

# Gas Safety Products

## Merlin 2000S Gas Proving & Interlock System



## Installation, operating and maintenance

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

## 1 General information

The Merlin 2000S is a gas proving and ventilation interlock panel.

The system comprises of a control panel and a gas pressure sensor. The Merlin 2000S can receive connections from remote air pressure differential switches or external current monitors, remote emergency shut-off buttons, gas detectors and a CO2 monitor. It can also be integrated with a BMS and fire alarm.

It is recommended that the user reads this guide before using the system. Please do NOT attempt to operate the unit until the contents of this document have been read and are thoroughly understood.

## 2 Installation

- 2.1 Panel Mounting.** The control panel is designed for surface mounting using 4 mounting screws. Removing the cover on the panel gives access to the circuit board. The PCB should be removed before drilling entry holes into the case.
- 2.2 Mains Supply.** A 100-240VAC electrical supply should be supplied to the panel. This should be externally fused at 3 Amps using a fused spur and should be connected to the terminals marked "LNE Power"
- 2.3 Gas solenoid valve.** The gas solenoid valve should be powered using the terminals on the Merlin 2000S marked "LNE GAS VALVE".
- 2.4 Supply Fan & Extract Fan PD Switches.** These terminals are used to receive an input signal from external air pressure switches or external current monitors. These are linked out as a factory setting. Wiring to the air pd switches & current monitors should be made using two-core volt free connections. If only one fan is being used the terminals not in use should be left linked out.
- 2.5 BMS Connections.** Terminal connections are available on the circuit board for connections to Building Management systems etc. Detailed on the circuit board as "BMS OUT N/C, Com and N/O" these are volt free connections.
- 2.6 Pressure Sensor.** The terminals marked pressure sensor "+ - in ". These wire to the gas pressure sensor which is screwed into the downstream port on the gas solenoid valve. Red + positive, Black – negative and Yellow IN. Please ensure this is wired as instructed.  
Minimum Operating Pressure = 0.17psi  
Maximum Operating Pressure = 1.45psi
- 2.7 Remote emergency shut off buttons.** The terminal for remote emergency shut-off buttons is detailed on the circuit board as "EM REMOTE". These connections are linked out as a factory setting. Remote emergency shut-off buttons should be volt free and wired to the Merlin 2000S using two-core cable.
- 2.8 Gas Detector.** The terminals detailed on the circuit board as "Gas Detector". These connections are "+, -" and "  " these can be wired to a Merlin gas detector. Natural gas, Carbon monoxide or LPG. If no detector is being used leave the link in between the "  ". Other detector types are available.
- 2.9 FS 123.** This terminal switches when the key is turned on and off. This can be linked to a fan switch (panel supplied separately) which can provide power to the fans when the control panel is switched on.
- 2.10 CO2 Monitor.** This terminal can be wired to CO2 monitor to shut off the system in the event of CO2 being at alarm level. If no CO2 monitor is supplied leave the terminal link in.

**2.11 12v DC.** This is a permanent 12v DC output when there is power at the panel. This is normally used to power a PM2 current monitor. (Supplied separately)

**2.12 Internal Buzzer.** Operates at 65dB measured 30cm from closed panel.

**Note:** all low voltage connections should be made using a screened cable. To avoid electrical interference this should not be in the same conduit as mains cable as per the low voltage directive.

## 3 Operation Instructions

### 3.1 How to turn the system on and off

1. Turn off all open gas appliances.
2. Turn the Fans On.
3. Turn the key switch to on position.
4. To turn the system off, turn the key switch to off position.

### 3.2 Explanation of LED status

#### 3.2.1 Power LED

When the system is connected to the mains supply, the Red LED of the AGS Logo located in the bottom right corner of the panel will illuminate. When no power is present, this LED will not light up.

RED = OK

OFF = No power to 2000S, a loose ribbon connection or the fuse may not be intact.

#### 3.2.2 Gas on LED

When the fans are operational and the key switch is turned on, the Merlin 2000S will check the installation for gas leaks. If gas proving is successful, the gas valve will open and the green 'Gas On' LED will illuminate.

GREEN = Gas On

OFF = Gas Off

#### 3.2.3 Testing LED

This LED will illuminate GREEN for approximately 30 seconds when the panel is checking the integrity of the gas installation upon start up. GREEN = proving the gas line, do NOT operate any appliances during the testing period.

#### 3.2.4 Test Fail LED

Under normal working conditions this LED is off. When the panel detects a gas leak on start-up, the LED will illuminate AMBER. Gas valve will remain closed.

OFF = OK

AMBER = gas proving test failed

#### 3.2.5 Pressure Low LED

Under normal working conditions the LED is off. The LED will illuminate AMBER when the incoming gas pressure drops below 0.17psi for 10 seconds. The gas valve will close.

OFF = OK

AMBER = gas supply pressure low.

#### 3.2.6 Supply fans LED

Under normal working the LED will illuminate GREEN. If a supply fan fault is detected, the LED will be flashing.

GREEN = OK

FLASHING = One of the supply fans is not running.

**3.2.7 Extract fans LED**

Under normal working the LED will illuminate GREEN. If an extract fan fault is detected, the LED will be flashing.

GREEN = OK

FLASHING = One of the extract fans is not running

**IF SUPPLY AND/OR EXTRACT FANS LED FLASHES FOR MORE THAN 20 SECONDS, THE Merlin 2000S WILL SHUT OFF THE GAS.**

**3.2.8 Fan Fault LED**

Under normal working conditions this LED is off. If a fan fault is present for more than 20 seconds, the LED will illuminate RED.

OFF = OK

RED = the gas supply has been shut off due to a ventilation fault.

**WHEN A FAULT IS PRESENT YOU WILL NEED TO CONTACT YOUR SERVICE/MAINTENANCE COMPANY.**

**YOU SHOULD NOT ATTEMPT TO CARRY OUT A REPAIR OR RECTIFY THE FAULTS UNLESS YOU ARE QUALIFIED TO DO SO.**

**3.2.9 EM Stop LED**

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.

OFF = OK

AMBER = EM Stop button pressed

**3.2.10 Gas Detected LED**

Under normal working conditions this LED is off. If the external Merlin detector connected detects gas this will show RED and the Gas valve will turn off.

OFF = OK

RED = Gas detected.

**3.2.11 CO2 High LED**

Under normal working conditions this LED is off. If the concentration of CO2 in the air is at alarm level (relevant detector required), the LED will show RED and the Gas valve will turn off.

OFF = OK

RED = the concentration of CO2 is at alarm level.

**3.3 Using the emergency shut off**

The Emergency shut off button is located on the front of the panel. There is also a facility for remote shut off buttons to be wired in series.

The Emergency shut off button(s) will cut off the gas supply when activated.

To reinstate the system, the Emergency shut off button(s) will need to be reset and the panel restarted.

**3.4 Fire alarm integration**

The Merlin 2000S can be integrated with a fire alarm to close the gas supply automatically in the event of a fire.

The volt free fire alarm signal can be wired in series with any remote emergency shut off buttons.

If there is no remote emergency stop buttons installed wire this directly to the terminal marked 'EM REMOTE'.

### 3.5 BMS integration

The Merlin 2000S 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 100-240VAC is being sent to the solenoid.

There is a dip-switch located on the inside facia of the Merlin 2000S labelled 'BMS Selection'. This is factory set in the 'off' position which signals the BMS on gas on/gas off. When switched to the 'on' position, the 2000S will only signal the BMS on a fault, i.e. fan fault, CO2 high level detected, gas detected, EM Stop pressed, etc.

### 3.6 Fan switch integration

There is the facility to connect a Fan Switch (FS1 or FS2 sold separately).

The Fan Switch provides the facility to turn on the fan(s) when the key switch on the Merlin 2000S is in the on position and turn the power off to the fan(s) when the key switch on the Merlin 2000S is in the off position.

There is a dip-switch located inside the facia of the Merlin 2000S labelled EM Selection.

This is factory set in the 'off' position which instructs the system to shut down the fan(s) and gas supply on activation of the Emergency shut off button(s). On installation, this can be switched to the 'on' position if required. This will instruct the system to leave the fans on and only shut off the gas supply on activation of the Emergency shut off button(s). Note: This option is not available if Fan Switch is not installed.

### 3.7 Gas fill and prove time

Gas fill and prove times are adjustable. There are two dip-switches located on the inside facia of the Merlin 2000S labelled "Fill Time" and "Prove Time". They are factory set in the 'off' position. Fill and prove time can be changed by turning the relevant dip switch to on position.

Fill time: Off – 5 seconds, On – 10 seconds

Prove time: Off – 30 seconds, On – 50 seconds

Once the settings has been changed please remove power from the fuse spur for 10 seconds.

Fill time is the amount of time the gas valve is open to fill the gas line.

Prove time is the amount of time the system tests the gas line for any leaks.

### 3.8 Auto reset

The Merlin 2000S has a built-in auto reset feature. There is a dip-switch located on the inside facia of the Merlin 2000S labelled "Auto Reset". This is factory set in the 'off' position. When the power is restored after the power cut, the panel has to be restarted manually. On installation, this can be switched to the 'on' position if required. This will instruct the system to restart automatically when power is restored after a power cut.

### 3.9 CO<sub>2</sub> MODE

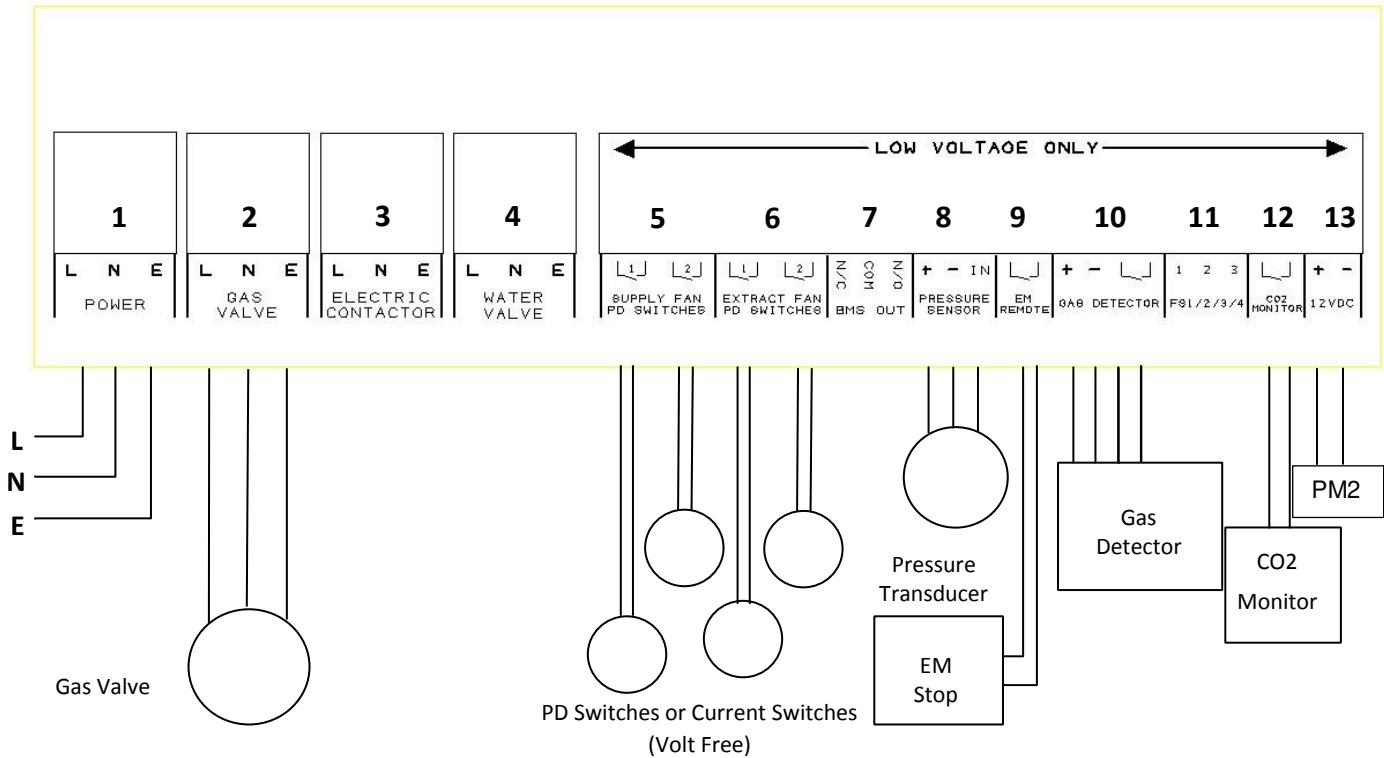
Under normal working conditions the Merlin 2000S monitors the ventilation and the concentration level of CO<sub>2</sub>. In the event of ventilation failure or if the CO<sub>2</sub> level is at alarm level, the panel will shut off the gas supply.

The Merlin 2000S features a 'CO<sub>2</sub> Mode'. This allows the kitchen to have the access to the gas supply in the event of a fan failure. There is a 'CO<sub>2</sub> Mode' button located on the front of the panel. This button will only be available to use when 'Fan fault' LED illuminates Red. To enable the CO<sub>2</sub> Mode, the 'CO<sub>2</sub> button' has to be pressed for 5 seconds. The Fan Fault LED will go off and CO<sub>2</sub> Mode LED will come on. In this mode, the Merlin 2000S will monitor only the CO<sub>2</sub> levels to ensure there is a safe working environment. This mode will allow the gas valve to open for 8 hours each time the system is energised, provided there are satisfactory levels of CO<sub>2</sub>.

At the end of 8 hours, the gas valve will close and CO<sub>2</sub> Mode LED will be flashing.

To reinstate the system the panel has to be restarted. The 'CO<sub>2</sub> Mode' will be permanently disabled if a CO<sub>2</sub> Sensor is not detected at power up.

## 2000S Wiring Diagram



1. Mains Input 100-240VAC Single Phase.
2. Gas Solenoid Valve Power Output, 100-240VAC, Max 3A.
3. This terminal is disabled on this system.
4. This terminal is disabled on this system.
5. Supply Fan 1 pressure differential switch or current switch. **VOLT FREE INPUT**
6. Supply Fan 2 pressure differential switch or current switch. **VOLT FREE INPUT**
7. Extract Fan 1 pressure differential switch or current switch. **VOLT FREE INPUT**
8. Extract Fan 2 pressure differential switch or current switch. **VOLT FREE INPUT**
9. BMS output contacts. Normally Closed, Common and Normally Open. Max. 1A @ 100-240VAC.
10. Gas pressure transducer, power supply and returned signal (supplied).
11. Remote EM Stop buttons and Fire Alarm input wired in series (purchased separately). **VOLT FREE INPUT**
12. Methane, CO or LPG Detector, power supply and **volt free input** (purchased separately).
13. Fan Switch output (purchased separately). For wiring instruction see Fan Switch user manual.
12. CO2 Monitor (purchased separately). **VOLT FREE INPUT**
13. Permanent 12VDC output (Normally used to power a PM2 Current Monitor). **50A Max.**

Please note, Mains wires and low voltage wires should not be run in the same conduit as per the **LOW VOLTAGE DIRECTIVE**



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