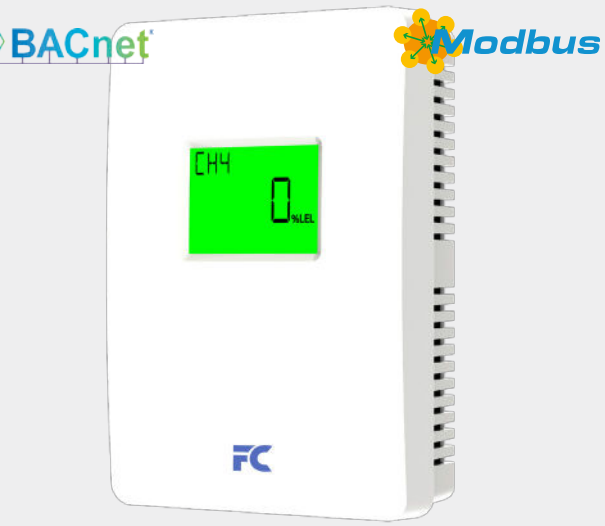
FLAMEFAST GAS SENSOR (FGS)

BACNET, MODBUS, 0-10V, VFC (24V AC/DC)





| OVERVIEW |

The Flamefast Gas Sensor is one of the most versatile gas sensors available on the market.

With an Analogue and Relay output, as well as a selectable BACnet or Modbus interface, FGS can connect directly into most third-party controllers or can easily connect to any of the Flamefast range of gas safety systems.

In a large proportion of modern buildings, the plant room safety systems are BMS integrated, and the FGS has been designed with this in mind. It can be treated like any other field sensor, the latching facility allows direct integration with the primary safety circuit, then simply pulse the Digital Input, or reset over the network once the alarm has cleared.

The unit can also be fully configured by the Flamefast App using the USB interface, including the address, relay properties, alarm set points and LCD behaviour.

| KEY FEATURES |

- 24 AC/DC Power Supply
- Pre-calibrated
- Traffic light LCD readout
- Volt free contact output
- BACnet and Modbus
- Latching function with Reset Input
- Analogue output
- Simple configuration and calibration
- Calibration and 'End of Life' reminders
- Mounts onto any standard single gang junction box or conduit box
- **UK MANUFACTURED**

DIMENSIONS

Height 125mm | Width 86mm | Depth 36mm

TECHNICAL SPECIFICATION

Power Supply	24V AC/DC ±10%
Power Consumption	100mA
Comms Output	BACnet MS/TP and Modbus RTU Baud: 9600, Addresses: 32 *Customisable through App with USB*
Analogue Output	0/2-10V Full scale linear
VFC Output	SPDT - 1A @ 24V Max
Audible	60dB @ 30cm
Operating Conditions	Temp 5 ~ 50°C Humidity 0 ~ 95% (NC)
Sampling Method	Diffusion
Warm-up Time	60 Seconds (24 Hours for full stability)
Response Time (T90)	< 60 Seconds (Adjustable)
IP Rating	IP40
Housing Material	PC/ABS
Colour	Pure White (RAL9010)
Approval	CE, UKCA

INSTALLER SELECTABLE OPTIONS

Fail-safe option	Energise / De-energise Relay 0-10V / 2-10V
Alarm Latching	Enable / Disable
Audible Alarm	Enable / Disable
THROUGH APP	
LCD Back Light	Enable / Disable
Auto Zero Calibration	Enable / Disable
Set-points	Alarm1 / Alarm 2 / Relay
Range	Analogue Output Scaling
Display	Gas Concentration / Formula
BACnet Properties	Identifier, Description, Location

PART NUMBERS & COMMON ACCESSORIES

PART NO	GAS	RANGE	TYP. LIFE (YEARS)
FGS-NG	Natural Gas	100% LEL	5
FGS-LPG	Propane	100% LEL	5
FGS-H2	Hydrogen (LEL)	100% LEL	5
FGS-SF6	Sulfur Hexafluoride	1,000ppm	5
FGS-CO2	Carbon Dioxide	5%	5
FGS-CO	Carbon Monoxide	200ppm	5
FGS-NO2	Nitrogen Dioxide	5ppm	3
FGS-NH3	Ammonia	100ppm	3
FGS-CL2	Chlorine	5ppm	3
FGS-H2E	Hydrogen (Electrochemical)	1,000ppm	3
FGS-SO2	Sulphur Dioxide	5ppm	3
FGS-O2	Oxygen	25%	5

OTHER GASES AVAILABLE ON REQUEST

T: 01925 281 249
W: www.flamefastcontrols.co.uk
E: sales@flamefastcontrols.co.uk

INSTALLATION & OPERATION
FGS RANGE

TECHNICAL SPECIFICATION

Power Supply	24V AC/DC ±10%
Power Consumption	100mA Max
Comms Output	BACnet MS/TP and Modbus RTU
	Baud: 9600, Addresses: 32
	Customisable with App with USB
Analogue Output	0/2-10V Full Scale Linear
VFC Output	SPDT - 1A @ 24V Max
Operating Conditions	Temp 5 - 50°C
	Humidity 0 - 95% (NC)
Response Time (T90)	< 1 Minute
Sampling Method	Diffusion
Warm-up Time	30 Seconds
Material	PC/ABS
Colour	Wall - Pure White (RAL9010)
	Duct – Black/Grey/Clear
Approval	CE

IMPORTANT – Please read carefully:

1. The sensors should not be exposed to high concentrations of the target gas or gases of a similar property. Such exposure can cause irreparable damage.
2. Following the detection of any significant gas leak, it is recommended that the sensor be replaced or recalibrated as a minimum as this may affect the sensor response or accuracy.
3. The Sensors are factory calibrated, however must be bump tested following installation to ensure that the sensing element has not been damaged and that the unit has been installed correctly.
4. All sensors must be calibrated in line with any site-specific requirements, however, must be calibrated at least annually by a competent person.

THE ABOVE NOTES ARE NOT SPECIFIC TO FLAMEFAST SENSORS, THIS SHOULD BE APPLIED TO THE MAJORITY OF GAS SENSOR DUE TO THE DETECTION PRINCIPLES.

MOUNTING LOCATION

Application and gas specific mounting locations are critical, however the below general guidance should be considered (please see gas specific mounting heights on sensor specification table);

- Do not install in high velocity air streams (near an air Inlet/Outlet).
- Do not install next to doors or opening windows.
- Ensure the sensor is installed near to where any gas escapes may occur.

INSTALLATION

All installation details shown on the wiring diagram should be followed carefully, failure to do so could result in irreparable damage to the unit.

Screened cable should be used at all times. Any voltage induction can result in corruption of the RS485 interface or failure of the analogue outputs.

It is recommended that the cable installation is checked prior to connecting the sensor to ensure that no voltage is applied to the RS485 terminals.

The connection details for the Wall and Duct mount units are the same, the only difference is the mounting.

Wall Mount Enclosure

The wall mount enclosure is designed to fit on a standard single gang junction box or conduit box. Please take care when tightening fixing screws as overtightening can distort the plastic.

To open/close:

1. Remove securing screw from the bottom of the enclosure.
2. Insert a flat screwdriver into the slot behind the screw and apply pressure until the bottom of the enclosure releases.
3. Pull the front of the enclosure outward from the bottom then up to release hooks securing the top.
4. When closing, hook the clips into place, then push the bottom until the securing clip fully engages.

Duct Mount Enclosure

The duct mount enclosure is IP66 external to the duct only, and although a foam gasket is provided, additional sealant may be required to maintain the integrity of the duct (the use of solvent-based sealant may damage the sensing elements).

A minimum hole size of 25mm should be drilled into the duct for clearance.

To open/close:

1. Remove securing screw from the lid of the enclosure.
2. Press on both securing clips simultaneously to release then simply open using the hinge mechanism.

OPERATION

On power up, the LCD will cycle through Green, Amber, Red with all icons lit to prove the display operation, then will show two boot-up screens showing the sensor version and setup configuration, followed by a 30 second count down.

During these 30 seconds the volt free contact will be in the default position for the selected programme and the voltage output will give 2.00V.



Once live, the sensor will display the gas type being monitored along with the live gas reading. If the sensor detects gas and reaches an alarm condition, the display colour will change, and the sensor will display “AL1” or “AL2”.



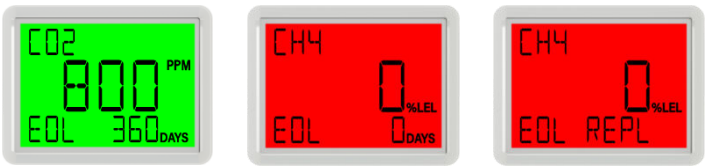
MAINTENANCE

All sensors must be calibrated at least annually, however please note for more sensitive applications it may be required to calibrate every 6 months.

The initial calibration countdown reminder is set to 480 days to allow handover and defects on new projects, although the sensor should be calibrated at 360 days, and the calibration notification will activate when the timer reaches 30 days. When exiting the calibration menu, the sensor will show how many days until the sensor reaches End of Life (EOL) for 60 seconds.

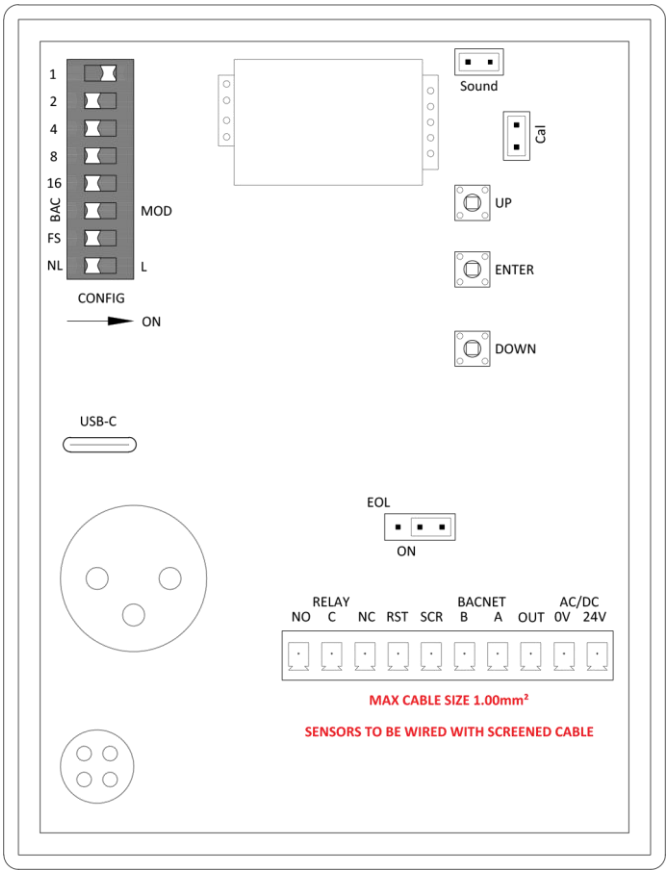


All sensors have a set life to ensure that they are replaced in line with the expected life of the specific sensor. The replacement notification will activate when it reaches 360 days, with a Red warning when the timer reaches 0. If the sensor reaches -90 days, the sensor will show REPL and enter an alarm status, and the complete unit will require replacing.



ANNUAL CALIBRATION REMINDERS CAN BE DISABLED - PLEASE CONTACT FLAMEFAST FOR DETAILS.

CONNECTIONS & CONFIG
FGS RANGE



PROGRAMMING SWITCHES

Label	Configuration	Setting
Addressing 1 2 4 8 16	MAC Address Sum of 1, 2, 4, 8 and 16 Example 1 + 4 ON Example 4 + 16 ON	Max = 32 *Baud, Address, Stop Bits configurable with Connect App.* Address = 5 Address = 20
MOD BAC	Modbus BACnet	19200, 1 Stop Bit, No Parity 9600
FS	Switch OFF = Failsafe ON	ON = 2-10V / Relay Energised OFF = 0-10V / Relay De-energised
NL L	Non-Latching Latching	 Pulse **RST** to release

WHEN CONNECTED TO A FLAMEFAST GAS SAFETY SYSTEM, THE BAUD RATE MUST BE SET TO 9600 AND ADDRESSES 1-24 MUST BE USED – WE RECOMMEND ADDRESSING SEQUENTIALLY STARTING AT 1.

Failsafe Mode (FS)

As default failsafe mode is enabled. This will result in the Relay being energised when healthy so a loss of power can be detected, therefore on the Normally Open becomes Normally Closed.

Non-Latching / Latching (NL/L)

When the latching function is enabled, the unit will remain in an alarm condition until 24V is applied to the RESET terminal. This should be used when connected to a safety circuit of a third-party system that does not have a manual reset integrated.

SENSOR POWER CONSUMPTION

Sensor	Max	Typical
Catalytic	100mA	80mA
Infra-red	100mA	80mA
Electrochemical	40mA	35mA

All sensors will have a small inrush on power up which should be considered, as should any Audible Visual Alarm Beacons running off the same supply.

PARAMETER CONFIGURATION

The following parameters can be adjusted:

Gas Type	This is set by Flamefast – DO NOT CHANGE.
Range	The 0/2-10V output will be full scale linear from 0 to the set Range.
Alarm 1	The display will turn Amber and the unit will beep every 10 seconds.
Alarm 2	The display will turn Red and the unit will beep constantly.
Relay Setpoint	The relay will change to an alarm state.
Auto Zero	The sensor will Auto zero calibrate by averaging any reading within 5% of Zero, then adjusting the Zero reading (if required) every 7 days, with a maximum adjustment of value of 1% of the factory def range, Please contact Flamefast for further details.

*Oxygen Sensors have dual alarms for Enrichment and Depletion.

To change any of the parameters,

1. Place the jumper onto the **CAL** pins.
2. Hold **ENTER** for 5 seconds to enter the menu
3. Pressing **ENTER** again cycles through the menu, and pressing the **UP** or **DOWN** buttons changes the value.
4. Once all parameters are set and the end of the menu is reached, the LCD with show **SAVE**, before returning to normal operation.

Note: All default alarm settings are as per the HSE EH40 (where applicable) and should not be changed without carrying out a site-specific risk assessment.

SENSOR SPECIFICATION

	Sens Type	Range	Unit	AL 1 Amber	AL 2 Red	Relay	Life (Yrs)	Typical Mounting Height*
NG/CH4	CAT	100	%LEL	10	20	20	5	300mm from Ceiling
LPG	CAT	100	%LEL	10	20	20	5	300mm from Floor
H2	CAT	100	%LEL	10	20	20	5	300mm from Ceiling
CO2	IR	5.00	%	2,800	4,500	4,500	5	1,500mm from Floor
CO	EC	200	PPM	20	100	100	5	1,500mm from Floor
NO2	EC	5.00	PPM	0.50	1.00	1.00	5	300mm from Floor
NH3	EC	100	PPM	25	35	35	3	300mm from Floor
CL2	EC	5.00	PPM	0.20	0.50	0.50	3	300mm from Floor
H2e	EC	1,000	PPM	250	500	500	3	300mm from Ceiling
SO2	EC	5.00	PPM	0.50	1.00	1.00	3	300mm from Floor
O2	EC	25.0	%	19.5 / 22.5	18.5 / 23.5	18.5 / 23.5	5	Dependant on Gas and Application
CO2 (H)	IR	5.00	%	0.50	1.50	1.50	5	300mm from Floor
SF6	IR	2,000	PPM	500	1,000	1,000	5	300mm from Floor
REF	IR	1,000	PPM	400	800	800	5	Dependant on Gas

THE APPLICATION, GAS AND SPECIFIC GRAVITY SHOULD BE CONSIDERED.

CALIBRATION

For sensor calibration, please contact Flamefast for details.

REFRIGERANT SENSORS
FGS-REF

The refrigerant sensors operate slightly differently to the other sensors, whereas they provide coverage for a wide range of gases from a single sensor.

IMPORTANT – PLEASE SELECT THE TARGET GAS AS BELOW

1. Without the **CAL** jumper fitted, hold the **ENTER** button for 5 seconds.
2. This will enter a menu with a white backlight, and 'REF' on the top line of the display.
3. Use the **UP** and **DOWN** buttons to scroll through the target gas.
4. Press the **ENTER** button to select the required gas.

ALL SENSORS SHOULD BE MOUNTED AT LOW LEVEL.

UNIT CALIBRATION CAN ONLY BE DONE USING 1,000ppm R32.