FOR FURTHER TECHNICAL ASSISTANCE, PLEASE CONTACT US BY

Phone: 01782 844688 (Option 2)

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Website: www.trentproducts.com

TRENT
CONTROLS THAT MAKE SENSE

CaterSense™

All S and L models

INSTALLATION & COMMISSIONING INSTRUCTIONS

CaterSense V3

This symbol on this product or the package indicates that disposal of this product after its lifecycle could harm the environment.

DO NOT dispose of this product (or batteries if used) as unsorted municipal waste.

It should be disposed by a specialised company for recycling.

This product should be returned to your distributor or to a local recycling service.

Respect the local environmental rules.

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Fan fault early warning - Undercurrent

Cause - System has detected a 10% decrease in fan current.

Solution - Check running current matches commissioned values and fan motor plate.

Fan fault - Undercurrent

Cause - System has detected a 20% decrease in fan current.

Solution - Check running current matches commissioned values and fan motor plate.

Fan fault early warning - Overcurrent

Cause - System has detected a 10% increase in fan current.

Solution - Check running current matches commissioned values and fan motor plate.

Fan early warning - Overcurrent

Cause - System has detected a 20% increase in fan current.

Solution - Check running current matches commissioned values and fan motor plate.

CO_2 Warning - stage 1

Cause - System has detected CO_2 levels between 2000 to 2399ppm.

Solutions: - Increase ventilation flow rate and/or reduce appliance usage.

CO_2 Warning - stage 2

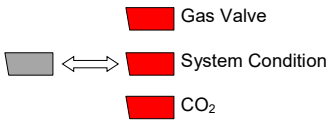
Cause - System has detected CO_2 levels between 2400 to 2699ppm.

Solutions: - Increase ventilation flow rate and/or reduce appliance usage.

CO_2 Warning - stage 3

Cause - System has detected CO_2 levels reached 2700 to 2799ppm.

Solutions: - Increase ventilation flow rate and/or reduce appliance usage.



CO_2 Fault

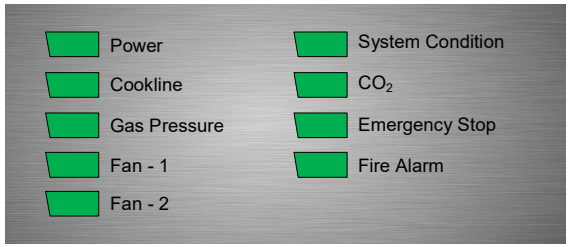
Cause - System has detected CO_2 levels reached 2800ppm.

Solutions: - Increase natural ventilation and/or reduce appliance usage.

Check voltage between terminals 6 and 7. 500ppm is

Troubleshooting

Fascia LED Layout



Fault Indication

Gas Valve
System Condition
Gas Pressure

Gas pressure fault on start up

Cause - System has detected a pressure drop or less than 12mBar.

Solution - Ensure all gas appliances are turned off. Check operating pressure and integrity of pipe work.

Check for minimum of 2.4VDC between terminals 2 and 4

Gas Valve
System Condition
Gas Pressure

Gas pressure fault during operation

Cause - System has detected less than 12mBar.

Solution - Check operating pressure and integrity of pipe work.

Gas Valve
System Condition
Emergency Stop

Emergency stop fault

Cause - Circuit between terminals 11 & 12 has been broken.

Solution: - Ensure emergency stops are not activated. Check wiring and continuity to each emergency stop.

Gas Valve
System Condition
Fire Alarm

Fire alarm / Thermal fault

Cause - Circuit between terminals 9 & 10 has been broken.

Solution - Ensure fire alarm is not activated. Check wiring to fire alarm Interface panel. Check that there is hot water available for the heater battery.

Document Scope

Instructions for installation, connection, and commissioning of the CaterSense S/L.

Safety Information

Read these instructions carefully and become familiar with the device before trying to install, operate or maintain it.

Please ensure that the ventilation system, electrical installation and the gas pipe work have been installed and commissioned in accordance with the relevant standards.

The existing regulations, rules and guidelines must be observed when doing so.

The installation of this interlock does not replace the need for regular maintenance of the ventilation system.

Device Overview

CaterSense - S is a ventilation controller with cookline interlock, offering additional functionality such as gas pressure proving, CO2 monitoring,

CaterSense-L includes all features of the S model, with added capabilities for heater battery control and Demand Controlled Kitchen Ventilation (DCKV).

Both models are designed to support compliance with DW172, BS6173, and IGEM/UP/19.

Installation & Safety Information

Commercial Data

(CSS / CSL = Product, YY = Year, NNN = Serial No)

Product barcode (enclosure), CSS / CSL - EYY-NNN

Main PCB barcode, CSS / CSL - PYY-NNN

Facia PCB barcode, CSS / CSL - FYY-NNN

Country of origin, UK

Package Weight,

Product Weight,

Safety Information

Installation, commissioning, and maintenance of the **CaterSense** should only be undertaken by competent persons.

The **CaterSense** is a safety control. Do not tamper.

Notes on Speed Controllers

For variable speed fan(s), please ensure that the speed controller is correctly matched to the fan(s)

CY cabling for inverters must be used in accordance with the Low Voltage Directive. **Faults are likely to occur if incorrect cable type is used.**

Electrical Installation

An **unswitched** fused spur must be provided in accordance with the latest edition of BS 7671 (IEE Wiring Regulations).

Control Cabling (Terminals 1-22)

Screened cable must be used on all control circuits.

Drain Wires

Screened cables must have their drain wires terminated at the **CaterSense** only. Do not terminate at the sensor end.

Insulate any bare drain wire or metallic cable screen.

Power Cabling (Terminals 23-34)

Maximum Full Load Current (FLC) for fans powered from PCB, 8.3A

Maximum amperage for gas valve, 6.0A

Fuses

F1	6.3A F (Fast Blow) Gas Valve
F2	10A T (Slow Blow) Fan 1
F3	10A T (Slow Blow) Fan 2
F4	1.0A T (Slow Blow) PCB Transformer

Speed control

Fan speed control

If the CaterSense is controlling the fan speeds via any of the following

- Electronic speed controllers (CS-ASC-10)
- Variable speed drives (VSDs)
- EC controlled motors

“PLUS” and “MINUS” pads will proportionally increase and decrease the fan speed based on the voltages set during commissioning.

Demand Controlled Kitchen Ventilation

CaterSense will modulate fan speed signal(s) based on extract air temperature when fan speed selector is in “AUTOMATIC” mode.

In “OVERRIDE” mode fan speeds are controlled using “PLUS” and “MINUS” pads.

For additional steam / smoke extraction user can press the remote boost button which will increase fan speed to maximum for 5 minutes.

Start / stop

Gas pressure proving enabled

- Power
- Cookline
- Gas Pressure
- Fan - 1
- Fan - 2
- System Condition
- CO_2 (if enabled)
- Emergency Stop
- Fire Alarm / Thermal

Press “START”

START / RESET

- Fan - 1
- Gas Pressure

↓ 1 Sec

- COOKLINE

↓ 1 Sec

- COOKLINE

↓ 10 Secs

- Fan - 2 (if enabled)

↓ 60 Secs

- Power
- Cookline
- Gas Pressure
- Fan - 1
- Fan - 2
- System Condition
- CO_2 (if enabled)
- Emergency Stop
- Fire Alarm / Thermal

To stop the system press and hold the “STOP” button until returns to standby display.

SYSTEM STOP

Gas pressure proving disabled

- Power
- Cookline
- Gas Pressure
- Fan - 1
- Fan - 2
- System Condition
- CO_2 (if enabled)
- Emergency Stop
- Fire Alarm / Thermal

Press “START”

START / RESET

- Fan - 1
- COOKLINE

↓ 10 Secs

- Fan - 2 (if enabled)

↓ 60 Secs

- Power
- Cookline
- Gas Pressure
- Fan - 1
- Fan - 2
- System Condition
- CO_2 (if enabled)
- Emergency Stop
- Fire Alarm / Thermal

To stop the system press and hold the “STOP” button until returns to standby display.

SYSTEM STOP

Notes on gas installations

For gas pressure proving, the CaterSense system is suitable for;

Natural gas systems with a maximum operating pressure (MOP) of 25mBar and maximum pipe volume of $0.15m^3$.

or

LPG systems with a maximum operating pressure of 50mBar and maximum pipe volume of $0.025m^3$.

Bespoke programmes are available for larger installations.

Air quality testing in accordance with BS 6173 and IGEM/UP/19 shall be carried out as part of the commissioning procedure and following changes or repairs to the system.

Technical Data

Power consumption (unit)	5W
Power consumption (CO_2/temperature sensor)	2.4W
Power consumption (Gas pressure transducer)	<0.24W
Transformer power rating	10VA
Enclosure material	High Impact Polystyrene
Operating temperature	-20 to 60°C
Ingress protection rating	IP40
Recommended control cable	Belden 8723 or equivalent
Minimum recordable on board current	0.3A
On board current monitor rating	10A (8.3A plus 20%)

Power terminals	**Number**	**Spec.** Max torque - 0.6Nm Max conductor - flexible 4mm^2 / solid 6mm^2 Stripping length, 8mm
Power supply	32 (E) 33 (L) 34 (N)	250 V ~ (F4 - 1A fuse, Type T)
Power output 1 (Fan 1)	23 (E) 24 (L) 25 (N)	8.3 A 250 V ~ (F2 - 10A fuse, Type T)
Power output 2 (Fan 2)	26 (E) 27 (L) 28 (N)	8.3 A 250 V ~ (F3 - 10A fuse, Type T)
Power output 3 (Gas valve)	29 (E) 30 (L) 31 (N)	6.3 A 250 V ~ (F1 - 10A fuse, Type F)

Sizing Electrical Supply	
CaterSense and sensors	1A
Power output 1 (Fan 1)	10A (8.3A plus 20%)
Power output 2 (Fan 2)	10A (8.3A plus 20%)
Power output 3 (Gas valve)	6.3A
Power output 3 (Electrical Contactor)	1A
Maximum Total	27.3A

Temperature control

The following functions must be setup during operation

Tempered supply air

CaterSense will provide a fan run-on for heat dissipation when J21 is fitted

	ON	OFF
J21	Electric / Gas Fired Heater Battery	LTHW Heater Battery

LTHW heater battery control & Ancillaries

0-10Vdc control signal (0Vdc = valve closed)

CS-CAP-01 to 03 (fan hold-off thermostat)
This should be set to 5°C with a differential of 0°C.

CS-OFS-02 (Outside frost / high limit thermostat)
The frost thermostat should be set to 8°C.
the high limit thermostat should be according to the temperature setpoint (default 18°C).

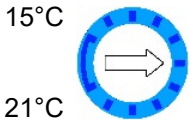
3 Port valve and actuator
If this is not provided by TRENT it should have the following functions:

- 0-10Vdc control
- Spring open on power loss

Electric / gas fired heater battery control

0-10Vdc control signal (0Vdc = no heat required)
Heater battery enable signal
5 minute fan run-on for heat dissipation

Setpoint adjustment for all types as follows:



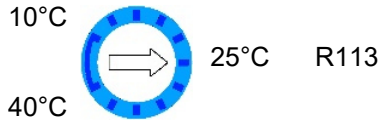
Demand control kitchen ventilation

To determine the correct setpoint run the system with 50% of the cookline capacity and set speed selector switch to “OVERRIDE” and the fan speed to its minimum setting.

Check temperature reading from extract sensor after 5 minutes.

Adjust temperature setpoint to match this temperature.

Setpoint range as follows:



Once the above is set, change the speed selector switch to “AUTOMATIC” and increase cookline capacity to 75%.

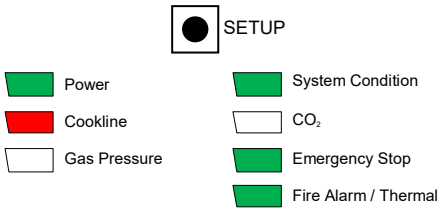
If done correctly the CaterSense should begin to gradually increase the fan speed(s) to maintain this setpoint.

IMPORTANT. Following re-fitting of facia please turn power to unit off and on again This will prevent ribbon cable stopping button operation.

System checking

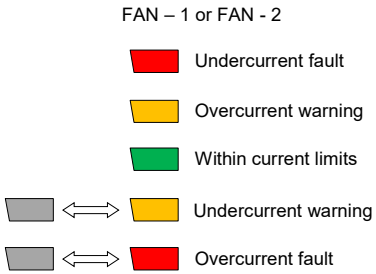
How to enter diagnostic mode

The enter diagnostic mode press and release the "SETUP" button.



Fan monitoring

In this mode, the FAN 1 and FAN 2 LEDs will instantly react to the current being drawn compared to the stored parameters. By slowly adjusting the speed control and observing the LEDs, the parameters can be quickly checked and problems identified.

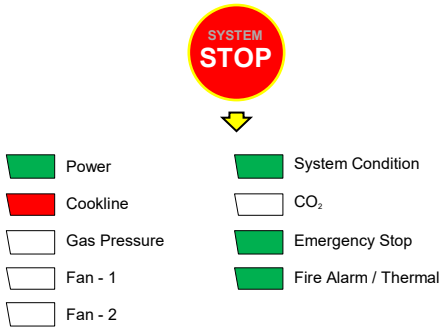


If either FAN – 1 or FAN – 2 indicates one of the above fault levels for longer than 30 seconds further investigation is required.

Ensure fan(s) are operating correctly before attempting a recommission the system. It is normal for current draw to fall outside normal levels for a few seconds whilst changing speeds. Allow fan to settle at each speed. IF IN DOUBT, ASK.

How to exit diagnostic mode

To leave diagnostic mode press and hold the "STOP" button until returns to standby display.



IMPORTANT. Following re-fitting of facia please turn power to unit off and on again This will prevent ribbon cable stopping button operation.

Control terminals	**Number/ description**	**Spec.** Max torque - 0.6Nm Max conductor -flexible / solid 1.5mm^2
Analogue input 1 (Gas pressure)	1 (24Vdc) 2 (0 to 10Vdc) 3 (0Vdc)	0 to 10V = 0 to 50mBar
Analogue input 2 (CO_2)	5 (24Vdc) 6 (0 to 10Vdc) 7 (0Vdc)	0 to 10V = 0 to 5000ppm
Analogue input 3 (Fan 1 interlock)	For use as AI. S+ (0-10Vdc), S- (0Vdc)	Range 0 to 10 Vdc
Analogue input 4 (Fan 2 interlock)	For use as AI. S+ (0-10Vdc), S- (0Vdc)	Range 0 to 10 Vdc
Analogue input 5 (Supply temperature sensor)	UIP3. 0-10V	0 to 10V = 0 to 100°C
Analogue input 6 (Extract temperature sensor)	UIP4. 0-10V	0 to 10V = 0 to 100°C
Discreet input 1 (Fire alarm)	9 & 10	Switched (2Vdc)
Discreet input 2 (E-stop)	11 & 12	Switched (2Vdc)
Discreet input 3 (Demand override)	UIP1. 0-10V & 0V	Discreet
Discreet input 4 (Fan hold-off)	UIP2. 0-10V & 0V	Discreet
Analogue output 1 (Fan 1 speed)	13 (0 to 10Vdc) 14 (0Vdc) 15 (SCR)	0 to 10Vdc
Analogue output 2 (Fan 2 speed)	16 (0 to 10Vdc) 17 (0Vdc) 18 (SCR)	0 to 10Vdc
Analogue output 3 (Heater control)	AO3. 0-10V & 0V	0 to 10Vdc
Discreet output 1 (Heater enable)	19 & 20	Switched VFC (240Vac 2A Max, 24Vdc 2A Max)
Discreet output 2 (Common fault)	21 & 22	Switched VFC (240Vac 2A Max, 24Vdc 2A Max)

Ancillary Data

	Product Code
CO_2 Sensor	CS-CO2-01A
Gas Pressure Transducer	CS-GPS-01
Gas Valve Junction Box	CS-GVJB-01
Remote Current Sensor	CS-RCT-01A
Fan Speed Control	
10A Electronic Speed Controller	CS-ASC-10
6A Manual Speed Controller	6A Manual
10A Manual Speed Controller	10A Manual
Variable Speed Drive	Please contact Trent
Gas Solenoid Valve	1/2" to 6"
Emergency Push Buttons	
Mushroom-head	RKPB-01
Mushroom-head with key-release	RKPB-02
Mushroom-head with shroud	RKPB-03
Yellow call point	RKPB-04
Duct Temperature Sensor (Supply / Extract)	CS-SAT-01
Demand Override Switch	CS-DOS-01
Fan Hold-off Thermostat	CS-CAP-02
IP65 Fan Hold-off Thermostat C/W Heater	CS-CAP-03
Outside Frost Thermostat	CS-OFS-01
Three Port Valve and Actuator	Please contact Trent
Valve Power Pack	CS-VPP-01
Weather Proof Bag	V3P-WPB
Damper Actuator	SFA-S2
Weather Proof Bag	V3P-WPB-L

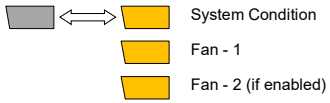
6) Fan 2 maximum speed can now be adjusted.

Using a multimeter between terminals 16 & 17 and plus / minus pads the output can be set between 0 to 10Vdc.

If using a VSD or CS-ASC-10 set this output to 10Vdc. Minimum speed should be set using VSD parameters or CS-ASC-10 adjustment pots.

Press the "SETUP" button to store speed value

7) The display will change to the following:

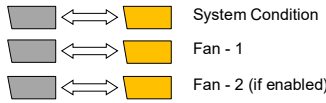


Using "PLUS" and "MINUS" pads ensure that the system has been correctly balanced to meet required flow rates.

8) If satisfied press "SETUP" to begin auto fan profiling.

The system will produce a short beep.
The CaterSense will slowly reduce the speed of the fans to establish the characteristics of your system.

DO NOT INTERRUPT THIS PROCESS.



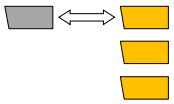
2 mins

After approximately two minutes, the system will have fully recorded the running currents of your fans.

If you have an electric or gas fired heater battery connected, the fans will run on for a further 5 minutes. Otherwise, the fans will stop straight away and return to the standby display.

2B) CaterSense speed control

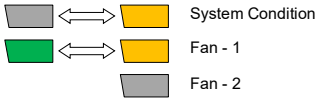
If DIL switch 2 is “ON” the following LEDs will change:



Fan 1 and fan 2 (if enabled) with start at full speed (10Vdc).

1) To adjust the minimum and maximum speed outputs press and hold the “C” button unit the display changes to the following:

Press & hold

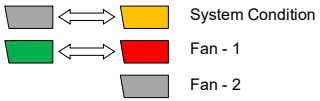


2) Fan 1 minimum speed can now be adjusted.

Using a multimeter between terminals 13 & 14 and plus / minus pads the output can be set between 0 to 10Vdc.

If using a VSD or CS-ASC-10 set this output to 0Vdc. Minimum speed should be set using VSD parameters or CS-ASC-10 adjustment pots.

Press the “SETUP” button to store speed value, the display will change to the following:



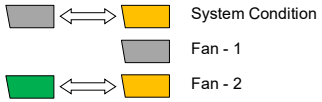
3) Fan 1 maximum speed can now be adjusted.

Using a multimeter between terminals 13 & 14 and plus / minus pads the output can be set between 0 to 10Vdc.

If using a VSD or CS-ASC-10 set this output to 10Vdc. Minimum speed should be set using VSD parameters or CS-ASC-10 adjustment pots.

Press the “SETUP” button to store speed value

4) If Fan 2 is enabled the display will change to below, if not enabled proceed to step 7.

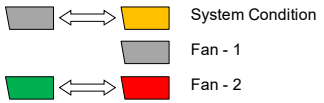


5) Fan 2 minimum speed can now be adjusted.

Using a multimeter between terminals 16 & 17 and plus / minus pads the output can be set between 0 to 10Vdc.

If using a VSD or CS-ASC-10 set this output to 0Vdc. Minimum speed should be set using VSD parameters or CS-ASC-10 adjustment pots.

Press the “SETUP” button to store speed value, the display will change to the following:



Maintenance

All products require regular maintenance to ensure safe and reliable operation.

Maintenance should be carried out on an annual basis as a minimum and should only be carried out by persons competent to do so.

It is recommended that maintenance of CaterSense - S & L system is carried out in conjunction with the servicing of the ventilation system.

Inspection Procedure

Ask site staff whether there have been any problems with the system.

Isolate supply and remove fascia.

Check condition of cables, PCB and enclosure for signs of damage or deterioration.

Replace fascia and reinstate power to carry out functional tests.

Maintenance Procedure

Carry out the following checks:

Functional test	P.19
Fan diagnostic check	P.17
Gas leak simulation	P.16
CO_2 sensor setup	P.16
Fire alarm functionality check	P.16
E-stop check	P.16

Clean with a dry cloth, removing any build-up from the CaterSense and any ancillary equipment (sensors etc).

Following maintenance please carry out recommissioning in accordance with fan commissioning P14.

Ancillaries Guide

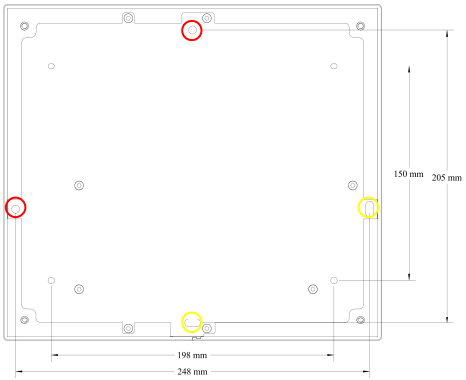
Location of Controller and Emergency Stop Button

An emergency stop button should be installed near every exit from the kitchen.

The unit should be protected from water ingress, splashes, and be located at least 1 metre away from sinks, basins, or similar.

Mounting points

The CaterSense has 4 mounting points.



- Mounting points.
- Knock-out mounting points.

Gas Pressure Transducer and Gas Valve Junction Box

Transducer **Must:**
Be located at least 6 pipe diameters downstream of gas valve.
Be installed in a pipework fitting, **NOT** into automatic isolation gas valve body.
Be positioned to avoid mechanical damage.
NOT be installed pointing upwards (i.e. with cable facing downwards) to avoid collection of dirt and moisture.

Location of CO_2 Sensor

Mount approximately 2 meters above floor and not within 100mm of ceiling.
Avoid mounting within 1 meter of inlet air supply or opening window or in the airstream.

Location of Extract Temperature Sensor

Mount into extract ductwork downstream of canopy spigot. Face gland downwards if possible.

Location of Outside Frost Thermostat

Mount thermostat externally on an north facing wall.

Fan Hold-Off Capillary Thermostat

Sensing element clipped near the off-air side of the heater battery coil. Set to 5°C with a differential of 0°C

Location of Supply Temperature Sensor

Mount onto duct approximately 2 meters downstream of heater battery. Face gland downwards if possible.

LTHW Three Port Valve and Actuator

Mount on return pipework with spindle NOT facing downwards.

To correctly locate actuator onto valve, rotate spindle so that 'flat' corner points towards port 'B' and the valve is therefore open.
The actuator will be rotated anticlockwise when not powered, this is in the open position.

The Y=0 switch must be in the clockwise

Fan commissioning

Setup sequence

1) How to enter "SETUP" mode
2A) Manual speed controllers (DIL SWITCH 2 OFF)
2B) CaterSense speed control (DIL switch 2 ON)
3) System checking

The sequence detailed above MUST be followed so CaterSense can program its parameters. Ensure that the system is allowed to settle and become stable before moving on to the next stage.

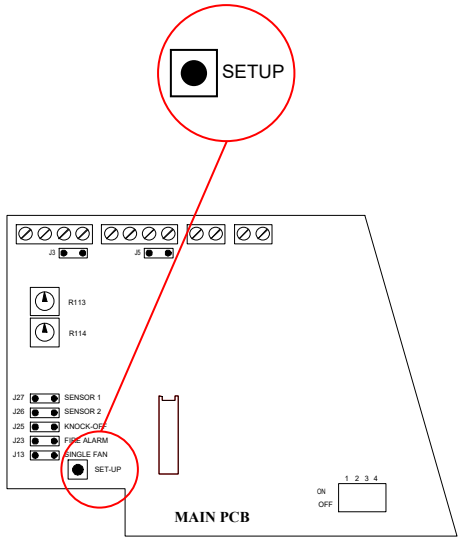
DO NOT RUSH.

Once powered, the unit will display the following:

- Power
- Cookline
- Gas Pressure
- Fan - 1
- Fan - 2
- System Condition
- CO_2
- Emergency Stop
- Fire Alarm / Thermal

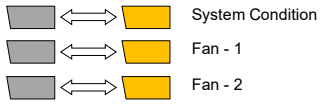
1) How to enter "SETUP" mode

Press and hold the "SETUP" button until the unit beeps. Let go when you hear the beep.



2A) Manual speed controllers

If DIL switch 2 is "OFF" the following LEDs will begin to flash amber:



In this mode "SETUP" button can be pressed multiple times to eliminate accidental or double presses.

Ensure the air balancing procedure has been carried out and fans are running.

Set each fan to the lowest speed and allow to settle.

1) Press and release the "SETUP" button to store fan current, a short beep will be produced.

Now increase to the next speed for both fans and allow 10 seconds to settle.

(if using an electronic speed controller split the full range into 10 equal parts)

2) Press and release the "SETUP" button to store fan current, a short beep will be produced.

Repeat steps 1 & 2 until all fan speeds have been saved at least once.

3) To exit fan setup press and hold "SETUP" button, unit will beep and return to standby display:

- Power
- Cookline
- Gas Pressure
- Fan - 1
- Fan - 2
- System Condition
- CO_2
- Emergency Stop
- Fire Alarm / Thermal

Un-powered checks

Check that the system has been installed correctly and ancillaries have been set-up.

Complete checks listed in the 'Pre-Commissioning Checks' section of the commissioning sheet.

Powered checks

Prior to energising the CaterSense, have a multimeter ready to immediately check the voltage between terminals 1 and 4 is in the range 21.9V to 25.3V.

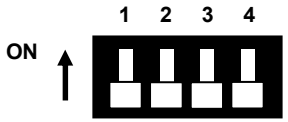
If outside these values power-down the unit and investigate. Low voltage indicates a problem with the field wiring such as a grounded control cable or an incorrectly wired sensor.

Initial Setup

IMPORTANT:
The following sequence **MUST** be followed to ensure the CaterSense and system operate correctly.

Ensure power supply is switched OFF before adjusting the following settings

DIL / DIP switch



Set DIL (DIP) switch to "ON" position to enable the following functions.

1	Gas pressure proving
2	Speed control signal from CaterSense
3	CO_2 Monitoring
4	Demand control kitchen ventilation

Sensor inputs and setpoint adjustment

Standard sensor inputs for both S & L versions

Sensor 1	Gas pressure transducer
Sensor 2	CO_2 sensor
Sensor 3	Fan 1 remote monitoring
Sensor 4	Fan 2 remote monitoring

Sensors only available on L version only

Sensor 5	Boost button
Sensor 6	Speed control selector
Sensor 7	Supply Temp sensor
Sensor 8	Demand Temp sensor

Jumper links

ON = 

OFF = 

Fixed jumpers -

J3	ON
J5	ON
J7	OFF
J8	OFF

Selectable jumpers -

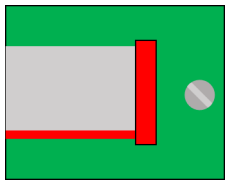
	ON	OFF
J27	Fan 1 On-board monitoring	Fan 1 Remote monitoring
J26	Fan 2 On-board monitoring	Fan 2 Remote monitoring
J25	Disable remote knock-off(s)	Enable remote knock-off(s)
J23	Disable fire alarm	Enable fire alarm
J13	Fan 1 monitoring only	Fan 1 & fan 2 monitoring

Ribbon Cable

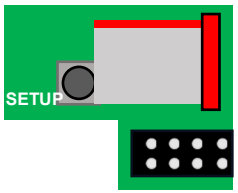
NOTE: Ensure the ribbon cable is plugged in correctly with the key pin (red stripe) at the **top** on the main PCB, and at the **bottom** on the facia PCB.

Otherwise, this may cause damage to the PCB and the unit will not function correctly

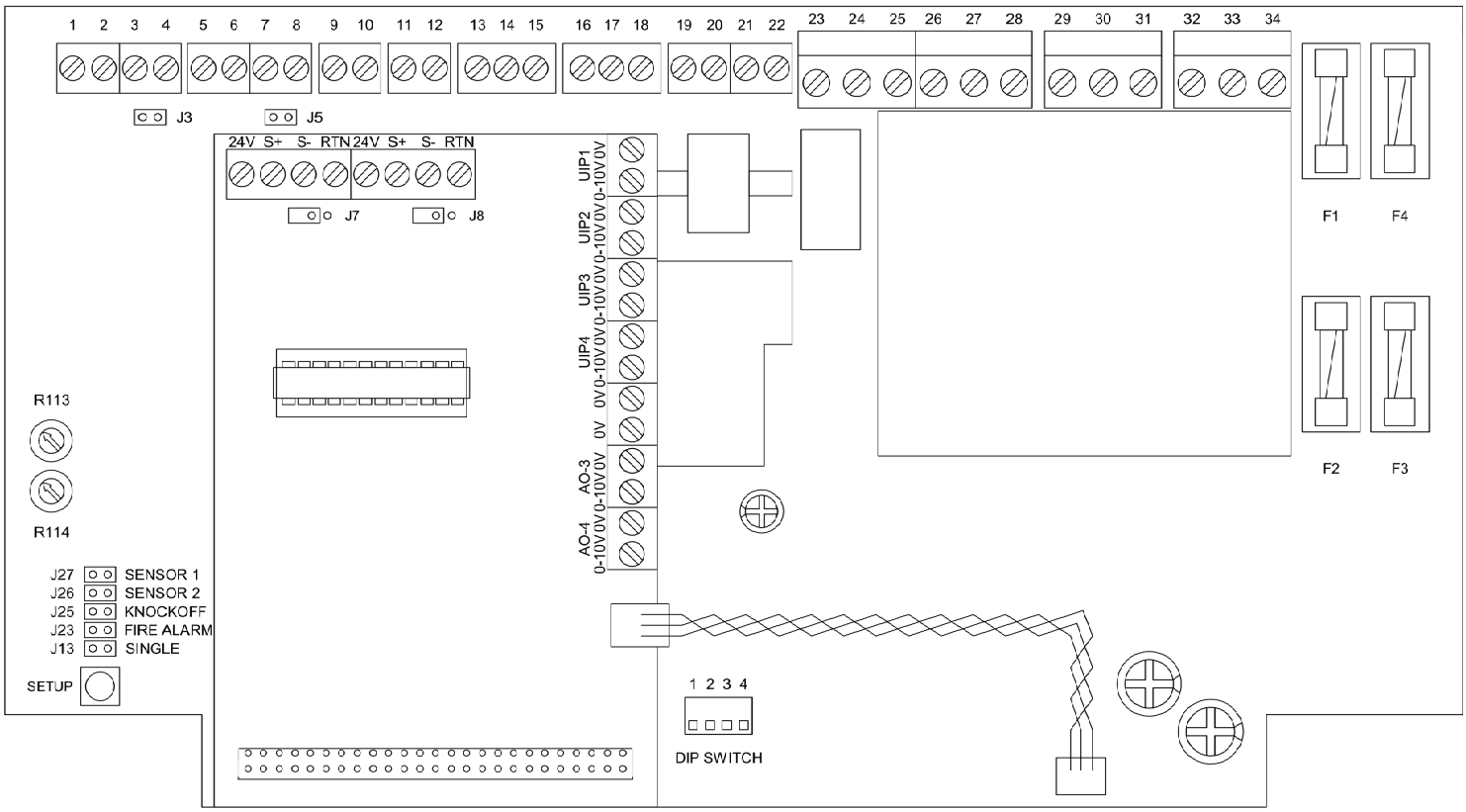
Fascia PCB

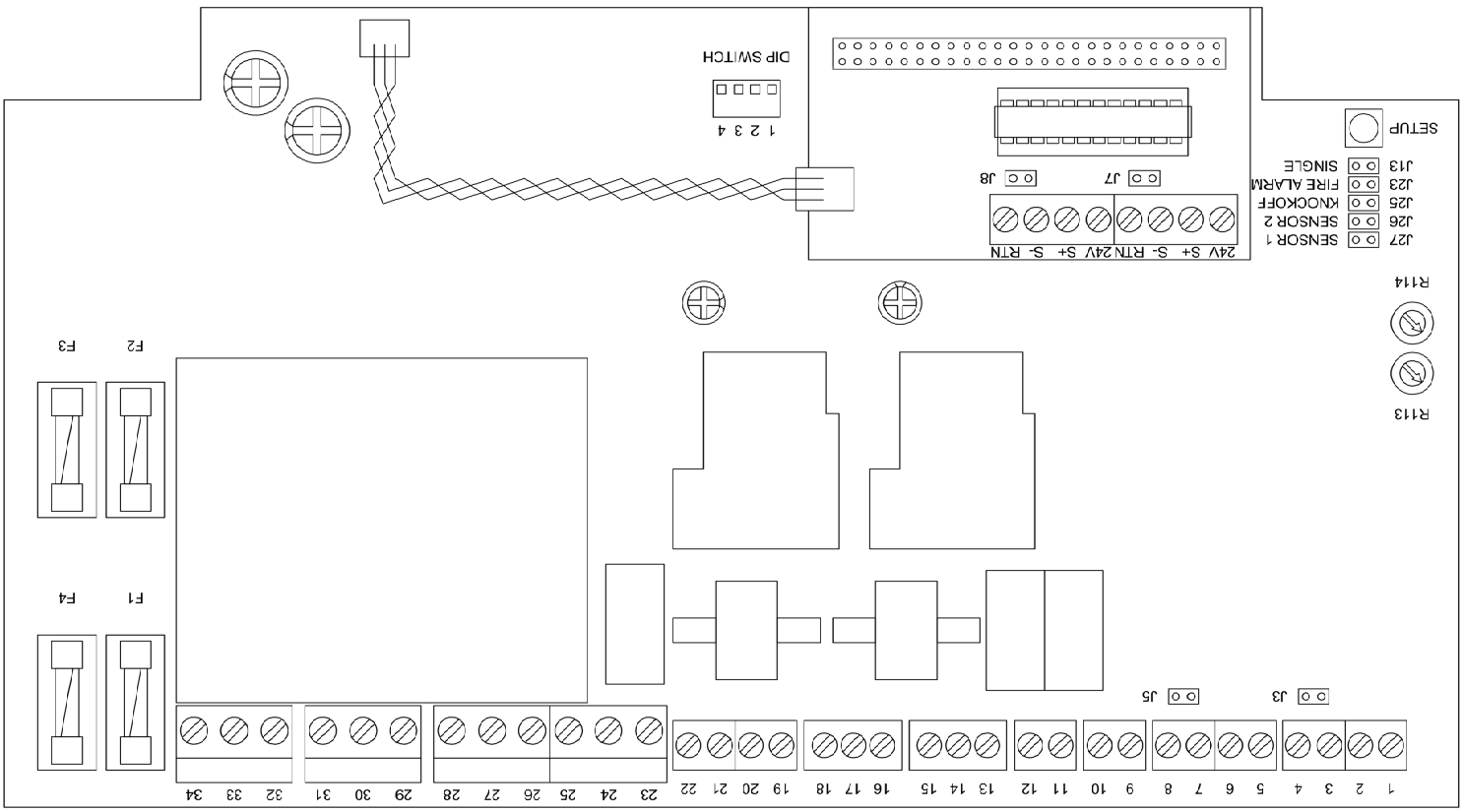


Main PCB



CS-L PCB LAYOUT





CS-S PCB LAYOUT