MERLIN GDP2

Safe Area Gas Detector Controller

UK CA CE

Installation, Operation & Maintenance

Please read this manual carefully and retain for future use.

CMR Electrical provide a range of detection panels which can be used in many applications such as factories, car parks, shopping centres and boiler houses. The GDP2 is used with up to six (6) gas detectors in a single cable run for monitoring and detecting gas in zones considered safe including CO, LPG and NG.

⚠ *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.*

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Important Warning Statements

Please take the time to thoroughly read these instructions which should be retained for future reference.

Detectors are shipped pre-calibrated and configured.

The expected lifetime of a 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 by a competent person.

Do not apply lighter gas or other aerosols to the device – this will cause extreme damage to the sensors.

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.

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 warning is possible provided your alarm is installed and maintained in accordance with 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.

Multiple detectors may be required to adequately protect property and persons.

This device does not prevent dangerous gasses from occurring or accumulating.

Actuation of your alarm indicates the presence of dangerous levels of gas.

The device is not intended for use in potentially explosive atmospheres.

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

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 they can be securely packaged and returned to CMR Electrical clearly marked for disposal. Electrochemical sensors should not be incinerated as this may cause the cell to emit toxic fumes.

Installation

Typical Application, Location & Positioning

The Merlin GDP2 is a multi-safe zone gas detection panel which can be used in many applications such as factories, car parks, shopping centres and most commonly - boiler houses. It can be used with up to 8 Merlin gas detectors (3 detectors per zone terminal) for monitoring and detecting gas including carbon monoxide, liquid petroleum gas and methane.
The controller panel can be integrated with, but not limited to, a BMS (building management system), a fire panel, external alarms and remote emergency shut-off buttons.

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 any recommended height of detector placement. Generally, the installation height of a detector 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.

Any 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 (O_2)	*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.

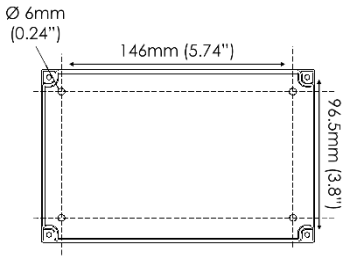
The control panel should be located away from the area that it is monitoring and accessible is for both status observation and alarm purposes. The control panel should be located outside of the hazardous area that it is monitoring. Easy access is required both for status observation and alarm purposes.

Access & Mounting

Unpack all the parts!
Designed for surface mounting, it must be installed by a licensed, insured contractor or competent person.

Carefully remove the front cover from the unit by unscrewing the four bolts located at each corner. To do this – use the socket wrench provided. Mark the four screw holes located on the back of the enclosure to the wall and ensure the wall surface is flat to prevent base distortion.

After executing the mounting and the connections – replace the front cover and insert the security caps over the four bolts.



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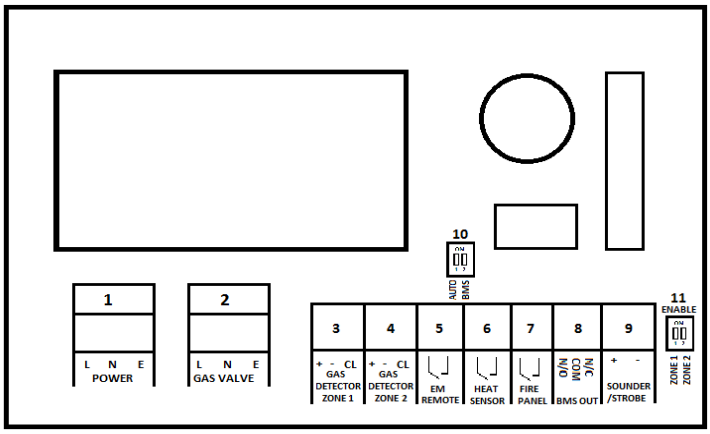
Access to the interior of the panel, when carrying out any work, must be conducted by a competent person. Before carrying out any work ensure local regulations and site procedures are followed.
We recommend all Merlin gas detection equipment and systems are commissioned by a competent/trained engineer to ensure correct installation and operation. Contact CMR Electrical for more information.

Internal Board Overview

1. 100-240VAC Mains power Input
2. 100-240VAC Gas Solenoid Valve Output.
3. 24VDC Gas detector power supply (Zone 1)
4. 24VDC Gas detector power supply (zone 2)
5. Remote emergency stop buttons
6. Heat Sensor: Fusible Links
7. Fire panel connection
8. BMS output contacts.
9. 24VDC Sounder/ Strobe alarm
10. Switch - BMS Selection & Auto Reset
11. Switch - Zone 1, 2, 3 & 4 enable/disable



Note: Terminal blocks are plug/socket type and may be removed to ease wiring.

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Be careful when creating access for cables – Damage to circuit boards will void any warranty!
Detectors are sold separately and shipped pre-calibrated and configured!

Board Connections Overview

POWER/LINE IN 100-240vac mains power is supplied to the [POWER/LINE IN] connector using a 3-core cable fused at 3A. On connecting the mains supply to the panel the power LED indicator will light up – this is located on the front.

GAS VALVE 100-240vac electrical power output from the [VALVE OUT] terminal using a 3-core cable to a gas solenoid valve, which can shut the gas supply on alarm status.

GAS DETECTOR (Zones 1 – 2) 24vdc power supply to gas detectors are wired to [GAS DETECTOR ZONE] terminals. For more information, see section*:* Wiring your detector.

EM REMOTE An open/close switch for remote emergency shut-off buttons detailed on the circuit board as [EM STOP].

HEAT SENSOR An open/close switch for heat sensors/ thermal links detailed as [HEAT SENSOR].

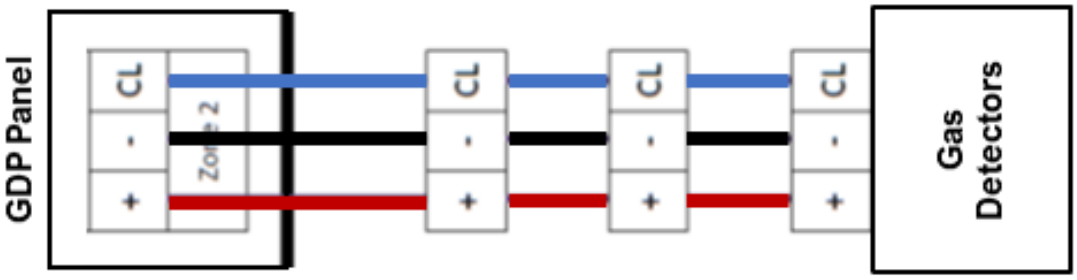
FIRE PANEL An open/close switch for fire alarms detailed on the circuit board as [FIRE PANEL].

BMS OUTPUT Connections are available on the board for Building Management Systems. These are volt free connections. This is a relay that changes state in alarm or when the gas is on/off and used in conjunction with the 24vdc output and other external relays that affect other devices and controls such as purge fans and audible alarms etc.

SOUNDER-STROBE 24vdc output for an external sounder alarm/ strobe lighting to activate on alarm.

Wiring your Detector

Power is supplied to a detector via the GDP terminal [+ / -] and using the panel [GAS DETECTION ZONE] terminal. If you are using a GDP panel you will need to use the detector [C/L] terminal as an alarm relay.



BMS Switch

The GDP2 can be integrated with a BMS to make or break a circuit on gas on/gas off, (valve open or valve closed). This will tell the BMS whether or not electrical power is being sent to the solenoid. There is a dip-switch located on the GDP2 circuit board labelled [BMS]. This is factory set to 'OFF' position which signals the BMS on gas on/gas off. When switched to 'ON', the GDP2 will only signal the BMS on a fault, i.e. gas detected, EM Stop pressed, etc.

BMS SWITCH	BMS SIGNAL
OFF	Gas on or off only.
ON	Error condition i.e. gas detected, emergency stop pressed.

Auto Reset Switch

The panel has a built-in auto reset feature. There is a dipswitch located on the circuit board labelled [AUTO RESET]. This is factory set in the 'Off' position i.e. when power is restored after a power cut or loss, the panel has to be restarted manually. When enabled, the system will restart automatically when power is restored and can be reset following a fire alarm and when the alarm is cleared.

AUTO SWITCH	CONDITION
OFF	Panel has to be restarted manually following a power cut/loss and/or alarm.
ON	Panel will automatically restart when power is restored and can be reset remotely via a fire panel.

Zone 1 - 2 Set-Up Switches

There are dipswitches located on the GDP2 circuit board labelled [ZONE 1] and [ZONE 2].
This is factory set in the 'Off' position. For each of the gas detector zones you are using please ensure that the relevant zone has being enabled. The zone you are not using should be left disabled.

ZONE 1/2/3/4 SWITCH	CONDITION
OFF	Gas detection zone disabled.
ON	Gas detection zone enabled.

Factory Set Condition

SWITCH	CONDITION
BMS	OFF
AUTO RESET	OFF
ZONE 1	OFF
ZONE 2	OFF

Trouble Shooting

Fault.	Possible Cause/Correction.
Detector not responding.	○ Incorrect wiring ○ Zone switches not properly configured
Panel not responding.	○ Incorrect Wiring ○ No Power ○ Auto-Reset not properly configured

Operation

Initial Power-Up (Commissioning)

On connecting mains power, press reset to start the testing sequence. The system will close the solenoid valve when an emergency stop has been pressed, gas has been detected or any alarm signal has been triggered.
When the system is connected to the mains power supply, the Power LED will illuminate RED.

LED Indicator Status

Power
Power LED will illuminate RED when power is supplied. When no power is present, this LED will not light up.

Gas On
On start up the Gas on LED will flash for one minute to check for gas detected. If no gas detected or any other faults the gas valve will open and the Gas On LED will illuminate. GREEN = Gas On OFF = Gas Off
If the test is unsuccessful, the relevant zone LED light will illuminate to indicate a fault.

EM Stop
If an emergency shut off button (either remote or on the panel) is pressed, the LED will illuminate AMBER and the gas will be turned off. The EM Stop button must be re-set before restarting the system.

Heat Detector
If the fusible link melts at >72° C, the LED will illuminate AMBER and the gas valve will de-energise.

Fire Alarm
On a fire alarm, the LED illuminates AMBER and gas supply isolated. The alarm must be reset before restarting the system. Off = OK AMBER = Fire alarm activated.

Zones 1-2
Under normal working conditions this LED is GREEN. If the gas detector connected reaches the low level alarm this will show AMBER. If the gas detector connected reaches high level alarm this will show RED and the gas solenoid valve will close.

Mute & Reset Buttons

MUTE The mute button is located on the front fascia of the GDP2 and is used to mute the sounder inside the board when in alarm. The internal buzzer operates at approximately >60db measured 30cm (1ft) from a closed panel. The mute button is used to mute the sounder inside the board when in alarm.

RESET The reset button is located on the front fascia of the GDP2 and is used to turn the system on and to reset the system following alarm.

General Maintenance

Cleaning

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.

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Concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements such as; wine; deodorants; stain removers and thinners. Other gases and substances to avoid are; corrosives (i.e. chlorine & hydrogen chloride); alkali metals; basic or acidic compounds; silicones; tetraethyl lead; halogens and halogenated compounds!

Manual Circuit Simulation Test

When the test button on the circuit board is pressed and held for ~3s the detector will simulate an open circuit to ensure outputs, alarms, indications and external devices etc. operate as intended in response to gas.

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Access to the interior of the detector, when carrying out any work, must be conducted by a competent person! This test does not check the gas-sensing element itself!

Bump Test (Gas Response Check)

What is a Bump Test?
Gas 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 detector is working at its optimum by briefly exposing the unit to a known concentration of the target gas that usually exceeds the highest alarm point. If the detector goes into alarm and all signals/outputs activate, then the system 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.

How often?

Regular bump tests are important to make sure the detector is able to detect a release of gas as early as possible and usually takes seconds (gas type dependant i.e. CO sensors will take over a minute) and is often completed alongside a scheduled fire alarm test, however the frequency should be determined following an appropriate 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 competent person.

What do I need?

Contact your CMR Electrical 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. We recommend only using CMR Electrical calibration gas kits to ensure correct flow rates meet CMR Electrical technical requirements. A bump testing gas is usually a concentration mix that exceeds the highest alarm set point.

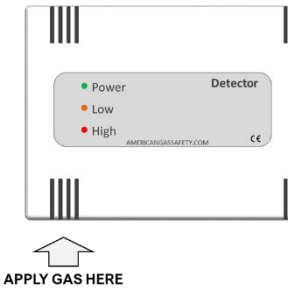
See below for recommended gas concentrations for bump testing your detector.

Detector Type	Bump Test Gas	Response Time
CO - Carbon Monoxide	400 - 500ppm (balance in air).	<120s
NG - Methane	0.6 - 0.8% BV (balance in air)	<30s
LPG - Liquid Petroleum Gas	0.3 – 0.4% BV (balance in air)	<30s
H - Hydrogen	5000 - 6000ppm (balance in air)	<30s
O_2 - Oxygen	15% (balance in Nitrogen).	<60s

All certified test gases supplied by CMR Electrical 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 to perform 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 the 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 if required. Record your test details.



Notes:

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 airtight bag or container.
For more help and advice on bump testing – contact us.

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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 CMR Electrical 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!

End of Operational Life (EOL)

The typical life of a gas detector depends on its application and intended target gas, in addition, the operational life can be prolonged if the system and equipment is installed and maintained in accordance the instructions stated within this manual.

- Natural Gas /Methane: 10 Years approx.
- Liquid Petroleum Gas: 10 Years approx.
- Hydrogen: 10 Years approx.
- Carbon Monoxide: 5 Years approx.

At the end of this time, contact your supplier and replace the unit immediately.

Specification

General	
Product:	GDP2 Gas Detector Controller
Use:	Indoor, Safe Areas (not to be used in potentially explosive atmospheres)
Indicators	LED
Mounting	Wall Mounting
Electrical	
Max. Power Consumption	20W Max (Full Load)
Power Voltage Input Range	100-240vac
Gas Valve Output Range	100-240vac
I/Os	24vdc Outputs (Detector / Strobe or Sounder) 3x Open/Close Switches (EM Stop / Heat Sensor / Fire Panel)
BMS	Volt Free (Normally Closed / Common / Normally Open) 3A Max
Relay(s)	2x 240vac 10A (Latching Switch)
Terminal Wire ratings	Copper 18AWG (0.75mm2) Min. x29 screw terminals.
Fuse	3.15A
Construction	
Dimensions (H x W x D)	140 x 190 x 62mm (5.51 x 7.48 x 2.44”)
Unit Weight (Approx.)	0.7kg / 24.7oz
Housing Material	Polylac - PA765
Environmental	
Ingress Protection	IP65 (Pre-installation)
Storage Conditions	Dry. Cool. Flat
Operating Conditions	-10 ~ 50°C / 14 ~ 122°F 30 ~ 80% rf
Compliance	
CE / UKCA	EN 61326-1 / BS EN IEC 61010-1

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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 be commissioned by a competent/trained engineer to ensure correct installation and operation. The Merlin range of gas detectors are calibrated when manufactured, however, we strongly recommend the detectors response and alarm signals are tested and validated once installed. This will ensure the equipment performs as intended and is free from any unforeseen damage caused by transit/installation.

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