

# Gas Safety Products

## Merlin CT1650+ Gas Interlock System



## Installation, operating and maintenance

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## 1 General information

The Merlin CT1650+ is a ventilation interlock system with in-built current monitoring.

The Merlin CT1650+ is designed for use with fans up to 18A running current (Min 0.1) located in commercial kitchens.

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. We recommend removing the PCB
- 2.2 Mains Supply.** A 230 Volt AC 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 IN"
- 2.3 Gas Solenoid Valve.** The gas solenoid valve should be powered using the terminals on the Merlin CT1650+ marked "LNE to VALVE OUT".
- 2.4 Current Monitor.** Located at the bottom of the main circuit board there are two separate terminals for fan current monitoring, and these are marked up as "FAN 1 LIVE IN / OUT" & "FAN 2 LIVE IN / OUT". The live feed from the fan speed controller should be taken through these contacts. Each will monitor its own independent fan. From a fan controller the live feed should be taken to the 'in' terminal and the 'out' terminal should be wired to the fan motor.

On the inside front fascia of the circuit board there is a high and low setting for each of the fans, this allows you to set a minimum and maximum running current for the fans to operate on. If the current goes above or below these parameters for 10 seconds or more, the fan fault alarm will be illuminated and the gas solenoid valve connected will be isolated.

### 2.5 How to setup the current monitors.

- 1) Turn Fan 1 dip switch to ON position, screen will display Fan 1 current value.

F1! 10.0A F2 OFF
---------------------

"!" - means Fan1 has not been calibrated.

- 2) Set Fan 1 to minimum operating current. Press and hold the Fan 1 low button until the LCD screen will display the following:

F1 LOW SAVED
-----------------

- 3) Set Fan 1 to maximum operating current. Press and hold the Fan 1 high button until the LCD screen will display the following:

F1 HIGH SAVED
------------------

**\* Please repeat steps 1-3 for Fan 2 \***

**IF YOU ARE ONLY INTERLOCKING WITH ONE FAN, PLEASE LEAVE THIS DIP SWITCH TO THE '1' POSITION TO PREVENT NUISANCE TRIPPING.**

If the measured current falls or rises 10% outside the set permitted values, the LCD display will show a 'LOW' or 'HIGH!' message next to the relevant fan and the gas solenoid valve connected will be isolated.

F1 LOW! F2 10.5A
---------------------

To erase the calibration data press and hold the relevant RESET button until a "!" sign appears.

**Please see extra feature page to adjust fan drop out threshold.**

- 2.6 Remote emergency shut off buttons.** The terminal for remote emergency shut-off buttons is detailed on the circuit board as "EM REM STOP". These connections are linked out as a factory setting. Remote emergency shut-off buttons should be volt free and wired to the Merlin CT1650+ using two-core cable.
- 2.7 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.
- 2.8 BMS Connections.** Terminal connections are available on the circuit board for connections to Building Management systems etc. Detailed on the circuit board as "TO BMS N/C, COM and N/O" these are volt free connections.
- 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 Internal Buzzer.** Operates at 65dB measured 30cm from closed panel.
- 2.11 PDS Fan1 and Fan 2.** Located on the main PCB are two terminals, these are marked up as 'PDS FAN 1 & FAN 2'. These are separate to the panels in built current monitors, and can be used to accept external current monitors or air flow switches if interlocking with more than two fans. If these are not required, please leave the links in.

**Note: all low voltage connections should be made using a screened cable to avoid electrical interference.**

## 3 Operation Instructions

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

1. Turn the Fans On.
2. Turn the key switch to on position.
3. 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 Power LED will illuminate. When no power is present, this LED will not light up.

RED = OK

OFF = No power to CT1650+, a loose ribbon connection or the fuse may not be intact.

**3.2.2 Gas on LED**

When the fans are running at the correct speed and the key switch is turned on, the Merlin CT1650+ will open the gas valve and the green 'Gas On' LED will illuminate.

GREEN = Gas On

OFF = Gas Off

**3.2.3 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

**3.2.4 CO2 High**

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.

**3.2.5 Fan 1 OK LED**

Under normal working the LED will illuminate GREEN. If a fan fault is present on fan 1, the LED will be flashing.

GREEN = OK

FLASHING = The supply fan is not running.

**3.2.6 Fan 2 OK LED**

Under normal working the LED will illuminate GREEN. If a fan fault is present on fan 2, the LED will be flashing.

GREEN = OK

FLASHING = The extract fan is not running

**IF FAN 1 AND/OR FAN 2 LED FLASHES FOR MORE THAN 10 SECONDS, THE MERLIN CT1650+ WILL SHUT OFF THE GAS.**

**3.2.7 Fan Fault LED**

Under normal working conditions this LED is off. If a fan fault occurs for 10 seconds, the LED will illuminate AMBER.

OFF = OK

AMBER = 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.**

**3.2.8 Mute Button**

Under normal working conditions the panel will activate the sounder alarm in the event of a fault being present. To mute the sounder alarm please press the 'Mute' button on the front fascia.

### 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.

The Emergency shut off button(s) can also switch off the fans when used with a FS1/FS2. This feature can be adjusted using the 'EM select' dip switch located on the PCB board of the front fascia.

### 3.4 BMS integration

The Merlin CT1650+ 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 the kitchen has use of the gas supply.

This can be adjusted using the dip switch (BMS Select) located on the PCB board of the front fascia to switch the BMS on gas detection/EM Stop.

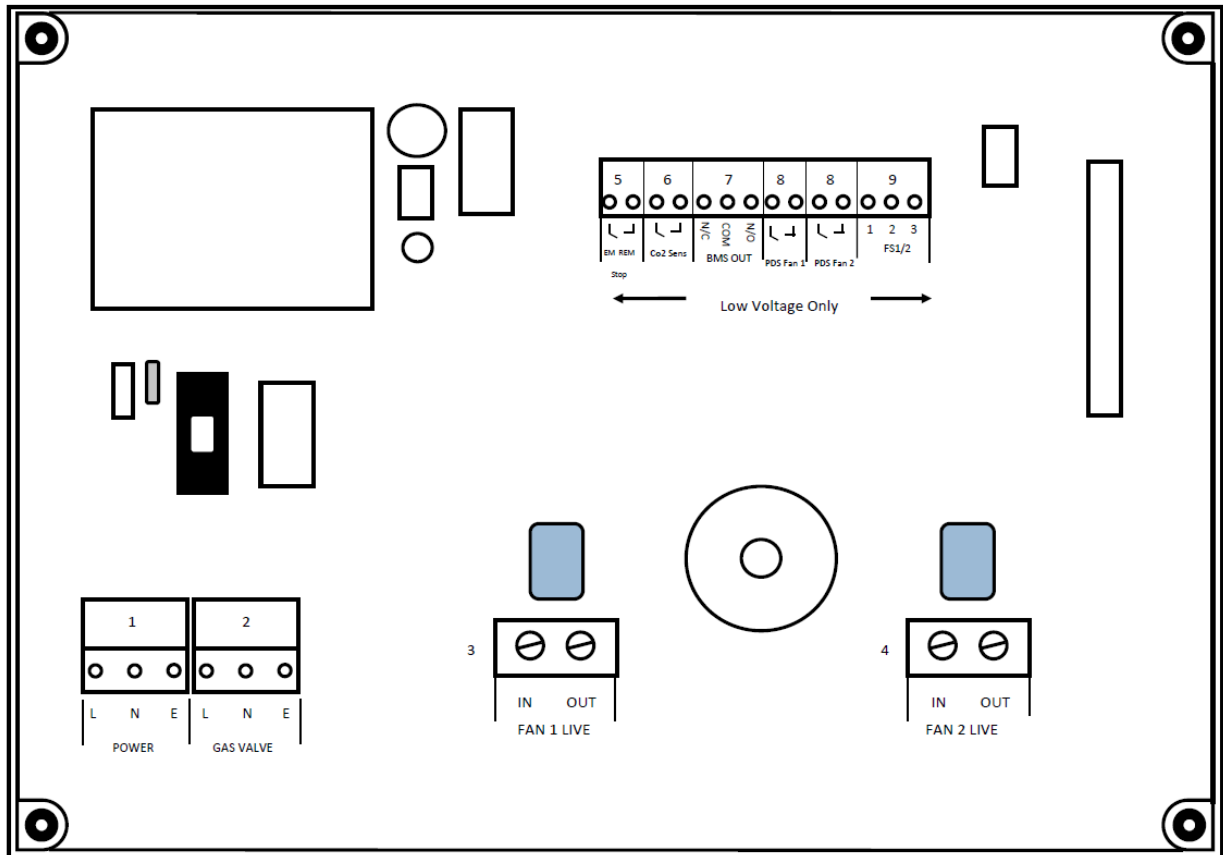
### 3.5 Fire alarm integration

The Merlin CT1650+ 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 REM STOP'.

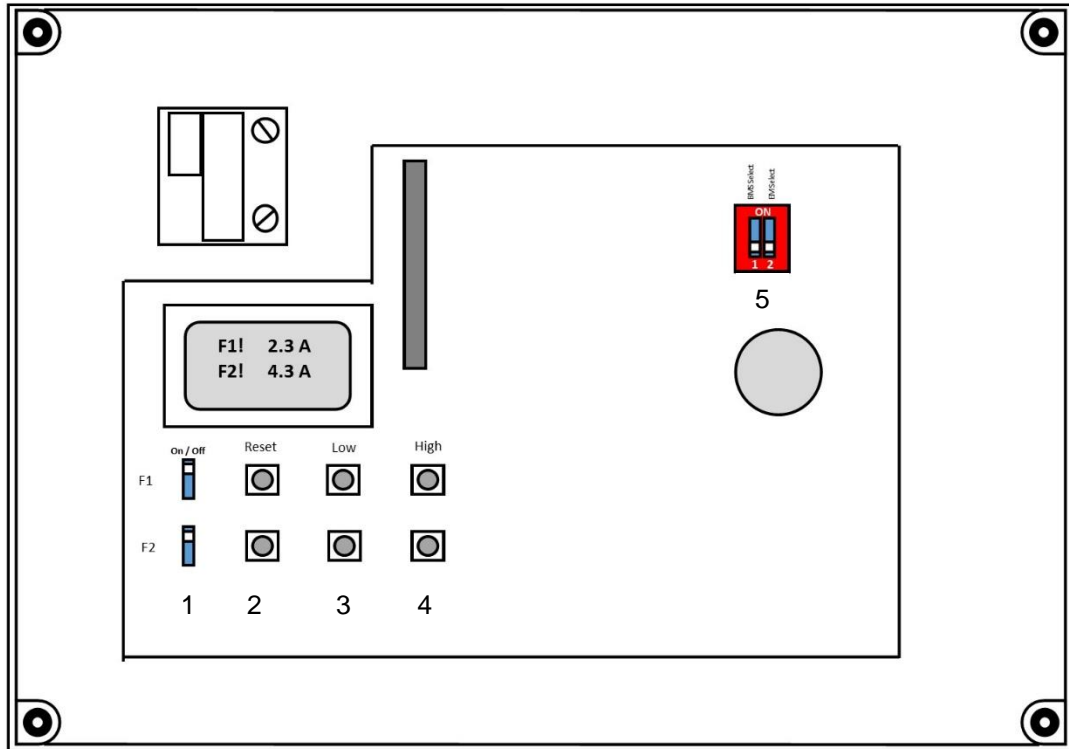
## CT1650+ Main PCB Wiring Diagram



1. Mains Input 230VAC.
2. Gas Solenoid Valve Power Output, 230VAC.
3. FAN 1 IN / OUT **MAX 18AMPS**
4. FAN 2 IN / OUT **MAX 18AMPS**
5. Remote EM Stop buttons and Fire Alarm input wired in series (purchased separately). **VOLT FREE INPUT**
6. CO2 Monitor (purchased separately). **VOLT FREE INPUT**
7. BMS output contacts. Normally Closed, Common and Normally Open.
8. Normally closed switches for additional external PD switches or current monitors
9. Fan Switch 12vdc output (purchased separately). For wiring instruction see Fan Switch user manual.

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

## CT1650+ Front PCB Wiring Diagram



1. Fan Current Monitor On/Off switches.
2. Fan Current Monitor Reset Button
3. Fan Current Monitor Low Button
4. Fan Current Monitor High Button
5. BMS Selection / EM Selection.

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



## Extra Feature

The CT1650+ has a factory set 10% dropout threshold for low and high values for fan 1 and fan 2. However, it is possible to alter between a 10% to a 40% dropout threshold if required. For further information, please see below.

1. Switch Fan 1 and Fan 2 On/Off dip switches to the 'OFF' position.

F1 OFF  
F2 OFF

2. To change the low threshold, press and hold Fan 1 and Fan 2 low buttons together until the LCD screen displays the following:

Offset L  
F1 10%

3. You can select the different dropout thresholds by pressing the Fan 1 low button until the required setting has been selected. After 5 seconds of the setting being selected the LCD screen will display the new low offset value for Fan 1:

Saved:  
F1 20%

4. Once the Fan 1 threshold setting has been completed the LCD screen will display the following:

Offset L  
F2 10%

5. Please repeat step 3 as above for Fan 2. Once this has been setup the LCD screen will display the new low offset value for Fan 2:

Saved:  
F2 20%

6. To change the high threshold, press and hold Fan 1 and Fan 2 high buttons together until the LCD screen displays the following:

Offset H  
F1 10%

7. You can select the different dropout thresholds by pressing the Fan 1 high button until the required setting has been selected. After 5 seconds of the setting being selected the LCD screen will display the new high offset value for Fan 1:

Saved:  
F1 30%

8. Once the Fan 1 threshold setting has been completed the LCD screen will display the following:

Offset H F2 10%
--------------------

9. Please repeat step 7 as above for Fan 2. Once this has been setup the LCD screen will display the new high offset value for Fan 2:

Saved: F2 40%
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10. Once you have completed the above steps please switch Fan 1 and Fan 2 On/Off dip switches to the ON position. You will now need to calibrate with the fans, please see page 3, section 2.5 for further information.

F1! 10.0A F2! 9.0A
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