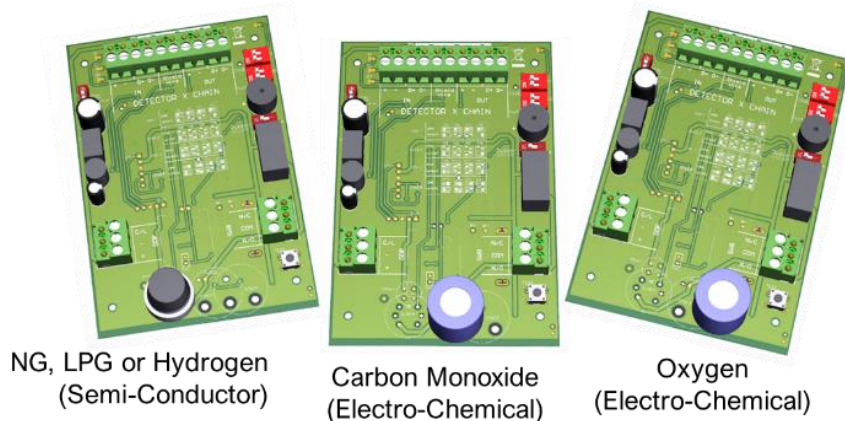
NG, LPG or Hydrogen (Semi-Conductor)   Carbon Monoxide (Electro-Chemical)   Oxygen (Electro-Chemical)

End of Life (EOL)

⚠ *The expected lifecycle is approximate from the first operation and power is continuously supplied.*

⚠ *The expected lifecycle will depend on the type of gas your detector is targeting and may vary depending on application/environmental conditions such as the frequency of exposure to the target gas, poisons or inhibitors.*

⚠ *At the end of their working life, electrochemical sensors for oxygen and carbon monoxide detectors should be disposed of in an environmentally safe manner.*

⚠ *Alternatively all detectors can be securely packaged and returned to S&S Northern clearly marked for disposal.*

⚠ *Electrochemical sensors should not be incinerated as this may cause the cell to emit toxic fumes.*

⚠ *The expected lifecycle is approximate from the first operation and power is continuously supplied.*

⚠ *The expected lifecycle will depend on the type of gas your detector is targeting and may vary depending on application/environmental conditions such as the frequency of exposure to the target gas, poisons or inhibitors.*

The typical life of a gas detector is as follows subject to appropriate testing, service and calibration on an annual basis, or according to site practice.

END OF LIFE

This message indicates that the detector has reached its expected operational lifecycle. No gas levels will be displayed.

General Specification

General	
Product:	Gas Detector-X
Model(s):	CO (Carbon Monoxide) NG (Methane/Natural Gas) LPG (Liquid Petroleum Gas) H (Hydrogen) O2 (Oxygen)
Use:	Indoor, Non-Hazardous Areas (not to be used in potentially explosive atmospheres) For protection against flammable and toxic gas hazards.
Indicators (1.8" TFT Screen)	Green (Safe), Yellow (Special State) & Red (Alarm). Gas Type & Detected Concentration Level. Measured Value Detector ID No. Serial No. End of Life. Sensor Fault. Service.
Screen Brightness	Non- adjustable
Orientation	Wall Mounted @ 360°
Electrical	
Max. Power Consumption	90mA Max @ 24Vdc
Power Voltage Input Range	12-32Vdc (24Vdc Nominal)
Communication	RS485, Modbus RTU
BMS Terminal	Volt Free (Normally Closed / Common / Normally Open)
GDP Terminal	24Vdc Power Input (+ -) & Current Loop (CL)
Relay(s)	1x 1A @ 125Vac/ 2A @ 30Vdc (Non-Latching) Configurable Normally open or Normally Closed (Switch)
Terminal Wire ratings	Copper 18AWG (0.75mm2) Min. 14 x screw terminals.
End of Life/ Service Battery	CR2032 - 3V 220mA Radial Lithium Annual service reminder message activated upon five (5) hours of continuous power. EOL message activated upon five (5) hours of continuous power and shown at end of expected sensor life.
Construction	
Dimensions (H x W x D)	140 x 95 x 30mm / 5.51 x 3.74 x 1.18"
Unit Weight (Approx.)	0.05kg / 1.77oz
Nominal Orientation	Wall Mounted (No Limits)
Housing Material	Polylac - PA765
Environmental	
Ingress Protection	IP40
Storage Conditions	Dry. Temp: -20 ~ 50°C / -4 ~ 122°F RH: 15 ~ 90%
Sensor Operating Temperature	-20C° ~ 50°C (-4 ~ 122°F)
Sensor Operating Humidity	Continuous 30-80% RH Non-Condensing
Sensor Operating Pressure	Normal Atmospheric Pressure ± 10%
Compliance	
CE	BS EN 50270 / BS EN 61010-1
UKCA	BS EN 50270 / BS EN 61010-1
Performance Considerations	BS EN 45544-1 / BS EN 60079-29-1 / BS EN 50104
Sensor Specification	
Factory Calibration Conditions	25° ± 5°C - 77° ± 41°F (40-70% RH)

Gas Sensor	Indicating Range	Steps	Calibration Gas	Response (T90)	Recovery (T10)	Accuracy	Alarm: 1 (Pre alarm warning)	Alarm: 2	*EOL (Years)
Electrochemical Sensors									
Carbon Monoxide (CO)	0-999ppm	1	120ppm CO	<60s	<60s	±20%	▲20ppm	Exposure time. ▲20ppm (after two hours) ▲50ppm (after one hour) ▲100ppm (after ten minutes) ▲300ppm (after one minute)	5
Oxygen (O$_2$)	0-30% V/V	0.1	20.9% O2	<30s	<60s	±20%	N/A	▼18.5% V/V ▲23% V/V	3
Semiconductor Sensors									
Methane (CH$_4$)	0-20% LEL	0.1	0.5% methane	<30s	<30s	±20%	▲8% LEL	▲10% LEL	10
Propane (LPG)	0-20% LEL	0.1	0.2% Propane	<30s	<30s	±20%	▲8% LEL	▲10% LEL	10
Hydrogen (H)	0-20% LEL	0.1	4000ppm Hydrogen	<30s	<30s	±20%	▲8% LEL	▲10% LEL	10

▲ Rising Alarm ▼Falling alarm

*EOL – Expected operational Life – Replace unit after this time.

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Installation Details

Please pass this manual to the system owner / user.

Date of Installation:	
Installation Location:	
Organisation:	
Stamp/Signature of the installer:	

We recommend all Merlin gas detection equipment is commissioned by competent/trained engineers to ensure correct installation and operation. The Merlin range of gas detectors are optimum calibrated when manufactured. However, we strongly recommend the detectors response and fault conditions are tested and validated once installed. This will ensure the equipment is performing as intended and free from unforeseen damage caused by transit/installation.

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