



1958P01

QPA63.1



1958P02

QPA63.2



1958P03

QPA63.1/AUS

CO₂/VOC Sensors

QPA63...

Sensors designed for acquiring indoor air quality in rooms or air ducts. Microprocessor-based units consisting of a selective photo-acoustic CO₂ sensor and a VOC¹⁾ 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:

- CO₂ 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 a room sensor to acquire indoor air quality
- As a duct sensor in conjunction with the ARG64 duct mounting kit to acquire extract air quality

The sensor is not suited for use in air ducts on the rooftop (solar radiation).

Typical fields of use:

- *Acquisition of CO₂ and VOC concentrations:*

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 is required. It calculates the ventilation demand signal for the ventilation controller based on the CO₂ and VOC signal.

- *Acquisition of CO₂ concentration:*

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

Note!

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

Type summary

Type reference	Description
QPA63.1	CO ₂ /VOC sensor without LEDs
QPA63.2	CO ₂ /VOC sensor with LEDs
QPA63.2/AUS	CO ₂ /VOC sensor <u>only for</u> duct mounting with ARG64, without LEDs
ARG64	Duct mounting kit for QPA63...

Ordering and delivery

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

CO₂/VOC sensor **QPA63.1**

The duct mounting kit **ARG64** must be ordered as a separate item; 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 DC 0...10 V output signals, such as:

- Synco, UNIGYR[®], VISONIK[®] or INTEGRAL
- TEC[™], AEROGYR[™] RWI65.02, POLYGYR[®] RWX..., DESIGO 30, CLASSIC RKN...or SED2
- Ventilation demand processor **AQP63.1** (Data Sheet 1959), to process the ventilation demand signal on CO₂/VOC measurement

The following application examples are available for the following combinations:

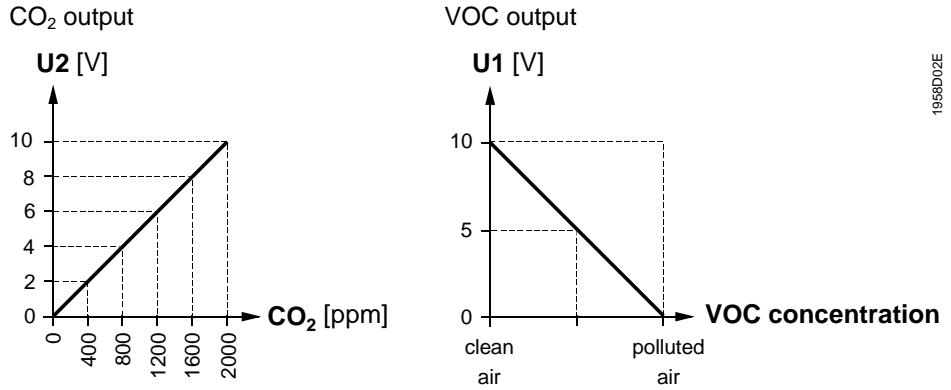
Name	Document no.
Application for AEROGYR RWI65.02	CM1A1958D1
Application for INTEGRAL RS	CM1A1958D2
Application for POLYGYR RWX...	CM1A1958D3
Application for UNIGYR EMS	CM1A1958D4

Mode of operation

The sensor acquires the CO₂ and VOC concentrations in the room or in the extract air duct.

- The CO₂ concentration is evaluated by the sensor. The output signal delivered (connection terminal U2) is proportional to the CO₂ content of the ambient air. The number of LEDs lit are proportional to the CO₂ 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 concentration decreases, the signal voltage will rise towards 10 V. To evaluate the output signal, the AQP63.1 is required

Function diagram



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Legend

U1 Signal voltage at output U1 (VOC) in V
 U2 Signal voltage at output U2 (CO₂) in V

Explanation

ppm = parts per million

Mechanical design

Sensor QPA63...

The sensors are designed for wall mounting. They are suited 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.

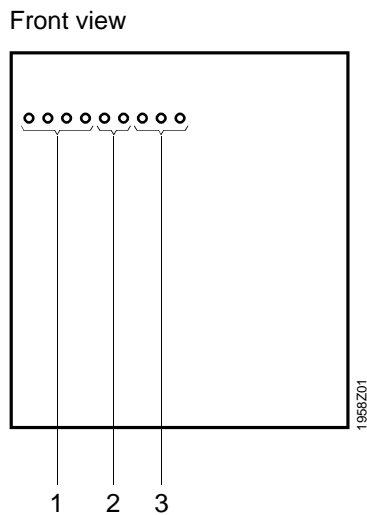
All connection terminals are protected against false wiring.

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 the LEDs.

The base carries the connection terminals.

Indicator lights
 (only with QPA63.2)



Legend

1 Green LEDs : ≧ 0...1000 ppm CO₂
 2 Yellow LEDs : ≧ 1000...1400 ppm CO₂
 3 Orange LEDs : ≧ 1400...2000 ppm CO₂

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 is used for mounting 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 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...

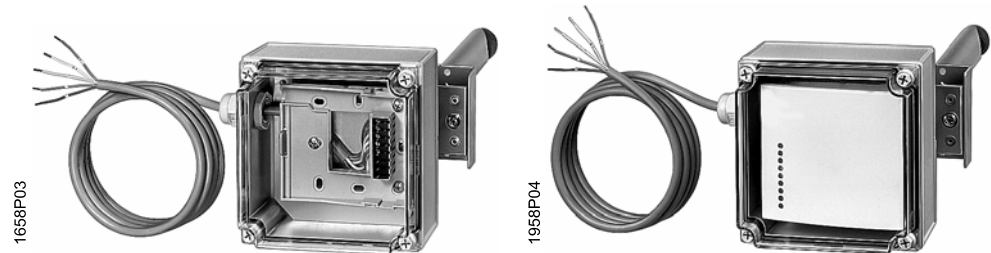
The upper part of the housing consists of removable cover, rubber seal and 4 fixing screws.

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 CO₂/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, also consider the power consumption of the QPA63...



The CO₂/VOC sensors may not be used for safety related measurements of gas concentrations.



The CO₂/VOC sensors are not suited for use in air ducts on the rooftop (solar radiation)!

Duct mounting with the help of the ARG64:

1. When installing the sensor, do not reorientate the rod with respect to the direction of air 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:
With QPA63.1/AUS = 43 °C
With QPA63.1, QPA63.2 = 35 °C
4. Minimum duct immersion depth = 170 mm

Mounting notes

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 indoor 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.

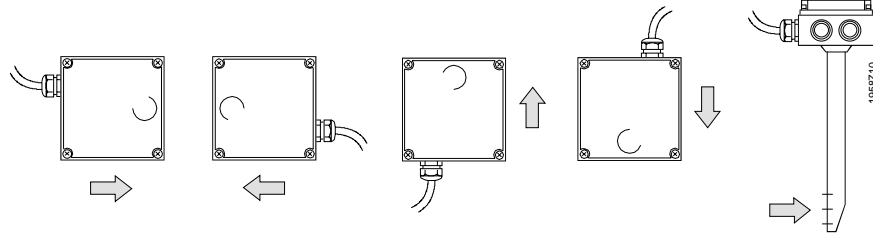
The permissible ambient conditions should be observed.

Mounting Instructions are printed on the packing.

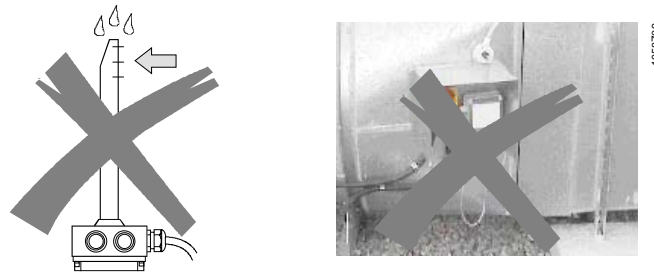
Duct mounting kit ARG64

Location: In the extract air duct, as close as possible to the air outlet of the room.

Permissible mounting positions



Non-permissible mounting position and location



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

The mounting kit is supplied with Mounting Instructions.

Commissioning notes

Check the CO₂/VOC sensor functions 30 minutes following operating voltage supply as follows:

- Check the CO₂ 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

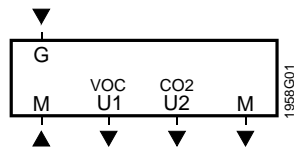
Power supply	Operating voltage (SELV)	AC 24 V \pm 20 %
	Frequency	50/60 Hz
	Power consumption	max. 6 VA (3 W)
Range of use	CO ₂ sensing range	0...2000 ppm ¹⁾
	Tolerance	\pm 100 ppm
	VOC sensing range	0...10 V _{VOC}
	Permissible air velocity in the duct	< 5 m/s
	Minimum distance between fan and sensor	> 2 m
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 ²	220 m
	Copper cable 1.5 mm ²	300 m
Functional data	Copper cable 2.5 mm ²	450 m
	Time constant t ₆₃ with CO ₂ measurement	
	Room	\leq 8 min
	Duct	\leq 8 min at v _{air} \leq 0.2...8 m/s
	Acquisition range per sensor	approx. 400 m ² in open rooms
	Long-term stability, drift	< \pm 150 ppm in 8 years
	Maintenance	not required ²⁾
Connection terminals	Screw terminals for	2 x 1.5 mm ² or 1 x 2.5 mm ²
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 for QPA63.1 and QPA63.2	
	Wall mounting	-5...+45 °C
	Duct mounting	-10...+35 °C
	Temperature for QPA63.1/AUS	
	Duct mounting	-10...+43 °C
	Humidity (noncondensing)	5...95 % r.h.
	Transport to	IEC 721-3-2
	Climatic conditions	class 2K3
Temperature	-25...+70 °C	
Humidity	<95 % r.h.	
Mechanical conditions	class 2M2	
Norms and standards	Electromagnetic compatibility	
	Emissions	EN 61 000-6-3
	Immunity	EN 61 000-6-1
	CE conformity to EMC directive	89/336/EEC
Materials and colors	QPA63...	
	Housing front	ASA+PC, NCS S 0502-G (white)
	Bottom section of housing	ASA+PC, NCS 2801-Y43R (grey)
	Base	PC, NCS 2801-Y43R (grey)
	Sensor (entirely)	silicon-free
	ARG64	
	Bottom section of housing	PC, similar to grey RAL7037
Housing cover, standard version	PC, similar to grey RAL7035	
Housing cover, transparent version	PC	
Weight	QPA63...	approx. 0.1 kg
	ARG64	0.69 kg

1) ppm = parts per million

2) The QPA63 sensors are maintenance-free. No recalibration is needed during the lifetime of the sensor. Excellent stability is reached by the patented photo-acoustic measurement principle

Connection diagrams

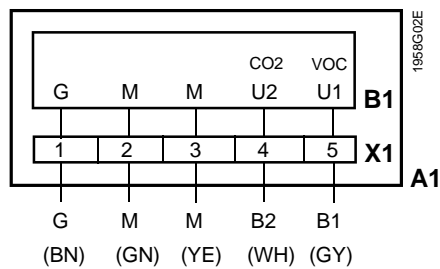
QPA63...



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 CO₂", DC 0...10 V
 M Measuring neutral (terminals M are internally interconnected)

ARG64 with QPA63...



Legend

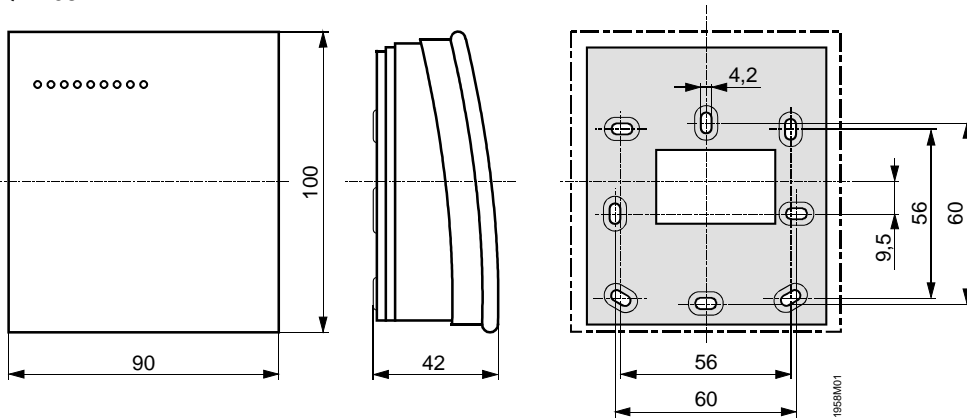
- A1 Duct mounting kit ARG64
 B1 CO₂/VOC sensor QPA63...
 X1 Terminal strip in the duct mounting kit ARG64

Wire code on the connecting cable of the ARG64:

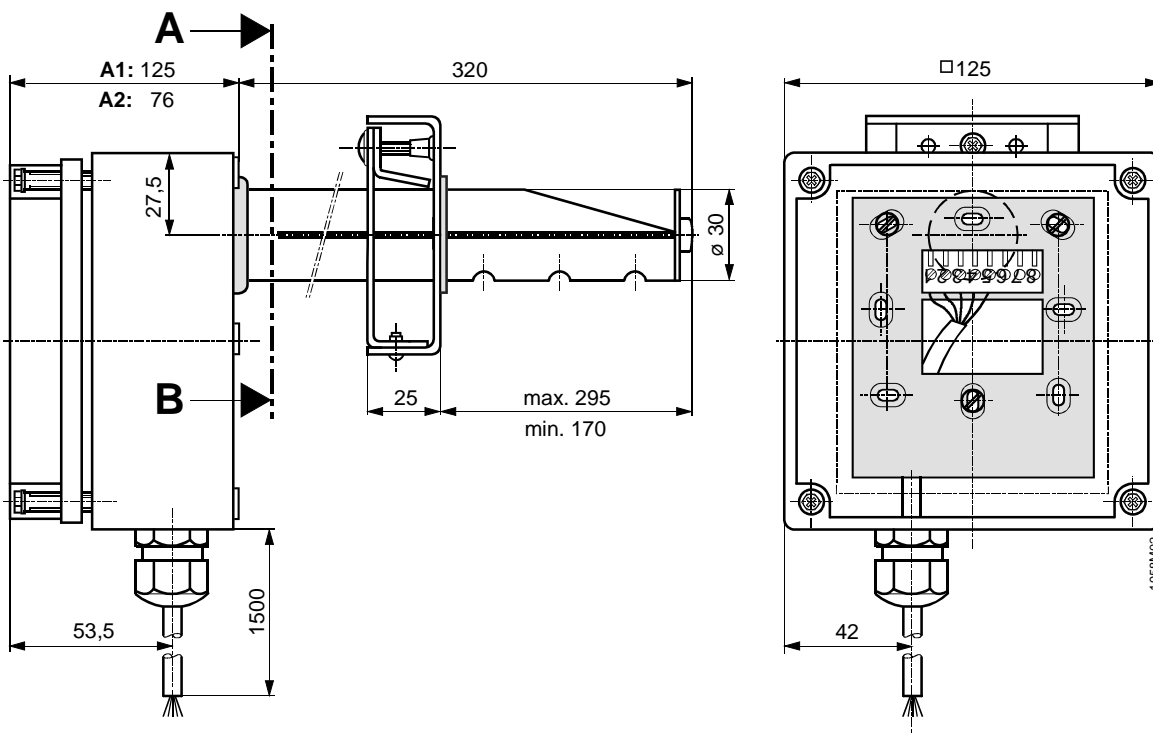
- G/brown (1) System potential AC 24 V (SELV)
 M/green (2) System neutral AC 24 V (SELV)
 M/yellow (3) Measuring neutral (system neutral)
 B1/grey (5) Signal output "Measured value VOC", DC 0...10 V
 B2/white (4) Signal output "Measured value CO₂", DC 0...10 V

Dimensions (in mm)

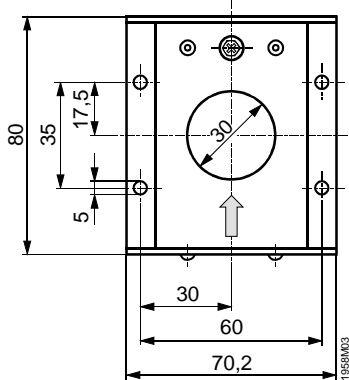
QPA63...



ARG64



Cross-section A – B



A1 = with high, grey cover (standard version)
A2 = with transparent cover