



## Merlin 2000SW+

Gas, Electric, Water Isolation System with Ventilation Interlock



## Installation & Operation Manual

Please read this manual carefully and retain for future use.

This panel is designed for use when the kitchen appliances do not have flame failure devices fitted, therefore gas proving is a requirement.

The Merlin 2000SW+ system acts as an interlock between the ventilation system, the gas solenoid valve, electrical and water supply. The system is compatible with both current monitors and air pressure differential switches in order to interlock with up to 4 fans.

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# INSTALLATION

## Planning

This panel is designed for use when the kitchen appliances do not have flame failure devices fitted, therefore gas proving is a requirement.

The Merlin 2000SW+ system acts as an interlock between the ventilation system, gas solenoid valve, water valve and an electrical contactor. The system is compatible with both current monitors and air pressure differential switches in order to interlock with up to 4 fans.

The fans can be monitored through air pressure switches or by means of an additional current monitor. To operate the Merlin 2000SW+ the fans should be turned to the 'on' position, once the panel receives a signal to indicate the fans are operating the key on the panel can be turned to the 'on' position and this will open the gas solenoid valve. If the fans should fail, the 'fan fail' LED on the panel will illuminate and the gas solenoid will close.

The Merlin 2000SW+ can work in conjunction with carbon dioxide, natural gas, carbon monoxide and LPG sensors.



Please refer to your detector manual for important information regarding coverage, location and positioning including areas and conditions to avoid.

## Fixing - Mounting

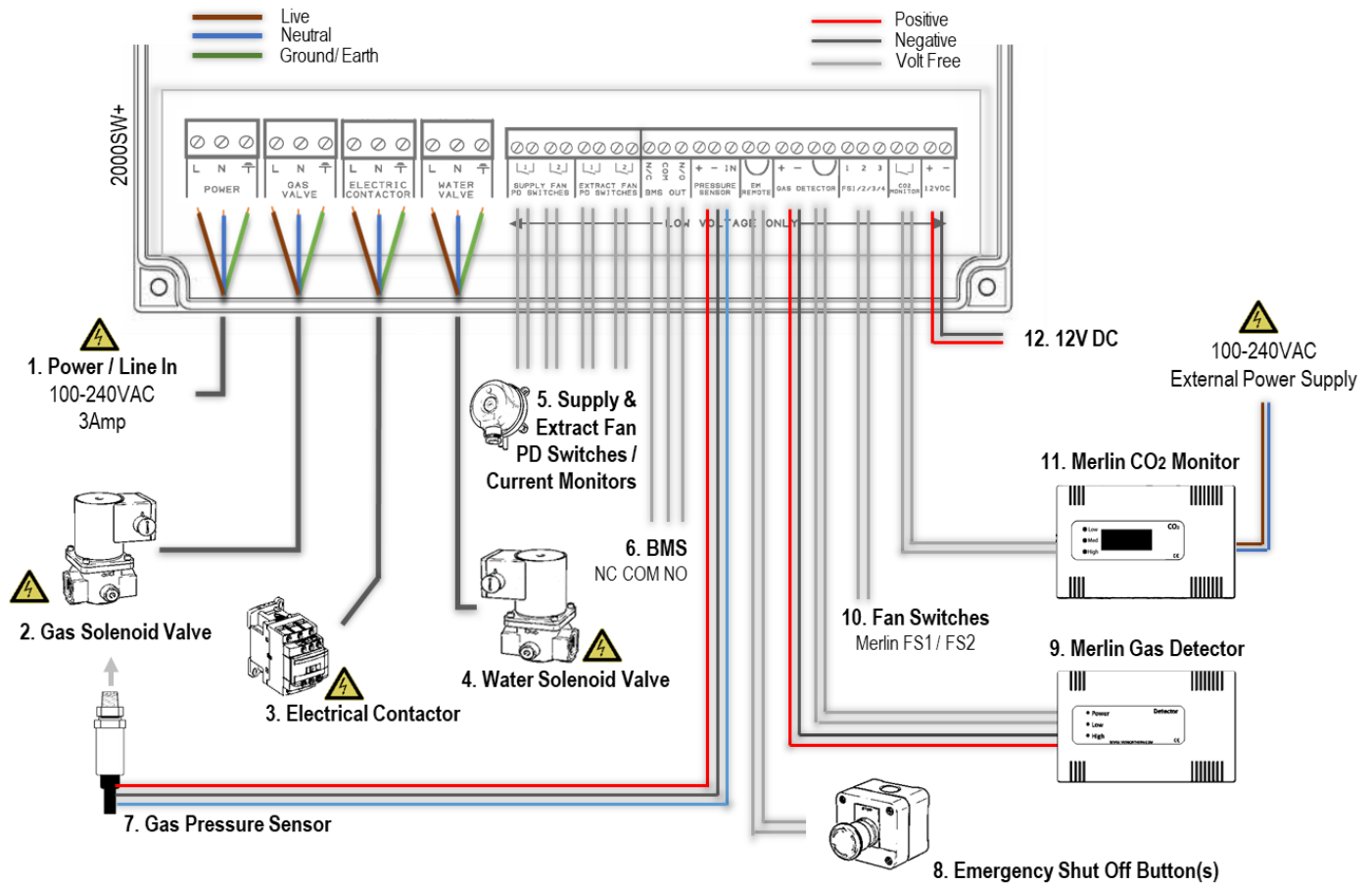
### Unpack all the parts!

1. 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.
2. Mark the four screw holes located on the back of the enclosure to the wall. Ensure the wall surface is flat to prevent base distortion.
3. After executing the mounting and the connections – replace the front cover and insert the security caps over the four bolts.



Be careful when creating access for cables – Damage to boards will void any warranty. Carefully remove the circuit board before drilling cable entry holes.

**Typical Installation Arrangement**



**Terminal Connections**

**1. POWER / LINE IN**

240VAC Power should be supplied to the [POWER / LINE IN] terminal and fused at 3A. On connecting the mains supply to the panel the power LED indicator will light up – this is located on the front cover.

**2. GAS SOLENOID VALVE OUTPUT**

240VAC electrical power supplied from the [VALVE OUT] connector using a 3 core cable can be connected to a gas solenoid valve which can shut the gas supply on alarm status.

*Pressure sensors should be screwed to the downstream port of the valve.*

Refer to your valve manual for more information and wiring!

**3. ELECTRIC CONTACTOR OUTPUT**

240VAC electrical power supplied from the [ELECTRIC CONTACTOR] connector using a 3 core cable can be connected to a contactor.

Refer to your contactor manual for more information and wiring!

#### 4. WATER VALVE OUTPUT

240VAC electrical power supplied from the [WATER VALVE] connector using a 3 core cable can be connected to a contactor.

Refer to your water valve manual for more information and wiring!

#### 5. SUPPLY/ EXTRACT FAN PRESSURE DIFFERENTIAL SWITCHES / CURRENT MONITORS

These terminals are used to receive an input signal from external air pressure switches or external current monitors. These terminals have factory fitted links installed.

If only one fan is being used – leave factory fitted links in terminals NOT IN USE!

#### 6. BMS OUTPUT

Connections are available on the board for Building Management Systems.

[NO Normally Open] [COM Common] [NC Normally Closed]

These are volt free connections.

This is a relay that changes state in alarm or when the gas is on/off and can be used in conjunction with the 12V DC output and other external relays that affect other devices and controls such as purge fans and audible alarms etc.

See section; Switch Settings - for BMS options

#### 7. PRESSURE SENSOR

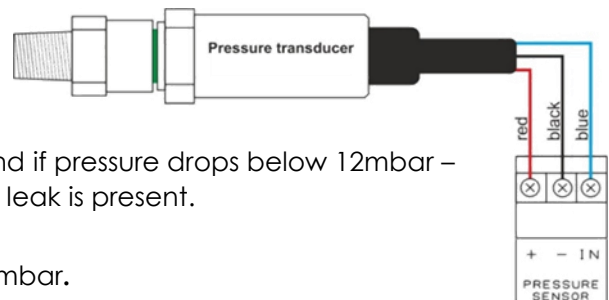
The pressure sensor is wired to the [PRESSURE SENSOR] connector and screwed into the downstream port of the gas solenoid valve.

Connect the pressure sensor as shown:

Red [+], Black [-], Blue [IN]

The sensor will monitor the gas supply pressure and if pressure drops below 12mbar – the gas valve will close as this could mean a gas leak is present.

The pressure sensor operating pressure is: 0 – 100mbar.



Screw the pressure sensor into the downstream port of your gas solenoid valve.

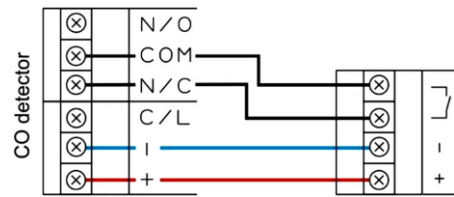
#### 8. EM REMOTE

Connections for remote emergency shut-off or stop buttons is detailed on the circuit board as [EM REMOTE]. This is linked out as a factory setting.

### 9. GAS DETECTOR

Connections can be made for a Merlin gas detector (LPG, NG, CO or Hydrogen).  
 If no detector is being used leave the factory fitted link in.  
 A wiring example is shown.

Refer to your gas detector manual for further information.



### 10. FAN SWITCHES

This terminal switches when the key is turned on and off.  
 This can be connected to a fan switch (supplied separately) which can provide power to fans when the control panel is switched on.

### 11. CO2 MONITOR

This terminal can be used to connect a Merlin CO<sub>2</sub> monitor to shut off the system in the event of a high concentration of CO<sub>2</sub>.  
 If no CO<sub>2</sub> monitor is connected, the panel will 'beep' upon power up and the CO<sub>2</sub> LED will flash 3 times to indicate that this terminal has been disabled.

An external power supply is required.

Refer to your CO<sub>2</sub> monitor manual for further information.

### 12. 12V DC

This is a power output for external auxiliary devices when there is power at the panel and can be used to create a relay switch with the BMS relay output.

Max output: 50mA

## Switch Settings

There are various DIP-switches on the front circuit board that can be adjusted to configure your system as per the following.

#### Auto Reset

There is a switch located on the circuit board labelled [AUTO RESET].

<b>OFF</b>	When power is restored after the power cut/ loss, the panel has to be restarted manually. (Default)
<b>ON</b>	This will instruct the system to restart automatically when power is restored after power cut/loss.



**Building Management System Integration**

There is a dip-switch located on the circuit board labelled [BMS SEL].

The panel can be integrated with a BMS to make or break a circuit when the gas is either on or off, (valve open or valve closed). This will tell the BMS whether or not power is being sent to the solenoid valve.

<b>OFF</b>	Signals the BMS when gas is on or gas is off. (Default)
<b>ON</b>	Signals the BMS on a fault, i.e. high gas levels detected, emergency shut-off activated, etc.



**Fan Switch Integration**

There is the facility to connect a Fan Switch.

A fan switch (Merlin FS1 or FS2 - sold separately) provides the facility to turn on fan(s) when the 2000SW+ panel is switched on and removes power to fan(s) when the switched off.

There is a switch located on the circuit board labelled [EM SEL].

<b>OFF</b>	Instructs the system to shut down fan(s) and gas supply upon activation of emergency shut off button(s). (Default)
<b>ON</b>	Instructs the system to leave the fans on and shut off the gas supply only upon activation of emergency shut off button(s).



**Note:** This option is not available if a Fan Switch is not installed.

**Gas Fill Time and Prove Time**

**FILL TIME:** Amount of time the gas valve opens to fill the gas line on power up or reset.

**PROVE TIME:** Amount of time the system tests the gas line for leaks on power up or reset.

There are two switches located on the circuit board labelled [FILL TIME] and [PROVE TIME].

FILL TIME		PROVE TIME	
<b>OFF</b>	5 Seconds (Default)	<b>OFF</b>	30 Seconds (Default)
<b>ON</b>	10 Seconds	<b>ON</b>	50 Seconds



Once the settings have been changed - remove power for 10 seconds.

**Fire Panel Integration**

The Merlin 2000SW+ 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 are no remote emergency shut off buttons being installed, wire this directly to the terminal marked [EM REMOTE].

## Specification

Model:	2000SW+
Visual Indication	LED
Mains Electrical Power Input	100-240VAC
Gas Solenoid Valve Output	100-240VAC
Electrical Contactor Output	100-240VAC
Water Valve Output	100-240VAC
Current Consumption	12W max (50mA)
Internal Fuse	3.15A
Pressure Sensor Operating Pressure	0 -100mbar
Operating Temperature	32 – 104°F 0-95%RH Non-Condensing
Audible Alarm Buzzer dB	65 dB (300mm distance in quiet conditions)
Internet connection	N/A
Housing Material	Polylac PA-765
Flame Rating	UL 94
Approvals	CE, RoHS
O/All Dimensions (H x W x D) mm / inch	7.08 x 10 x 3.03"



# OPERATION

## First Power Up

On connecting mains power, an LED on the front of the panel (S&S Logo) will illuminate red.

- Turn the fans and key switch to on position.
- Gas, electric & water LEDs will flash for 10 seconds.
- Press relevant service button to turn required utility on.
- Turn the key switch to the off position to turn the panel off.

**Please Note:** All services can be turned on or off only within 10 seconds of the key switch being turned on. After 10 seconds, all utility buttons will be disabled. The user must turn the key off and back on to adjust any services.

## Emergency Shut Off Button

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 on the circuit board.

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.

## LED Indicators

### ● Gas

When the key switch is turned on, the Merlin 2000SW+ will check the installation for gas leaks. If gas proving is successful, the gas valve will open and the blue 'Gas' LED will illuminate.

ON = Gas On / OFF = Gas Off

### ● Electric

When Electric service is turned on, the Electric LED will illuminate BLUE.

ON = Electric On

FLASHING = Electric Off, Electric button enabled

OFF = Electric Off, Electric button disabled.

### ● Water

When water service is turned on, the Water LED will illuminate BLUE.

ON = Water On

FLASHING = Water Off, Water button enabled

OFF = Water Off, Water button disabled.

### ● Testing

This LED will illuminate for approximately 30 seconds when the panel is checking the integrity of the gas installation upon start up.

ON = proving the gas line, do NOT operate any appliances during the testing period.

### ● Test Fail

Under normal working conditions this LED is off.

When the panel detects a gas leak on start- up, the LED will illuminate and the gas valve will remain closed. OFF = OK / ON = gas proving test failed

- **Pressure Low**

Under normal working conditions the LED is off.

The LED will illuminate when the incoming gas pressure drops below 12mbar for 10 seconds and the gas valve will close.

OFF = OK / ON = gas supply pressure low.

- **Supply Fans**

Under normal working the LED will illuminate.

If a supply fan fault is detected, the LED will flash.

ON = OK / \*FLASHING = One of the supply fans is not running.

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

- **Extract Fans**

Under normal working the LED will illuminate.

If an extract fan fault is detected, the LED will flash.

ON = OK / \*FLASHING = One of the extract fans is not running

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

- **Fan Fault**

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

- **EM Stop**

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

OFF = OK / ON = Emergency Shut Off button pressed

- **Gas Detected**

Under normal working conditions this LED is off.

If an external Merlin detector connected detects high levels of gas this LED will illuminate and the Gas valve will turn off.

OFF = OK / ON = Gas detected.

- **CO<sub>2</sub> High**

Under normal working conditions this LED is off.

If the concentration of Carbon Dioxide (CO<sub>2</sub>) in the air is at alarm level (CO<sub>2</sub> Monitors sold separately), the LED will show illuminate and the Gas valve will turn off.

OFF = OK / ON = the concentration of CO<sub>2</sub> is at alarm level.

## Servicing & General Maintenance



It is recommended that any detectors connected to the system are inspected and serviced at least annually from the date of installation for optimum performance and protection.

- ✓ DO carefully remove any accumulated dust from the outer enclosure once a month.
- ✗ NEVER spray lighter gas, paint or other aerosols near detectors or monitors.
- ✗ NEVER paint the device. Paint will seal vents and may interfere with the device.



Avoid exposure of high concentrations of alcohol found in many products, this can damage, deteriorate or affect gas detectors. For more information refer to your detector manual.

## Bump Testing

### What is Bump Testing?

Bump testing is a term used for checking a gas detector is functioning correctly by exposing it to the target gas. A known concentration of the target gas is applied to the device to trigger an alarm condition and ascertain the detector is working safely.

### Why is it Important?

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

The aim of the bump test is to make sure a gas detector is working at its optimum by briefly exposing the unit to a known concentration of the target gas. The reading (if displayed) is compared to the actual content of gas present, as stated on the test gas cylinder and if the detector goes into alarm within an acceptable range of the actual concentration, usually within 10%, then it is working safely.

If the bump test results are not within the acceptable range, the gas detector must not be used until a full calibration has been conducted.

Bump testing has a number of benefits for the end user:

- Peace of mind that the system does actually detect the gas in question.
- Allows the site to practice safe operations in a similar manner to the fire system.
- Early indication of any issues.

### How Often?

Regular bump tests are important to make sure the detector is able to detect a release of gas as early as possible. A bump test usually takes seconds (gas type dependant) and is often completed alongside a scheduled fire alarm test, however the frequency should be determined following a risk assessment by the end user.

Current standards recommend that for new installations - it may be prudent to carry out a bump test frequently (perhaps weekly), following a successful initial period and as confidence grows in the installation concerned, the frequency could be reduced.

Remember, bump testing does not remove the need to have gas detectors inspected, calibrated and serviced periodically by a trained engineer. You should not attempt this yourself and should employ the services of a specialist company.

For more information on this, contact us.

## **IMPORTANT WARNING STATEMENTS**

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

It is recommended that this device be commissioned upon installation.

Do not apply lighter gas or other aerosols to detectors – this will cause extreme damage to the gas sensing elements.

High concentrations of alcohol found in many products may damage, deteriorate or affect the gas sensing elements of the detectors – Avoid exposure near your devices.

Never ignore your devices when in alarm. Actuation of your alarm indicates the presence of an error or issue that requires immediate attention.

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.

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. 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.

## Notes

## Notes

**Installation Details**

Please pass this manual to the system owner or system user.

<i>Date of Installation:</i>	
<i>Installation Location:</i>	
<i>Organisation:</i>	
<i>Stamp/ Signature of the installer:</i>	

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