# Merlin GM-100

AMERICAN GAS SAFETY


# INSTALLATION & OPERATION

Please read these instructions carefully before use and retain for future reference.

These instructions can also be downloaded in electronic form on the product website.

For specific requirements that may deviate from these instructions – contact your supplier.

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# Contents

# Important Information

## Copyrights



## Manufacturer's Warranty

The manufacturer warrants to the original consumer purchaser, that this product will be free of defects in material and workmanship for a period of **3 years** from the date of purchase.

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. 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.

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.

## Disposing of Electrical & Electronic Equipment (WEEE)

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.

## Revisions

Every effort is made to ensure the accuracy of this document; however, AGS can assume no responsibility for any errors or omissions in this document or their consequences. AGS would greatly appreciate being informed of any errors or omissions that may be found in the content of this document. For information not covered in this document, or if there is a requirement to send comments/corrections, please contact AGS using the contact details given below.

## Safety Statements

⚠ Take extra care where this symbol is used throughout this document to understand the nature of potential hazards and how to avoid them.

# Introduction

## General Description

This equipment has been designed to meet the requirements of high specification requirements of customised solutions. Available with single and dual gas detection capability, designed for all areas being directly connected to low voltage supply. The equipment is to be installed in non-classified, non-hazardous, permanent locations and is intended to continuously monitor the ambient air for dangerous gas/air concentrations. The equipment can operate as a standalone unit, be connected to a control panel or direct to other 3rd party devices capable of accepting digital and/or analogue outputs, such as a Building Management System (BMS).

The equipment features two alarm levels, a selectable audible alarm, LED status and LCD display indicating power, alarm status, gas type, concentration, measurement, address, and fault conditions. Plug-and-play modular assembly allows for replaceable smart gas sensor modules. On delivery, the equipment is calibrated at ambient, normal conditions and configured for the specified gas, measuring range and alarms.

For any further information and technical support, contact your supplier.

## Key Features

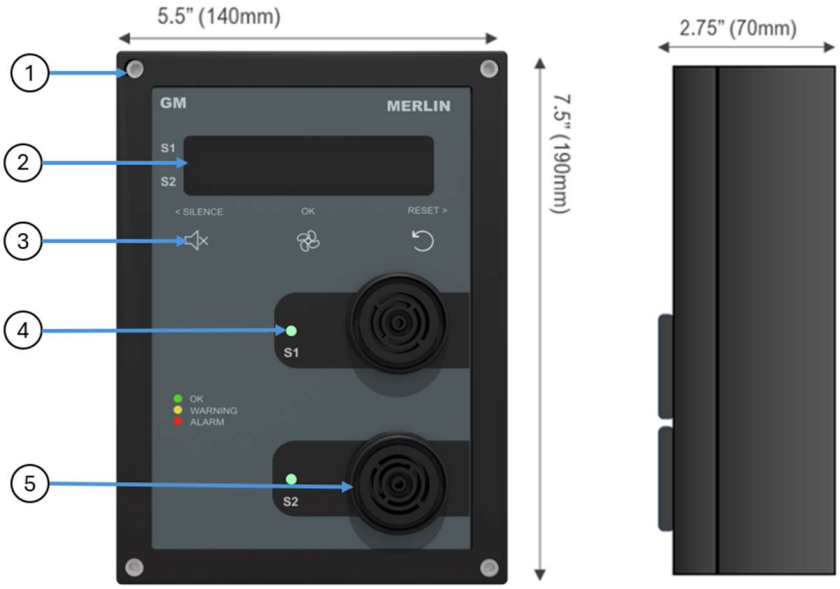
- ✓ Single or Dual channel operation.
- ✓ Factory calibrated field replaceable sensor modules.
- ✓ Two analog output signals in the range of voltage or current loop principle.
- ✓ One relay signal (1A)
- ✓ Digital RS485 communication – Modbus RTU or BACnet MS/TP – field selectable.
- ✓ Strong anti-interference circuit boards and RoHS compliant.
- ✓ Standard corrosion resistant enclosure

The equipment can be used indoors or in covered outdoor locations. If used outdoors, choose a sheltered location which is protected from direct sunlight, rain, and other extreme conditions.

## Applications

Private homes • Apartment buildings • Condominium buildings • Parking garages • Schools • Hospitals • Commercial buildings • Shopping malls • Service centres • Retail • Offices • Hotels • Warehouses • Data centres • Food processing plants • Textile plants • Vehicle and machinery facilities • Warehouses • Vehicle Emissions (CO, NO2) • Enclosed parking garages • Loading docks • Automotive maintenance facilities • Truck maintenance facilities • Fire stations • Ambulance bays • Boiler rooms • Warehouses • Food processing plants • Cold storage • Ice rinks • Landfills • Water and wastewater treatment plants • Recycle centres • Natural gas monitoring • Commercial kitchens • Laboratories • Warehouses • Lead acid battery charging stations • Swimming pool mechanical rooms • Medical labs • Hospitals • Welding facilities • Mechanical rooms • Compressor rooms.

# Appearance




| | | |
|---|---|---|
| **1** | M4x15mm bolts | Secures front fascia decal. |
| **2** | LCD Display | Gas Type / Concentration / Unit / ID |
| **3** | User Buttons | Silence audible buzzer / Acknowledge alarm / Override / Navigate menu |
| **4** | LED Status Indication | Power-OK / Fault-Warning / Alarm / Calibration |
| **5** | Gas Sensor Opening | Allows diffusion monitoring of air and gas |

# Replacement Parts List

| Part Number | Item |
|---|---|
| GDM-CO | CO: Carbon Monoxide Sensor |
| GDM-NO2 | NO2: Carbon Dioxide Sensor |
| GDM-CH4 | CH4: Methane (Natural Town Gas) %LEL |
| GDM-H2 | H2: Hydrogen %LEL |
| GDM-LPG | LPG: Propane / Butane %LEL |

# Technical Specifications

### Mechanical

| | |
|---|---|
| Material | ABS Flame Retardant UL94 V0 |
| Height | 5.95” (151.2mm) |
| Width | 4.37” (111.2mm) |
| Depth | 1.97” (50mm) |
| Weight | 350g / 12.5 oz |

### Electrical

| | |
|---|---|
| Power – Low Voltage | Nominal 24V AC/DC (12-32) |
| Consumption - Low V | 1.5 W |
| Wiring (RS485) | 127 Units |

### IO

| | |
|---|---|
| Digital Output x1 | Modbus RTU or BACnet MS/TP (field selectable) |
| Signal Relay Output x1 | 1A, 60VDC |
| Analog Outputs x2 | 0/4-20mA or 0/2-10V (field selectable) |

### Environmental

| | |
|---|---|
| Operating Temperature | -4° to 122°F (-20° to 50°C) |
| Humidity | 15 to 90% RH (continuous) 0-99% (intermittent) non-condensing. |
| Atmospheric Pressure | 6561ft (2000m) |
| Installation Category | III @ 24V~ |
| Pollution Degree | 2 |

### User Interface

| | |
|---|---|
| LED Indications x2 | Power, Alarm Low, Alarm High, Fault, Calibration |
| Audible Alarm x1 | >85dB |
| Button(s) x3 | Silence Alarm / Reset Unit / Manual Override |
| Language | English |

### Certification/Conformance

| | |
|---|---|
| Safety | UL/CSA/IEC/EN/BS 61010-1 |
| Electromagnetic Compatibility | Directive 2014/30/EU / Regulation 2016 / EN 50270 |
| FCC | This device complies with part 15 of the FCC Rules, Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. |
| Gas Performance | UL 2075 (CO and $NO_2$) |

# Sensor Specifications

## Carbon Monoxide (CO)

| | |
|---|---|
| Type | Electrochemical |
| Measuring Range | 0-250ppm |
| Response (t90) | <30s |
| Resolution | 1ppm |
| Stability / Year | <5% |
| Expected Lifecycle | 7 years in clean air and regular maintenance. |
| Calibration | Every 6, 12 or 18-months dependant on application and climate. |
| Cross Sensitivity | Available on request |
| Repeatability | < ±3% |
| Deadband | ≤ 3ppm |
| Accuracy | 5% of applied concentration following correct calibration. |

## Nitrogen Dioxide ($NO_2$)

| | |
|---|---|
| Type | Electrochemical |
| Measuring Range | 0-10ppm |
| Response (t90) | <50s |
| Resolution | 0.1ppm |
| Stability / Year | <20% |
| Expected Lifecycle | 2 years in clean air and regular maintenance. |
| Calibration | Every 6, 12 or 18-months dependant on application and climate. |
| Cross Sensitivity | Available on request |
| Repeatability | < ±2% |
| Deadband | ≤ 0.2ppm |
| Accuracy | 5% of applied concentration following correct calibration. |

## Methane / Hydrogen / Propane, Butane ($CH_4$ / $H_2$ / LPG)

| | |
|---|---|
| Type | Catalytic |
| Measuring Range | 0-100% LEL (Lower Explosive Limit) |
| Response (t90) | <60s |
| Resolution | 0.1% |
| Stability / Year | <20% |
| Expected Lifecycle | 10 years in clean air and regular maintenance. |
| Calibration | Every 6, 12 or 18-months dependant on application and climate. |
| Cross Sensitivity | Sensitive to Hydrogen, LP (iso-butane) gas and organic vapours |
| Repeatability | < ±10% |
| Deadband | ≤ 1.4%LEL |
| Accuracy | 10% of applied concentration following correct calibration. |

# O2 Oxygen

| | |
|---|---|
| Type | Electrochemical |
| Measuring Range | 0-25% Oxygen |
| Response (t90) | <10 seconds |
| Resolution | 0.1% |
| Maximum Overload | 30% Oxygen |
| Stability / Year | 5% over operating life |
| Expected Lifecycle | 5 years |
| Calibration | Every 12 months |
| Deadband | 21.5 ~ 20.7 % will be displayed as 21.0% |

## Sensor Warnings

⚠ Response time (t90) may increase when operating in lower temperature conditions.
⚠ All figures are valid over the temperature range −20°C to 50°C (-4 to 122°F)
⚠ If not used in accordance with these instructions, the safety of the equipment may be impaired.
⚠ Do not use in classified hazardous areas (explosion rated environments).
⚠ The equipment is shipped pre-calibrated to traceable standards and set to a factory condition.
⚠ It is recommended that this equipment be commissioned upon installation.
⚠ Concentrations of alcohol found in many products may damage, deteriorate, or affect gas readings.
⚠ The equipment is not designed to detect smoke, fire or other gases not specified.
⚠ Never ignore the equipment when in alarm or special state condition.
⚠ The equipment 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.
⚠ The equipment does not prevent dangerous gasses from occurring or accumulating.
⚠ Seek fresh air supply and contact your local gas emergency service should you suspect a gas leak.
⚠ This equipment may not fully safeguard individuals with specific medical conditions. If in doubt, consult a doctor/physician.
⚠ Do not apply lighter gas or other aerosols to the equipment – this may cause extreme damage.
⚠ Avoid environmental conditions outside of this specification that could potentially impede the accuracy and operation of the equipment such as condensation; vibration; temperature, pressure, the presence of other gases, electromagnetic interference, and draft zones.
⚠ The audible alarm will only sound if the buzzer switch is turned on.
⚠ Following over or under range indications, recalibrate the sensor to ensure continued accuracy.
⚠ Calibrate upon installation if in non-ambient conditions (i.e., extreme temperature or humidity).
⚠ The gas diffusion path can become occluded (moisture, dust, debris, frozen condensation) over time resulting in reduced or complete lack of gas detection and alarming function. Routine visual inspection of the gas detector and bump testing are suggested to ensure proper gas detection and alarm function.
⚠ Use only genuine parts and accessories. Failure to comply may impair the operation of the product and void the warranty.

# Installation

## General Safety Cautions

⚠ Failure to observe the following may cause injury to persons and/or property.

Installation must be carried out by a licenced and insured contractor and installed in areas at risk of gas leaks and higher concentrated areas e.g., near boilers, valves, or areas of critical protection, located in positions determined by those who have knowledge of gas dispersion, the process plant system and equipment involved, and in consultation with both safety and electrical engineering personnel.

Final positioning of gas detectors should be indicated by the characteristics of the gas being detected and other environmental factors. Seek advice where necessary. Take in to account the design of the air flow patterns within the area, sensors should be installed in the correct orientation as per the manufacturer's specification, and ease of access should be accounted for to allow for any forms of maintenance throughout its operational life.

Installation must be in accordance with the recognized standards of the appropriate authority in the country concerned. For Europe, see EN 60079-29-2, EN 62990-2 and/or EN44554-4. For installations in North America, the National Electrical Code (NFPA 70) should be strictly observed. All appropriate local and national regulations should be observed.

## EMI and RF Interference Considerations

All electronic devices are susceptible to EMI (Electromagnetic Interference) and RFI (Radio Frequency Interference). Our products are designed to reduce the effects of these interferences. However, there are still circumstances and levels of interference that may cause the equipment to respond to these interferences. Reduce the possibility by:

- Avoiding installation locations near high foot traffic and high energy equipment.
- Confirming equipment is properly grounded if required and shielded cabling.

## Coverage

50ft radius per detector is a reasonable guide, therefore multiple detectors may be required to adequately protect property and persons. However, coverage should be determined by those who have knowledge of gas dispersion, target gas characteristics, the environment, process plant system(s) and intended functions etc., and in consultation with both safety and electrical engineering personnel.

## Positioning

There are no specific standards governing gas detector locations (unlike fire detection systems); there are, however, general guidance documents. The most relevant being *IEC 60079-29-2.* Much of what it covers is also relevant to toxic gas & oxygen monitoring equipment. Recommended heights may vary based on air flow and other environmental conditions in addition to the proposed application, location, and target gas.

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 (e.g., LPG) would be close to the lowest point in the area, and for a light gas (such as methane or hydrogen) would be close to the highest point in the area.

These typical heights may vary based on application.

| **Target Gas** | **Typical Install Height** |
|---|---|
| Carbon Monoxide (CO) | Breathing Zone – 4 - 6ft from ground level. |
| Nitrogen Dioxide ($NO_2$) | Breathing Zone or, Low Level - 1ft from ground level. |
| Carbon Dioxide ($CO_2$) | Breathing Zone - 1700mm (5ft 6”) from ground level |
| Natural Gas (NG) / Methane ($CH_4$) | High Level - 300mm (1ft) from ceiling |
| Propane / Butane (LPG) | Low Level - 300mm (1ft) from ground level |
| Hydrogen ($H_2$) | High Level - 300mm (1ft) from ceiling |
| Oxygen (O2) | Breathing Zone – 4 - 6ft from ground level. |

Observe the following also.

- Ease of access to the equipment for functional testing and servicing.
- How gas may behave due to natural or forced air currents.
- Any regulation/standard/code that locations are bound by.

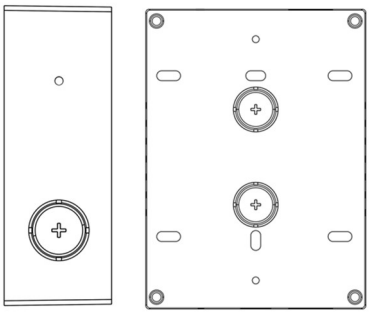
## Mounting Instructions

⚠ Position at a location with minimum noise, vibration, and environmental variation.

⚠ Damage when creating entry points or attempting to remove the circuit board may void any warranty.

⚠ Avoid environmental conditions outside of this specification that could potentially impede the accuracy and operation of the equipment such as condensation; vibration; temperature, pressure, the presence of other gases, electromagnetic interference, and draft zones.

1. Carefully remove the front cover from the unit by using an M3 hex key supplied.
2. Using the rear base - mark mounting holes to the wall or align with a gang/pattress box.
3. Fixing straight to wall – drill 0.2” (5mm) hole, insert plugs and use the four screws (No.4 Pozi) provided.
   There are 2x pre-fractured knockouts for cable entry on the rear of the base.
   For 0.5” conduit mounting use the 2x knockouts on the top and bottom.
   Two indents are visible and can be drilled out as necessary.



4. After executing the mounting/connections – secure the front cover with all bolts and insert the security caps provided.

# Circuit Board Overview

1. S2 Gas Sensor - Replaceable module
2. S1 Gas Sensor - Replaceable module

3. RS485 Configration dip-switches
   Protocol / Network Address / Baud Rate

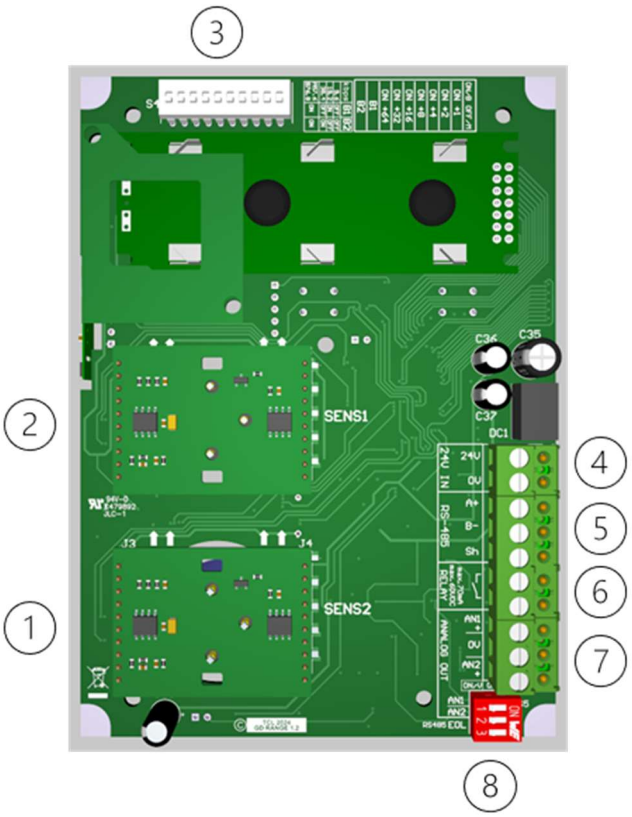
4. Power Input
   12-32V AC/DC (Nominal 24V)

5. RS-485 Digital Output
   Modbus RTU or BACnet MS/TP

6. Signal Relay Output
   1A, 60V max

7. AN1 & AN2 Analog Output (mA or V)

8. 3-Way Dip-switch
   - AN1 & AN2 Voltage or Current Output
   - RS485 120ohm Termination Resistor




# Power & Digital RS485 Wiring

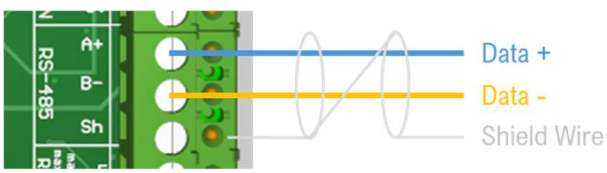
⚠ Warranty may be void if damage occurs to the circuit board from use of solid core wire attached directly to terminals.

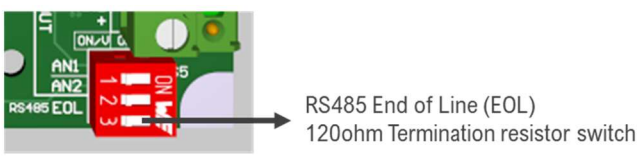
⚠ The equipment requires a continual supply of electrical power – it will not work without power.

The equipment is powered by low voltage 12-24V DC or AC.

Cable specifications ultimately determine the distance the sensors can be mounted away from a control panel or power supply. Consider voltage drops due to cable resistance and strip the cables as short as possible ensuring bare wires, e.g., wire shields, do not contact with the circuit board (risk of short-circuit).

For the Modbus RS-485 or BACnet MS/TP network use a 3-core, 2 twisted pair + ground, shielded cable with 120 Ω characteristic impedance. Any cable with similar characteristics can be used to connect all the devices together. Daisy chain wires running to additional monitors – 127 sensors max per cable run. First and last device in bus requires a termination resistor. Use RS485 EOL switch to terminate by turning ON.



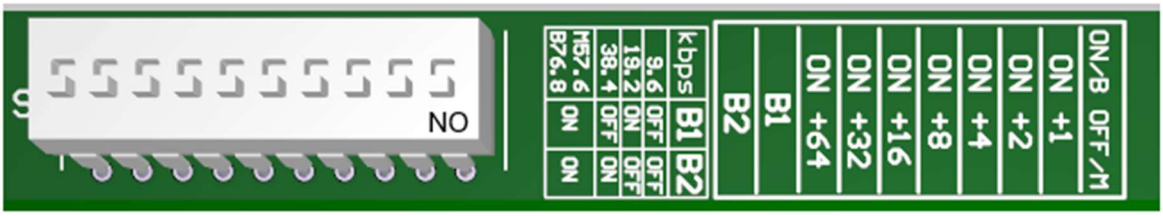

All wiring should be run within properly grounded (earth or safety) conduit. The cable shield should be connected to earth ground at the controller/power supply that is providing power to the equipment.

Low voltage wiring must not be within the same conduit as any line/mains voltage wiring.

To ensure optimal performance of the network ensure the following guidelines are implemented:

- Ensure the equipment is configured in a single bus topology, connecting multiple buses in parallel or branching multiple units from the main bus, may introduce impedance mismatches, reflections and/or signal distortions.
- Ensure equipment at each end of a bus has the 120 Ω terminating resistor switch enabled.
- Ensure A+/B- signal polarity is maintained throughout the network.
- Connect shield wires to earth/ground of the central control panel if no shield connection is present.
- Ensure cable shield integrity is maintained throughout the network.
- Do not use shield connection for signal ground. Use cable that provides dedicated ground conductor for signal ground. Connect signal ground to (0V/GND) terminal.

RS485 Dipswitch Settings



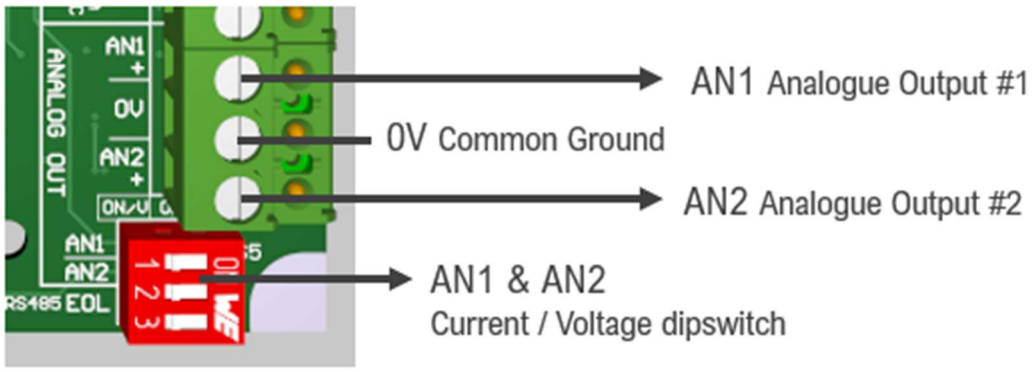

| Switch | Function | Label | Parameter |
|---|---|---|---|
| 1 | RS485 Selection | OFF/M<br>ON/B | Off/M: Modbus RTU /<br>On/B: BACnet MS/TP |
| 2~8 | Slave ID | - | Achieved by adding binary switch values together.<br>Example #2 ON + #4 ON = ID: . (Max. 16) |
| 9~10 | Baud Rate | B1 / B2 | On/Off **c**onfiguration achieves either. 9600, 19200, 38400 or 57600 (Modbus) / 76800 (BACnet) |

## Analog Output Wiring

⚠ Outputs are scaled to the high alarm concentration level.

Two linear voltage or current output terminals are available and often used to regulate external fan speed controllers. The AN1 & AN2 dipswitch will change from 4-20mA to 2-10V. The output is scaled to the Alarm H (high) setpoint, and the gas closest to the Alarm H will take priority and drive the speed (default).

Configure dipswitches to select current (OFF) or voltage (ON) for each output (AN1 and AN2).




| **Gas Concentration to High Alarm Level** (See section: Configuration List) | **0-100%** | | **20-100%** | |
|---|---|---|---|---|
| 0% | 0v | 0mA | 2v | 4mA |
| 100% | 10v | 20mA | 10v | 20mA |

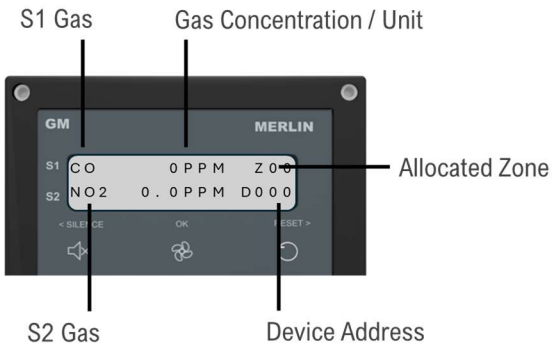
# Operation

## Initial power-up

⚠ Before leaving the instrument for normal operation, check configuration for proper settings.
⚠ Allow the equipment to stabilise for at least 2 hours (preferably 24 hours) upon power up.

During initial powering, the device will go through a 60s start-up count-down sequence.

Once initialized, normal/measuring mode will be displayed.



# LED Indication Status


**Low Gas Alarm**
*In low alarm the red LED will blink*


**High Gas Alarm**
*In High alarm the red LED will be solid and display will turn Red.*

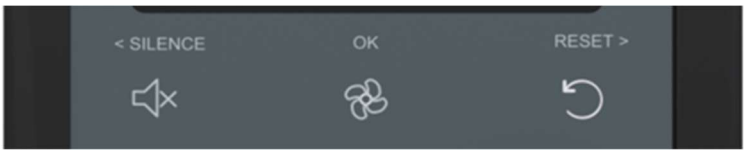
Visual indication of the gas detector status is provided by a single RGB colour LED.
Detector condition and corresponding outputs are shown below (as **factory set condition**).

| Condition | LED | Description | Buzzer | 1A Relay |
|---|---|---|---|---|
| Warm-up | | Green LED Blink | OFF | - |
| Normal | | Green LED On | OFF | - |
| Alarm Low | | Red LED Blink | BEEP (*Default OFF) | - |
| Alarm High | | Red LED On | ON (*Default OFF) | ON |
| Fault | | Yellow On | BEEP (*Default OFF) | - |
| Cal. Ready | | Blue LED Blink | OFF | - |
| Cal. OK | | Blue/Green Blink | BEEP (*Default OFF) | - |
| Cal. Fail | | Blue/Yellow Blink | BEEP (*Default OFF) | - |

IMPORTANT: * Buzzer is OFF as default and can be turned on from the configuration menu.

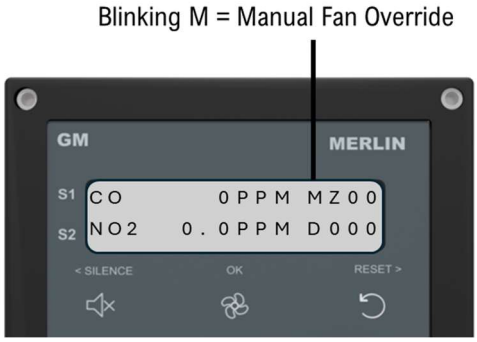
# User Button Functions

User interaction with the detectors is accomplished using accessible buttons on the fascia.




| Button | Description |
|---|---|
| < SILENCE | - Silence the audible alarm.<br>- Toggle left. |
| OK | - Manual Override.<br>- Confirm selection.<br>- Toggle Centre |
| RESET > | - Toggle right. |
| < SILENCE & RESET > | - Hold to prompt Configuration Menu |

## Manual Override




Press [OK] for 5s to activate manual override.
Press < > to select the override time (minutes).
Press < > to select if the signal relay is included

Analog outputs will drive at 100% for the selected time. The signal relay will be activated if selected.

'M' will blink on the equipment for the duration of the override.
To cancel the override, press [OK] for 5 secs and select 0 minutes.

## Temperature Alarm


If the temperature alarms are set to ON, a 'T' indication will blink on the display. There are no output changes, but configurations can be made over a network. This is an indication only; ambient temperatures should be measured and the unit calibrated to match. It may take up to 6 hours energised to stabilise temperature readings.

## Access Configuration Menu

1. To enter the settings menu, hold the <SILENCE & RESET> buttons for 5 sec.
2. Use all 3 buttons to scroll through numbers (0-9) and **Enter Code 753**.
3. Hold the OK button for 3s to accept the code and enter the menu.

   (Toggle using < > to access CALIBRATION or REPLACE (see Maintenance section))

4. In the configuration menu, use < > to toggle between functions and OK to select/confirm changes.
5. If adjustments are made, select [SAVE/EXIT/R] and select [SAVE & EXIT].

# Configuration List & Parameters

| No | Display Text | Parameter | Default | Description |
|---|---|---|---|---|
| 01 | S1: ALARM L | See section: Default Sensor Alarms | | Sensor 1: Low alarm setpoint (Pre-alarm) |
| 02 | S1: ALARM H | | | Sensor 1: High alarm setpoint (Main alarm) |
| 03 | S2: ALARM L | | | Sensor 2: Low alarm setpoint (Pre-alarm) |
| 04 | S2: ALARM H | | | Sensor 2: High alarm setpoint (Main alarm) |
| 05 | AL H DELAY | 0- 30 seconds | 02 | Set acknowledgement time for the high alarm to avoid false readings |
| 06 | ZONE NUMBER | 0-10 | 00 | Set Zone number (if required). |
| 07 | SIG RLY AL | L / H | H | Signal alarm relay to [L] or [H] alarm |
| 08 | SIG RLY POL | NO / NC | NC | Relay polarity, normally open (NO) or normally closed (NC) |
| 09 | TEMP UNIT | °C / °F | °F | Select °C / °F |
| 10 | TEMP ADJ | -9° / +9° | 0° | Offset temperature value by maximum ± 9° |
| 11 | TEMP AL HIGH | ON / OFF | OFF | Turn ON/OFF the temperature high alarm |
| 12 | TEMP AL H SET | 77- 104° F (25- 40°C) | 104° F | Set the temperature high alarm setpoint. Enabled if TEMP AL HIGH is ON. |
| 13 | TEMP AL LOW | ON/OFF | OFF | Turn ON/OFF the temperature low alarm |
| 14 | TEMP AL LOW SET | 32- 59° F (0- 15°C) | 32° F | Set the temperature low alarm setpoint. Enabled if TEMP AL LOW is ON. |
| 15 | DEADBAND | ON / OFF | ON | Gas readings hovering around zero are displayed as zero. |
| 16 | BUZZER | ON / OFF | OFF | Audible buzzer upon AL H condition. |
| 17 | SERVICE MSG | OFF / 6/12/18 | 12 | Calibration/Service Reminder. |
| 18 | ANALOG RANGE | 0-100%<br>20-100% | 20-100% | Configure Analog Output<br>- 0-100% = 0-10v / 0-20mA<br>- 20-100% = 2-10v /4-20mA |
| 00 | SAVE/EXIT/R | BACK TO MENU<br>EXIT W/O SAVE<br>SAVE & EXIT<br>RESET & EXIT | | Return to the menu<br>Exit without saving<br>Save settings and exit<br>Exit and reset to default settings |

## Default Sensor Alarms

⚠ Users should check and adjust alarms according to any local regulation and/or code.
⚠ **AGS** accepts no responsibility for alarm configuration.

| Target Gas | Alarm Low | Alarm High | Parameter | *Hysteresis |
|---|---|---|---|---|
| Carbon Monoxide (CO) | ▲ 25 ppm | ▲ 100 ppm | 10 - 250ppm | 10% |
| Nitrogen Dioxide ($NO_2$) | ▲ 0.5 ppm | ▲ 2.0 ppm | 0.5 - 10ppm | 10% |
| Methane ($CH_4$) Nat. Gas | ▲ 8% LEL | ▲ 10% LEL | 3.0 - 90% LEL | 10% |
| Hydrogen ($H_2$) | ▲ 8% LEL | ▲ 10% LEL | 3.0 - 90% LEL | 10% |
| Butane / Propane (LPG) | ▲ 8% LEL | ▲ 10% LEL | 3.0 - 90% LEL | 10% |
| Oxygen (O2) Depletion | ▼ 19.5% V/V | ▼ 18.5% V/V | 0-25 % V/V | 2% |

**ppm**: Parts Per Million / **% LEL**: Lower Explosive Limit / ▼Falling Alarm / ▲Rising Alarm

* All alarms have a % hysteresis built in to avoid changing multiple states when gas concentrations are hovering around the alarm level, i.e., if a CO alarm is triggered at ▲20ppm rising, the alarm indications will be displayed until the gas concentration drops below 18ppm 10% hysteresis.

## End Of Life (Replace) Indication

⚠ At the end of its life, the equipment must be decommissioned and replaced immediately.
The GM is fitted with replaceable sensor modules with end-of-life (EOL) tracking. The end of life is a safety feature that monitors the time remaining before the sensor has reached the end of life.

When the end of life is reached, and the monitor will display a message [REPLACE]. To clear the end-of-life message the sensing module must be replaced. See section: Disable/Replace Sensor Module.

| Product | Expected EOL (dependent on environmental conditions ) | EOL Indication |
|---|---|---|
| Carbon Monoxide (CO) | 7-10 | 7 |
| Nitrogen Dioxide ($NO_2$) | 2-4 | 2 |
| Methane ($CH_4$) Nat. Gas | >10 | 10 |
| Hydrogen ($H_2$) | >10 | 10 |
| Butane / Propane (LPG) | >10 | 10 |
| Oxygen (O2) Depletion | >5 | 5 |

# Commissioning

## Overview

We recommend all gas detection equipment be commissioned by competent/trained engineers.
Gas detectors are factory calibrated when shipped under ambient conditions, however, we recommend the detectors response and alarm signals are tested and validated once installed and subsequently every 6-18 months thereafter to retain optimum safety.

**During Commissioning**

- Check installation, mounting, cable entry, position.
- Check the power supply voltage and indication.
- Check/perform calibration.
- Check indications for proper operation.
- Check buzzer and relay operation.
- Check signal transmission to the BMS/central controller, where appropriate.

Regular maintenance and calibration of the sensors by trained technicians is strongly recommended. Inspections and services should be documented and executed at regular intervals with records in place. The frequency must be determined and observed by the person responsible for the gas warning system according to all regulatory, code and legal requirements. The inspection interval is normally 6 to 18 months to retain optimum safety. The date for the next maintenance should be affixed to the equipment sensor.

Our equipment is designed to operate in a wide range of harsh environments and conditions. However, it is important that exposure to high concentrations of solvent vapours is avoided, both during storage and operation. Regular maintenance and calibration of the sensors by trained technicians is strongly recommended. Inspections and services should be documented and executed at regular intervals with records in place.

The frequency must be determined and observed by the person responsible for the gas warning system according to all regulatory, code and legal requirements. The inspection interval is normally 6 to 18 months, and a service reminder can be set following the procedure in the Menu section.

The date for the next maintenance should be affixed to the equipment sensor.

| Interval | Description |
|---|---|
| During commissioning | Check installation, orientation, mounting, cable entry & wiring.<br>Check/perform calibration.<br>Check indications for proper operation.<br>Check buzzer and relay operation.<br>Check signal transmission to the BMS/central controller, where appropriate. |
| **Every 6-18 months | Inspection by trained service personnel.<br>Calibrate, bump, or change the sensor with a factory calibrated one. |
| As required | Replace sensor modules. |

** This can vary by sensor type, application, environment and national or local regulation/code.

## Alarm Test

An Alarm test can be carried as follows as part of the system commissioning.

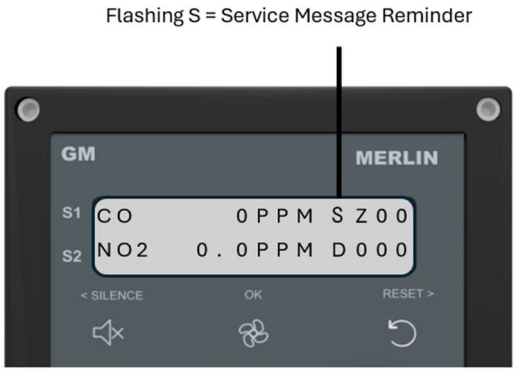
Follow the procedure in the Setting Menu section to enter the code **813**. Once the code is accepted use the < and > buttons to access **Alarm Test** and press OK.

The GM will automatically return to normal operation gas levels simulated in the high alarm condition for 10 seconds during which time the signal relay will be activated and the system can be tested in an alarm condition.

# Maintenance

## Service Reminder

The service message is factory set as OFF and can be set up from the configuration menu.  The service message acts as a reminder to carry out a periodic check of the sensor. Once a service message has been set and the period has been reached, an indication (S) will be displayed on the screen.




The planned maintenance schedule should now be carried out according to industry and calibration procedures.

All inspection calibration/bump testing records should be documented.

The frequency must be determined and observed by the person responsible for the gas warning system according to all regulatory, code and legal requirements.

## Reset Service Reminder

In the configuration menu, go to the [SERVICE MESSAGE] setting and select the required period before the next service, now [EXIT/SAVE] to initialise the next service reminder.

## Cleaning the Equipment

⚠ 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!

Keep your Detector in good working order

- Remove any dust/debris from the outer enclosures regularly using a slightly damp cloth.

- Never use detergents or solvents to clean your device(s).
- Never spray air fresheners, hair spray, paint or other aerosols near the detectors.
- Never paint the device(s). Paint will seal vents and interfere with the equipment.

## Replace or Disable Gas Sensor S1 or S2

Follow the procedure in the Setting Menu section to enter the code 753.

Once the code is accepted use the < and > buttons to access REPLAC**E** and press OK.

If only a single gas type is required, S1 or S2 can be disabled. In addition to replace a sensor, first disable the sensor you wish to replace, remove and then install the new sensor, then ENABLE.

***1.***


*Once the code is accepted use the < and > buttons to access **REPLACE** and press Ok.*

***2.***


*Select the module S1 or S2 using the < > buttons, press OK to confirm.*

***3.***


*Select Enable or Disable using the < > buttons, press OK to confirm*

***4.***


*Select Yes or No using the < > buttons, press OK to confirm.*

***5.***


*Select the detected gas type CO or NO2, press OK to confirm.*
*Now press Ok and then < press OK to select BACK and wait 10 sec for timeout or press Ok to return to normal operation.*

# Calibration

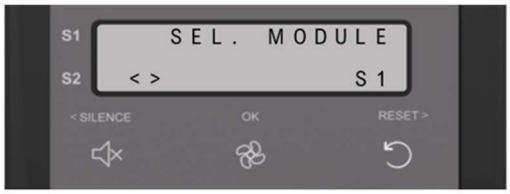
## General Safety Statements

⚠ Gas mixtures must be prepared using equipment traceable to N.P.L / ISO standards.
⚠ Ensure all test gas is within the expiration date.
⚠ Take note of any material safety data sheet accompanying test gases and equipment.
⚠ Before starting the calibration procedure, ensure the environment is free of any gas that may affect the result.
⚠ Acknowledge any alarms or faults before attempting to begin the calibration process.
⚠ At elevations higher than 6,560' (2,000m), calibration will result in a lower reading.
⚠ Give at least seven (7) minutes between testing the same unit or until gas has fully dispersed.
⚠ Sensors should be calibrated if the measuring range has been exceeded, which can shorten the sensor lifetime and/or reduce its sensitivity.
⚠ Ensure the device orientation is maintained when performing calibration.
⚠ Do not apply gas during the [ZERO] and make sure the environment if free of any gas that may affect the calibration result.  wait until a beep is heard before moving on.
⚠ Calibration consists of zero and span adjustments, it is not possible to adjust only one.

## Calibration Procedure

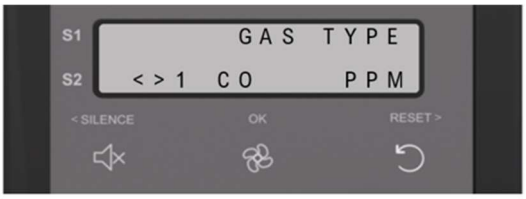
To enter calibration, enter configuration menu, use the < > buttons to access [Calibration] and press [OK].

***1.***




*Use the < and > buttons to select the module to be calibrated S1 or S2 and press OK.*

***2.***




*Press OK to confirm the gas type.*

***3.***

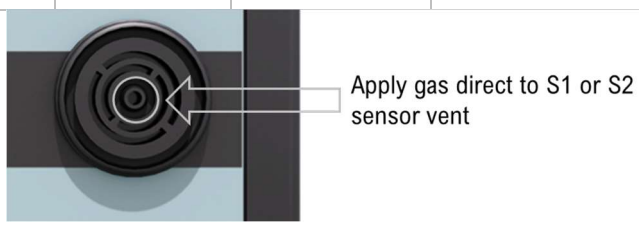

*Press OK to start the calibration.*

***4.***


*When calibration starts, the screen will turn blue.*

When instructed, fit pipe direct to the gas inlet as detailed below and apply gas to the appropriate sensor within the range specified. Calibration is recommended to be performed as per local code requirements and must be carried out following the specified conditions and using equipment as detailed below.

| Target Gas | Formula | Concentration | Balance/Mix | Flow Rate | Application Time |
|---|---|---|---|---|---|
| Carbon Monoxide | CO | 50~150ppm | Air | 0.3-0.5L Per/Min | <120s |
| Nitrogen Dioxide | $NO_2$ | 2~5ppm | | | |
| Methane | $CH_4$ | 8 – 20% LEL | | | |
| Hydrogen | $H_2$ | 8 – 20% LEL | | | |
| Propane (LPG) | $C_3H_8$ | 8 – 20% LEL | | | |


After 60-120 seconds check the gas value is stable and no longer rising, now use the ↑ ↓ buttons to adjust the value to exactly match the test gas bottle value, the example below is a reading using a 120ppm calibration gas.

**Calibration Success [OK]**



Press OK to complete the calibration. If you would like to exit the calibration without applying any changes remove the gas and press OK to display [NOK].

**Calibration failed [NOK]**


NOK displayed in yellow indicates the calibration has failed and results haven't been saved, the calibration should be repeated following the parameters as specified at the start of the procedure.

Now press OK and then < to select BACK, wait 10 sec for a time out to return to normal operation or Press OK to return to the Menu.

If the sensor is faulty and cannot be calibrated, the sensor module can be replaced. As a final calibration check, it is recommended to perform a bump test.

# System Bump Test

## General information

Gas response checks are often referred to as a ‘bump test’.

Bump tests are important to make sure a device can 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 has been conducted. NFPA requires all gas detectors to be tested annually and that the test results be recorded on site and available to inspectors. A detector may visually appear in good working order, but its sensitivity and accuracy can be inhibited by external factors. Dust, humidity, temperature fluctuations, cleaning products, contaminants, exposure to its target gas or sensor drift (ageing) can cause a decline in sensitivity, accuracy, and eventual failure. Regular bump tests are important to make sure the detector can 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. We recommend testing detectors every 12-18 months along with the regular fire test procedures and coincide with the annual service message prompted on the detection system after each year of service/operation.

## Bump Test Procedure

⚠ Take normal precautions when using cylinders, they should always be stored in the vertical position and secured to prevent them from falling over.

⚠ Ensure valve/regulators are screwed and secured tight before use and ensure valves are closed after use.

⚠ Ensure all test gas is within the expiration date.

⚠

The bump test must be carried out following the specified conditions and using equipment as detailed below.

| Target Gas | Formula | **Concentration | Balance/Mix | Flow Rate | Application Time |
|---|---|---|---|---|---|
| Carbon Monoxide | CO | 150 ppm | Air | 0.3 - 0.5L Per/min | <120s |
| Nitrogen Dioxide | $NO_2$ | 5ppm | | | |
| Methane | $CH_4$ | 20% LEL | | | |
| Hydrogen | $H_2$ | 20% LEL | | | |
| Propane (LPG) | $C_3H_8$ | 20% LEL | | | |

**Bump test concentrations must be higher than the set alarm level but not exceed the measuring range.

Open the gas valve and apply gas to the inlet nipple of the sensor vent until an alarm is triggered, during this time you should observe the gas level rising and stabilising and response time.

Check the monitor goes into alarm and displays the applied gas correctly, in addition, consider the response time in accordance with the sensor specifications. If the response exceeds the time specified, the sensor module may need to be replaced.

If the monitor is displaying an incorrect gas level, follow the Calibration Procedure section.

# Trouble Shooting

## Fault Indications

If a fault occurs with the gas sensing module an error code will be displayed as shown below. Additional fault-finding error codes are listed in the Modbus/BACnet functionality document.


| Error Code F!! | Description |
|---|---|
| 07 | S1 Wrong Type |
| 08 | S1 Module Missing |
| 09 | S2 Wrong Type |
| 10 | S2 Module Missing |

# Additional Information

## Sensor Principle - Electrochemical

Electrochemical sensors measure the partial pressure of gases under atmospheric conditions. The monitored ambient air diffuses through a membrane into the liquid electrolyte in the sensor. The electrolyte contains a measuring electrode, a counter-electrode, and a reference electrode. An electronic “potentiated” circuit ensures a constant electrical voltage between measuring electrode and reference electrode. Voltage, electrolyte, and electrode material are selected to suit the gas being monitored so that it is transformed electrochemically on the measuring electrode and a current flow through the sensor. This current is proportional to the gas concentration. At the same time, oxygen from the ambient air reacts at the counter electrode electrochemically. The current flowing through the sensor is amplified electronically, digitized, and corrected for several parameters (e.g., the ambient temperature).

## Sensor Principle - Catalytic

When a flammable gas, such as methane, propane, or hydrogen, enters the sensor, it combusts on the active bead's surface. This reaction produces heat, which increases the bead's temperature. As a result, the bead's resistance changes, and this difference in resistance is measured and translated into a gas concentration reading. The reference bead, which does not react with the gas, is used to compare temperature changes, providing a baseline for accuracy. This technology is reliable because it directly detects the heat generated by combustion, making it effective in environments where explosive gas leaks are a risk. The underlying concept might sound straightforward, but the engineering and precision behind catalytic bead sensors ensure consistent and reliable readings, which can mean the difference between safety and danger in hazardous environments.

# BACnet Functionality

Parity: None / Data-Word length: 8-bit / Stop bit: 1

## BACnet Interoperability Building Blocks Supported

| Description | BIBB | Comments |
|---|---|---|
| Read Property | DS-RP-B | |
| Read Property Multiple | DS-RPM-B | |
| Write property | DS-WP-B | |
| Dynamic Device Binding | DM-DDB-B | Execute who is / Initiate I am |
| Dynamic Object Binding | DM-DOB-B | |
| Device Comm Control | DM-DCC-B | |
| Reinitialize Device | DM-RD-B | |

## BACnet Standard Object Types Supported

| Object | No Of Instance | Instance Assignments |
|---|---|---|
| Device Object | 1 | |
| Analog Input (AI) | 4 | AI-1: [S1] Gas Type<br>AI-2: [S2] Gas Type<br>AI-3: Temperature<br>AI-4: Humidity |
| Analog Output (AO) | 2 | AO-1: Analog output 1<br>AO-2: Analog output 2 |
| Analog Value (AV) | 14 | AV-1: S1 Low Alarm<br>AV-2: S1 High Alarm<br>AV-3: S2 Low Alarm<br>AV-4: S2 High Alarm<br>AV-5: High Alarm Delay<br>AV-6: Zone Number<br>AV-7: Signal Relay Follows<br>AV-8: Temperature Offset<br>AV-9: Temperature High Alarm<br>AV-10: Temperature Low Alarm<br>AV-11: Service Warning<br>AV-12: Service Time Left<br>AV-13: S1 Module Working Time Left<br>AV-14: S2 Module Working Time Left |
| Binary Output (BO) | 1 | BO-1: Signal Relay |
| Multi-State Value (MSV) | 6 | MSV-1: Temperature Unit<br>MSV-2: Error Codes<br>MSV-3: Deadband<br>MSV-4: Audible Alarm<br>MSV-5: Temperature High Alarm Enable<br>MSV-6: Temperature Low Alarm Enable |

## BACnet Standard Object Types Supported

| Property Name / ID | Default | Read/Write |
|---|---|---|
| Object Identifier | OBJECT_DEVICE: Vendor No x1000 & Mac Address | R/W |
| Object Name | GM Range | R/W |
| Object Type | 8: Object Device | R |
| System Status | 0: Operational | R |

| | | |
|---|---|---|
| Vendor Name | American Gas Safety LLC | R |
| Vendor Identifier | 1447 | R |
| Model Name | Merlin GM 100 | R |
| Firmware Revision | 1.0.0 | R |
| Application SW Version | 1v0 | R |
| Protocol Version | 1 | R |
| Protocol Revision | 18 | R |
| Protocol Services Supported | Binary List | R |
| Object List | Object Array | R |
| Max APDU Length | 480 | R |
| Segmentation Support | 3: None | R |
| APDU Timeout | 3000 | R |
| Number APDU Retries | 3 | R |
| Database Revision | 0 | R |
| Description | Gas Detection | R/W |
| Location | Location | R/W |
| Max Master | 127 | R |
| Max Info Frames | 1-16 | R |
| Link Speed | (Baud Rate Indicator) | R |
| Mac Address | (Network ID) | R |
| 1000-Proprietary (Factory Reset) | 0 (AI / AO / AV / BO / MSV ONLY) 1: Prompt Reset | R/W |

## Analog Input Objects (AI)

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_ANALOG_INPUT: # | R |
| Object Name | AI-1: “Gas Formula”<br>AI-2: “Gas Formula”<br>AI-3: Temperature<br>AI-4: Humidity | R |
| Object Type | 0: Object Analog Input | R |
| Present Value | REAL | R |
| Status Flag | 0000 | R |
| Event State | NORMAL | R |
| Out-of-Service | FALSE | R/W |
| Units | AI-1: Gas Type Dependant (ppm / %LEL etc.)<br>AI-2: Gas Type Dependant (ppm / %LEL etc.)<br>AI-3: DEGREES FAHRENHEIT<br>AI-4: PERCENT RELATIVE HUMIDITY | R |
| Description | N/A | R/W |

## Analog Output Objects (AO)

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_ANALOG_OUTPUT: # | R |
| Object Name | AO-1: Analog Output 1<br>AO-2: Analog Output 2 | R |
| Object Type | 1: Object Analog Output | R |
| Present Value | Real | R |
| Status Flag | 0000 | R |
| Event State | 0: Normal | R |
| Out-of-Service | False | R/W |
| Units | AO-1: PERCENT<br>AO-2: PERCENT | R |

## Analog Value Objects (AV)

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_ANALOG_OUTPUT: # | R |
| Object Name | AV-1: S1 Low Alarm<br>AV-2: S1 High Alarm<br>AV-3: S2 Low Alarm<br>AV-4: S2 High Alarm<br>AV-5: High Alarm Delay (0-99)<br>AV-6: Zone Number (0-10)<br>AV-7: Signal Relay Follows (1: Low Alarm, 2: High Alarm)<br>AV-8: Temperature Offset (-9 to +9)<br>AV-9: Temperature High Alarm<br>AV-10: Temperature Low Alarm<br>AV-11: Service Warning (0: OFF, 6,12,18 Months)<br>AV-12: Service Time Left<br>AV-13: S1 Module Working Time Left<br>AV-14: S2 Module Working Time Left | R |
| Object Type | 2: Object Analog Value | R |
| Present Value | Real | R- R/W |
| Status Flag | 0000 | R |
| Event State | 0: Normal | R |
| Out-of-Service | False | R/W |
| Units | AV-1: Gas Type Dependant (PPM / %LEL etc.)<br>AV-2: Gas Type Dependant (PPM / %LEL etc.)<br>AV-3: Gas Type Dependant (PPM / %LEL etc.)<br>AV-4: Gas Type Dependant (PPM / %LEL etc.)<br>AV-5: SECONDS<br>AV-6: NO UNIT<br>AV-7: NO UNIT<br>AV-8: NO UNIT<br>AV-9: DEGREES FAHRENHEIT<br>AV-10: DEGREES FAHRENHEIT<br>AV-11: MONTHS<br>AV-12: HOURS<br>AV-13: DAYS<br>AV-14: DAYS | R |

## Binary Output Objects (BO)

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_BINARY_OUTPUT: # | R |
| Object Name | BO-1: RELAY | R |
| Object Type | 4: Object Binary Output | R |
| Present Value | 0: OFF<br>1: ON | R |
| Status Flag | 0000 | R |
| Event State | NORMAL | R |
| Out-of-Service | FALSE | R/W |
| Polarity | 0: Normal<br>1: Reversed | R/W |

## Multi-State Value (MSV) Temperature Unit

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_MULTI_STATE_VALUE:1 | R |
| Object Name | Error Codes | R |
| Object Type | 19: Object Multi State Value | R |
| Present Value | 2: (°Fahrenheit) | R/W |
| Status Flag | 0000 | R |
| Event State | NORMAL | R |
| Out-of-Service | FALSE | R/W |
| Number of States | 2 | R |
| States | 1: °C<br>2: °F | R |

## Multi-State Value (MSV) Error Codes

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_MULTI_STATE_VALUE:2 | R |
| Object Name | Error Codes | R |
| Object Type | 19: Object Multi State Value | R |
| Present Value | 1: (No Error) | R |
| Status Flag | 0000 | R |
| Event State | NORMAL | R |
| Out-of-Service | FALSE | R/W |
| Number of States | 10 | R |
| States | 1: No Error<br>2: EEPROM Error<br>3: Temperature Sensor Error<br>4: DAC Error<br>5: M1 Error<br>6: M2 Error<br>7: S1 Wrong Type<br>8: S1 Module Missing<br>9: S2 Wrong Type<br>10: S2 Module Missing | R |

## Multi-State Value (MSV) Deadband

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_MULTI_STATE_VALUE:3 | R |
| Object Name | Deadband | R |
| Object Type | 19: Object Multi State Value | R |
| Present Value | 1: (OFF) | R/W |
| Status Flag | 0000 | R |
| Event State | NORMAL | R |
| Out-of-Service | FALSE | R/W |
| Number of States | 2 | R |
| States | 1: OFF<br>2: ON | R |

### Multi-State Value (MSV) Audible Alarm

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_MULTI_STATE_VALUE:4 | R |
| Object Name | Audible Alarm | R |
| Object Type | 19: Object Multi State Value | R |
| Present Value | 1: (OFF) | R/W |
| Status Flag | 0000 | R |
| Event State | NORMAL | R |
| Out-of-Service | FALSE | R/W |
| Number of States | 2 | R |
| States | 1: OFF<br>2: ON | R |

### Multi-State Value (MSV) Temperature High Alarm Enable

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_MULTI_STATE_VALUE:5 | R |
| Object Name | Temperature High Alarm Enable | R |
| Object Type | 19: Object Multi State Value | R |
| Present Value | 1: (OFF) | R/W |
| Status Flag | 0000 | R |
| Event State | NORMAL | R |
| Out-of-Service | FALSE | R/W |
| Number of States | 2 | R |
| States | 1: OFF<br>2: ON | R |

### Multi-State Value (MSV) Temperature Low Alarm Enable

| Property Name / ID | Default | R/W |
|---|---|---|
| Object Identifier | OBJECT_MULTI_STATE_VALUE:6 | R |
| Object Name | Temperature Low Alarm Enable | R |
| Object Type | 19: Object Multi State Value | R |
| Present Value | 1: (OFF) | R/W |
| Status Flag | 0000 | R |
| Event State | NORMAL | R |
| Out-of-Service | FALSE | R/W |
| Number of States | 2 | R |
| States | 1: OFF<br>2: ON | R |

# Modbus Functionality

Parity: None / Data-Word length: 8-bit / Stop bit: 1

### Operation

| Register/Address | Description | Notes | Read/Write |
|---|---|---|---|
| 40000-40030 | Reserved | | |
| 40031 | Baud Rate | Type: uINT, Factor:1 9600 (Default),<br>19200, 38400, 57600 via dipswitch | R |
| 40032 | Address | Type: uINT, Factor:1,<br>0-127 via DIP Switch | R |

| | | | |
|---|---|---|---|
| 40033 | Model number | Type: uINT, Factor:1 | R |
| 40034 | N/A | N/A | R |
| 40035 | *S1 Gas Concentration | Type: INT, Factor: 1,<br>Unit: Gas Type Specific (PPM, %LEL etc.) | R |
| 40036 | *S2 Gas Concentration | Type: INT, Factor: 10,<br>Unit: Gas Type Specific (PPM, % LEL etc.) | R |
| 40037 | Temperature | Type: INT, Factor: 10,<br>Unit: °C/°F | R |
| 40038 | Humidity | Type: INT, Factor: 10,<br>Unit: %RH | R |
| 40039 | Analog Output 1 | Type: INT, Factor: 1,<br>Unit: % | R |
| 40040 | Analog Output 2 | Type: INT, Factor: 1,<br>Unit: % | R |
| 40041 | *S1 Low Alarm Setpoint | Type: uINT, Factor: 1, Unit: Gas Type Specific<br>Range: Gas Type Specific | R/W |
| 40042 | *S1 High Alarm Setpoint | Type: uINT, Factor: 1, Unit: Gas Type Specific<br>Range: Gas Type Specific | R/W |
| 40043 | *S2 Low Alarm Setpoint | Type: uINT, Factor: 10, Unit: Gas Type Specific<br>Range: Gas Type Specific | R/W |
| 40044 | *S2 High Alarm Setpoint | Type: uINT, Factor: 10, Unit: Gas Type Specific<br>Range: Gas Type Specific | R/W |
| 40045 | High Alarm Delay | Type: uINT, Factor: 1, Unit: sec, Default: 2<br>(0-99) | R/W |
| 40046 | Zone Number | Type: uINT, Factor: 1, Default: 2<br>(0-10) | R/W |
| 40047 | Signal Relay Follows | Type: uINT, Factor: 1, Default: 2<br>(1=Low Alarm, 2=High Alarm) | R/W |
| 40048 | Temperature Offset | Type: INT, Factor: 1, Default: 0<br>(-9 to +9) | R/W |
| 40049 | Temperature High Alarm Setpoint | Type: INT, Factor: 10, Unit: °C/°F<br>Default: 104°F / 40°C<br>(77-104°F) (25-40°C) | R/W |
| 40050 | Temperature Low Alarm Setpoint | Type: INT, Factor: 10, Unit: °C/°F<br>Default: 32°F / 0°C<br>(32-59°F) (0-15°C) | R/W |
| 40051 | Service Warning | Type: uINT, Factor: 1, Unit: Months, Default: 12<br>(0=OFF, 6, 12, 18) | R/W |
| 40052 | Audible Alarm | Type: uINT, Factor: 1, Default: O<br>(0=OFF, 1=ON) | R/W |
| 40053 | Signal Relay Polarity | Type: uINT, Factor: 1, Default: 1<br>(0=N/O, 1=N/C) | R/W |
| 40054 | Deadband | Type: uINT, Factor: 1, Default: 1<br>(0=OFF, 1=ON) | R/W |
| 40055 | Temperature High Alarm Enable | Type: uINT, Factor: 1, Default: 0<br>(0=OFF, 1=ON) | R/W |
| 40056 | Temperature Low Alarm Enable | Type: uINT, Factor: 1, Default: 0<br>(0=OFF, 1=ON) | R/W |
| 40057 | N/A | N/A | R |
| 40058 | Temperature Unit | Type: uINT, Factor: 1, Default: 2<br>(1=°C, 2 =°F) | R/W |
| 40059 | Reserved | | |
| 40060 | Error Codes | 1: No Error<br>2: EEPROM Error<br>3: Temperature Sensor Error<br>4: DAC Error | R |

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|---|---|---|---|
| | | 5: M1 Error<br>6: M2 Error<br>7: S1 Wrong Type<br>8: S1 Module Missing<br>9: S2 Wrong Type<br>10: S2 Module Missing | |
| 40061 | Signal Relay Status | Type: INT, Factor: 1,<br>(0=No alarm, 1=Alarm, relay changed status) | R |
| 40062 | Service Time Left | Type: INT, Factor: 1, Unit: Hours | R |
| 40063 | S1 Alarm Status | Type: INT, Factor: 1,<br>(0=No alarm, 1=Low Alarm, 2=High Alarm) | R |
| 40064 | S2 Alarm Status | Type: INT, Factor: 1,<br>(0=No alarm, 1=Low Alarm, 2=High Alarm) | R |
| 40065 | Temperature Alarm Status | Type: INT, Factor: 1,<br>(0=No alarm, 1=Alarm) | R |
| 40066 | S1 Module Working Time left | Type: INT, Factor: 1, Unit: Days | R |
| 40067 | S2 Module Working Time left | Type: INT, Factor: 1, Unit: Days | R |

**Please pass this manual to the system owner/user.**

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


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