



QPA63.1



QPA63.2

## CO<sub>2</sub>/VOC Sensors

## QPA63...

**Sensors designed for sensing indoor air quality in rooms or air ducts;  
microprocessor-based units consisting of a selective photo-acoustic CO<sub>2</sub> sensor  
and a VOC<sup>1)</sup> sensor with a heated stannic dioxide semiconductor;  
operating voltage AC 24 V;  
output signals DC 0...10 V**

1) VOC = volatile organic compounds (also called mixed gas)

### Use

In ventilation and air conditioning plants to enhance room comfort and to optimize energy consumption by providing demand-controlled ventilation.

The sensor acquires the following:

- CO<sub>2</sub> concentration as an indicator of occupancy in rooms where smoking is prohibited
- VOC concentration as an indicator of combustible gases and odors (tobacco smoke, body odor, material fumes) in the room air

The sensor can be used as follows:

- As a room sensor to acquire room air quality
- As a duct sensor in conjunction with the ARG64 duct mounting kit to acquire extract air quality

Typical areas of use:

- *Acquisition of CO<sub>2</sub> and VOC concentration*

In party rooms, lounges, fair pavilions and exhibition halls, restaurants, canteens, shopping malls, sports gymnasiums, sales rooms, and conference rooms. In this case, the AQP63.1 ventilation demand processor, which calculates the ventilation demand signal for the ventilation controller based on the CO<sub>2</sub> and VOC signal, is required.

- *Acquisition of CO<sub>2</sub> concentration*

In rooms with varying occupancy at different hours where smoking is prohibited such as museums, theatres, movie theatres, auditoriums.

*Note!*

The sensors cannot be used as safety devices, such as gas or smoke warning devices!

## Type summary

Type reference	Description
<b>QPA63.1</b>	CO <sub>2</sub> /VOC sensor without LEDs
<b>QPA63.2</b>	CO <sub>2</sub> /VOC sensor with LEDs
<b>ARG64</b>	Duct mounting kit for QPA63...

## Ordering and delivery

When ordering, please give name and type reference, for example:

CO<sub>2</sub>/VOC sensor **QPA63.1**

The duct mounting kit **ARG64** must be ordered separately; it is supplied as the standard version (with high, grey cover).

## Equipment combinations

The sensors are suited for use with all systems and devices capable of acquiring and handling the DC 0...10 V output signal, such as:

- UNIGYR<sup>®</sup>, VISONIK<sup>®</sup> or INTEGRAL
- TEC<sup>™</sup>, AEROGYR<sup>™</sup> RWI65.02, POLYGYR<sup>®</sup> RWX..., DESIGO 30 or CLASSIC RKN...
- Ventilation demand processor **AQP63.1** (Data Sheet no. 1959), to process the ventilation demand signal on CO<sub>2</sub>/VOC measurement

The following application examples are available for the following combinations:

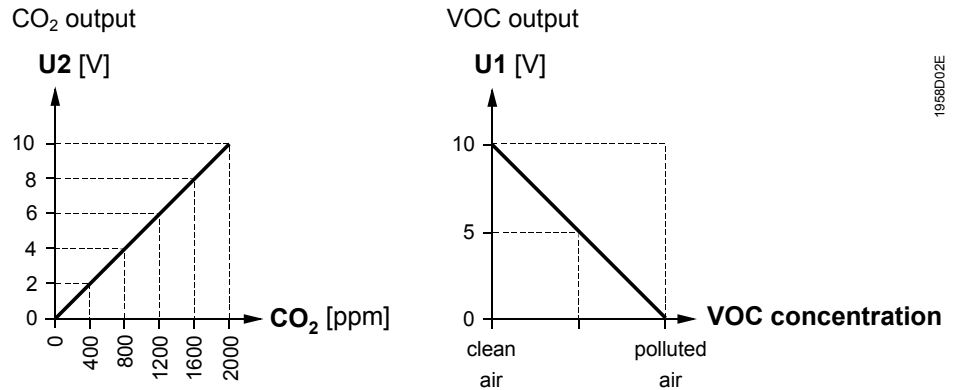
Name	Docu number
Application for AEROGYR RWI65.02	CM1A1958D1
Application for INTEGRAL RS	CM1A1958D2
Application for POLYGYR RWX...	CM1A1958D3
Application for UNIGYR EMS	CM1A1958D4

## Mode of operation

The sensor acquires the CO<sub>2</sub> and VOC concentrations in the room or in the extract air duct.

- The CO<sub>2</sub> concentration is evaluated by the sensor. The output signal delivered (connection terminal U2) is proportional to the CO<sub>2</sub> content of the ambient air. The number of LEDs lit are proportional to the CO<sub>2</sub> concentration. The poorer the air quality, the more LEDs are lit
- The acquired VOC concentration is also passed on to a sensor output (connection terminal U1). The output signal provided is inversely proportional to the concentration of oxidizable gases (VOCs), such as tobacco smoke, CO, alcohol and body odors. This means that when the VOC concentration increases, the signal voltage will drop towards 0 V, and when the VOC concentration decreases, the signal voltage will rise towards 10 V. To evaluate the output signal, the AQP63.1 is required

Function diagram



Legend

U1 Signal voltage at output U1 (VOC) in V  
U2 Signal voltage at output U2 (CO<sub>2</sub>) in V

Explanation

ppm = parts per million

Mechanical design

Sensor QPA63...

The sensors have been designed for wall mounting. They are suitable for use with most commercially available recessed conduit boxes. The cables can be introduced from the rear (concealed wiring) or from below or above (surface-run wires) through knockout openings.

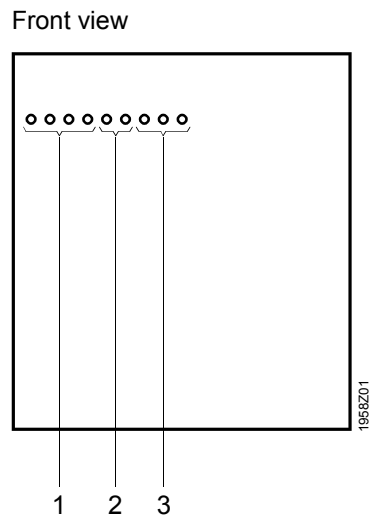
All terminals are protected against false wiring.

The units consist of 2 major parts: 4-sectional housing and base. Both snap together but can be detached again.

The housing accommodates 2 sensing elements, the electronics and, depending on the type of sensor, various setting elements and LEDs.

The base carries the connection terminals.

Indicator lights  
(only with QPA63.2)



Legend

1	Green LEDs	:	≧	0...1000 ppm CO <sub>2</sub>
2	Yellow LEDs	:	≧	1000...1400 ppm CO <sub>2</sub>
3	Orange LEDs	:	≧	1400...2000 ppm CO <sub>2</sub>

Disposal

The major plastic components bear the material references in compliance with ISO/DIS 11469 to facilitate environment-friendly disposal.

## Duct mounting kit ARG64

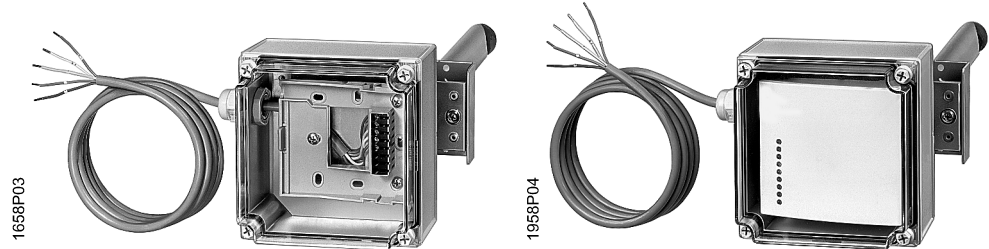
The duct mounting kit has been designed to mount the sensor in the extract air duct. The kit consists of a 2-sectional plastic housing and an attached metal rod with a clamped-on, adjustable duct fixing flange. At the bottom part of the rod, there is an air inlet (3 holes) and an air outlet. The sensor mounting plate is installed in the lower part of the housing; the plate corresponds to the mounting plate of the QPA63...

The upper part of the housing consists of removable cover, rubber seal and 4 fixing screws. 2 versions of the cover are available:

A1: With high, grey cover (standard version)

A2: With transparent cover allowing readout of the QPA63.2

The housing is supplied complete with a ready wired 5-wire connecting cable.



**ARG64** with transparent cover  
without QPA63...

**ARG64** with transparent cover  
with QPA63.2 fitted

## Disposal

The plastic components bear the material references in compliance with ISO/DIS 11469 to facilitate environment-friendly disposal.

## Engineering notes



The CO<sub>2</sub>/VOC sensors operate on AC 24 V.

- The operating voltage must meet the requirements of safety extra-low voltage (SELV) to EN 60 730
- Use safety transformers with double insulation conforming to EN 60 742; the transformers must be suited for 100 % duty

The transformers must be sized and fused in compliance with local safety regulations. When sizing the transformer, consider the power consumption of the QPA63...



The CO<sub>2</sub>/VOC sensors may not be used for safety related measurements of gas concentrations.

Duct mounting with the help of the ARG64:

1. When installing the sensor, do not reorientate the rod with respect to the direction of flow: (Max.  $\pm 10^\circ$ ).
2. Maximum permissible air velocity in the duct = 5 m/s
3. Maximum permissible temperature inside and outside the duct = 35 °C
4. Minimum duct immersion depth = 170 mm

## Mounting notes

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### Sensor QPA63...

Location: In the room or, with the duct mounting kit ARG64, in the extract air duct.

When mounting in a room, a location with typical air quality should be chosen, e.g. on an open wall, approximately 1.5...3 m above the floor. The sensor should not be mounted in niches, shelves, behind curtains, etc., or in locations where people are constantly present.

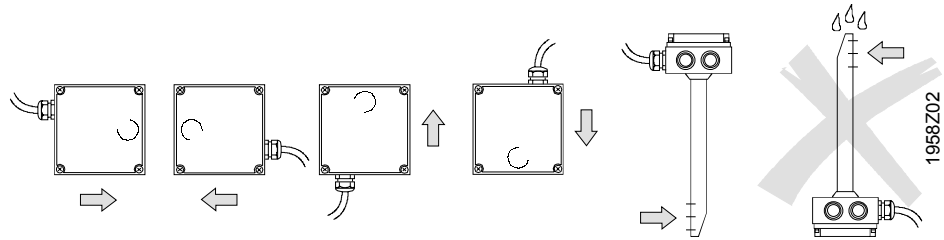
The permissible ambient conditions should be observed.

Mounting instructions are printed on the packing.

### Duct mounting kit ARG64

Location: In the extract air duct, as close as possible to the air outlets.

Permissible and non-permissible mounting positions:



When mounting, do not reorientate the rod with respect to the direction of flow.

The mounting kit is supplied with mounting instructions.

## Commissioning notes

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Check the CO<sub>2</sub>/VOC sensor functions 30 minutes following operating voltage supply as follows:

- Check the CO<sub>2</sub> function: Exhale on the sensor
- Check the VOC function: Touch the sensor with a cotton ball dowsed in alcohol (possibly gas from lighter, without flame)

Ventilation should start as soon as the preset switching level of the connected controller is reached.

After supplying power to the QPA63.2, the LEDs will flash for about 1 minute.

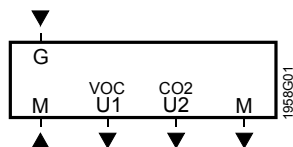
## Technical data

Power supply	Operating voltage (SELV)	AC 24 V $\pm$ 20 %
	Frequency	50/60 Hz
	Power consumption	max. 6 VA (3 W)
Range of use	CO <sub>2</sub> sensing range	0...2000 ppm <sup>1)</sup>
	tolerance	$\pm$ 100 ppm
	VOC sensing range	0...10 V <sub>VOC</sub>
	Permissible air velocity in the duct	< 5 m/s
Measured value outputs U1, U2	Voltage	DC 0...10 V
	Current	$\pm$ 1 mA
	Permissible line lengths	
	Copper cable 0.5 mm dia.	60 m
	Copper cable 1 mm <sup>2</sup>	220 m
	Copper cable 1.5 mm <sup>2</sup>	300 m
Functional data	Copper cable 2.5 mm <sup>2</sup>	450 m
	Time constant t <sub>63</sub> with CO <sub>2</sub> measurement	
	Room	$\leq$ 8 min
	Duct	$\leq$ 8 min at v <sub>air</sub> $\leq$ 0.2...5 m/s
Connection terminals	Screw terminals for	2 x 1.5 mm <sup>2</sup> or 1 x 2.5 mm <sup>2</sup>
Protective data	Degree of protection of housing	
	QPA63... without ARG64	IP 30 to EN 60 529
	QPA63... with ARG64	IP 54 to EN 60 529
	Safety class	III to EN 60 730
Environmental conditions	Operation	
	Climatic conditions	
	Temperature	
	Wall mounting	-5...+45 °C
	Duct mounting	-10...+35 °C
	Humidity (non-condensing)	5...95 % r.h.
	Transport to	IEC 721-3-2
	Climatic conditions	class 2K3
	Temperature	-25...+70 °C
	Humidity	< 95 % r.h.
Norms and standards	Mechanical conditions	class 2M2
	Electromagnetic compatibility	
	Emissions	EN 50 081-1
	Immunity	EN 50 082-1
	CE conformity to EMC directive	89/336/EEC
Weight	QPA63...	approx. 0.1 kg
	ARG64	0.69 kg

1) ppm = parts per million

## Connection diagrams

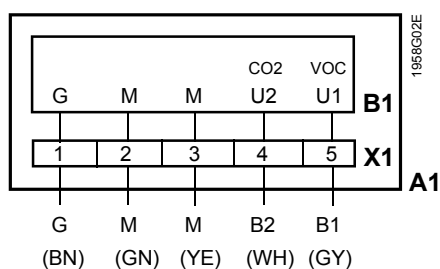
### QPA63...



#### Legend

- G, M Operating voltage AC 24 V (SELV)  
 G System potential  
 M System neutral  
 U1 Signal output "Measured value VOC", DC 0...10 V  
 U2 Signal output "Measured value CO<sub>2</sub>", DC 0...10 V  
 M Measuring neutral (terminals M are interconnected inside the sensor)

### ARG64 with QPA63...



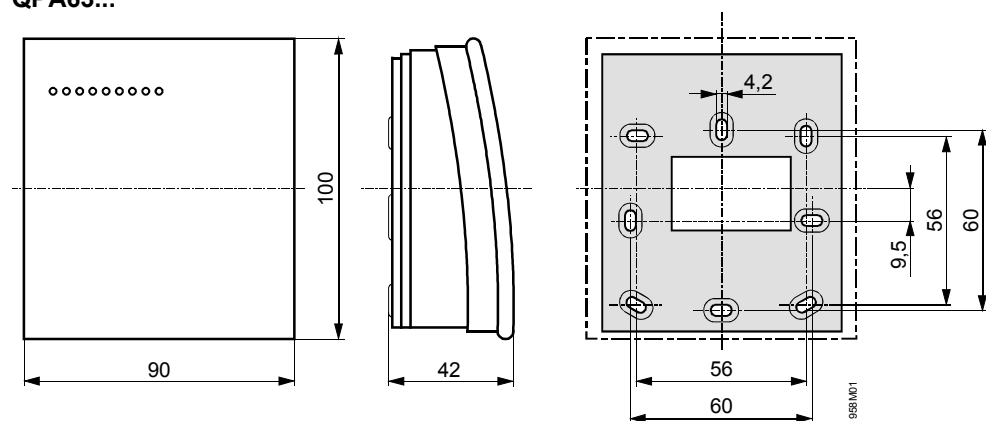
#### Legend

- A1 Duct mounting kit ARG64  
 B1 CO<sub>2</sub>/VOC sensor QPA63...  
 X1 Terminal strip in the duct mounting kit ARG64

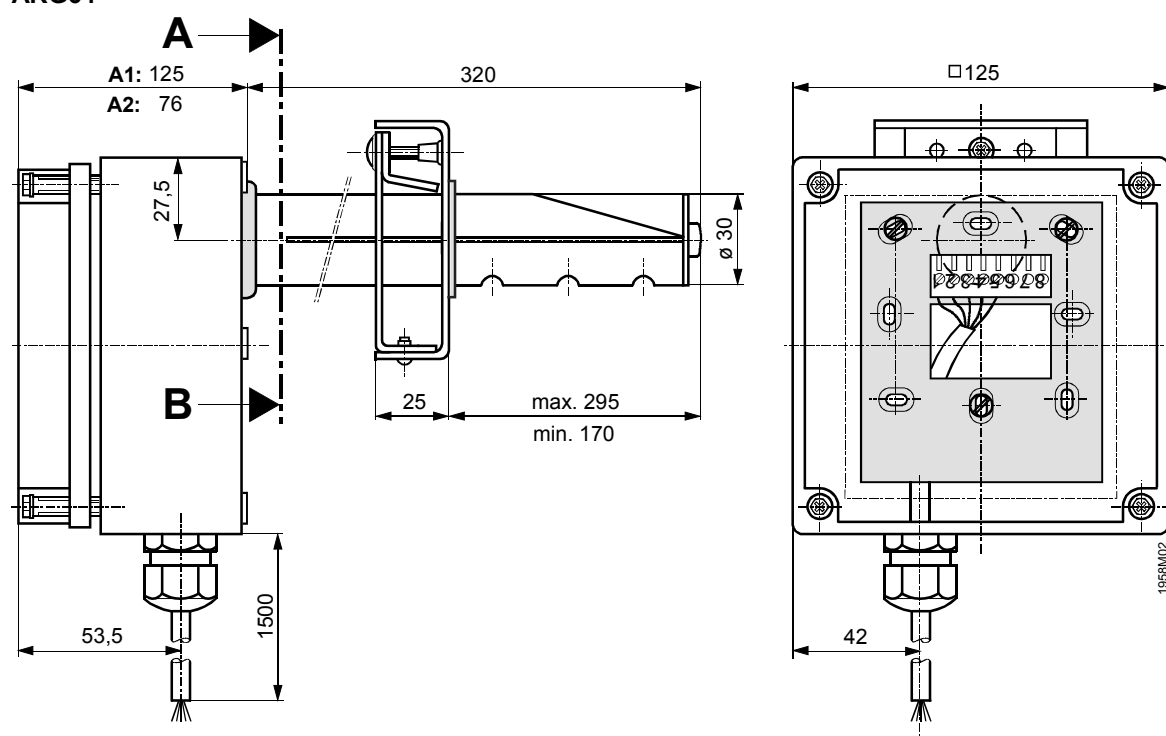
Wire code on connecting cable of the ARG64:

- G/brown (1) System potential AC 24 V (SELV)  
 M/green (2) System neutral AC 24 V (SELV)  
 M/yellow (3) Measuring neutral (system neutral)  
 B1/grey (5) Signal output "Measured value VOC", DC 0...10 V  
 B2/white (4) Signal output "Measured value CO<sub>2</sub>", DC 0...10 V

QPA63...



ARG64



Cross-section A – B

