SPRKM-R | CAR PARK GAS SENSOR

Mounting and operating instructions

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SAFETY AND PRECAUTIONS

Read all the information, the datasheet, Modbus map, mounting and operating instructions and study the wiring and connection diagram before working with the product. For personal and equipment safety, and for optimum product performance, make sure you entirely understand the contents before installing, using or maintaining this product.

For safety and licensing (CE) reasons, unauthorised conversion and / or modifications of the product are inadmissible.

The product should not be exposed to abnormal conditions, such as extreme temperatures, direct sunlight or vibrations. Long-term exposure to chemical vapours in high concentration can affect the product performance. Make sure the work environment is as dry as possible; avoid condensation.

All installations shall comply with local health and safety regulations and local electrical standards and approved codes. This product can only be installed by an engineer or a technician who has expert knowledge of the product and safety precautions.

Avoid contacts with energised electrical parts. Always disconnect the power supply before connecting, servicing or repairing the product.

Always verify that you apply appropriate power supply to the product and use appropriate wire size and characteristics. Make sure that all the screws and nuts are well tightened and fuses (if any) are fitted well.

Recycling of equipment and packaging should be taken into consideration and these should be disposed of in accordance with local and national legislation / regulations.

In case there are any questions that are not answered, please contact your technical support or consult a professional.

PRODUCT DESCRIPTION

The SPRKM-R are multifunctional gas sensors for parking garages which measure temperature, relative humidity, CO and LPG (propane C_3H_8) levels. They are Power over Modbus supplied and all parameters and the output value are accessible via Modbus RTU.

ARTICLE CODES

Article code	Supply	Imax	Connection
SPRKM-R	24 VDC, PoM	52 mA	RJ45

INTENDED AREA OF USE

- Monitoring gas concentration in underground parking garages and loading docks
- Ventilation control based on temperature, relative humidity and vehicle exhaust fumes - CO and LPG
- Suitable for both indoor and outdoor use (e.g. open-air spaces, multi-storey and subterranean car parks, residential and commercial buildings)

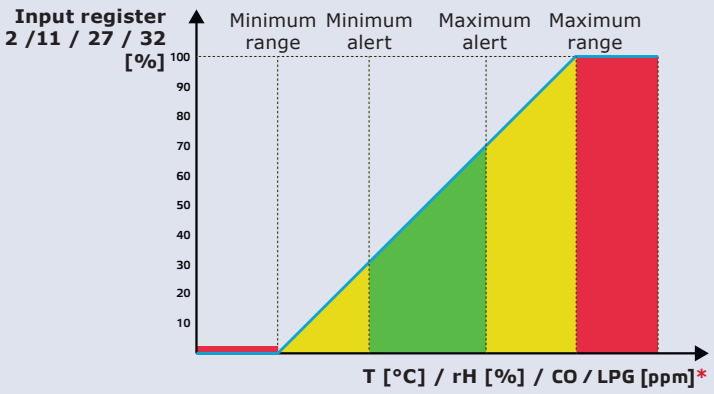
TECHNICAL DATA

- Suitable for harsh environments
- Selectable temperature, relative humidity, CO (0 - 1.000 ppm) and LPG (300 - 10.000 ppm) ranges and alert levels
- Bootloader for updating the firmware via Modbus RTU communication
- Day / Night detection via ambient light sensor with adjustable 'active' and 'standby' level
- RGB LED with adjustable brightness via Modbus register
- Modbus RTU (RS485)
- Replaceable CO and LPG sensor element
- CO / LPG sensor element warm-up time: 15 minutes
- Long-term stability and accuracy
- Enclosure material: POLYFLAM® RABS 90000 UV5, colour: gray RAL 7035
- Protection standard: IP54 (according to EN 60529)
- Operating ambient conditions:
  - temperature: -10—50°C
  - rel. humidity: 0—95 % rH, (non-condensing)
- Storage temperature: -10—60 °C

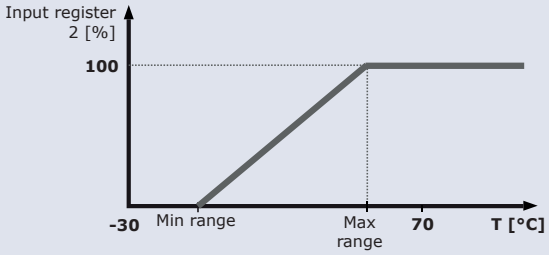
STANDARDS

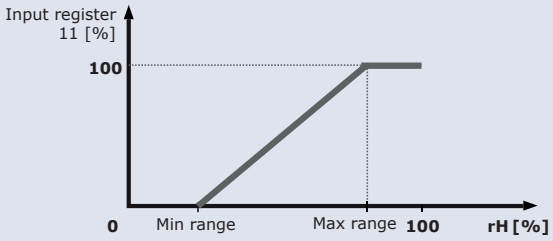
- Low Voltage Directive 2014/35/EC CE
  - EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
  - EN 60529:1991 Degrees of protection provided by enclosures (IP Code) Amendment AC:1993 to EN 60529
- EMC directive 2014/30/EC
  - EN 61000-6-1:2007 Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light industrial environments
  - EN 61000-6-3:2007 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments Amendments A1:2011 and AC:2012 to EN 61000-6-3
  - EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
  - EN 61326-2-3:2013 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning
- RoHs Directive 2011/65/EC

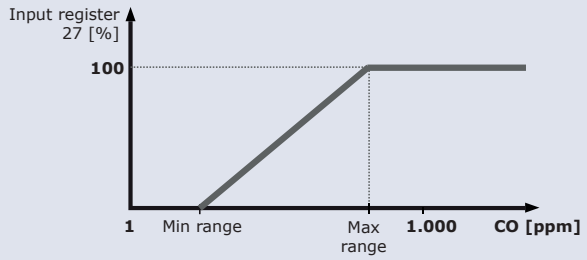
OPERATIONAL DIAGRAMS

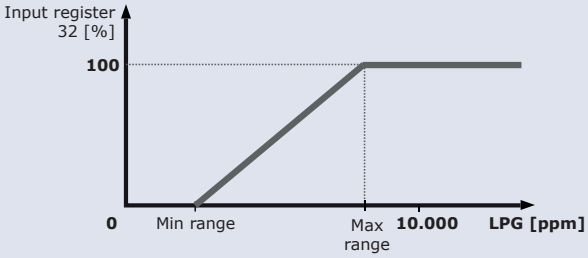


* *LED indications - T, rH, CO or LPG (default)*









WIRING AND CONNECTIONS

		RJ45 socket (Power over Modbus)
Pin 1	24 VDC	Supply voltage
Pin 2		
Pin 3	A	Modbus RTU communication, signal A
Pin 4		
Pin 5	/B	Modbus RTU communication, signal /B
Pin 6		
Pin 7	GND	Ground, supply voltage
Pin 8		

MOUNTING & OPERATING INSTRUCTIONS IN STEPS

Before you start mounting the unit, read carefully **"Safety and Precautions"**. Choose a smooth surface for mounting location, preferably not directly exposed to the sun (e.g. the wall of a building facing north or north-west).

ATTENTION

Mount the sensor in a well-ventilated area where it receives adequate airflow for proper operation and hide it from direct sunlight. Make sure it can be easily accessed for service. Leave at least 50 cm clearance at the front, left and right of the unit.

NOTE

It is recommended that you use two SPRKM-R sensors and mount each at a different height:

- *For CO measurements: in the middle/upper part of the building (at minimum 1,5 m from the ground/floor level) as it is a lighter gas.*
- *For LPG measurements: in the lower part (10 to 30 cm from the ground/floor level) as it is a heavier gas.*
- *Guarantee a free space of 50 cm around the sensors.*

Follow these steps:

1. Unscrew the front cover of the enclosure and remove it.
2. Fix the enclosure onto the surface by means of suitable fasteners while adhering to the mounting dimensions shown in **Fig.1** *Mounting dimensions* and the correct mounting position shown in **Fig.2** *Mounting position*. Mind the mounting requirements in **Fig.3**.

Fig. 1 Mounting dimensions

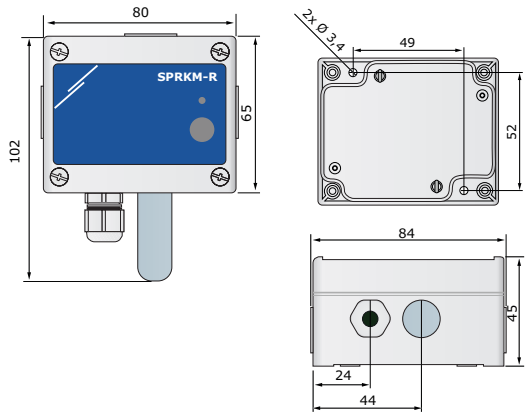


Fig. 2 Mounting position

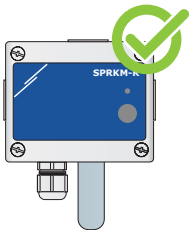
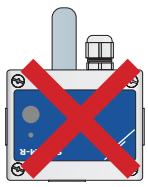
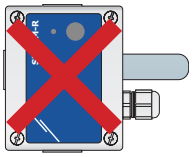
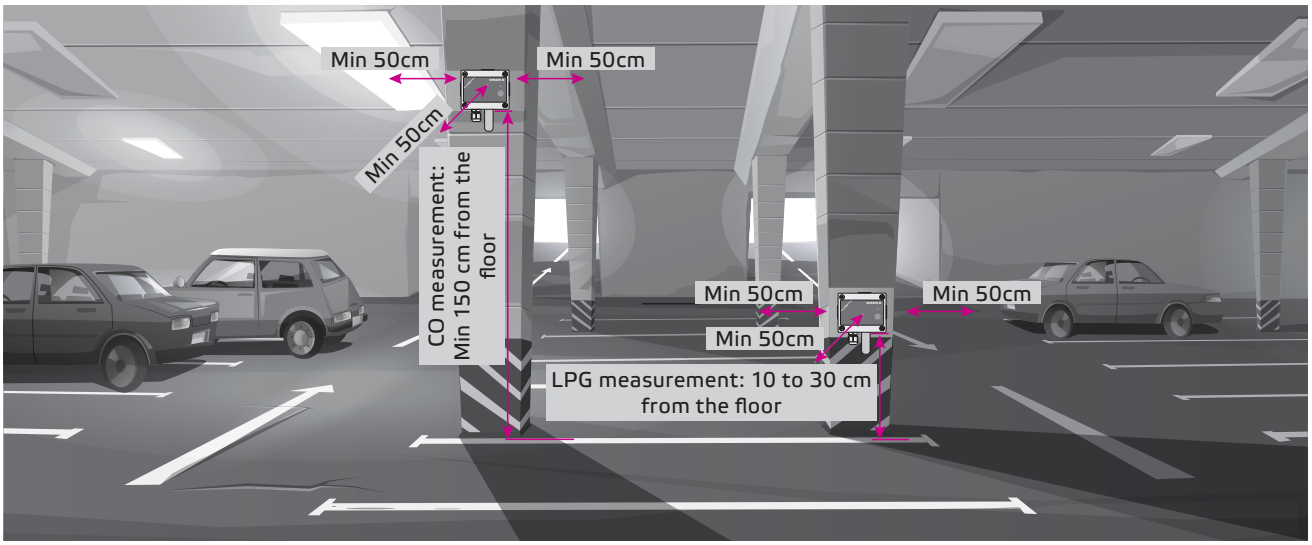
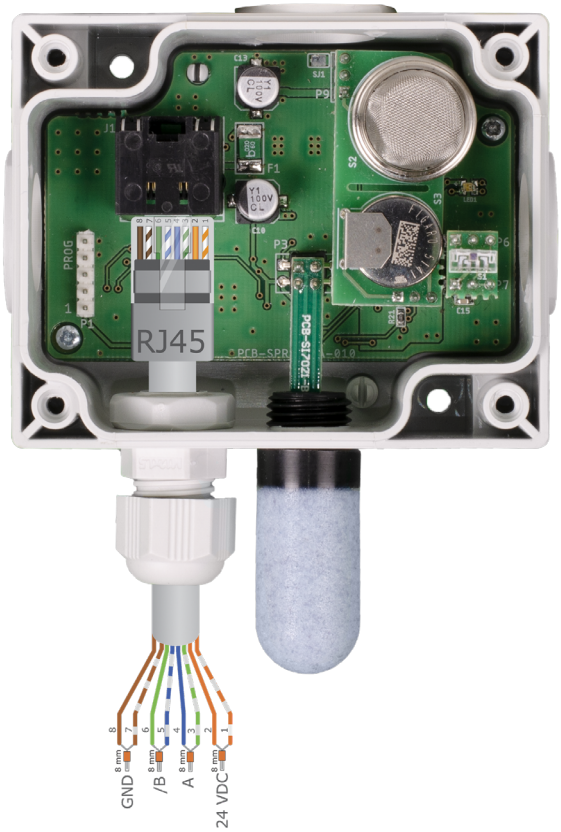
Correct	Incorrect
	
	

Fig. 3 Mounting requirements



3. Insert the cable through the cable gland, then crimp and plug it into the RJ45 socket as shown in **Fig. 4** below and the ***Wiring and connections*** section above.

Fig. 4 Connection



4. Close the enclosure and secure it with the screws. Tighten the cable gland to retain the IP rating of the enclosure.

5. Switch on the mains supply.
6. Customise the factory settings to the desired ones via the SenteraWeb, 3SModbus software or Sensistant (if necessary). For the default factory settings, see the Modbus Register map of the product.

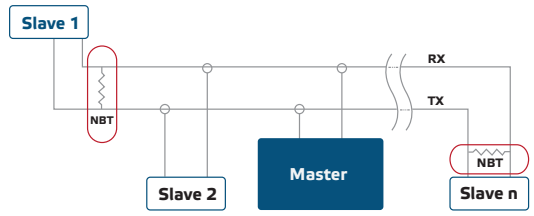
NOTE

For the complete Modbus register data, see the Modbus Register Map of the product. This is a separate document linked to the article code on the website containing the list of registers.
Products with earlier firmware versions may not be compatible with this list.

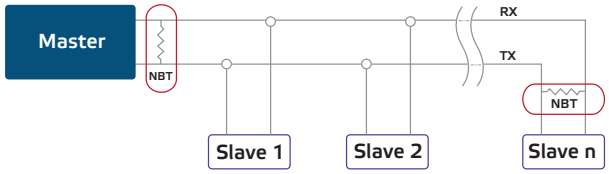
Optional settings

To assure correct communication, the NBT needs to be activated in only two devices on the Modbus RTU network. If necessary, enable the NBT resistor via 3SModbus or Sensistant (*Holding register 9*).

Example 1



Example 2



OPERATING INSTRUCTIONS

NOTE

The sensor is not designed, manufactured or intended for control or monitoring equipment in environments requiring life safety performance, in which the failure of the sensor could lead directly to death, personal injury or severe physical or environmental damage.

Calibration procedure

All sensor elements are calibrated and tested in our factory. Recalibration is not necessary.

Firmware update

New functionalities and bug fixes are made available via a firmware update. In case your device does not have the latest firmware installed, it can be updated. SenteraWeb is the easiest way to update the firmware of the unit. In case you do not have an internet gateway available, the firmware can be updated via the 3SM boot application (part of the Sentera 3SMcenter software suite).

NOTE

Make sure the power supply does not get interrupted during "bootload" procedure.

Ambient light sensor

The measured light intensity in lux is available in Input Register 41. Additionally, an active and standby level can be defined in Holding registers 35 and 36. Input Register 42 indicates if the measured value is below standby level, above active level or in between both levels:

- Ambient light level < standby level: Input Register 42 indicates "Standby".
- Ambient light level > active level: Input Register 42 indicates "Active".
- Standby level < Ambient light level < Active level: Input Register 42 indicates "Low intensity".

LED indications

The unit features an RGB LED. Its status and colour indicates status and measurements:
Blinking single coloured LED refers to sensor status. See **Table 2**.
Continuous single coloured LED indication refers to measurement values. See **Table 1** below.

Table 1 LED indications

Single coloured LED indication	Status	Meaning
Red LED	Continuous	Value of selected measurement (LPG by default) is above the maximum range
	Blinking	Sensor failure
Yellow LED	Continuous	Value of selected measurement (LPG by default) is between the maximum and minimum level
	Blinking	Modbus safety timeout (Holding register 8 is not 0) is activated and runs out due to lost Modbus communication. After Modbus communication is recovered, the yellow LED will stop blinking
Green LED	Continuous	Value of selected measurement (LPG by default) is within range
	Blinking	The CO or LPG sensor LED indication is selected and the sensor is warming up. Sensor warm-up time is 15 minutes after power ON

Alternating coloured blinking LED indicates the status of the two separate sensors. See **Table 2** below.

Table 2 LED indications - simultaneous conditions

Status of one or both sensors	LED indication
Sensor fault	Blinking red
Sensor OK / Warming-up	Blinking green
Sensor OK / No Modbus communication	Blinking yellow
Sensor fault / No Modbus communication	Alternating blinking red and yellow
Sensor warming up / No Modbus communication	Alternating blinking green and yellow
No Modbus communication	Blinking yellow

NOTE

The green and the blue LEDs are blinking sequentially to indicate that the device has entered bootloader mode. During the firmware download, the LED is blinking in multiple colours.

NOTE

By default, the LED indication refers to LPG measurement. This can be changed to temperature, relative humidity or CO values via Modbus Holding Register 79 (see Table *Holding registers).*

NOTE

The intensity of the LEDs can be adjusted between 0 and 100 % with a step of 10 % according to the value set in Holding register 80. The LEDs can be turned OFF (no indicator) by setting Holding register 80 to 0.

NOTE

The warm-up time for the sensor to attain its highest accuracy and performance level once the voltage supply has been applied is 15 minutes. During the warm-up period, the CO and LPG measurements will return 0 ppm.

VERIFICATION OF INSTALLATION INSTRUCTIONS

If your device does not function as expected, please check the connections.

TRANSPORT AND STORAGE

Avoid shocks and extreme conditions; stock in original packing.

WARRANTY AND RESTRICTIONS

Two years from the delivery date against defects in manufacturing. Any modifications or alterations to the product after the date of publication relieve the manufacturer of any responsibilities. The manufacturer bears no responsibility for any misprints or mistakes in this data.

The warranty will be void in the event of damage caused by failure to observe these safety instructions! We do not assume liability for any resulting damage.

We do not assume any liability for material and personal damage caused by improper use or non-compliance with the safety instructions. In such cases, the warranty will be invalid.

MAINTENANCE

In normal conditions this product enclosure is maintenance-free. If soiled, clean with a dry or damp cloth. In case of heavy pollution, clean with a non-aggressive product. The sensor element protector is made from porous material and, when exposed to extreme climate conditions such as dust, water and wind, may become clogged. This may result in faulty measurements. Please clean with mild non-acidic detergent.
In these circumstances the unit should be disconnected from the supply. Pay attention that no fluids enter the unit. Only reconnect it to the supply when it is completely dry.