

# CARBON MONOXIDE (CO) DETECTOR WITH RELAY OUTPUT

## RGS 328 Eng.



- **Conforms to CEI EN 50291 & CEI EN 50292 standards**
- **Incorporates internal sensing element of electrochemical cell type**
- **LEDs for power supply, pre-alarm, alarm & sensing element fault**
- **SPDT relay output**
- **Power supply 230 V~ ; protection IP 42**



### 1. APPLICATION

Carbon monoxide (CO) is undoubtedly one of the most toxic gases for the human body. Its danger, moreover, is compounded by the fact that it is odourless, colourless and non-irritating and so absolutely undetectable by human senses.

The RGS 328 detector is able to detect the presence of carbon monoxide in the air and can, therefore, ensure the safety of persons in domestic spaces where there are gas appliances.

An output relay can activate devices for changing the air and turning off, where possible, the combustion (e.g. by closing a shut-off valve for appliances operating on combustible liquids or gases).

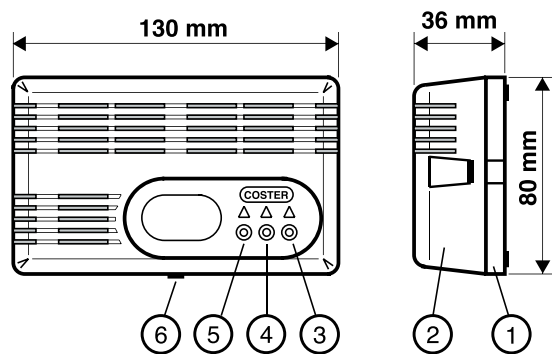
### 2. TYPICAL INSTALLATION



### 3. TECHNICAL DATA

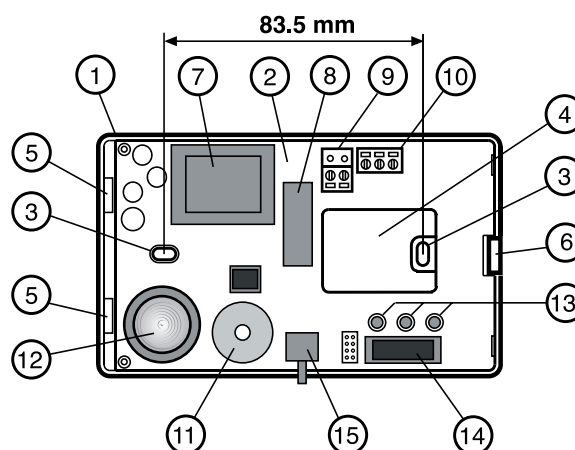
|                               |                     |                               |  |
|-------------------------------|---------------------|-------------------------------|--|
| Power supply                  | 230 V ~ ± 10%       | Acoustic alarm                | 85 db / 1 meter                            |
| Frequency                     | 50...60 Hz          | Sensor stabilisation time     | 120 s                                      |
| Consumption                   | 2,5 VA              | Sensing element:              |  |
| Protection                    | IP 42               | – electrochemical cell        | Sixth-Sense ECO-Sure/2e                    |
| Electromagnetic compatibility | CEE 93/68           | Alarm & pre-alarm thresholds: |  |
| Ambient temperature :         |                     | – alarm                       | "threshold + time"                         |
| – operating                   | 0...40 °C           |                               | < 50 ppm: no alarm                         |
| – storage                     | – 20...+ 60 °C      | – pre-alarm                   | 50...100 ppm: 60 minutes                   |
| Permitted ambient humidity    | classe F DIN 40040  |                               | 100...300 ppm: 10 minutes                  |
| Weight                        | 250 g               |                               | > 300 ppm: immediate alarm                 |
| Output SPDT relay :           |                     |                               | time between exceeding threshold and alarm |
| – type                        | stagno a gas inerte |                               |  |
| – maximum switching voltage   | 250 V ~             |                               |  |
| – maximum switching current   | 5 (1) A             |                               |  |

#### 4. OVERALL DIMENSIONS



- |                           |   |
|---------------------------|---|
| 1 – Base                  | 5 – Power supply LED  |
| 2 – Cover                 | 6 – Button for TEST and for switching off the internal acoustic alarm |
| 3 – Sensor fault LED      |   |
| 4 – Alarm & pre-alarm LED |   |

#### 5. BASE



- |                                 |  |
|---------------------------------|--|
| 1 – Base                        | 10 – Terminal block operations (relay switch)                  |
| 2 – Printed circuit             | 11 – Gas detecting sensing element                             |
| 3 – Holes for fixing screws     | 12 – Acoustic alarm  |
| 4 – Entry for cables            | 13 – LEDs  |
| 5 – Cover hinge elements        | 14 – Microprocessor  |
| 6 – Cover securing clip         | 15 – Button for TEST and switching off internal acoustic alarm |
| 7 – Transformer                 |  |
| 8 – Output relay                |  |
| 9 – Power supply terminal block |  |

#### 6. CONSTRUCTION

The detector comprises :

- Shockproof plastic base (4.1, 5.1) with two screw-holes at standard spacing (5.3), which permit installation on a wall or on a standard pattress, and the knockout (5.4) for the passage of the electric cables.
- electronic circuit (5.2), constructed according to CEI standards, where are housed the terminal block for the electrical connections (5.9 and 5.10); the gas-detecting sensor (5.11); the acoustic alarm (5.12); the hermetically-sealed output relay with its contacts enclosed in inert gas to avoid the sparks from switching coming into contact with the surrounding atmosphere (5.8); the push button for switching off the internal acoustic alarm and the TEST for the device (4.6, 5.15); the microprocessor (5.14); the LEDs (5.13).
- protective cover (4.2), in shockproof plastic, which is secured by means of two hinge elements (5.5) situated on the left; and by a cover securing clip (5.6) on the right.

#### 7. SITING

Carbon monoxide (CO) is produced by the combustion of carbonaceous materials: solids (e.g. carbon, coke); liquids (e.g. crude oil) or gaseous (e.g. methane, propane-LPG). Various types of gas appliances are normally installed in domestic premises: e.g. fireplaces, stoves, gas hobs, ovens, water heaters, etc. Lack of or poor maintenance of the appliances and, above all, of the means of removing the exhaust gases, can create the formation or the return of carbon monoxide in the spaces themselves, thereby creating an extremely dangerous situation for the persons present in them.

Large quantities of carbon monoxide are also present in the exhaust gases of automobiles, so that it is important to check the presence of this gas in public or private garages.

**The correct positioning of the gas detector is vital for ensuring its correct operation and, consequently, for ensuring the safety of the persons present. For this reason you are advised to have the installation carried out by qualified persons.**

Carbon monoxide is a gas with a density very similar to that of air so that it tends to diffuse uniformly.

##### The detector must be positioned:

- at a height of 150...200 centimetres from the floor (at eye level).
- as far as possible from kitchen gas appliances (also in order to avoid contamination of the sensor by grease and kitchen vapours)
- at a horizontal distance not less than 2...3 metres from gas boilers or calorifiers.

##### The detector must not be positioned:

- in the open;
- in closed spaces (e.g. behind a curtain, in a corner or in a wardrobe);
- directly above or below a basin or sink;
- near doors or windows;
- near air extractors;
- in places where the temperature and humidity could be at variance with those indicated under 3. TECHNICAL DATA;
- in places where dust or dirt could block and so render ineffective the sensor;
- in places where air movement could be hindered by furniture;
- in places where it might be sprayed by water;
- in places where it would be especially difficult to reach for checking.

**8. ELECTRICAL CONNECTIONS**

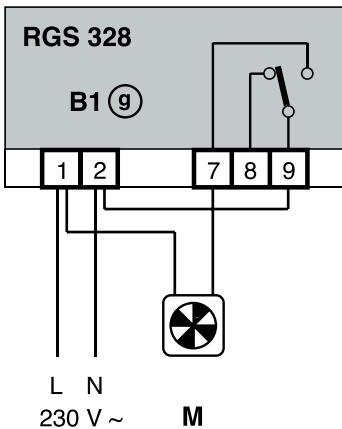
**IMPORTANT :** The detection system must always be in operation and so the electric power must come directly from the mains supply without the interposition of switches or other devices which could inadvertently render it inactive.

For the electric wiring use 1.5 mm<sup>2</sup> section cables.

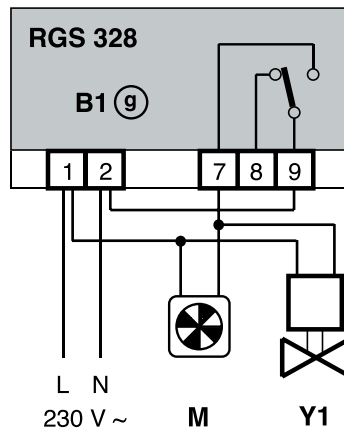
**9. WIRING DIAGRAMS**

**Warning: RGS 328 detector is not fitted with an alarm latching device so that it cannot be used to control Normally-closed gas shut-off valves.**

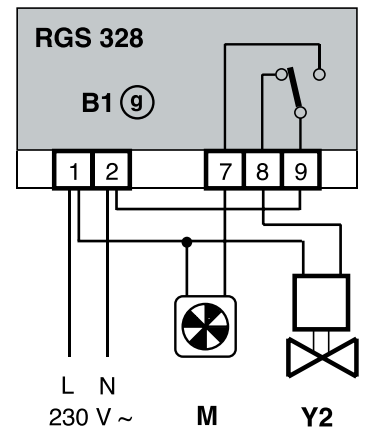
**Control of an air extract fan**



**Control of an air extract fan and a normally-open valve with manual reset**



**Control of an air extract fan & of a normally-closed valve with manual reset**



B1 – Internal sensor of detector  
 M – Air extract fan  
 Y1 – Normally-open solenoid valve with manual reset  
 Y2 – Normally-closed solenoid valve with manual reset

**10. OPERATION**

**10.1 Switching on**

The detector does not acquire, and therefore does not signal, alarms for the first two minutes of operation. This is the time necessary for the gas sensing element to reach full working order and become stabilized so that the reading can be considered correct and reliable. During this period the green LED (4.5), which indicates the presence of power, lights intermittently; after this stabilization period the green LED remains lit and the detector is ready for the detection of the gas.

**Signalling a normal situation**

The power supply LED (green) must be lit, whilst the LEDs for signalling a fault (yellow) and pre-alarm-alarm (red) must be unlit. The acoustic alarm must be off and the output relay switched off.

**10.2 Prealarm and alarm thresholds for carbon monoxide CO**

The danger of carbon monoxide does not lie in its inflammability or potential explosiveness, but in its high toxicity. Moreover, its danger does not depend only on the concentration of gas in the air but also on the length of time a person remains in an atmosphere in which this gas is present. For this reason there are different ways in which the detector can act, that is:

- concentration <0.005% (50 ppm): the safety of the persons present is ensured for an indefinite time and so the detector takes no action
- concentration 0.005...0.01% (50...100 ppm): within this concentration range the sensor and the detector for 60 minutes signal a "pre-alarm" situation; when this period has elapsed they pass to the "Alarm" condition.
- concentration 0.01...0.03% (100...300 ppm): within this concentration range the sensor & the detector for 10 minutes signal a "pre-alarm" situation; after this period has elapsed they pass to the "Alarm" condition
- concentration >0.03% (300 ppm): the safety of the persons present is not guaranteed. The sensor and the detector immediately signal the "Alarm" condition.

The values for concentration and exposure time taken into consideration by the sensor and, consequently, by the detector, have been established allowing a large safety margin in order to ensure the safety of the persons involved. The response of the sensor is of the "Dynamic" type: if the concentration passes from one band to another, the time count increases or decreases as a consequence, modifying the response of the detector.

**If the concentration of gas should return below 0.005% (50 ppm) for more than one minute, the detector returns to the "Normal" condition, thereby cancelling all the times counted up to that moment.**

### 10.3 Signalling pre-alarm and alarm

When the detector enters "Pre-alarm" (exceeding the pre-established threshold), the red LED of the detector (4.4) starts to flash.

When the detector enters the "Alarm" state (at the end of the programmed time for exceeding the threshold), the red LED lights and stays lit, the internal acoustic alarm is switched on and the output relay is switched on.

### 10.4 Switching off internal buzzer

When the detector is in the alarm state, press the TEST button – silence for about two seconds: the internal buzzer is switched off (to remove the annoyance), but the detector remains in the alarm state (alarm LED lit and relay switched on).

### 10.5 Sensor fault and signalling this

The detector is able to signal a possible fault in the sensing element: this possibility is indicated by the flashing of the yellow LED on the face.

## 11. PERIODIC MAINTENANCE

**To ensure the continuous operation of the detector it is necessary to check its operation at least once every three or four months according to the instructions in 11.1 and 11.2 below.**

**At least once a year, a check by a specialist technician is advisable.**

### 11.1 Check detector (TEST)

Keep the TEST button (4.6 & 5.15) pressed for about 5 seconds until the detector enters the pre-alarm condition and then that of alarm. Check that :

- the red LED lights and stays lit indicating presence alarm
- the internal acoustic alarm is switched on,
- the external switch is switched on (relay switched on).

Release the push-button :

- after about 5 seconds the alarm ceases and the detector returns to its normal operating condition,
- if the detector is connected to a solenoid valve with manual reset, it is necessary to re-open it with the reset lever.

### 11.2 Life cycle of sensing element

On the cover of the detector is a plate showing the date of the last servicing.

After this date the life cycle of the sensing element comes to an end and the element must, therefore, be replaced by a new one. It is necessary to carry out the calibration of the new sensing element and a complete overhaul of the detector. These operations must be carried out in the manufacturer's workshop.

## 12. WARNING: IN THE EVENT OF AN ALARM!!

Carbon monoxide is produced by the faulty operation of a gas appliance or by a defective flue.

**It is absolutely odourless and therefore it is impossible to detect its presence: this makes it extremely dangerous.**

The only means of detecting the presence of carbon monoxide in the air is a gas detector.

For the above reasons, if the detector triggers the alarm, act as follows:

- turn off all naked flames
- turn off all the gas appliances;
- **open the windows and the doors to ventilate the rooms.**

If the cause of the alarm is found and definitely eliminated, the detector can be re-set and the gas supply turned on again.

### Amendment to data sheet

| Date        | Revision No. | Page | Section  | Amendment description         |
|-------------|--------------|------|--|-------------------------------|
| 25.11.08 MZ | 01           | 3    | 10.2 Pre-alarm and alarm thresholds for carbon monoxide (CO) | Adjust CO concentration value |



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