

Sensigas[®]



Wall-mounted Carbon Monoxide detectors

for homes, recreational vehicles
and similar sites

ESN.F.O..

Conformity standard EN50291

Electronic carbon monoxide detectors with time-varying alarm threshold and three calibration points for homes, recreational vehicles and similar sites.

230Vac, 12Vac/dc or 12...24Vac/dc power supply, depending on the model.

Relay command output with voltage free contact, so suitable for any kind of solenoid valve or other command and alarm device.

Possibility of parallel connection of more than one detector, also for monitoring different gases.

Use The ESN.F.O.. detectors can be used to provide a visual/audible alarm and to control other alarm transmitters or actuating devices, in the presence of carbon monoxide concentrations that pose a hazard to humans from gas poisoning.

Operation The detector will enter a warm-up phase after power-up; this will take about 5 seconds and during this time the detector activates all its visual and audible alarms in sequence. At the end of the initial test and warm-up phase (about one minute), the detector enters normal operation mode, and will continue in this state until it detects gas or until the detector fails.

Gas detection In conformity with the requirements of European standard EN50291, the monitoring algorithm used for gas detection is “**time-varying alarm threshold**” that considers both the concentration of the gas and the time it is detected.

A threshold level one, set at about 50ppm⁽¹⁾, sets off the time meter; if the concentration remains at this value the alarm will activate after a time limit of 60 to 90 minutes; at a concentration level of 100ppm the detector will enter alarm condition after a time limit of 10 to 40 minutes; if the concentration level is 300ppm (or higher) the alarm will go off immediately (within 3 minutes).

Intermediate concentration values require proportionately intermediate alarm times.

Once the alarm condition ceases to exist, the detector will be restored to normal operation.

⁽¹⁾ ppm = parts per million of concentration of gas in the air.

Available models and ordering information

Power supply	230Vac	12Vac/dc	12...24Vac/dc
Detector			
Type A	ESN.F.O.A	ESN.F.O.A.D	ESN.F.O.A.E
Type B	ESN.F.O.B	ESN.F.O.B.D	ESN.F.O.B.E

Type A = with command output to SPDT relay 8A / 250Vac

Type B = only visual/audible alarm (no command output)

Installation and Commissioning

Ensure compliance with standards in force for electrical wiring.

The devices must be connected to the mains and remain permanently powered.

Omnipolar disconnection must be included in the mains.

The installation of a detector must not be a substitute for the correct installation, use and maintenance of combustible gas appliances and equipment and for ventilation and exhaust systems for fumes.

Carefully read the instructions and electrical wiring diagrams in this document and follow them to the letter. Keep this document in a safe place for future consultation.

The device must be installed by qualified technicians.

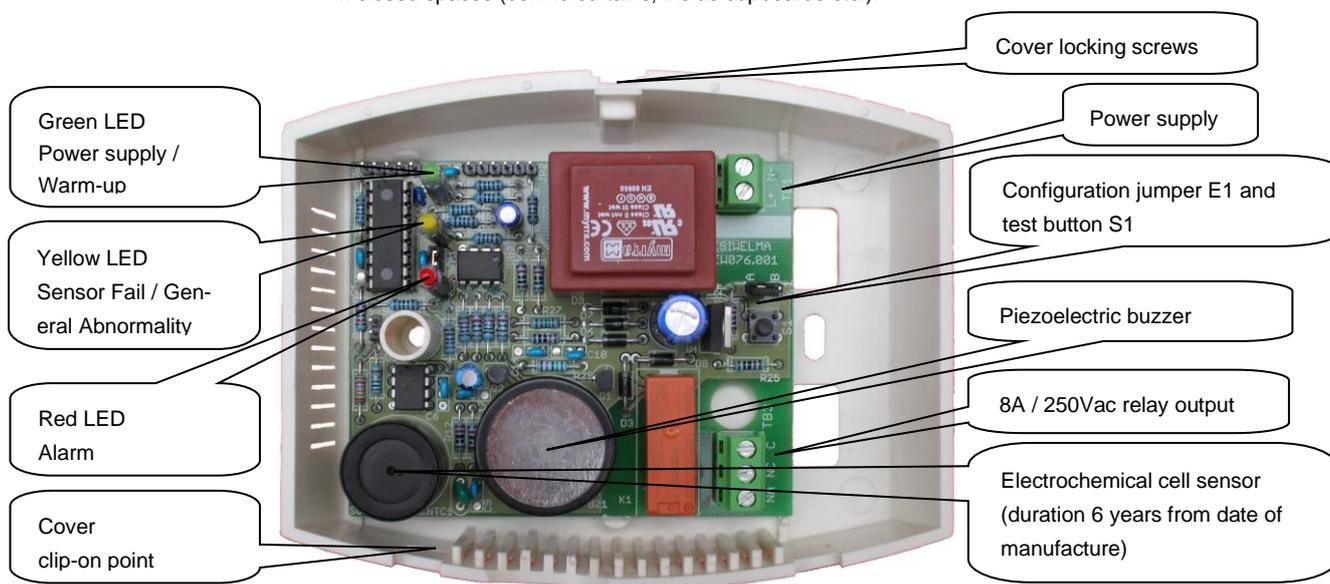
Installation

Since carbon monoxide weighs the same as air, it will be concentrated near the same height as the appliance that manifests combustion defects or that is located in premises with insufficient ventilation.

Install about 2 metres (minimum 1 metre, maximum 3 metres) from the gas-operated appliance and at standard face height of the occupants in those premises; example: 130...170cm in a kitchen, 50...100cm in a bedroom.

The detector **must not** be installed:

- outdoors
- too close to stoves, cooking appliances and, more in general, to gas appliances
- near sinks and taps
- near exhaust hoods, windows, fans, or ventilation apertures.
- in areas where dirt and/or dust can clog the front grille of the detector
- where the temperature or humidity exceeds the detector's operating limits
- in closed spaces (behind curtains, inside cupboards etc.).



Commissioning

Select the relay operational mode by positioning jumper E1

E1 positioned towards A = continuous relay control

E1 positioned towards B = pulsed relay control (0.5s ON every 10s)

Power up the detector and make sure the initial operational test, the display of the firmware version and the sensor warm-up is executed as indicated on the operational table.

At the end of the warm-phase, the detector enters normal operation mode by pressing button S1 for at least 1 second; check that the alarms act in conformity to what is indicated in the operational table and that the solenoid valve or other command and/or alarm device connected to the relay are correctly engaged.

It is advisable to repeat the operational test at least once a year, or after a prolonged period of stoppage.

If other test methods are used instead of the one described, the detector may generate different, unexpected responses. In particular, the use of inappropriate substances or vapours (alcohol or silicon-based solvents etc.) or in any case, high concentrations of test gases could cause permanent damage to the sensing element and may cause the detector to operate incorrectly.

After the wiring is completed and the operational checks have been made, power down the detector, and tilt the front cover slightly downwards to fasten it onto the two clip-on points shown in the figure.

Rotate the cover upwards, making sure that all three LEDs are centred.

Press down firmly on the top of the cover and tighten the locking screw.

Power up the detector and make sure the initial operational test, the display of the firmware version, the sensor warm-up and the passage to normal operation is executed correctly.

Operational table

Outputs	LED GREEN	LED YELLOW	LED RED	BUZZER	RELAY
Detector status					
Off	OFF	OFF	OFF	OFF	OFF
Initial test for LEDs and buzzer (1s)	ON	ON	ON	C	OFF
Visualisation Firmware Version (5s)	See Table 1			OFF	OFF
Sensor warm-up (60s)	A	OFF	OFF	OFF	OFF
Normal operation	ON	OFF	OFF	OFF	OFF
Sensor fail	ON	B	OFF	C	OFF
General abnormality	ON	ON	ON	C	OFF
Alarm	ON	OFF	ON	ON	ON
Operational test: Alarm for 25sec, 5sec displaying firmware version, then Normal Operation					

Key: **ON** = steady on / activated / switched **OFF** = off / deactivated / not switched
A = flashes slowly at 1Hz **B** = cycle of two rapid flashes (2Hz) every second
C = Short sound of Buzzer (Beep) to signal the passage from one condition to another.

Firmware version	1	2	3	4	5	6	7
GREEN LED	ON	OFF	OFF	OFF	ON	OFF	ON
YELLOW LED	OFF	ON	ON	OFF	OFF	ON	ON
RED LED	OFF	OFF	ON	ON	ON	ON	ON

Warnings for use and maintenance

The detector and its sensing element have been designed for ongoing use in areas where there is permanent occupation by people, so normally pollution-free.

The presence of gases or vapours from some substances such as alcohol, silicon or solvents found in some detergents or polishes, or from the fumes generated by cooking may cause inappropriate action of the detector and in the long term could affect the reliability of the device.

The detector needs no periodic maintenance, with the exception of the periodic operational test and its replacement 6 years after the date of manufacture indicated on the device.

Do not tamper with the device: danger of electric shock and/or malfunction.

Use a wet cloth and mild detergent to periodically clean the device.

Do not use aggressive detergents like alcohol, ammonia, solvents etc.

Before cleaning the detector, switch off the system power supply to avoid the risk of electric shock.

Effects of carbon monoxide on the human body

Carbon Monoxide (CO) is a colourless, odourless and non-irritating gas that is classified as a chemical asphyxiant whose toxic action is the direct result of hypoxia (oxygen deprivation) caused by exposure to it.

Carbon Monoxide is also rapidly absorbed by the lungs and is spread through the pulmonary alveolus where it reversibly binds with the haemoglobin as carboxyhaemoglobin (COHb), which is present in the bloodstream in small quantities. The affinity of haemoglobin for CO exceeds its affinity for oxygen by 200 times.

This reduces the capacity to carry oxygen into the bloodstream and also has the effect of dissociation of the oxyhaemoglobin that further reduces the supply of oxygen to the tissues.

CO is chemically stable in the body and is eliminated with the air breathed out.

Elimination is regulated by the same factors that determine its absorption.

If the CO level in the air inhaled is constant, the level of COHb in the bloodstream will approach a state of equilibrium after a few hours.

Still, the speed of that equilibrium depends on a number of factors such as the rate of lung ventilation (physical activity), the transfer to the pulmonary alveolus, cardiac parameters, concentration of haemoglobin in the bloodstream, barometric pressure, concentration of oxygen and of carbon dioxide in the breathed air, the individual's state of health, but the two most important factors are the concentration of CO and the time of exposure to the gas.

Typical effects of exposure to CO (at concentrations and exposure times over the ones that set off the detector) are, in growing order of concentration and/or time:

- Slight headache, weakness and, if pregnant, possible effect on foetus
- Strong headache, nausea, loss of movement in hands
- Strong headache, irritability, confusion, loss of vision, muscle weakness, dizziness
- Convulsions and loss of consciousness
- Coma, respiratory arrest, death.

The action of the detector cannot protect individuals in particular risk categories such as people who suffer from cardiovascular disease, hyperthyroidism, respiratory disease etc

In the event of alarm

If an alarm goes off, stay calm, put out flames, switch off the gas or LPG cylinder at the meter, switch off all gas heating appliances such as gas stoves etc., open doors and windows to increase the flow of fresh air.

If the alarm stops, it is necessary to find out what set it off and take consequent action.

If the alarm continues and the reason for the presence of carbon monoxide cannot be determined or eliminated, leave the building and contact the gas supply maintenance service of emergency services.

Technical specifications

Power supply (see available models)	230Vac \pm 10% or 12Vac/dc \pm 10% or 12...24Vac/dc
Frequency	50/60Hz
Consumption	2 VA
Command outputs	SPDT relay - capacity of the contact 250Vac 8A (2000VA)
1 st , 2 nd and 3 rd alarm threshold	50, 100 and 300ppm ⁽¹⁾ of Carbon Monoxide
Alarm threshold times at	50ppm between 60 and 90 minutes 100ppm between 10 and 40 minutes 300ppm within 3 minutes
Operational lifetime of the detector	6 years from the date of manufacture (indicated on the detector)
Max detectable area	approx. 40 m ²
Visual warnings	Green LED (power is on / warm-up) Yellow LED (sensor fail / general abnormality) Red LED (gas alarm)
Audible alarms:	Piezoelectric buzzer 85dB at 1m
Protection Rating	IP42 when correctly installed
Product conformity standard	EN50291
CE EMC Electromagnetic Compatibility	EMC 2014/30/EU – EN50270
Low voltage (LVD)	LV 2014/35/EU – EN60335-1
Operational room temperature	-10...+40 °C (storage -20.....+70 °C)
Ambient humidity allowed:	30... 90% RH (storage 0...+95% RH) (non condensing)
Dimensions	Mounting holes compatible with 503 type recessed mounting box Maximum dimensions: 138 x 104 x 40 mm
Enclosure	ABS/PC UL94-V0 flame retardant

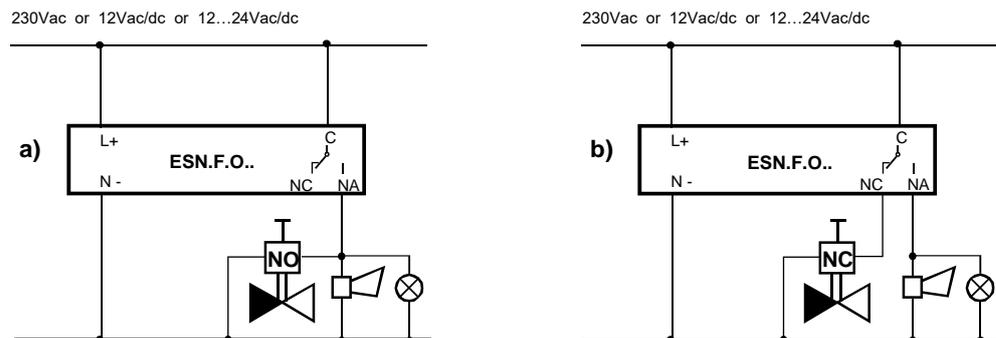
⁽¹⁾ ppm = parts per million of concentration of gas in the air.

Connection diagrams

Wiring diagrams:

Example a): - Command of a solenoid valve (Normally Open); in this mode, when the alarm threshold is exceeded the solenoid valve and therefore the gas supply will close or an appropriate ventilation and/or alarm system will start up.

Example b): - Command of a solenoid valve (Normally Closed) and of visual and audible alarms; in this mode, the solenoid valve and therefore the gas supply will close when the alarm threshold is exceeded, if there is a power outage or if the actual solenoid valve connection is cut off.



Environmental Compatibility and Disposal



This product has been developed and built using materials and processes that take into account the environmental issue. Refer to the following notes for disposal of the product at the end of its life, or in case of its replacement:

- for the purpose of disposal, this product is classified as an electrical and electronic device: do not dispose of it as household waste, in particular as regards the printed circuit
- comply with all local laws in force
- facilitate the reuse of basic materials as much as possible in order to minimize the environmental impact
- use local depots and waste recycling companies, or refer to the supplier or manufacturer, to return used products or to obtain further information on environmental compatibility and waste disposal
- The product packaging is reusable. Keep it for possible future use or in case of returning the product to the supplier.

Due to our policy of continuous product improvement, specifications are subject to change without notice.