

GAS DETECTORS WITH REMOTE SENSORS

RFG 65. Eng. C1

- Remote sensor for natural gas, LPG or carbon monoxide
- One voltage-free SPST output relay for control valve
- One voltage-free SPST output relay for external alarm
- Adjustable alarm threshold
- Self-diagnosis sensor fault
- Construction and operation in accordance with BSI 7348, EN 50054 & CEI-UNI/CIG 70028 standards
- Power supply 230 V ~ or 12 V- ; DIN rail mounting



1. APPLICATION

RFG 65. is designed for the detection of gas leaks in spaces such as :

- boiler plants
- laboratories
- workshops
- garages

2. FUNCTIONS

- Monitors, according to type of sensor connected, the concentration in air of :
 - natural gas,
 - LPG,
 - CO
- Indicates when pre-alarm threshold has been exceeded by blinking of alarm LED
- In the event that alarm threshold has been exceeded, RFG 65., by means of its output relays, can control :
 - a N.C. shut-off valve
 - a N.O. shut-off valve
 - an aeration fan
 - a remote alarm warning

3. MODELS

Code	Description
RFG 651	Gas detector for 1 remote sensor
RFG 652	Gas detector for 2 remote sensors
RFG 653	Gas detector for 3 remote sensors

4. GAS DETECTING SENSORS

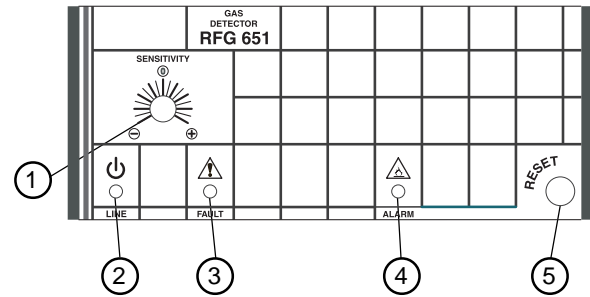
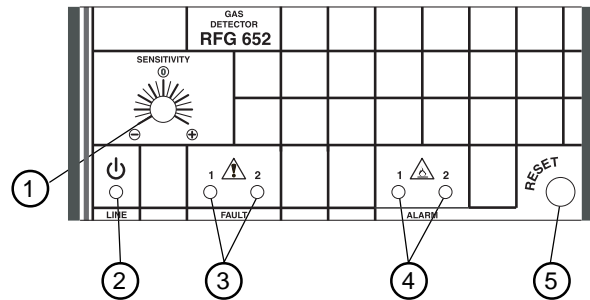
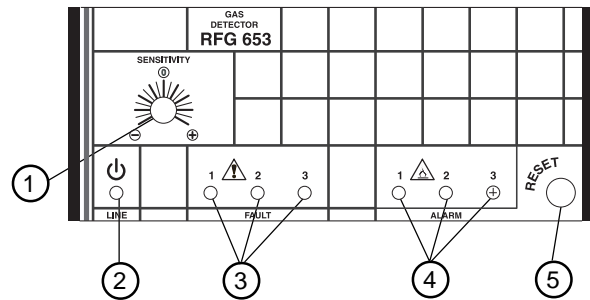
Code	Description	Gas	Sensing element	Protection	Data sheet
SGC 150	Sensor in non-industrial-type case	natural gas	TGS 2611	IP 30	-
SGC 250	Sensor in non-industrial-type case	propane, LPG	TGS 2610	IP 30	-
SGC 350	Sensor in non-industrial-type case	CO	TGS 812	IP 30	-
SGS 150	Sensor in industrial-type case	natural gas	TGS 2611	IP 44	-
SGS 250	Sensor in industrial-type case	propane, LPG	TGS 2610	IP 44	-
SGS 350	Sensor in industrial-type case	CO	TGS 812	IP 44	-
SGA 150	Sensor in explosion-proof case	natural gas	TGS 2611	EExd	-
SGA 250	Sensor in explosion-proof case	propane, LPG	TGS 2610	EExd	-
SGA 350	Sensor in explosion-proof case	CO	TGS 812	EExd	-

5. TECHNICAL DATA

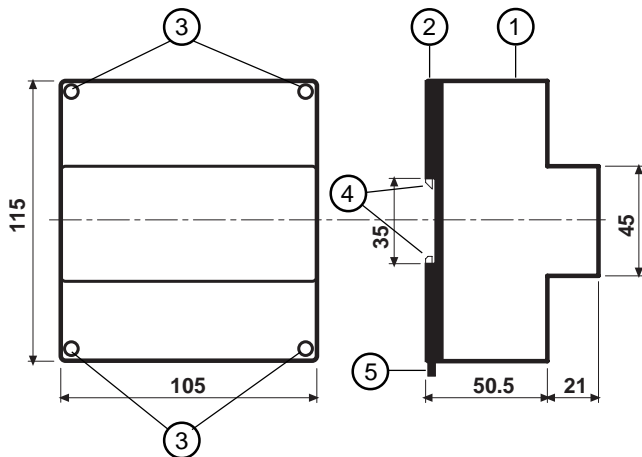
Power supply	230 V~ or 12 V – ± 10 %
Frequency	50...60 Hz
Consumption	7 VA
Protection	IP40
Radio disturbances	VDE0875/0871
Vibration test	with 2g (DIN 40046)
Output relay:	voltage-free SPST
contact	
maximum switching voltage	250 V~
maximum switching current	5 (1) A
Alarm threshold (in bold type with sensitivity = 0):	
Natural gas	0.5... 0.8 ...1.25 %
	5,000... 8,000 ...12,500 ppm
LPG	0.22... 0.35 ...0.56 %
	2,200... 3,500 ...5,600 ppm
CO	0.02... 0.03 ...0.05 %
	200... 300 ...500 ppm
Pre-alarm threshold (in bold type with sensitivity = 0):	
Natural gas	0.3... 0.5 ...0.8 %
	3,000... 5,000 ...8,000 ppm
LPG	0.14... 0.22 ...0.35 %
	1,400... 2,200 ...3,500 ppm
CO	0.012... 0.019 ...0.03 %
	120... 190 ...300 ppm

Construction standards	Italian Electr. Committee (CEI)
Case	DIN 6E module
Mounting	on DIN 35 rail
Materials:	
base	NYLON
cover	ABS
Ambient temperature	
operation	0 ... 45°C
storage	- 25 ... + 60°C
Ambient humidity	Class F DIN 40040
Weight	0.6 kg

7. FACIA



6. OVERALL DIMENSIONS



- 1 - Protective cover for electronic components
- 2 - Base with transformer, relay & terminal blocks
- 3 - Screws for fixing cover- base
- 4 - DIN rail securing elements
- 5 - DIN rail release lever

- 1 - Sensitivity potentiometer
- 2 - Power supply LED
- 3 - Fault LED
- 4 - Alarm LED
- 5 - Reset button

8. SITING DETECTOR, SENSORS & SHUT-OFF VALVE

8.1 Detector

The detector must be sited in a dry space in which the relevant ambiental limits shown under 5. TECHNICAL DATA are observed. If sited in a space classified as "Dangerous" it must be installed in a cabinet for electrical devices constructed according to the regulations in force for the danger class involved. The controller can be installed on a DIN rail or in a DIN modular enclosure.

8.2 Sensors

The correct siting of the sensors is essential for efficient operation and depends on the type of gas to be monitored and its density in respect of air :

- Natural gas (light) : 10...50 cm from the ceiling
- LPG (heavy) : 10...50 cm. from the floor
- Carbon monoxide : 150...200 cm. from the floor

It is advisable to position the sensors at a certain distance from the gas appliances so as to avoid triggering unnecessary alarms :

- Boilers & calorifiers : 1...2 meters
- Gas cookers : 2...3 meters

8.3 Shut-off solenoid valve

This must be installed on the gas feed pipe, possibly **outside the space controlled, in a place which is easily accessible and is protected from bad weather.**

In LPG installations the valve must be installed **downstream of the pressure reducing valve** (30 ... 40 mbar).

11. OPERATION

The detector, when it is powered (LINE 7.2 LED lights), remains inactive for 1.5 ... 2 minutes with the FAULT (7.3) and ALARM (7.4) LEDs blinking, to give time to the sensor to become stabilised.

The sensor sends to the detector a signal with a voltage proportional to the concentration of gas present in the air. When the concentration exceeds the *pre-alarm threshold* the ALARM (7.4) LED blinks.

When the signal exceeds the *alarm threshold* the detector:

- activates the internal buzzer
- lights the ALARM (7.4) LED
- activates the operational control

11.1 Pre-alarm and alarm threshold

The *alarm threshold* for natural gas is about 16% of the LEL (lower limit of explosivity of the gas in air) which is below the limit set by the manufacturing standards (20% of LEL). The *pre-alarm threshold* is about two thirds of the alarm threshold.

This permits, in the event of an alarm, taking action under conditions of maximum safety.

Using the *SENSITIVITY* potentiometer (7.1) the thresholds can be adjusted within the limits established by the manufacturing standards :

- Potentiometer towards + = increase sensitivity
- Potentiometer towards - = decrease sensitivity

11.2 Alarm

The alarm status brings about the action of the operational relay :

- if normally de-energised (F2 - F3 with link) : relay becomes energised, contacts : 1-3 closes, 2-3 opens.
- if normally energised (F2 - F3 without link) : relay becomes de-energised, contacts : 1-3 opens, 2-3 closes.

It is signalled by:

- energising of internal buzzer (only if terminals M - F1 without link)
- lighting of *ALARM* (7.4) LED on facia.

11.3 Latching alarm and reset

The detector can be programmed in two ways :

- *Without latching alarm* (F3 - F4 with link) :
 - alarm ceases when concentration of gas returns below threshold level
 - a slow blinking (0.2 seconds On and one second Off) of the *ALARM* (7.4) LED indicates the alarm status. To deactivate it use *RESET* (7.5) button.
- *With latching alarm* (F3 - F4 without link - factory setting) :
 - alarm status continues even when concentration of gas returns below threshold level
 - to deactivate it use the *RESET* (7.5) button (press for 5 seconds).

11.4 Self- diagnosis

In the event of a fault or of an incorrectly wired sensor the *FAULT* (7.3) or *ALARM* (7.4) LED lights.

Type of fault	LED	
	FAULT	ALARM
Breakage of sensor	⊗	
No connection to terminal G	⊗	
No connection to terminal B	⊗	
No connection to terminal M		⊗
Sensor connections G and B inverted	⊗	
Sensor connections G and M inverted		⊗

When ALARM LED lights the detector puts the system in alarm mode.

12.COMMISSIONING

- Power the detector : LINE (7.2) LED lights.
- After 1.5 ... 2 minutes the detector is enabled for operation.
- Set SENSITIVITY (7.1) potentiometer on 0.
- Simulate the presence of gas : **release gas from an ordinary cigarette lighter** near the monitoring sensor.
- When the gas concentration reaches the pre-alarm threshold the *ALARM* (7.4) LED blinks.
- When it reaches the alarm threshold, after a delay of about 20 seconds :
 - the ALARM (7.4) LED lights and remains lit
 - the internal buzzer sounds (only if terminals M - F1 are without link).
 - the operational relay closes the shut-off valve or switches on an aeration fan.
- Stop releasing gas : when the gas concentration near the sensor falls below the threshold level :
 - if the detector is *Without latching alarm*, the alarm ceases and the *ALARM* (7.4) LED continues to blink slowly until the *RESET* (7.5) button is pressed.
 - if *With latching alarm*, the alarm status continues until the *RESET* (7.5) button is pressed for at least five seconds.
- If the detector controls a valve with manual reset this must be re-opened.