

Symaro - Sensors from Siemens

센서 (Sensor)

Symaro sensors ensure a healthy and productive indoor climate. They record and transmit readings extremely quickly and accurately, providing an optimal basis for precise and therefore energy- and cost-efficient control of the entire HVAC plant.







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Siemens Smart Infrastructure combines the real and digital worlds across energy systems, buildings and industries, enhancing the way people live and work and significantly improving efficiency and sustainability

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Room Temperature Sensors

QAA20...

- Passive sensors for acquiring the temperature in rooms.
- Range of use 0...50 °C / <85 % r. h.

Use

In heating, ventilation and air conditioning plants for acquiring the room temperature.

Type summary

Type reference	Sensing element	Range of use	Time constant
QAA2010	Pt 100	050 °C	Approx. 7 min
QAA2012	Pt 1000	050 °C	Approx. 7 min
QAA2030	NTC 10k	050 °C	Approx. 7 min

Ordering

When ordering, please give name and type reference, e.g.: Room temperature sensor **QAA2010**

Equipment combinations

The room temperature sensors are suited for use with all types of controllers that can handle analog, passive sensor signals.

The sensor acquires the room temperature via its sensing element. The resistance of the sensing element changes as a function of the ambient temperature. The resistance value is used for further handling by a suitable controller.

Sensing element

Characteristic:













NTC 10k

R Resistance in Ohm

θ

Temperature in degrees Celsius $\Delta \vartheta$

Temperature differential in Kelvin







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

The units consist of 2 major sections: Housing and base. Both snap together but can be detached again. The base carries the connection terminals.

Disposal



Engineering notes

The permissible cable lengths are dependent on the type of controller with which the sensor is used. They are specified in the Data Sheet of the relevant controller.

Mounting notes

Location: On an inner wall of the space to be heated or air conditioned. Not in recesses, shelves, not behind curtains, not opposite or near heat sources. The unit must not be exposed to direct solar radiation.

The end of the conduit at the sensor must be sealed to prevent false measurements due to drafts through the conduit.

The permissible ambient conditions should be observed.

Installation Instructions are printed on the packaging.

Technical data

Functional data	Range of use	refer to "Type summary"
	Sensing element	refer to "Type summary"
	Time constant	refer to "Type summary"
	Measuring accuracy	refer to "Function"
	Type of measurement and output	passive
Degree of protection	Safety class	III according to EN 60730-1
	Protection degree of housing	IP30 according to EN 60529
Electrical connections	Screw terminals for	2 x 1.5 mm ² or 1 x 2.5 mm ²
	Perm. cable lengths	refer to "Engineering notes"
Environmental conditions	Operation	to IEC 60721-3-3
	Climatic condition	class 3K5
	Temperature	050 °C
	Humidity	<85 % r. h.

	Transport	to IEC 60721-3-2
	Climatic condition	class 2K3
	Temperature	−25+65 °C
	Humidity	<95 % r. h.
	Mechanical environmental conditi	ons class 2M2
Directives and Standards	Product standard	EN 60730-1
		Automatic electrical controls for household and
		similar use
	EU Conformity (CE)	8000073890 ^{*)}
	UL	UL873 http://ul.com/database
Environmental	The product environmental declarat	ion CE1E1701 ^{*)} contains data on environmentally
compatibility	compatible product design and asse	essments (RoHS compliance, materials composi-
	tion, packaging, environmental bene	efit, disposal).
Materials and colors	Housing front	ASA+PC, NCS S 0502-G (white)
	Bottom	ASA+PC, NCS 2801-Y43R (grey)
	Base	PC, NCS 2801-Y43R (grey)
	Packaging	corrugated cardboard
	Sensor (complete assembly)	silicone-free
Weight	Incl. packaging	Ca. 0,1 kg
	*) The documents can be downloaded from ht	ttp://siemens.com/bt/download.

Internal diagram



The internal diagram is identical for all types of room temperature sensors covered by this Data Sheet.

The connecting wires are interchangeable.

Dimensions



Dimensions in mm

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Room Temperature Sensors

QAA20..1..

- Active sensors for acquiring the room temperature
- Operating voltage AC 24 V or DC 13.5...35 V
- Signal output DC 0...10 V or 4...20 mA

Use

In heating, ventilation and air conditioning plants for acquiring the room temperature.

Type summary

Type reference	Measuring range	Operating voltage	Output signal
QAA2061 QAA2061D	050 °C	AC 24 V ±20 % / DC 13.535 V SELV or class 2 (US)	DC 010 V
QAA2071	050 °C	DC 13.535 V SELV or class 2 (US)	420 mA

Ordering and delivery

When ordering, please give name and type reference, e.g.: Room temperature sensor **QAA2061**.

Equipment combinations

All systems or devices capable of acquiring and handling the sensor's DC 0...10 V or 4...20 mA output signal.

The sensor acquires the room temperature via its sensing element whose resistance value changes as a function of the temperature.

This change is converted to a DC 0...10 V or 4...20 mA output signal, depending on the type of sensor. The output signal corresponds to the selected temperature range.

Burden diagram

Output signal, terminal I1



Mechanical design

QAA20..1

The units 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 knock-out openings.

The units consist of two major sections: Casing and baseplate. Both snap together but can be detached again.

The measuring circuit, the sensing element and the setting element are located on the printed circuit board inside the casing.

The baseplate carries the connecting terminals.

QAA2061D Mechanical design is similar to QAA20.1.. with additional LC-Display. Display of room temperature in °C or °F

Setting element



The setting element is accessible after removing the baseplate. It consists of 6 pins and a shorting plug. It is used to select the required measuring range and to activate the test function.

The different plug positions have the following meaning

 For the active temperature measuring range: Shorting plug in the upper position (R1) = -35...+35 °C,

	Shorting plug in the mid position (R2) = 050 °C (factory setting) Shorting plug in the lower position (R3) = $-50+50 \text{ °C}$
	For activating the test function:
	Shorting plug in the vertical position: The values according to the table "Test function active" will be made available at the signal output.
Fault	In the event of fault, the output signal will reach 0 V (4 mA) after 60 seconds.
Engineering notes	
	Room sensors with active outputs have a high power loss, which ultimately influences
	temperature measurement. The degree of influence depends on the operating voltage
	and is compensated in the Symaro TM room sensors for an operating voltage of AC 24 V
	or DC 24 V. Over- or undercompensation may occur for other operating voltages.
	Furthermore, the measuring accuracy is impacted by the following factors: - Prevailing air flow
	- Wall surface (rough, smooth)
	- Wall texture (wood, plaster, concrete, brick)
	- Wall type (interior, exterior).
	approx. 1 operating hour, and it can be adjusted as needed in a higher system (e.g. controller). No correction on the local LCD.
	To power the sensor, a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required. When sizing and electrically protecting the transformer, local safety regulations must be observed.
	When sizing the transformer, the power consumption of the room temperature sensor must be taken into consideration. For correct wiring, refer to the Data Sheets of the devices with which the sensor is used.
	The permissible cable lengths must be observed.
Cable routing and cable selection	When laying the cables, it must be observed that the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Twisted pair cables are required for the secondary supply lines and the signal lines.
Mounting notes	
Location	On an inner wall of the space to be heated or air conditioned. Not in recesses, shelves,
	not behind curtains, not above or near heat sources.
	The unit must not be exposed to direct solar radiation.
	The end of the conduit at the sensor must be sealed to prevent false measurements due to draughts through the conduit.
	The permissible ambient conditions should be observed.
Installation instructions	Installation instructions are printed inside of the packing.
Commissioning notes	
	Check wiring before switching on power. The temperature measuring range must be

Check wiring before switching on power. The temperature measuring range r selected on the sensor, if required.

Disposal



The devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Power supply	Operating voltage	refer to "Type summary"
	Frequency	50/60 Hz at AC 24 V
	Power consumption	
	QAA2061, QAA2061D	≤0.3VA
	QAA2071	≤0.7W
	External supply line protection (EU)	Fuse slow max. 10 A
		or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or
		Power source with current limitation of max. 10 A
Line lengths for	Perm. cable lengths	
measuring signal	Copper cable 0.6 mm dia.	50 m
	Copper cable 1 mm ²	150 m
	Copper cable 1.5 mm ²	300 m
Functional data	Measuring range	050 °C (R2 = factory setting), −35+35 °C (R1), −50+50 °C (R3)
	Sensing element	Pt 1000
	Time constant	approx. 7 min
	Measuring accuracy at AC 24 V / DC 24V in th range of:	ne
	23 °C	±0.50 K
	−25+25 °C	±0.75 K
	−50+50 °C	±0.9 K
	Output signal, linear (terminal U1)	DC 010 V ≙ 050 °C or −35+35 °C or −50+50 °C max. ±1 mA
	Output signal, linear (terminal I1)	4…20 mA ≙ 0…50 °C or
	Burden	−35+35 °C or −50+50 °C refer to "Function"
Degree of protection	Protection class	III according to EN 60730-1
	Protection degree of housing	IP30 according to EN 60529
Electrical connections	Connection terminals for	$1 \times 2.5 \text{ mm}^2 \text{ or } 2 \times 1.5 \text{ mm}^2$
Environmental conditions	Operation Climatic conditions	IEC 60721-3-3 class 3K5
	Temperature (housing with electronics) Humidity Mechanical conditions	–15+50 °C 095 % r. h. (non-condensing) class 3M2
	Transport	IEC 60721-3-2
	Climatic conditions	class 2K3
	Temperature	-25+70 °C
	Humidity	<95 % r. h.
	Mechanical conditions	class 2M2

Housing front	ASA+PC, NCS S 0502-G (white)
	equates to RAL9010
Bottom	ASA+PC, NCS 2801-Y43R (grey)
	equates to RAL 7035
Base	PC, NCS 2801-Y43R (grey)
	equates to RAL 7035
Packaging	corrugated cardboard
Sensor (complete assembly)	silicone-free
Product standard	EN 60730-1
	Automatic electrical controls for
	household and similar use
Electromagnetic compatibility (Applications)	For use in residential, commerce,
	light-industrial and industrial environ-
	ments
EU Conformity (CE)	CE1T1749xx *)
RCM Conformity	8000078879_en ^{*)}
UL	UL 873, http://ul.com/database
The product environmental declaration CE1E19 compatible product design and assessment (Ro packaging, environmental benefit, disposal).	61 ^{*)} contains data on environmentally HS compliance, materials composition,
Incl. packaging	0.13 kg
Without LCD display	Approx. 0.130 kg
With LCD display	Approx. 0,150 kg
	Housing front Bottom Base Packaging Sensor (complete assembly) Product standard Electromagnetic compatibility (Applications) EU Conformity (CE) RCM Conformity UL The product environmental declaration CE1E19 compatible product design and assessment (Ro packaging, environmental benefit, disposal). Incl. packaging Without LCD display With LCD display

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals

▼ QAA2061 QAA2061D G 1749G01 G0 U1 ▲ QAA2071 G1 1749G02 11 G, G0 Operating voltage AC 24 V (SELV) or DC 13.5...35 V G1 Operating voltage DC 13.5...35 V 11

- Signal output 4...20 mA for temperature range (R2 = 0...50 °C, factory setting)
- U1 Signal output DC 0...10 V for temperature range (R2 = 0...50 °C, factory setting)

Dimensions



Drilling plan

Dimensions in mm

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Room Temperature Sensors

QAA24...27

with and without setpoint adjuster

Use

In heating, ventilating and air conditioning plants, especially where a high level of comfort is required.

Major field of application: Acquisition and adjustment of room temperature.

Type summary

Type reference	Description
QAA24	Room temperature sensor
QAA25	Room temperature sensor with setpoint adjuster (setting range 535 °C)
QAA26	Room temperature sensor with setpoint adjuster (setting range 530 °C)
QAA27	Room temperature sensor with setpoint adjuster (setting range ± 3 K)

Ordering

When ordering, please give name and type reference, for example: Room temperature sensor **QAA24** The sensor acquires the air temperature via its sensing element whose resistance changes as a function of the temperature.

The signal is delivered to a suitable controller for further handling.



Mechanical design

The units 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 knock-out openings.

The units consist of two major sections: Casing and baseplate. Both snap together but can be detached again. The casing accommodates the temperature sensing element and, depending on the type of unit, various setting and operating elements. The baseplate carries the connecting terminals.

Setting and operating	(only with QAA25, QAA26 and QAA27)
elements	Front Rear
Legend	 Setting knob for infinite setpoint adjustment Pin for mechanical maximum limitation of setpoint setting range Pin for mechanical minimum limitation of setpoint setting range
Disposal	The major plastic components bear the material references in compliance with ISO/DIS 11 469 to facilitate environment-friendly disposal.
Engineering notes	
	 For the permissible lengths of lines and measured value errors, refer to «Basic System Data» of the respective control system. Following applies to the following systems/devises: UNIGYR[®]/VISONIK[®] When using the QAA26, both the temperature sensor and the setpoint setting unit must be connected to a measured value input (B) of the measured value module (PTM1.2R1K).
Fitting and installation note	25
Location	On an inner wall of the space to be heated or air conditioned. Not in recesses, shelves, not behind curtains, not opposite or near heat sources. The unit must not be exposed to direct solar radiation. The end of the conduit at the sensor must be sealed to prevent false measurements
	The permissible ambient conditions should be observed.
Installation instructions	Installation instructions are printed on the packing.

Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Sensor	Range of use Sensing element Time constant	050 °C LG-Ni 1000 7 min (depend thermal couplin	ing on air movem ng to the wall)	ent and
	Max. permissible line lengths and measured value errors	refer to «Engin	eering notes»	
Setpoint setting knob		QAA25	QAA26	QAA27
	Setpoint setting range	535 °C	530 °C	$\pm 3 \text{ K}$
	Resistance range	95685Ω	10001195 Ω	10001175 Ω
	Resistance value at setpoint 10 °C 20 °C 25 °C 30 °C	193,9 Ω 390,0 Ω 488,3 Ω 586,7 Ω	1039 Ω 1118 Ω 1157 Ω 1195 Ω	0 K ≙ 1091 Ω
General data				
Connection terminals	Connection terminals for cross-sectional areas of	2 x 1.5 mm ² or	⁻ 1 x 2.5 mm ²	
Degree of protection	Protection degree of housing Protection class	IP30 according III according to	g to EN 60529 EN 60730	
Environmental conditions	Operation to Climatic conditions Temperature Humidity Mechanical conditions	EN 60721-3-3 class 3K5 050 °C 095 % r. h. Class 3M2	(noncondensing)	
	Transport to Climatic conditions Temperature Humidity Mechanical conditions	EN 60721-3-2 class 2K3 -25+65 °C <95 % r. h. Class 2M2		
Directives and Standards	Product standard	EN 60730-1 Automatic ele and similar u	ectrical controls fo	or household
		0000073090	,	
Materials and colors	Housing front Botton section of housing Base Sensor (entirely)	ASA+PC, NCS ASA+PC, NCS PC, NCS 2801 Silicon-free	S S 0502-G (white 2801-Y43R (gre -Y43R (grey)	e) y)
Weight	With packaging	Approx. 0,1 kg		

*) The documents can be downloaded from http://siemens.com/bt/download.

Internal diagram

QAA24



QAA25, QAA26



QAA27

	1721
R M B M	

Legend

- B1 Room temperature measuring signal
- M Measuring neutral
- R Setpoint signal

Dimensions



Dimensions in mm

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QAM2110.040, QAM2120.040

Symaro™

QAM2120.200, QAM2120.600

Duct Temperature Sensors QAM21...

Passive sensors for acquiring the air temperature in air ducts.

Use

The duct temperature sensors are for use in ventilation and air conditioning plants as:

- Supply or extract air temperature sensors
- Limit sensors, e.g. for minimum limitation of the supply air temperature
- Reference sensors, e.g. for shifting the room temperature as a function of the outside temperature
- Measuring sensors, e.g. for measured value indication or for connection to a building automation and control system

Type summary

Type reference	Probe length	Mounting clamps	Sensing element
QAM2110.040	0,4 m	no	Pt 100
QAM2112.040	0,4 m	no	Pt 1000
QAM2112.200	2,0 m	4 pcs.	Pt 1000
QAM2120.040	0,4 m	no	LG-Ni 1000
QAM2120.200	2,0 m	4 pcs.	LG-Ni 1000
QAM2120.600	6,0 m	6 pcs	LG-Ni 1000
QAM2130.040	0,4 m	no	NTC 10k

Accessories	Name		Type reference
(Spare parts)	Capillary tube clamb for the QAM2120.200 and QAM2120.600 (6 pieces)		AQM63.3
	Monting flange	AQM63.0	
Ordering and delivery			
	When ordering, please give name and type reference, e.g.: Duct temperature sensor QAM2120.040		
	The sensor is supplied complete with mounting flange AQM63.0 and, if required, mounting clamps AQM63.3.		
Equipment combinations			
	All systems or devices capable of acquiring a signal.	and handling the senso	or's passive output
Function			
	The sensor acquires the air temperature via changes as a function of the temperature. The for further handling.	its sensing element wh he signal is delivered to	nose resistance o a suitable controller
Sensing elements			
LG-Ni 1000	Characteristic:	Accuracy:	20 30 40 50 60 70 80 [°C]
Pt 100 (class B)	Characteristic: $ \begin{array}{c} & & & \\ & & $	Accuracy:	0 20 30 40 50 60 70 80 [°C]



The duct temperature sensor consists of the following components:

- Two-sectional plastic housing comprised of base with connection terminals and removable cover (snap-on design)
- Fully active, flexible probe with sensing element which acquires the average temperature

The connection terminals can be accessed after removing the cover. Cable entry is made via a grommet which, if required, can be replaced by a cable entry gland M16 (IP 54).

After fitting the mounting flange, the sensor can be installed in 6 different immersion positions so that the sensor housing is always located outside the insulation for layers up to 70 mm. The probe with a length of 2 or 6 m is to be fitted across the air duct with the help of the mounting clamps supplied with the sensor.

Mounting notes

Mounting location	 For supply air temperature control: Downs after the last air handling unit. Otherwise, a mum distance of 0.5 m 	tream from the fan, if the fan is located after the last air handling unit with a mini-
	 For extract air temperature control: Always As a limit sensor for the supply air temperature into the room For dew point control: Immediately after the supply and the supply after the supply and the supply after the supply and the supply and the supply and the supply after the supply	s upstream of the extract air fan <i>ature:</i> As close as possible to the air outlet ne spray trap of the air washer
	Manually bend the probe so that it lies diagon windings across the entire duct cross-section	nally across the duct or in equally spaced n. The probe must not touch the duct wall.
	The sensor is supplied complete with Mounti	ng Instructions.
Mounting positions	permitted:	not permitted:
Mounting examples		

Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Functional data	Operating range	-40+80 °C for NTC type -50+80 °C other types
	Sensing element	refer to "Type summary"
	Probe	
	Length	Refer to "Type summary"
	Min. bending radius	10 mm
	Time constant	30 s at 2 m/s
	Dead time	<1 s
	Measuring accuracy	Refer to "Function"
Degree of protection	Protection class	III according to EN 60730-1
	Protection degree of housing	IP42 according to EN 60529
	With cable entry gland M 16 x 1.5	IP54 according to EN 60529
		(not included as standard)
Electrical connections	Screw terminals for	1 x 2.5 mm ² or 2 x 1.5 mm ²
	Cable entry	
	Grommet	For 5.57.2 mm dia. cable
	Cable entry gland	M 16 x 1.5 can be fitted
	Perm. cable lengths	refer to Data Sheet of the relevant controller
Directives and Standards	Product standard	EN 60730-1
		Automatic electrical controls for household and similar
		USE
	UL	UL 873, http://ul.com/database
	EU Conformity (CE)	CE1T1761xx *)
Environmental conditions	Operation	To IEC 60721-3-3
	Climatic conditions	class 3K5
	Temperature (housing)	−40+70 °C
	Humidity (housing)	595 % r. h.
	Transport	To IEC 60721-3-2
	Climatic conditions	Class 2K3
	Temperature	−25+70 °C
	Humidity	<95 % r. h.
	Mechanical conditions	class 2M2
Materials and colors	Probe	Copper, polyolefine
	Base	Polycarbonate, RAL 7001 (silver-grey)
	Cover	Polycarbonate, RAL 7035 (light-grey)
	Mounting flange	PA 66 (black)
	Clamps	PA-GF 35 (black)
	Packaging	Corrugated cardboard
Weight	Incl. packaging	
	QAM2110.040	Ca. 0,15 kg
	QAM2112.040	Ca. 0,15 kg
	QAM2112.200	Ca. 0,3 kg
	QAM2120.040	Ca. 0,15 kg
	QAM2120.200	Ca. 0,30 kg
	QAM2120.600	Ca. 0,53 kg
	QAM2130.040	Ca. 0,15 kg

*) The documents can be downloaded from http://siemens.com/bt/download.

Internal diagram

E	3	┯╧	м	1761G01
				-

The internal diagram is identical for all types of duct temperature sensors covered by this Data Sheet.

The connecting wires are interchangeable.



	L1	L2	
		max.	min.
QAM2130.040	400	97	37
QAM2110.040	400	97	37
QAM2120.040	400	97	37
QAM2112.040	400	97	37
QAM2112.200	2000	97	37
QAM2120.200	2000	97	37
QAM2120.600	6000	97	37
		•	





Drilling plan

Dimensions in mm

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Symaro™

Duct Temperature Sensor Modbus RTU

QAM2151. 040/MO

Duct temperature sensor with Modbus communication

- Modbus RTU (RS-485)
- On-event addressing via push button together with Climatix[™] controllers
- DIP switches setting together with other controllers

Use

The duct temperature sensor is used in ventilation and air conditioning plants as:

- Supply or exhaust air temperature sensors
- Limit sensors, for example, for minimum limitation of the supply air temperature
- Reference sensors, for example, for compensation of the room temperature as a function of the outside temperature
- Dew point temperature sensors
- Measuring sensors, for example, for measured value indication or for connection to a building automation and control system

Technical design

Cable entry is made via the M16 cable entry gland (IP54) supplied with the sensor which can be screwed into the housing. Probe and housing are rigidly connected.

The sensor is designed for screwed or flanged mounting.

It can be fitted as follows:

- With the mounting flange supplied with the sensor (recommended), which is to be fitted to the sensor and then secured according to the required immersion length
- Without the mounting flange (using the maximum immersion length). For that propose, the housing has 4 holes for fitting the sensor directly to the air duct

Type summary

Product number	SSN NO.	Probe length	Measuring range	Operating voltage	Output signal
QAM2151.040/MO	S55720-S466	0.4 m	-5050 °C	AC 24 V ±20 %/ DC 13.535 V	Modbus RTU

Ordering and When ordering, specify name and product number, for example: Duct temperature sensor QAM2151.040/MO. delivery

The sensor is supplied complete with mounting flange AQM63.0 and cable entry gland M16.

Notes

Engineering Powering the sensor requires a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty. When sizing and protecting the transformer, comply with all local safety regulations.

> When sizing the transformer, determine the power consumption of the room sensor. For correct wiring, see the datasheets of the devices with which the sensor is used. Observe permissible line lengths.

Cable routing and cable selection

Note that when routing cables, the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems.

Twisted pair cables are required for the secondary supply lines and the signal lines.

Mounting and

Mounting location

installation

For supply air temperature control: Downstream from the fan, if the fan is located after the last air handling unit. Otherwise, after the last air handling unit with a minimum distance of 0.5 m

- For exhaust air temperature control: Always upstream of the exhaust air fan •
- As a limit sensor for the supply air temperature: As close as possible to the air outlet into the room
- For dew point control: Immediately after the spray trap of the air washer

Manually bend the probe so that it lies diagonally across the duct or in equally spaced windings across the entire duct cross-section. The probe must not touch the duct wall.

Mounting instructions

Mounting instructions are enclosed in the package.

Mounting positions

1

Permitted



Disposal



Technical data

Function	
Communication	Modbus RTU (RS-485)
Supported baud rate	9600; 19200; 38400; 57600; 76800; 115200
Transmission format	1-8-E-1; 1-8-O-1; 1-8-N-1; 1-8-N-2
Bus termination	120 ohm, jumper selection

For detailed information about specific functions, see Basic documentation (A6V11610643 *).

Power supply	
Operating voltage	Safety extra-low voltage (SELV) AC 24 V ±20 % or DC13.535 V or AC/DC 24 V class 2 (US)
Frequency	50/60 Hz at AC 24 V
External supply line protection (EU)	Fuse slow max. 10 A
	or
	Circuit breaker max. 13 A
	Characteristic B, C, D according to EN 60898
	or
	Power source with current limitation of max. 10 A
Power consumption	≤ 1.5 VA

Functional data		
Measuring range	-5050 °C	
Probe Probe length Minimum bending radius	0.4 mm 10 mm	
Sensing element	Pt 1000	
Time constant	30 s at 2 m/s	
Dead time	< 1 s	
Measuring accuracy in the range of -2525 °C -5050 °C	±0.75 K ±0.9 K	

Ambient conditions and protection classification			
Pro	tection degree of housing	IP54 according to EN 60529	
Pro	tection class	III according to EN 60730-1	
Environmental conditions			
Tr	ansport	IEC 60721-3-2	
•	Climatic conditions	Class 2K3	
	– Temperature	-2570 °C	
	– Humidity	< 95 % r.h.	
•	Mechanical conditions	Class 2M2	
Operation		IEC 60721-3-3	
•	Climatic conditions	Class 3K5	
	 Temperature (housing) 	-4070 °C	
	 Humidity (housing) 	595 % r.h.	

Standards, directives and approvals	
Product standard	EN 60730-1, EN 60730-2-9, EN 61000-6-2, EN 61000-6-3 Automatic electrical controls for household and similar use
EU conformity (CE)	A5W00037903A *)
RCM conformity	A5W00037912A *)
UL	UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration (A5W90011832 *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

General		
Line lengths for measuring signals Perm. cable lengths Copper cable 0.6 mm dia. Copper cable 1 mm ² Copper cable 1.5 mm ²	50 m 150 m 300 m	
Electrical connections terminals for	1 × 2.5 mm ² or 2 × 1.5 mm ²	
Cable entry gland (enclosed)	M 16 × 1.5	
Materials and colors		
Probe	Copper, polyolefine	
Base	Polycarbonate, RAL 7001 (silver-grey)	
Cover	Polycarbonate, RAL 7035 (light-grey)	
Mounting flange	PA 66 (black)	
Cable entry gland	PA, RAL 7035 (light-grey)	
Packaging	Corrugated cardboard	
Weight including package	Approx. 213.8 g	

*) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.



Dimensions



Туре	L1	L	.2	
		max.	min.	
QAM2151.040/MO	400	97	37	





Dimensions in mm

SIEMENS





Mounting flange AQM63.0

Symaro™

Duct Temperature Sensors

QAM2161.040 QAM2171.040

- Active sensors for acquiring the air temperature in air ducts
- Operating voltage AC 24 V or DC 13.5...35 V
- Signal output DC 0...10 V or 4...20 mA

Use

The QAM... duct temperature sensors are for use in ventilation and air conditioning plants as:

- Supply or extract air temperature sensors
- Limit sensors, e.g. for minimum limitation of the supply air temperature
- Reference sensors, e.g. for compensation of the room temperature as a function of the outside temperature
- Dew point temperature sensors
- Measuring sensors, e.g. for measured value indication or for connection to a building automation and control system

Type summary

Type reference	Probe length	Measuring range	Operating voltage	Output signal
QAM2161.040	0.4 m	−50+50 °C	AC 24 V ± 20 % /	DC 010 V
			DC 13.535 V	
QAM2171.040	0.4 m	−50+50 °C	DC 13.535 V	420 mA

When ordering, please give name and type reference, e.g.: Duct temperature sensor **QAM2161.040** The sensor is supplied complete with mounting flange AQM63.0 and cable entry gland M16.

Equipment combinations

All systems or devices capable of acquiring and handling the sensor's DC 0...10 V or 4...20 mA output signal.

Function

The sensor acquires the air temperature via its sensing element whose resistance value changes as a function of the temperature. This change is converted to a DC 0...10 V or 4...20 mA output signal, depending on the type of sensor. The output signal corresponds to the selected temperature range.

Burden diagram

Output signal, terminal I1



Mechanical design

The duct temperature sensor consists of housing, printed circuit board, connection terminals and probe.

The 2-sectional housing is comprised of base and removable cover (snap-on design). The measuring circuit and the setting element are located on the printed circuit board inside the cover, the connection terminals on the base.

Cable entry is made via the M16 cable entry gland (IP 54) supplied with the sensor which can be screwed into the housing. Probe and housing are rigidly connected. The sensor is designed for screwed or flanged mounting.

It can be fitted as follows:

- With the mounting flange supplied with the sensor (recommended), which is to be fitted to the sensor and then secured in accordance with the required immersion length, or
- Without mounting flange (making use of the maximum immersion length). For that propose, the housing has 4 holes for fitting the sensor directly to the air duct

Setting element



	The setting element is located inside the cover. It consists of 6 pins and a shorting plug. It is used to select the required measuring range and to activate the test function.		
	 The different plug positions have the following meaning For the temperature measuring range: Shorting plug in the left position (R1) = 050 °C Shorting plug in the mid position (R2) = -50+50 °C (factory setting) Shorting plug in the right position (R3) = -35+35 °C For activating the test function: Shorting plug in the horizontal position: The values according to the table "Test function active" will be made available at the signal output. 		
Fault	In the event of fault, the output signal will reach 0 V (4 mA) after 60 seconds.		
Engineering notes			
	To power the sensor, a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required. When sizing and electrically protecting the transformer, local safety regulations must be observed.		
	When sizing the transformer, the power consumption of the temperature sensor must be taken into consideration. For correct wiring, refer to the Data Sheets of the devices with which the sensor is used.		
	The permissible cable lengths must be observed.		
Cable routing and cable selection	When laying the cables, it must be observed that the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Twisted pair cables are required for the secondary supply lines and the signal lines.		
Mounting notes			
Mounting location	 For supply air temperature control: Downstream from the fan, if the fan is located after the last air handling unit. Otherwise, after the last air handling unit with a minimum distance of 0.5 m For extract air temperature control: Always upstream of the extract air fan As a limit sensor for the supply air temperature: As close as possible to the air outlet into the room For dew point control: Immediately after the spray trap of the air washer Manually bend the probe so that it lies diagonally across the duct or in equally spaced windings across the entire duct cross-section. The probe must not touch the duct wall. 		
Mounting positions	Permitted: Not permitted:		
	TPPPIT		
Mounting examples			

Disposal



The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Doworoupply	Power supply	Safety extra-low voltage (SELV)
Fower suppry	Operating voltage (OAM2161.040	AC 24 V + 20% or $DC 135 35 V$
	Operating voltage (QAIVIZ 101.040	or
		AC/DC 24 V class 2 (US)
	Operating voltage (QAM2171.040)	DC 13.535 V
		or
		DC 24 V class 2 (US)
	Frequency	50/60 Hz at AC 24 V
	External supply line protection (EU)	Fuse slow max. 10 A
		or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or
		Power source with current limitation of max.
		10 A
	Power consumption	≤1 VA
Line lengths for	Perm. cable lengths	
measuring signal	Copper cable 0.6 mm dia.	50 m
	Copper cable 1 mm ²	150 m
	Copper cable 1.5 mm ²	300 m
Functional data	Measuring range	-50+50 °C (R2 = factory setting),
		050 °C (R1), -35+35 °C (R3)
	Probe	
	Probe length	0.4 m
	Minimum bending radius	10 mm
	Sensing element	Pt 1000
	Time constant	30 s at 2 m/s
	Dead time	<1 s
	Measuring accuracy in the range of −25+25 °C −50+50 °C	±0.75 K ±0.9 K
	Output signal, linear (terminal U1)	DC 010 V
	Output signal linear (terminal I1)	4 20 mA $\hat{-}$ -50 +50 °C
		or – 35+35 °C or 050 °C
	Burden	refer to "Function"
Degree of protection	Protection degree of housing	IP54 according to EN 60529
0	Protection class	III according to EN 60730-1
Electrical connections	Connection terminals for	1 x 2.5 mm ² or 2 x 1.5 mm ²
	Cable entry gland (enclosed)	M 16 x 1.5
Environmental conditions	Operation	IEC 721-3-3
	Climatic conditions	class 3K5
	Temperature (housing)	−40+70 °C
	Humidity (housing)	595 % r. h.
	Transport	IEC 721-3-2
	Climatic conditions	class 2K3
	Temperature	−25+70 °C
	Humidity	<95 % r. h.
	Mechanical conditions	class 2M2

Materials and colors	Probe	copper, polyolefine
	Base	polycarbonate, RAL 7001 (silver-grey)
	Cover	polycarbonate, RAL 7035 (light-grey)
	Mounting flange	PA 66 (black)
	Cable entry gland	PA, RAL 7035 (light-grey)
	Packaging	corrugated cardboard
Directives and Standards	Product standard	EN 60730-1
		Automatic electrical controls for household and similar use
	EU Conformity (CE)	CET1762xx *)
	RCM Conformity	CE1T1864en_C1 *)
	UL	UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration CE1E1762 ^{*)} contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
Weight	Incl. packaging QAM2161.040 QAM2171.040	approx. 0.17 kg approx. 0.17 kg

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals

QAM2161.040



G, G0 Operating voltage AC 24 V (SELV) or DC 13.5...35 V

G1 Operating voltage DC 13.5...35 V

I1 Signal output 4...20 mA

for measuring range –50...+50 °C (factory setting), 0...50 °C or –35...+35 °C U1 Signal output DC 0...10 V

for measuring range –50...+50 °C (factory setting), 0...50 °C or –35...+35 °C


Тур	L1	L	.2
		max.	
QAM2161.040	400	97	37
QAM2171.040	400	97	37



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1762M01

Drilling plan

Dimensions in mm



Symaro™ Immersion Temperature Sensors



Passive sensors for acquiring the water temperature in pipes and tanks.

Use

The QAE21... immersion temperature sensors are for use in ventilation and air conditioning plants for:

- · Controlling or limiting the flow temperature
- Limiting the return temperature
- Controlling the DHW temperature

Type summary

Тур	Outfit	Immersion length	Nominal pressure	Sensing element	Protection degree of housing
QAE2111.010	With clamp for protection pocket ¹⁾	100 mm	PN ³⁾	Pt 100	IP42 (IP54) ²⁾
QAE2111.015	With clamp for protection pocket ¹⁾	150 mm	PN ³⁾	Pt 100	IP42 (IP54) ²⁾
QAE2112.010	With clamp for protection pocket ¹⁾	100 mm	PN ³⁾	Pt 1000	IP42 (IP54) ²⁾
QAE2112.015	With clamp for protection pocket ¹⁾	150 mm	PN ³⁾	Pt 1000	IP42 (IP54) ²⁾
QAE2120.010	Including protection pocket with threaded nipple G $\frac{1}{2}$ A	100 mm	PN 10	LG-Ni 1000	IP42 (IP54) ²⁾
QAE2120.015	Including protection pocket with threaded nipple G $\frac{1}{2}$ A	150 mm	PN 10	LG-Ni 1000	IP42 (IP54) ²⁾
QAE2121.010	With clamp for protection pocket ¹⁾	100 mm	PN ³⁾	LG-Ni 1000	IP42 (IP54) ²⁾
QAE2121.015	With clamp for protection pocket ¹⁾	150 mm	PN ³⁾	LG-Ni 1000	IP42 (IP54) ²⁾
QAE2130.010	With clamp for protection pocket ¹⁾	100 mm	PN ³⁾	NTC 10k	IP42 (IP54) ²⁾
QAE2130.015	With clamp for protection pocket ¹⁾	150 mm	PN ³⁾	NTC 10k	IP42 (IP54) ²⁾

1) Protection pocket required (not included as standard)

2) IP54 with cable entry gland M16 (not included as standard)

3) Depending on the type of protection pocket used

When ordering, please give name and type reference, e.g. : Immersion temperature sensor **QAE2120.010** or protection pocket **ALT-SS100**

Equipment combinations

All systems or devices capable of acquiring and handling the sensor's passive output signal.

Function

The sensor acquires the medium temperature via its sensing element whose resistance value changes as a function of the temperature.

The signal is delivered for further handling by a suitable controller.

Sensing elements





Legend

Resistance value in Ohm Temperature in degrees Celsius θ Temperature differential in Kelvin $\Delta \vartheta$

Mechanical design

The immersion temperature sensors consist of the following components:

- Two-sectional plastic housing comprised of base with connection terminals and removable cover (snap-on design)
- · Immersion rod complete with sensing element

The connection terminals can be accessed after removing the cover. The cable entry is via a grommet which, if required, can be replaced by a cable entry gland M16 (IP54).

Accessories (not included in standard delivery)

Name	Material	Nominal pressure	Type of sealing	Immersion length	Type reference
Compression fitting	V4A (1.4571)	PN 16	Threaded with sealing means		AQE2102
Protection pocket	Brass (CuZn37)	PN 10	Threaded with sealing means	100 mm	ALT-SB100
Protection pocket	Brass (CuZn37)	PN 10	Threaded with sealing means	150 mm	ALT-SB150
Protection pocket	V4A (1.4571)	PN 16	Threaded with sealing means	100 mm	ALT-SS100
Protection pocket	V4A (1.4571)	PN 16	Threaded with sealing means	150 mm	ALT-SS150
Protection pocket	V4A (1.4571)	PN 40	With flange for flat seal	100 mm	ALT-SSF100
Protection pocket	V4A (1.4571)	PN 40	With flange for flat seal	150 mm	ALT-SSF150

For other protection pocket accessories, refer to Data Sheet N1194.

Engineering notes

Protection pockets made of Brass may not be used with nominal pressures over PN 10 or at temperatures over 130° C. For higher nominal pressures or temperatures up to max. 135 °C the protection pocker is to omit (max. PN 16) or a protection pocket made of stainless steel (V4A) is required (see table accessories).

The max. media temperature for the QAE2130.xx is 125 °C!

Mounting and installation notes

Depending on use, the sensor should be located as follows:

- For flow temperature control:
 - In the heating flow:
 - Directly after the pump if the pump is located in the flow
 - 1.5 to 2 m after the mixing valve if the pump is located in the return
- For return temperature limitation: In the return at a location where the temperature can be correctly acquired

The sensor should be installed in an elbow such that the immersion rod or the protection pocket faces the direction of flow. The water must be well mixed where the temperature is acquired. This is downstream from the pump or, if the pump is mounted in the return, at least 1.5 m after the mixing point.

The sensor should be mounted such that the cable does not enter from the top.

With all types of sensors, the immersion length must be a minimum of 60 mm!

The sensor must not be covered by lagging.

To fit the sensor, a threaded fitting or T-piece G $\frac{1}{2}$ must be welded into the pipe.



- For sensors with non-sealing threaded nipples G ¹/₂, sealing means must be used with the threaded connection (e.g. hemp, Teflon tape or similar)
- Tighten compression fitting AQE2102 on the sensor's immersion rod

 When tightening for the first time:
 Turn the nut about 1 ½ turns until strong resistance is felt. Then, slightly loosen the nut again and retighten ¼ turn
 - For premounted compression fittings or repeated fitting:
 Screw the nut on until finger-tight. Then, tighten with a spanner ¼ turn for the final fit

Mounting Instructions are printed on the packaging.

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Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Functional data	Measuring range	-30+125 °C for NTC-Type
	Sensing element	Refer to "Type summary"
	Time constant	
	With protection pocket Without protection pocket	Approx. 30 s Approx. 8 s
	Measuring accuracy	Refer to "Function"
	Immersion length	Refer to "Type summary"
	Nominal pressure	Refer to "Type summary"
Degree of protection	Protection class	III according to EN 60730-1
	Protection degree of housing	Refer to "Type summary" according to EN 60529
Electrical connections	Screw terminals for	1 x 2.5 mm ² or x 1.5 mm ²
	Cable entry via	For 5.5.72 mm dia cable
	Cable entry gland	M 16 x 1.5
	Perm. cable lengths	Refer to Data Sheet of controller
Environmental conditions	Operation	To IEC 721-3-3
	Climatic condition	class 3K5
	Temperature (housing)	–40+70 °C
	Humidity (housing)	595 % r.h.
	Transport	To EC 721-3-2
	Climatic condition	class 2K3
	Temperature	–25+70 °C
	Humidity	<95 % r.h.
	Mechanical environmental conditions	Class 2M2
Materials and colors	Base	Polycarbonate, RAL 7001 (silver-grey)
	Cover	Polycarbonate, RAL 7035 (light-grey)
	Immersion rod	Stainless steel to DIN 17 440, steel 1.4571
	Protection pocket	Brass (CuZn37)
	Compression fitting	Stainless steel 1.4404, 1.4435, 1.4571
	Cable entry gland M 16 x 1.5	PA, RAL 7035 (light-grey)
	Packaging	Corrugated cardboard

Directives and Standards	Product standard	EN 60730-1
		Automatic electrical controls for household and similar use
	EU conformity (CE)	CE1T1761xx *)
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial and industrial envi- ronments
	UL	UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration CE1E176 compatible product design and assessments (Re tion, packaging, environmental benefit, disposal)	61 ^{*)} contains data on environmentally bHS compliance, materials composi-).
Weight	Incl. Packaging QAE2111.010 QAE2111.015 QAE2112.010 QAE2112.015 QAE2120.010 QAE2120.015 QAE2121.010 QAE2121.015 QAE2130.010 QAE2130.015	Approx. 0,13 kg Approx. 0,15 kg Approx. 0,13 kg Approx. 0,15 kg Approx. 0,21 kg Approx. 0,23 kg Approx. 0,13 kg Approx. 0,14 kg Approx. 0,15 kg
	*) The documents can be downloaded from http://siemens	s.com/bt/download.
internal diadram		

B M 1781601

The internal diagram is identical for all types of immersion temperature sensors covered by this Data Sheet.

The connecting wires are interchangeable.

QAE2120.010 QAE2120.015







QAE2111.010 QAE2111.015 QAE2112.010 QAE2112.015 QAE2121.010 QAE2121.015 QAE2130.010 QAE2130.015





Тур	L
QAE2111.010	100 mm
QAE2111.015	150 mm
QAE2112.010	100 mm
QAE2112.015	150 mm
QAE2121.010	100 mm
QAE2121.015	150 mm
QAE2130.010	100 mm
QAE2130.015	150 mm

Variable immersion length: with accessory AQE2102

Accessory compression fitting AQE2102





Symaro™

Immersion Temperature Sensor Modbus RTU



Immersion temperature sensor with Modbus communication

- Temperature sensor for acquiring the water temperature in pipes and tanks
- Modbus RTU (RS-485)
- On-event addressing via push button together with ClimatixTM controllers
- DIP switches setting together with other controllers

	The sensor is us Controlling or Limiting the r Controlling th	ed in ventilation limiting the f eturn tempera- le domestic h	on and air conditic low temperature ature ot water (DHW) te	oning plants	for:	
Function						
	The immersion te element whose re converted to a M temperature rang	emperature se esistance vali odbus RS-48 je.	ensor acquires the ue changes as a fi 5 output signal. Tl	e temperatur unction of th ne output sig	e of the medium via e temperature. This gnal corresponds to	a its sensing s change is the selected
Technical design						
	Cable entry is ma be screwed into t	ade via the M he housing. I	16 cable entry gla mmersion rod and	nd (IP54) su I housing are	pplied with the sen e rigidly connected.	sor which can
Type summary		_		_		
	Product number	SSN NO.	Accessory	Immersion length	Operating voltage	Output signal
	QAE2154.010/MO	S55720-S465	With clamp for protection pocket ¹⁾	100 mm	AC 24 V ±20 %/ DC 13.535 V	Modbus RTU
	¹⁾ Protection pocl	ket needs to b	be ordered separa	tely.		
Ordering	When ordering, p temperature sens	lease specify sor QAE2154	v name and product. .010/MO.	ct number, fo	or example: Immer	sion

Accessories

Use

Accessories are not included with standard delivery.

Name	Material	Nominal pressure	Type of sealing	Immersion length	Type reference
Protection pocket	Brass (CuZn37)	PN10	Threaded with sealing means	100 mm	ALT-SB100
Protection pocket	V4A (1.4571)	PN16	Threaded with sealing means	100 mm	ALT-SS100
Protection pocket	V4A (1.4571)	PN40	With flange for flat seal	100 mm	ALT-SSF100

For other protection pocket accessories, see datasheet N1194.

Notes

EngineeringIf the nominal pressure exceeds PN10, protection pockets made of stainless steel (V4A) are
required. The temperature measuring range must be selected on the sensor, if required.
Powering the sensor requires a transformer for safety extra low-voltage (SELV) with
separate windings for 100 % duty. When sizing and protecting the transformer, comply with
all local safety regulations.
When sizing the transformer, determine the power consumption of the room sensor.
For correct wiring, see the datasheets of the devices with which the sensor is used.
Observe permissible line lengths.

Cable routing and cable selection

Note that when routing cables, the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems.

Twisted pair cables are required for the secondary supply lines and the signal lines.

Mounting and installation

Depending on use, the sensor should be located as follows:

- For flow temperature control (heating flow):
 - Directly after the pump if the pump is located in the flow
 - 1.5 to 2 m after the mixing valve if the pump is located in the return
- For return temperature limitation:
- In the return at a location where the temperature can be correctly acquired

The sensor should be installed in an elbow with the immersion rod or the protection pocket facing the direction of flow. The water must be well mixed where the temperature is acquired. This is downstream from the pump or, if the pump is mounted in the return, at least 1.5 m after the mixing point.

Mount the sensor so that the cable does not enter from the top.

For all sensors, the immersion length must be a minimum of 60 mm.

Do not cover the sensor with insulation.

To fit the sensor, a threaded fitting or T-piece G 1/2 must be welded into the pipe.

Mounting positions



NOTICE! For sensors with non-sealing threaded nipples G ½, use a sealant with the threaded connection (for example, hemp, Teflon tape and so on).

Mounting instructions

Mounting instructions are enclosed in the package.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose. •
 - Comply with all local and currently applicable laws and regulations.

Technical data

Function		
Communication	Modbus RTU (RS-485)	
Supported baud rate	9600; 19200; 38400; 57600; 76800; 115200	
Transmission format	1-8-E-1; 1-8-O-1; 1-8-N-1; 1-8-N-2	
Bus termination	120 ohm, jumper selection	

For detailed information about specific functions, see Basic documentation (A6V11610643 *).

Power supply	
Operating voltage	Safety extra-low voltage (SELV) AC 24 V ±20 % or DC13.5…35 V or AC/DC 24 V class 2 (US)
Frequency	50/60 Hz at AC 24 V
External supply line protection (EU)	Fuse slow max. 10 A
	or
	Circuit breaker max. 13 A
	Characteristic B, C, D according to EN 60898
	or
	Power source with current limitation of max. 10 A
Power consumption	≤ 1.5 VA

Functional data		
Measuring range	-10120 °C	
Immersion length	100 mm	
Sensing element	Pt 1000 class B to DIN EN 60 751	
Time constant With pocket Without pocket	30 s at 2 m/s 8 s at 2 m/s	
Measuring accuracy in the range of 070 °C -10120 °C	±1 K ±1.4 K	
Nominal pressure	PN 16	

Ambient conditions and protection classification		
Protection degree of housing	IP54 according to EN 60529	
Protection class	III according to EN 60730-1	
Environmental conditions		
Transport	IEC 60721-3-2	
Climatic conditions	Class 2K3	
– Temperature	-2570 °C	
– Humidity	<95 % r.h.	
Mechanical conditions	Class 2M2	
Operation	IEC 60721-3-3	
Climatic conditions	Class 3K5	
 Temperature (housing) 	-4070 °C	
– Humidity (housing)	595 % r.h.	

Standards, directives and approvals	
Product standard	EN 60730-1, EN 60730-2-9, EN 61000-6-2, EN 61000-6-3 Automatic electrical controls for household and similar use
Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial and industrial environments
EU conformity (CE)	A5W00028382A *)
RCM conformity	A5W00028384A *)
UL	UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration (A5W90011832 *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

General	
Cable lengths for measuring signal Max. perm. cable lengths	See data sheet for the device handling the signal
Electrical connections terminals for	1 × 2.5 mm ² or 2 × 1.5 mm ²
Cable entry gland (enclosed)	M 16 × 1.5
Materials and colors	
Base	Polycarbonate, RAL 7001 (silver-grey)
Cover	Polycarbonate, RAL 7035 (light-grey)
Immersion rod	Stainless steel to DIN 17 440 Steel 1.4571
Cable entry gland	PA, RAL 7035 (light-grey)
Packaging	Corrugated cardboard
Weight including package	Approx. 184.4 g

*) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.





Dimensions in mm



Symaro™

Immersion Temperature Sensors

QAE2164... QAE2174...

- Active sensors for acquiring the water temperature in pipes and tanks
- Operating voltage AC 24 V or DC 13.5...35 V
- Signal output DC 0...10 V or 4...20 mA

Use

The sensors are for use in ventilation and air conditioning plants for:

- Controlling or limiting the flow temperature
- Limiting the return temperature
- Controlling the DHW temperature

Type summary

Type reference	Outfit	Immersion length	Operating voltage	Output signal
QAE2164.010	With clamp for protection pocket ¹⁾	100 mm	AC 24 V ±20 % / DC 13.535 V	DC 010 V
QAE2164.015	With clamp for protection pocket ¹⁾	150 mm	AC 24 V ±20 % / DC 13.535 V	DC 010 V
QAE2174.010	With clamp for protection pocket ¹⁾	100 mm	DC 13.535 V	420 mA
QAE2174.015	With clamp for protection pocket ¹⁾	150 mm	DC 13.535 V	420 mA

1) Protection pocket required (not included as standard). From 1. April 2008 all active immersion sensors are delivered without protection pocket.

When ordering, please give name and type reference, e.g.: Immersion temperature sensor **QAE2164.010**

Equipment combinations

All systems or devices that are capable of acquiring and handling the sensor's DC 0...10 V or 4...20 mA output signal.

Function

The immersion temperature sensor acquires the temperature of the medium via its sensing element whose resistance value changes as a function of the temperature. This change is converted to a DC 0...10 V or 4...20 mA output signal, depending on the type of sensor. The output signal corresponds to the selected temperature range.

Burden diagram

Output signal, terminal I1



Mechanical design

The immersion temperature sensor consists of housing, printed circuit board, connection terminals and immersion rod.

The 2-sectional housing is comprised of base and removable cover (snap-on design). The measuring circuit and the setting element are located on the printed circuit board inside the cover, the connection terminals on the base.

Cable entry is made via the M16 cable entry gland (IP54) supplied with the sensor which can be screwed into the housing. Immersion rod and housing are rigidly connected.

P	Range 1 2 3 0 0 0 0 0	-	Messbereich 1 2 3
	•••		

Tes	Testfunktion aktiv				
	U1	l1			
0000 0000	10 V	20 mA			
0000	5 V	12 mA			
0,0,0	0 V	4 mA			
	5 V	12 mA			

The setting element is located inside the cover. It consists of 6 pins and a shorting plug. It is used to select the required measuring range and to activate the test function.

The different plug positions have the following meaning:

 For the temperature measuring range: Shorting plug in the left position (R1) = 0...100 °C,

Setting element

Shorting plug in the mid position (R2) = -10...+120 °C (factory setting), Shorting plug in the right position (R3) = 0..70 °C

 For activating the test function: Shorting plug in the horizontal position: The values according to the table "Test function active" will be made available at the signal output.

Fault

In the event of fault, the output signal will reach 0 V (4 mA) after 60 seconds.

Accessories	(not included with	standard deliverv)

Name	Material	Nominal pressure	Type of sealing	Immersion length	Type reference
Compression fitting	V4A (1.4571)	PN16	Threaded with sealing means		AQE2102
Protection pocket	Brass (CuZn37)	PN10	Threaded with sealing means	100 mm	ALT-SB100
Protection pocket	Brass (CuZn37)	PN10	Threaded with sealing means	150 mm	ALT-SB150
Protection pocket	V4A (1.4571)	PN16	Threaded with sealing means	100 mm	ALT-SS100
Protection pocket	V4A (1.4571)	PN16	Threaded with sealing means	150 mm	ALT-SS150
Protection pocket	V4A (1.4571)	PN40	With flange for flat seal	100 mm	ALT-SSF100
Protection pocket	V4A (1.4571)	PN40	With flange for flat seal	150 mm	ALT-SSF150

For other protection pocket accessories, refer to Data Sheet N1194.

Engineering notes

If the nominal pressure exceeds PN10, protection pockets made of stainless steel (V4A) are required. The temperature measuring range must be selected on the sensor, if required.

To power the sensor, a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required. When sizing and electrically protecting the transformer, local safety regulations must be observed.

When sizing the transformer, the power consumption of the temperature sensor must be taken into consideration. For correct wiring, refer to the Data Sheets of the devices with which the sensor is used.

The permissible cable lengths must be observed.

Cable routing andWhen laying the cables, it must be observed that the longer the cables run side by sidecable selectionand the smaller the distance between them, the greater the electrical interference.Twisted pair cables are required for the secondary supply lines and the signal lines.

Mounting and installation notes

Depending on use, the sensor should be located as follows:

- For flow temperature control (heating flow):
 - Directly after the pump if the pump is located in the flow
 - 1.5 to 2 m after the mixing valve if the pump is located in the return
- For return temperature limitation: In the return at a location where the temperature can be correctly acquired

The sensor should be installed in an elbow such that the immersion rod or the protection pocket faces the direction of flow. The water must be well mixed where the temperature is acquired. This is downstream from the pump or, if the pump is mounted in the return, at least 1.5 m after the mixing point.

The sensor should be mounted such that the cable does not enter from the top.

With all types of sensors, the immersion length must be a minimum of 60 mm!

The sensor must not be covered by lagging.

To fit the sensor, a threaded fitting or T-piece G $\frac{1}{2}$ must be welded into the pipe.

Mounting positions



Note!

Mounting

For sensors with non-sealing threaded nipples G ½, sealing means must be used with the threaded connection (e.g. hemp, Teflon tape or similar). Mounting Instructions are printed on the packaging.

Disposal



The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

• Dispose of the device via the channels provided for this purpose.

• Comply with all local and currently applicable laws and regulations.

Technical data

Power supply

Power supply Operating voltage (QAE2161.xxx	Safety extra-low voltage (SELV) AC 24 V ±20%, or DC 13.535 V or AC/DC 24 V class 2 (US)
Operating voltage (QAE2171.xxx)	DC 13.535 V or DC 24 V class 2 (US)
Frequency	50/60 Hz at AC 24 V
External supply line protection (EU)	Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or
	Power source with current limitation of max. 10 A
Power consumption	≤1 VA

Cable lengths for the measuring signal	Max. perm. cable lengths	refer to Data Sheet of the device handling the signal	
Functional data	Measuring ranges	−10+120 °C (R2 = factory setting), 0100 °C (R1), 070 °C (R3)	
	Immersion length	refer to "Type summary"	
	Sensing element	Pt 1000 class B to DIN EN 60 751	
	Time constant		
	With pocket	30 s at 2 m/s	
	Without pocket	8 s at 2 m/s	
	Measuring accuracy in the range of		
	070 °C −40+120 °C	±1 K ±1.4 K	
	Output signal, linear (terminal U1)	DC 010 V ≙ −10+120 °C (factory setting) or 0100 °C or 070 °C, max. ±1 mA	
	Output signal, linear (terminal I1)	420 mA ≙ – 10+ 120 °C (factory setting) or 0100 °C or 070 °C	
	Burden	refer to "Function"	
	Nominal pressure		
Degree of protection	Protection degree of housing	IP54 according to EN 60529	
	Protection class	III according to EN 60730-1	
Electrical connections	Connection terminals for	1 x 2.5 mm ² or 2 x 1.5 mm ²	
	Cable entry gland (enclosed))	M 16 x 1.5	
Environmental	Operation	IEC 721-3-3	
conditions	Climatic conditions		
	Humidity (housing)	-40+70 C 5 95 % r h	
	Transport	IFC 721-3-2	
	Climatic conditions	class 2K3	
	Temperature	−25+70 °C	
	Humidity	<95 % r.h.	
	Mechanical conditions	class 2M2	
Materials and colors	Base	polycarbonate, RAL 7001 (silver-grey)	
	Cover	polycarbonate, RAL 7035 (light-grey)	
	Immersion rod	stainless steel to DIN 17 440 steel 1.4571	
	Cable entry gland	PA, RAL 7035 (light-grey)	
	Packaging	corrugated cardboard	
Directives and	Product standard	EN 60730-1	
Standards		Automatic electrical controls for	
		household and similar use	
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light- industrial and industrial environments	
	EU Conformity (CE)	CE1T1782xx *)	
	RCM Konformität	8000078879 ^{*)}	
	UL	UL 873, http://ul.com/database	
Environmental compatibility	The product environmental declaration CE1E1762 ^{*)} contains data on environmentally compatible product design and assessments (RoHS compliance, materials		
Weight			
weigin	ΩΑΕ2164 010	approx 0.14 kg	
	QAE2164.015	approx. 0.16 kg	
	QAE2174.010	approx. 0.14 kg	
	QAE2174.015	approx. 0.16 kg	

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals

QAE2164...

QAE2174...

R1 = 0...100 °C / R2 = -10...+120 °C / R3 = 0...70 °C U1 G G0 v R1 = 0...100 °C / R2 = -10...+120 °C / R3 = 0...70 °C G1 11 -

- Operating voltage AC 24 V (SELV) or DC 13.5...35 V Operating voltage DC 13.5...35 V G, G0
- G1

1782G01

1782G02

- 11 Signal output 4...20 mA
- for measuring range $-10...+120~^\circ\text{C}$ (factory setting), 0...100 $^\circ\text{C}$ or 0...70 $^\circ\text{C}$ Signal output DC 0...10 V U1
 - for measuring range -10...+120 °C (factory setting), 0...100 °C or 0...70 °C

Dimensions



Тур	L
QAE2164.010	100
QAE2164.015	150
QAE2174.010	100
QAE2174.015	150

Dimensions in mm



Immersion Temperature Sensors

QAE3010... QAE3075...

Use

Type summary

The sensors are used for acquiring the temperature of liquid or gaseous media (e.g. heating water) in heating, ventilation or air conditioning plants. They are designed for use in connection with automation equipment, display and logging devices.

Type reference	Measuring range	Immersion length	Type of measure- ment, output	M	lax. speed of flo	0W
				With water 200 °C, 40 bar	With steam 200 °C, 40 bar	With steam 100 °C, 10 bar
QAE3010.010	−50+200 °C	100 mm	Passive	9 m/s	11 m/s	100 m/s (39.1 m/s) ¹⁾
QAE3010.016	−50+200 °C	160 mm	Passive	4.5 m/s	6 m/s	65 m/s (14.2 m/s) ¹⁾
QAE3075.010	0200 °C	100 mm	Active, 420 mA	9 m/s	11 m/s	100 m/s (39.1 m/s) ¹⁾
QAE3075.016	0200 °C	160 mm	Active, 420 mA	4.5 m/s	6 m/s	65 m/s (14.2 m/s) ¹⁾

1) Resonance frequency

1794P01

When ordering, please give name and type reference according to "Type summary", e.g. immersion temperature sensor **QAE3010.010**

Mechanical design

The sensor consists of an exchangeable insert with sensing element and connecting head with a removable cover made of aluminum. The inserts are not available as replacement parts, but can be removed from a new sensor with the identical apparatus item number (ASN).

The terminal block for the electrical connections is located in the connecting head. The sensors have a 70 mm neck tube made of stainless steel and a G $\frac{1}{2}$ threaded bushing with sensor sleeve. The sensing element is located at the end of the sensor sleeve. The sleeve is suited from operating pressures up to 40 bar.

Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

	Type of sensor	QAE3010	QAE3075
General sensor data	Measuring range, immersion length	Refer to "Type summary"	
	Sensing element	Pt100 (class B)	Pt100 (class B)
	Measuring tolerance	± 0.3 K at 0 °C	± 1 % of measuring range
	Time constant t ₆₃	25 s	25 s
	Type of measurement and output	passive	active, 420 mA
	Power supply (Ub)		DC 7.530 V (SELV)
	Current draw		Max. 20 mA
	Load / dummy load (Rb)		Rb = (Ub – 7.5) V / 0.022 A
	Perm. amb. temp. at connecting head	Min40 °C /	Min40 °C / Max. 85 °C
		Max. 100 °C	
	Perm. amb. hum. at connecting head	<95 % r.h. (nonc	ondensing)
	Measuring medium	Gaseous or liquid	ł
	Max. speed of flow	Refer to "Type su	immary"
	Nominal pressure	PN 40	
Connections	Mechanical	Thread G ¹ / ₂ , SW2	24
	Electrical	Screw terminals for max. 2 x 1.5 mm ²	
Degree of protection	Protection degree of housing	IP65 according to EN 60529	
	Protection class	III to EN 60730-1	
Materials and colors	Connecting head, type BUZ	Die-cast aluminiu	ım;
		Similar to white-a	aluminium RAL 9006
	Neck tube and threaded bushing	Stainless steel 1.	4571
	Sensor tube	Stainless steel 1.	4571, pipe dia. = 9 mm

Directives and Standards	Product standard	EN 60730-1 Automatic electrical controls for household and similar use		
	EU Conformity (CE)	CE1T1794xx *) A5W00040799 *)		
	RCM Conformity	8000078879 ^{*)} (QAE3075.xxx)		
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light-indus- trial and industrial environments		
Weight	Excl. packaging			
	QAE3010.010, QAE3075.010	0.37 kg		
	QAE3010.016, QAE3075.016	0.41 kg		
	*) The documents can be downloaded from ht	tp://siemens.com/bt/download.		

Mounting notes

If possible, mount the sensor in a pipe bend facing the direction of flow. Make sure that the medium is properly mixed where the sensor is located.

Choose the mounting location so that the insert can be easily replaced.



The sensor is supplied complete with Mounting Instructions.

Internal diagram

QAE3010...



QAE3075



Temp. in °C	-50	-40	-30	-20	-10	0	+10	+20	+25	+30
Res. in Ω	80.306	84.271	88.222	92.160	96.086	100.00	103.903	107.794	109.735	111.673
Temp. in °C	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130
Res. in Ω	115.541	119.397	123.242	127.075	130.897	134.707	138.506	142.293	146.068	149.832
Temp. in °C	+140	+150	+160	+170	+180	+190	+200	+210	+220	+230
Res. in Ω	153.584	157.325	161.054	164.772	168.478	172.173	175.856	179.528	183.188	186.836

Resistance characteristic Pt100 (DIN EN 60 751, class B)

Dimensions (in mm)



A = immersion length

QAE3010.010	100
QAE3010.016	160
QAE3075.010	100
QAE3075.016	160



Immersion Temperature Sensors

QAE26.9..

Use

Acquisition of flow or return temperature in heating, ventilating, and air conditioning plants.

Type summary

Туре	Measuring range	Cable length	Material connecting cable	Time constant	Mounting length	Nominal pressur e
QAE26.9	_40+180 °C	1,2 m	silicone	<3 s	260 mm	PN 40
QAE26.90	−50+180 °C	2,0 m	silicone	<2,5 s	65 mm	PN 16
QAE26.91	−50+180 °C	2,0 m	silicone	<2,5 s	125 mm	PN 16
QAE26.93	−50+180 °C	2,0 m	silicone	<2.5 s	240 mm	PN 16
QAE26.95	−50+180 °C	2,0 m	silicone	<2.5 s	465 mm	PN 16
QAE1020.024	_5+105 °C	2,0 m	PVC	<2.5 s	240 mm	PN 16

Ordering

When ordering, please indicate give name and type reference, for exa mple: Immersion temperature sensor **QAE26.9**.

Equipment combinations

All systems or devices capable of acquiring and handling the sensor's passive LG-Ni 1000 output signal.

The sensor acquires the medium temperature via its sensing element whose resistance value changes as a function of the temperature.

The signal is delivered for further handling by a suitable controller.



Mechanical design

The immersion temperature sensor consists of a stainless steel immersion stem, a threaded bushing, and ready-wired connection cables. The sensing element is mounted and soldered to the end of the immersion stem by means of a heat transfer compound. The threaded bushing with screwed nipple R $\frac{1}{4}$ (sealing capacity within thread) is used to mount the sensor on the pipe. The interface between the connection cable and the immersion step is capped by a ca. 30 mm long shrink sleeve.

Disposal



Technical data

The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Functional data	Measuring range	Refer to "Type summary"			
	Sensing element	LG-Ni 1000			
	Time constant	See "Type summary"			
	Measuring accuracy	Refer to "Function"			
	Mounting length	Refer to "Type summary"			
	Effective sensor length				
	QAE26.9	25 mm			
	QAE26.90, QAE26.91, QAE26.93,				
	QAE26.95, QAE1020.024	15 mm			
Degree of protection	Protection degree of housing	IP64 according to EN 60529			
	Protection class	III according to EN 60730-1			
Electrical connection	Connection cables	two-wire			
	Core cross section				
	QAE26.9	0.35 mm ²			
	QAE26.90, QAE26.91, QAE26.93,				
	QAE26.95, QAE1020.024	0.14 mm ²			
	Cable length	Refer to "Type summary"			
Mechanical connection	Screwed nipple	R ¼ (sealing capacity inside thread)			
Ambient conditions	Permissible cable temperature				
	QAE26.9,QAE26.90, QAE26.91,				
	QAE26.93, QAE26.95	–50+180 °C			
	QAE1020.024	– 5+105 °C			
	Permissible humidity	<95 % r.h.			
	EU conformity (CE)	A5W00040799 *)			
Environmental	The product environmental declaration CE1E	1701 ^{*)} contains data on environmentally			
compatibility	compatible product design and assessments (RoHS compliance, materials				
	composition, packaging, environmental benefit, disposal).				
Materials	Immersion stem	Stainless steel 1.4571 (V4A)			
	Threaded bushing	Ms nickel-plated			
	Connection cables	Refer to "Type summary"			
Weight	incl. packing				
	QAE26.9	0.104 kg			
	QAE26.90	0.074 kg			
	QAE26.91	0.074 kg			
	QAE26.93	0.079 kg			
	QAE26.95	0.093 kg			
	QAE1020.024	0,079 kg			

*) The documents can be downloaded from http://siemens.com/bt/download

The permissible electrical line lengths depend on the controller. Refer to the respective controller's data sheet for more information.

Mounting and installation notes

To mount the immersion temperature sensor, weld a T-junction or a threaded fitting with a cylindrical pipe thread for a sealing connection inside the thread (Rp $\frac{1}{4}$) so that the immersion stem faces the direction of the flow.

In order to ensure temperature acquisition along the entire immersion stem, the immersion length for the QAE26.9 must be at least 25 mm and 15 mm for QAE26.90, QAE26.91, QAE26.93 , QAE26.95 and QAE1020.024.

If the connection cable needs to be extended, use a branching box.

Internal diagram



The internal diagram applies to all types. The connections are interchangeable.

Dimensions (in mm)

QAE26.9



QAE26.90, QAE26.91 QAE26.93, QAE26.95 QAE1020.024



Тур	l L	.1	L2
	min.	max.	
QAE26.90	15	65	ca. 100
QAE26.91	15	125	ca. 160
QAE26.93	15	240	ca. 275
QAE26.95	15	465	ca. 500
QAE1020.024	15	240	ca. 275



Outside Sensors

QAC... FW-T1G

- Passive sensors for acquiring the outside temperature and to a lesser degree solar radiation, the wind effect and the temperature of the wall.
- Range of use -40/50...+70 °C / 5...95 % r. F.

Use

The QAC... outside sensors are for use in heating, ventilation and air conditioning plants as:

- · Reference sensors for weather-compensated control
- Measuring sensors, e.g. for optimization, measured value indication, or for connection to a building automation and control system

Type summary

Type reference	Sensing element	Range of use	Time constant	Approval
QAC22	LG-Ni 1000	−50+70 °C	ca. 14 min	
QAC32	NTC 575 (linearized)	−50+70 °C	ca. 12 min	
QAC2010	Pt 100	-50+70 °C	ca. 14 min	UL, class 2
QAC2012	Pt 1000	-50+70 °C	ca. 14 min	UL, class 2
QAC2030	NTC10k	-40+70 °C	ca. 14 min	UL, class 2
FW-T1G *)	T1 (PTC)	−50+70 °C	ca. 14 min	

*) No longer available

Ordering and delivery

When ordering, please give name and type reference, e.g.: Outside sensor **QAC22.**

Equipment combinations

The outside sensors are suited for use with all types of controllers capable of acquiring and handling the sensor's measured value.

Function

The outside sensor acquires the outside temperature and - to a lesser degree - solar radiation, the wind effect and the temperature of the wall. The sensing element changes its resistance value as a function of the temperature.

Sensing elements

LG-Ni 1000

NTC 575



Pt 1000 (class B)

NTC 10k	R[Ω]	∆9 [K]		
		1.20 1.00 0.80 0.60 0.40 0.20 0.20 0.20 0.40 0.20 0.20 0.40		
	1000 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 [°C]	0.60 0.80 -1.00 -1.20 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 [°C]		
T1 (PTC)	R [Ω] 300 400 400 400 400 400 400 400	A9 [K] 60 60 60 60 60 60 60 60 60 60		
Legend	RResistance in OhmθTemperature in degrees CelsiusΔθTemperature differential in Kelvin			
Mechanical design				
Engineering notes	The sensor has a plastic housing with a remo The connection terminals can be accessed at Cable entry is either from the rear (concealed A cable entry gland can be screwed into the b	vable cover. iter removal of the cover. wiring) or from below (surface-run wires). pottom of the housing.		
	The permissible cable lengths depend on the used. They are specified in the Data Sheet of	type of controller with which the sensor is		
Mounting notes				
Mounting location	 Depending on use, the outside sensor must be For control: On the wall of the house or building that has the sensor must not be exposed to the more mounted on the wall facing north or north-we For optimization: Always on the coldest wall of the house or The sensor must never be exposed to the 	the located as follows: as the windows of the occupied rooms, but rning sun. In case of doubt, it should be west building (normally the wall facing north). morning sun		
Mounting height	 Preferably in the middle of the house or building or heating zone, but at least 2.5 m above the ground. The sensor must not be fitted at the following locations: Above windows, doors, air extracts or other heat sources Below balconies or the eave of the roof To prevent measuring errors due to air circulation, the cable conduit at the sensor should be sealed. The sensor may not be painted over. Mounting Instructions are printed on the packaging. 			

Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Functional data	Range of use	refer to "Type summary"	
	Sensing element	refer to "Type summary"	
	Time constant	refer to "Type summary"	
	Accuracy	refer to "Function"	
	Type of measurement and output	passive	
Degree of protection	Protection class	III according to EN 60730	
	Protection degree of housing	IP54 according to EN 60529	
Electrical connections	Screw terminals for	2 x 1.5 mm ² or 1 x 2.5 mm ²	
	Cable entry for	cable gland (e.g. M 16 x 1.5)	
	Perm. cable length	refer to "Engineering notes"	
Environmental conditions	Operation Climatic conditions Temperature Humidity	-40+70 °C 0…100 % r. h.	
	Storage / transport to Climatic conditions Temperature Humidity Mechanical conditions	IEC 721-3-2 class 2K3 - 25+65 °C <95 % r. h. class 2M2	
Directives and Standards	Product standard	EN 60730-1 Automatic electrical controls for house- hold and similar use	
	EU conformity (CE)	8000073890 *)	
	UL	UL873 <u>http://ul.com/database</u>	
Environmental compatibility	The product environmental declaration CE1E17 uct design and assessments (RoHS compliance	701 ^{°)} contains data on environmentally compatible prod- e, materials composition, packaging, environmental	
Materials and colors	Base	plastic (ASA)	
	Cover	plastic (ASA), RAL9003	
	Packaging	cardboard	
Weight	Incl. packaging	approx. 0.093 kg	
	*) The documents can be downloaded from <u>http://siemens.com/bt/download</u> .		

Internal diagram

B W 181

The internal diagram is identical for all types of outside sensors covered by this Data Sheet.

The connecting wires are interchangeable.



Drilling plan

Dimension in mm



Symaro™

Outside Temperature Sensors



- Active sensors for acquiring the outside temperature
- Operating voltage AC 24 V or DC 13.5...35 V
- Signal output DC 0...10 V or 4...20 mA

Use

The QAC31... outside temperature sensors are for use in heating, ventilation and air conditioning plants as:

- Reference sensors for outside temperature-compensated control
- Measuring sensors, e.g. for optimization, measured value indication, or for connection to a building automation and control system
- · High-end sensors for acquiring the room temperature in commercial spaces

Type summary

Type reference	Measuring range	Operating voltage	Output signal
QAC3161	−50+50 °C	AC 24 V ± 20 % / DC 13.535 V	DC 010 V
		AC/DC 24 V class 2 (US)	
QAC3171	−50+50 °C	DC 13.535 V	420 mA

Ordering and delivery

When ordering, please give name and type reference, e.g.: Outside temperature sensor **QAC3161**.

The sensor is supplied complete with cable entry gland M16.
All systems or devices capable of acquiring and handling the sensor's DC 0...10 V or 4...20 mA output signal.

Function

The sensor acquires the outside temperature via its sensing element whose resistance value changes as a function of the temperature.

This change is converted to a DC 0...10 V or 4...20 mA output signal, depending on the type of sensor. The output signal corresponds to the selected temperature range.

Burden diagram

Output signal, terminal I1



Mechanical design

The outside temperature sensor consists of housing, printed circuit board, connection terminals and measuring probe.

The two-sectional housing is comprised of base and removable cover (screwed connection). The measuring circuit and the setting element are located on the printed circuit board inside the cover, the connection terminals on the base.

The measuring probe is screwed into the bottom of the housing.

Cable entry is either from the rear (concealed wiring) or from below (surface-run wires). For that purpose, a hole can be knocked out in the base or the enclosed cable entry gland M16 can be screwed into the bottom of the base.



Test function active		
	U1	11
0,0,0	10 V	20 mA
	5 V	12 mA
	0 V	4 mA
000	5 V	12 mA

The setting element is located inside the cover. It consists of 6 pins and a shorting plug. It is used to select the required measuring range and to activate the test function.

The different plug positions have the following meaning

 For the temperature measuring range: Shorting plug in the left position (R1) = 0...50 °C
 Shorting plug in the mid position (R2) = -50...+50 °C (factory setting)
 Shorting plug in the right position (R3) = -35...+35 °C

Setting element

	 For activating the test function: Shorting plug in the horizontal position: The values according to the table "Test function active" will be made available at the signal output.
Fault	In the event of fault, the output signal will reach 0 V (4 mA) after 60 seconds.
Engineering notes	
	To power the sensor, a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required. When sizing and electrically protecting the transformer, local safety regulations must be observed.
	When sizing the transformer, the power consumption of the outside temperature sensor must be taken into consideration. For correct wiring, refer to the Data Sheets of the devices with which the sensor is used.
	The permissible cable lengths must be observed.
Cable routing and cable selection	When laying the cables, it must be observed that the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Twisted pair cables are required for the secondary supply lines and the signal lines.
Mounting notes	
	Depending on use, the outside temperature sensor must be located as follows:
Mounting location	 For control: On the wall of the house or building that has the windows of the occupied rooms, but the sensor must not be exposed to the morning sun. In case of doubt, it should be mounted on the wall facing north or north-west For optimization: Always on the coldest wall of the house or building (normally the wall facing north). The sensor must never be exposed to the morning sun
Mounting height	Preferably in the middle of the house or building or heating zone, but at least 2.5 m above the ground.
	The sensor must not be fitted at the following locations:Above windows, doors, air exhausts or other heat sourcesBelow balconies or the eave of the roof
	To prevent measuring errors due to air circulation, the cable conduit at the sensor should be sealed.
	The sensor may not be painted over.
	Mounting Instructions are printed on the packaging.
Commissioning notes	
	Check wiring before switching on power. The temperature measuring range must be selected on the sensor, if required.
Disposal	
X	The devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic waste.
	Disease of the device vie the character provided for this provess

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Power supply	Operating voltage	refer to "Type summary"	
	Frequency	50/60 Hz at AC 24 V	
	Power consumption	≤1 VA	
	External supply line protection	Fuse slow max. 10 A	
		or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or	
		Power source with current limitation of max. 10 A	
Line lengths for	Perm. cable lengths		
measuring signal	Copper cable 0.6 mm dia.	50 m	
	Copper cable 1 mm ²	150 m	
Free diamated at a		300 m	
Functional data		-50+50 °C (R2 = factory setting), 050 °C (R1), $-35+35$ °C (R3)	
	Sensing element	Pt 1000	
	Time constant	approx. 9 min	
	Measuring accuracy in the range of -25+25 °C -50+50 °C	±0.75 K ±0.9 K	
	Output signal, linear (terminal U1)	DC 010 V	
		max. ±1 mA	
	Output signal, linear (terminal I1)	420 mA	
	Burden	refer to "Function"	
Electrical connections	Connection terminals for	$1 \times 2.5 \text{ mm}^2 \text{ or } 2 \times 1.5 \text{ mm}^2$	
	Cable entry gland (enclosed)	M 16 x 1.5	
Degree of protection	Protection class	III according to EN 60730-1	
	Protection degree of housing	IP65 according to EN 60529	
Environmental conditions	Operation	IEC 721-3-3	
	Climatic conditions	class 3K5	
	Temperature (housing with electronics)	-40+70 °C	
	Humialty Mechanical conditions	595 % r. n. (non-condensing)	
	Climatic conditions	rec 721-3-2	
	Temperature	-25+70 °C	
	Humidity	<95 % r. h.	
	Mechanical conditions	class 2M2	
Materials and colors	Base	polycarbonate, RAL 7001 (silver-grey)	
	Cover	polycarbonate, RAL 7035 (light-grey)	
	Measuring nipple	stainless steel 1.4401	
	Cable entry gland	PA, RAL 7035 (light-grey)	
	Sensor (complete assembly)	silicone-free	
	Packaging	corrugated cardboard	
Directives and Standards	Product standard	EN 60730-1	
		Automatic electrical controls for household	
	Electromagnetic competibility (Applications)	Eor uso in residential commerce light	
		industrial and industrial environments	
	EU Conformity (CE)	CE1T1814xx ^{*)}	
	RCM Conformity	8000078879 *)	
	UL	UL873 http://ul.com/database	
Weight	Incl. packaging		
	QAC3161	approx. 0.14 kg	
	QAC31/1 *) The desuments can be described from http:///	approx. 0.14 kg	

*) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.

Connection terminals

QAC3161 QAC3161 G R1 = 0..50 °C/ R2 = -50..+50 °C/ R3 = -35..+35 °C G0 U1 A ∇ QAC3171 G R1 = 0..50 °C/ R2 = -50..+50 °C/ R3 = -35..+35 °C R3 = -35..+35 °C R3 = -35..+35 °C/ R3 = -35

G, G0 Operating voltage AC 24 V (SELV) or DC 13.5...35 V

G1 Operating voltage DC 13.5...35 V

- I1 Signal output 4...20 mA
- for measuring range –50...+50 °C (factory setting), 0...50 °C or –35...+35 °C U1 Signal output DC 0...10 V
 - for measuring range –50...+50 °C (factory setting), 0...50 °C or –35...+35 °C

Dimensions







Drilling plan

Dimensions in mm

SIEMENS



Strap-on temperature sensor

QAD2...

- Strap-on sensor for acquiring the temperature of pipework.
- Range of use -30... 125/130 °C / 5...95 % r. F. non-condensing (not suitably for chillers)

Use

Acquisition of temperature of pipework for

- controlling or limiting the flow temperature
- limiting the return temperature
- controlling the d.h.w. temperature

Type summary

Type reference	Sensing element	Range of use	Time constant
QAD22	LG-Ni 1000	-30+130 °C	3 s
QAD2010	Pt 100	-30…+130 °C	3 s
QAD2012	Pt 1000	-30+130 °C	3 s
QAD2030	NTC 10k	-30…+125 °C	6 s

Ordering

When ordering, please give type reference, e.g.: Strap-on temperature sensor QAD2...

Equipment combinations

The QAD2... is suited for use with all types of controllers that can handle analog passive sensor signals.

The sensor's nickel sensing element acquires the temperature of pipework. The resistance of the sensing element changes as a function of the medium temperature. The resistance value is used for handling by a suitable controller.

Sensing element









Accuracy









Legend

Temperature in degrees Celsius θ

 $\Delta \vartheta$ Temperature differential in Kelvin

Mechanical design

The strap-on temperature sensor consists of the following components:

- Two-sectional plastic housing comprised of base with connection terminals, grommet and removable cover (snap-on design)
- The coupling sheet with sensing element is flexible and adapts to the pipe's surface
- Mounting clamp (adjustable strap-on band) for pipe diameters from 15...140 mm

The connection terminals can be accessed after removing the housing cover. Cable entry is made via a grommet (tension relief into housing). If required, the grommet can be replaced by a Pg 11 cable entry gland.

Engineering notes

The permissible cable lengths are dependent on the controller with which the sensor is used. They are specified in the Data Sheet of the relevant controller.

Mounting and installation notes

Depending on the application, the sensor is to be located as follows:

- For flow temperature control:
 - In the heating flow:
 - Directly after the pump if the pump is located in the flow _
 - _ 1.5 to 2 m after the mixing valve if the pump is located in the return
- For limiting the return temperature:

In the return at a location where the temperature can be correctly acquired

The water must be well mixed where the temperature is acquired.

The pipe may not be lagged in the vicinity of the sensor.

The sensor should be mounted such that the cable does not enter from the top.

Permitted mounting positions



Not permitted mounting position

Fixing

Mounting Instructions are printed on the packaging.

- Remove any paint on the pipe before fitting the strap-on temperature sensor.
- Ensure that the sensor is fixed firmly with the adjustable band supplied.



Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

General sensor data	Range of use	refer to "Type summary"		
	Sensing element	refer to "Type summary"		
	Time constant t ₆₃	refer to "Typ summary"		
		(referred to the pipe's surface)		
	Measurement accuracy	refer to "Function"		
	Measured medium	water, other liquid media		
	Type of measurement and output	passive		
Degree of protection	Protection class	III according to EN 60730-1		
	Protection degree of housing	IP42 according to IEC 60529		
Electrical connections	Screw terminals for	max. 1 x 2.5 mm ²		
	Cable entry	grommet for cable of 5.57.2 mm dia.		
	Pg 11 cable entry gland	can be fitted		
	Permitted cable lengths	refer to Data Sheet of controller		
Environmental conditions	Operation	as per IEC 60721-3-3		
	Climatic conditions	class 3K5		
	Temperature (housing)	−5+50 °C		
	Humidity (housing)	595 % r.h.		
	Transport	as per IEC 60721-3-2		
	Climatic conditions	class 2K3		
	Temperature	–25+70 °C		
	Humidity	<95 % r.h.		
	Mechanical conditions	class 2M2		
Materials	Base	PA-GF35		
	Housing cover	ASA Luran S		
	Adjustable strap-on band	stainless steel		
Directives and	Product standard	EN 60730-1		
Standards		Automatic electrical controls for		
		household and similar use		
	EU conformity (CE)	8000073890 *)		
Environmental	The product environmental declaration CE1E	1701 ^{*)} contains data on environmentally		
compatibility	compatible product design and assessments (RoHS compliance, materials			
	composition, packaging, environmental benefit, disposal).			
	Packaging	Cardboard		
Colors	Base	silver-grey, RAL 7001		
	Housing cover	light-grey, RAL 7035		
Weight	without packaging	0.072 kg		
	incl. packaging	0.083 kg		
	*) The documents can be downloaded from http://siemens.com/bt/download			

Internal diagram



The connecting wires are interchangeable.



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Cable Temperature Sensors

QAP...

Use

The sensors are used in heating, ventilation and air conditioning plants to acquire the temperature. They are for use with the corresponding accessories as:

- strap-on sensors for pipework
- strap-on sensors for solar collectors
- immersion sensors
- Changeover (from heating to cooling or vice versa)

Type summary

Type reference	Sensor element	Cable length	Material connecting	Measuring range	Weight (incl.
			Cabic		packaging)
QAP2010.150	Pt 100	1,5 m	silicone	-30+130 °C	0,05 kg
QAP2012.150	Pt 1000	1,5 m	silicone	-30+130 °C	0,05 kg
QAP21.3	LG-Ni 1000	1,5 m	silicone	-30…+130 °C	0,05 kg
QAP21.3/8000	LG-Ni 1000	8 m	silicone	-30+130 °C	0,23 kg
QAP22	LG-Ni 1000	2 m	PVC	-25+ 95 °C	0,06 kg
QAP1030.200	NTC 10k	2 m	PVC	-25+ 95 °C	0,06 kg

Accessories	Name		Part number/ type reference
	Protection pocket, Ms63, PN10, in	mersion length 100 mm	ALT-SB100 ¹⁾
	Cable holder for protection pocket	mounting	4 213 1416 0
	Changeover mounting kit For fitting on pipes (pipes of ab consisting of holding piece and	out 1318 mm dia.), cable ties (2x)	ARG22.1 ²⁾
	Aluminium bar Consisting of bar with riveted h	older and rubber grommet	ARG22.2
	 For other protection pocket accessorial Suited for max. 95 °C. Use cable ties 	es, refer to Data Sheet N1194. made of metal for temperatures abo	ove 95 °C
Ordering and delivery			
	When ordering, please give type re ence of the accessories required. Example: Cable temperature sensor The cable temperature sensor is su must be ordered separately.	ference of sensor and part nur or QAP2010.150 . Ipplied without any mounting a	mbers / type refer- accessories. These
Equipment combinations			
	The cable temperature sensors are handle the sensor's passive output	suited for use with all types o signal.	f controllers that can
Function			
	The sensor acquires the temperatu sensing element changes as a func The resistance value is used for fur	re via its sensing element. The stion of the ambient temperatu ther handling by a suitable co	e resistance of the re. ntroller.
Sensing elements			
- I G-Ni 1000	Characteristic:	Accuracy:	
R[Ω]		Δ9 [K]	
1800			
	80	N	



Accuracy:





Legend

R Resistance in Ohm θ

Temperature in degrees Celsius

-1.8

30 20 10 0

10 20 30 40 50 60 70 80 90 100 110 120 130 [°C]

θ

θ

The sensor consists of sleeve (40.5 mm in length), sensing element and 2-core connecting cable. The sensing element is encapsulated in the sleeve so that it is mechanically and electrically protected. The sleeve also ensures strain relief for the connecting cable. The end of the cable carries ferrules for easy connection. Different accessories are available for fixing the sensor.

Engineering notes

The permissible cable lengths are dependent on the type of controller with which the sensor is used. They are specified in the Data Sheet of the relevant controller.

Mounting and installation notes

The connecting cable should always be connected to a conduit box.

When mounted in a protection pocket, the sensor must always be fixed in the pocket by means of the cable holder.

Instructions for mounting in induction or fan coil units:

The sensor should be fitted in the location specified by the manufacturer of the terminal unit. If there is no such specification, it must be fitted in the return air flow where it captures the temperature of the room air drawn in. It should be fitted as high as possible to minimize the floor effect. The sensor must be protected against heat radiation from the terminal unit.

Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Functional data	Measuring range	refer to "Type summary"	
	Sensing element	refer to "Type summary"	
	Time constant		
	Sensor with ARG22.1 (attached to pipe)	approx. 25 s	
	Sensor with protection pocket	<30 s	
	Sensor with ARG22.2 in air at v = 3 m/s	<1 min	
	Measurement accuracy	refer to "Function"	
	Type of measurement and output	passive	
Degree of protection	Protection degree of housing	IP65 according to EN 60529	
	Protection class	III according to EN 60730-1	
Electrical connections	Connecting cable	2-core, interchangeable	
	Cross-sectional area	2 x 0.34 mm ²	
	Length	see "Type summary"	
	Perm. cable lengths	refer to "Engineering notes"	
Environmental conditions	Permissible ambient temperature		
	for silicone cables	−30+140 °C	
	for PVC cables	–25+95 °C, Short-time (2 h/d) +110 °C	
	Perm. ambient humidity	95 % r. h.	
	EU conformity (CE)	8000073890 *)	
Environmental	The product environmental declaration CE	1E1701 ^{*)} contains data on environmentally	
compatibility	compatible product design and assessmen	ts (RoHS compliance, materials composi-	
	tion, packaging, environmental benefit, disposal).		
Materials	Sensor sleeve	stainless steel 1.4571 (V4A)	
	Connecting cables	refer to "Type summary"	
	Packaging	corrugated cardboard	
Weight	Incl. packaging	refer to "Type summary"	
	*) The documents can be downloaded from http://s	iemens.com/bt/download.	

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The internal diagram is identical for all types of cable temperature sensors covered by this Data Sheet.

The connecting wires are interchangeable.

Dimensions



Dimension in mm

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Cable Temperature Sensors

QAZ21.682/101 QAZ21.685/101

for use in refrigeration plant

Cable temperature sensor for acquiring the medium temperature in refrigeration plant. Strap-on sensor with 2 cable ties or immersion sensor with a protection pocket.

Use

For the control or limitation of the medium temperature in refrigeration plant, especially for acquiring the suction gas temperature and for controlling superheat. Suited for use with controllers operating with LG-Ni 1000 sensing elements.

Ordering and delivery

When ordering, please give name and type reference of the sensor, e.g.: Cable temperature sensor **QAZ21.682/101** The sensor is supplied complete with 2 cable ties and sleeve coated with thermal conductive wax. Minimum order quantity: 100 pieces for QAZ21.685/101

Function

The sensor acquires the medium temperature in the solar collector. The resistance value of the sensing element changes as a function of the temperature. It is delivered for further handling by a suitable controller.



Mechanical design

The cable temperature sensor consists of sleeve (6 mm diameter, 50 mm long), sensing element and connecting cable with ferrules.

The sensing element is embedded in the sleeve. The sleeve is flat on one side and coated with thermal conductive wax. The sensor is not suited for direct immersion in liquid media (protection pocket mandatory).

Accessories (not included with standard delivery)

Name	Type reference
Protection pocket, Ms63, PN10, immersion length 100 mm	ALT-SB100 ¹⁾

1) For other protection pocket accessories, refer to Data Sheet N1194.

Engineering notes

The permissible cable lengths are dependent on the type of controller used. For details, refer to the Data Sheet of the relevant controller.

Mounting notes

On pipes

Mounting choices:

Place flat section on the pipe and secure with the 2 cable ties supplied with the sensor



Permissible mounting location on the suction gas pipe

Sensor can be mounted on a piece of pipe with no lagging or underneath the lagging.

Indirect immersion

With the help of a protection pocket. The inside diameter of the pocket should match the diameter of the sensor's sleeve (e.g. 6.1 mm).

The sensor is supplied complete with Mounting Instructions.

Disposal



Technical data

The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Functional data Sensing range -50 ... +80 °C Sensing element LG-Ni 1000 Time constant Sensor when fitted on the pipe <20 s Sensor with protection pocket <30 s Measuring accuracy at 0 °C ±0.4 K (refer to "Function") Measurement and output passive Connections Mechanically cable tie (2x) Electrical connections Connecting cable 2-core, interchangeable, with ferrules Cable length approx. 1.5 m Perm. cable length refer to "Engineering notes" Degree of protection III according to EN 60730-1 Protection class Protection degree of housing IP67 according to EN 60529 EU conformity (CE) A5W00040799 *) Environmental conditions Operation to IEC 721-3-3 **Climatic conditions** class 3K8H Temperature -50...+80 °C 10...100 % r. h. Humidity IEC 721-3-2 Transport to **Climatic conditions** class 2K3 -50...+80 °C Temperature Humidity <100 % r. h. Environmental The product environmental declaration CE1E1701en^{*} contains data on environmentally compatibility compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal). Materials Sensor sleeve stainless steel V4A (1.4571) Connecting cable silicon PVC Packaging (minigrip[®] bag) Weight Including packaging 0.075 kg

*) The documents can be downloaded from http://siemens.com/bt/download.



Dimensions



Dimensions in mm

SIEMENS



Room sensors

QFA20..

For relative humidity and temperature

- Operating voltage AC 24 V or DC 13.5...35 V
- Signal output DC 0...10 V / 4...20 mA for relative humidity
- Signal output DC 0...10 V / 4...20 mA / LG-Ni 1000 or T1 for temperature
- Accuracy of ±3 % r.h. within comfort range
- Range of use -15...+50 °C / 0...95 % r.h. (non-condensing)

Use

- In ventilating and air conditioning plants to acquire
- relative humidity and
- temperature

in rooms.

The QFA20.. is used as a

- · control sensor and
- measuring sensor for building automation and control systems or indicating units.

Type summary

Type reference	Temperature measuring range	Temperature signal output	Humidity measuring range	Humidity signal output	Operating voltage
QFA2000	None	None	0100 %	active, DC 010 V	AC 24 V or DC 13.535 V
QFA2001	None	None	0100 %	active, 420 mA	DC 13.535 V
QFA2020	050 °C	passive, LG-Ni 1000	0100 %	active, DC 010 V	AC 24 V or DC 13.535 V
QFA2040	050 °C	passive, T1 (PTC)	0100 %	active, DC 010 V	AC 24 V or DC 13.535 V
QFA2060 QFA2060D	050 °C / -35+35 °C / -40+70 °C	active, DC 010 V	0100 %	active, DC 010 V	AC 24 V or DC 13.535 V
QFA2071	050 °C / -35+35 °C / -40+70 °C	active, 420 mA	0100 %	active, 420 mA	DC 13.535 V

When ordering, please give name and type reference, e.g.: Room sensor QFA2060D.

Equipment combinations All systems or devices capable of acquiring and handling the sensor's DC 0...10 V, 4...20mA, LG-Ni 1000 or T1 output signal. When using the sensors for minimum or maximum selection, for averaging, or to calculate enthalpy, enthalpy difference, absolute humidity, and dew point, we recommend to use the SEZ220 signal converter (see Data Sheet N5146). Mode of operation **Relative humidity** The sensor acquires the relative humidity in the room via its capacitive humidity sensing element whose electrical capacitance changes as a function of the relative humidity. The electronic measuring circuit converts the sensor's signal to a continuous DC 0...10 V or 4...20 mA signal, which corresponds to 0...100 % relative humidity. Temperature The sensor acquires the temperature in the room via its sensing element whose electrical resistance changes as a function of the temperature. This change in resistance is converted to an active DC 0...10 V or 4...20 mA output signal, corresponding to a temperature range of 0... 50 °C, -35...+35 °C, or -40...+70 °C. The measuring range can be selected. The temperature is provided as a simulated passive LG-Ni 1000 or T1 output signal (≙ 0...50 °C) as an alternative to the active output signal. Simulated passive The measuring current from systems/devices to acquire the electrical resistance of the output signal passive sensor differs greatly and impacts self-heating of the temperature sensing element at the end of the measuring tip. To compensate the impact, the passive output signal is simulated with an electronic circuit. Sensing elements, Characteristic T1 (PTC) Characteristic LG-Ni 1000 simulated **R** [Ω] **R** [Ω] 3200 3000 1400 2800 1200 2600 2400 1000 2200 2000 800 1800 1600 600 1400 -50 -40 -30 -20 -10 20 30 40 50 60 70 80 [°C] -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 [°C] 0 10 Legend R Resistance value in Ohm θ Temperature in degrees Celsius

Burden diagram

Output signal, terminal I1 / I2



Mechanical design

The room 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 knock-out openings.

The two-part housing comprises a casing and a baseplate. Both snap together but can be detached again.

The measuring circuit, the sensing elements and the setting element are located on the printed circuit board inside the casing.

The baseplate carries the connecting terminals.

Measured value display The type QFA2060D provides the measured values on its LCD display. The following measured values are displayed alternately in intervals of 5 s:

Temperature: in °C or °F
 Humidity: in % r.h.



The setting elements are located in the casing. A setting element consists of 6 pins and a jumper. It is used for selecting the required temperature measuring range and for activating the test function. Types with LCD display have a second setting element with 4 pins and a jumper.

The different jumper positions have the following meaning:

- For the passive temperature measuring range (QFA2020, QFA2040): Jumper in the middle position (R2) = LG-Ni 1000 or T1 (0...50 °C)
- For the active temperature measuring range: Jumper in the upper position (R1) = -35...+35 °C, Jumper in the middle position (R2) = 0...50 °C (factory setting), Jumper in the lower position (R3) = -40...+70 °C

Setting element

	 For activating the test function: Jumper in the vertical position: The values according to the table "Test function ac- tive" will be made available at the signal output.
	 For the measured value display (QFA2060D) Jumper horizontal, in the upper position = °F Jumper horizontal, in the lower position = °C (factory setting)
Malfunction	 Should the temperature sensor become faulty a voltage of 0 V (4 mA) will be applied at signal output U2 (I2) or signal output BS-MS becomes high impedance (>1 MΩ) after 60 seconds, and the humidity signal at signal output U1 (I1) will reach 10 V (20 mA). Should the humidity sensor become faulty a voltage of 10 V (20 mA) will be applied at signal output U1 (I1) after 60 seconds, and the temperature signal will remain active.
Engineering notes	
	Room sensors with active outputs have a high power loss, which can influence temper- ature measurement. The degree of influence depends on the operating voltage and is compensated in the Symaro [™] room sensors for an operating voltage of AC 24 V or DC 24 V. Over- or undercompensation may occur for other operating voltages.
	 Furthermore, the measuring accuracy is impacted by the following factors: Prevailing air flow Wall surface (rough, smooth) Wall texture (wood, plaster, concrete, brick) Wall type (interior, exterior). This application-specific measuring inaccuracy is constant for an installed sensor after approx. 1 operating hour, and it can be adjusted as needed in a higher system (e.g.
	controller). No correction on the local LCD. A transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required to power the sensor. When sizing and protecting the transformer, the local safety regulations must be complied with. When sizing the transformer, the power consumption of the room sensor must be taken into consideration. For correct wiring of the sensor, refer to the Data Sheets of the devices with which the
	sensor is used. The permissible line lengths must be considered.
Cable routing and cable selection	It must be considered for routing of cables that the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems. Twisted pair cables are required for the secondary supply lines and the signal lines.
Note to QFA2071	Terminals G1(+) and I1(–) of the humidity output must always be connected to power, even if only terminals G2(+) and I2(–) of the temperature output are used! G1(+) and I1(–) are galvanically isolated towards G2(+) and I2(–).

Mounting notes

Location	Inside wall (not on outside wall!) of the room to be air conditioned; not in recesses, behind curtains, above or close to heat sources or shelves not on walls behind which a chimney is located. The unit must not be exposed to spot lights or direct solar radiation. The unit must not be exposed to spot lights or direct solar radiation.
	from the next wall. The end of the conduit at the sensor must be sealed to prevent false measurements due to draughts through the conduit.
Mounting instructions	Mounting instructions are printed on the inner side of the package.
Chemical vapors	It is of great importance to understand that a humidity sensor is a sensitive measure device and needs to be handled with care. Chemical vapors at high concentration in combination with long exposure times may offset the sensor reading.
Commissioning notes	
	Check wiring before switching on power. The temperature measuring range must be selected on the sensor, if required. Wiring and the output signals can be checked by making use of the test function (refer to "Mechanical design").
\triangle	We recommend not to use voltmeters or ohmmeters directly at the sensing element. In the case of the simulated passive output signals, measurements with commercially available meters cannot be made (measuring current too small).
Disposal	
	The devices are considered electronics devices for disposal in term of European Di-



rective 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Power supply

Operating voltage	AC 24 V ±20 % or DC13,535 V (SELV) or
	AC/DC 24 V class 2 (US)
Frequency	50/60 Hz at AC 24 V
External supply line protection	Fuse slow max. 10 A or
	Circuit breaker max. 13 A
	Characteristic B, C, D
	according to EN 60898
	or
	Power source with current limitation of max. 10 A
Power consumption	
QFA2	≤0.4VA
QFA2001	≤0.7W
QFA2071	≤1.4W
QFA2020, QFA2040	≤1VA
Perm. cable lengths	See data sheet for the device
	handling the signal
Range of use	095 % r.h. (non-condensing)
Measuring range	0100 % r.h.
Measuring accuracy (*) at 23 $^\circ\text{C}$ and AC/DC 24 V and at	
095 % r.h.	±5 % r.h.
3070 % r.h.	±3 % r.h.
(*) Values for output signal sensor types with 0-10 V signal: only for AC 24 V and 4 20 mA signal: only for DC 24 V	
Temperature dependency	<0.1 % r h /°C
Time constant	< 20 s
Output signal, linear (terminal U1)	DC 010 V
Output signal, linear (terminal I1)	420 mA ≙ 0100 % r.h.
Burden	refer to "Mode of operation"
Range of use	–15+50 °C
Measuring range	050 °C (R2 = factory setting), -35+35 °C (R1) or -40+70 °C (R3)
Sensing element	NTC 10k
Measuring accuracy at AC/DC 24 V and at	+0.3 K
15 35 °C	+0.7 K
–35+50 °C	±1 K
Time constant	8.5 min (depending on air movement and
Output signal linear (terminal U2)	$D_{c} = 10 V \triangle 0.50 \circ 0.735 \pm 35 \circ 0.000$
	/-40 +70 °C
	max. 1 mA
Output signal, linear (terminal I2)	420 mA
Burden	refer to "Mode of operation"

Functional data of temperature sensor with QFA2060(D), QFA2171

Cable lengths for measuring

Functional data of humidity sensor

signal

Functional data of	Measuring range	0.50°C
temperature sensor with		050 C
QFA2020 QFA2040	Sensing element simulated, corresponding to	L C NI: 1000
	QFA2020	
		11 (FTC)
	Measuring accuracy at AC/DC 24 V and at	
		±0.7 K
	l ime constant	8.5 min (depending on air movement and thermal coupling to the wall)
	Perm. measuring current with	· · · · ·
	QFA2020	1.184.21 mA
	QFA2040	0.531.89 mA
Degree of protection	Protection degree of housing	IP30 according to EN 60529
	Protection class	III according to EN 60730
Electrical connections	Screw terminals for	$1 \times 2.5 \text{ mm}^2 \text{ or } 2 \times 1.5 \text{ mm}^2$
Environmental	Operation to	IEC 60721-3-3
conditions	Climatic conditions	Class 3K5
	Temperature (housing with electronics)	–15+50 °C
	Humidity	095 % r. h (non-condensing)
	Mechanical conditions	Class 3M2
	Transport to	IEC 60721-3-2
	Climatic condition	Class 2K3
	Temperature	−25+70 °C
	Humidity	<95 % r.h.
	Mechanical conditions	Class 2M2
Materials and colors	Housing front	ASA + PC, NCS S 0502-G (white) equates to RAL9010
	Bottom section of housing	ASA + PC, NCS 2801-Y43R (grey) equates to RAL7035
	Base	PC, NCS 2801-Y43R (grey)
		equates to RAL7035
	Sensor (complete assembly)	Silicone-free
	Packaging	Corrugated cardboard
Standards, directives, and	Product standard	EN 60730-1
approvals		Automatic electrical controls for household
		and similar use
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light-
		industrial and industrial environments
	EU Conformity (CE)	CE1T1857xx ^{*)}
	RCM Conformity	CE1T1961en_C1
	EAC Conformity	Eurasia Conformity
	UL	UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration $CE1E1961^{*}$	contains data on environmentally compatible prod-
	uct design and assessments (RoHS compliance, ma	terials composition, packaging, environmental
	benefit, disposal).	
Woight	Incl. packaging	
	Without LCD display	Approx. 0.130 kg
	With LCD display	Approx 0 150 kg
		- + P

*) The documents can be downloaded from http://siemens.com/bt/download.



- I1 Signal output 4...20 mA for 0...100 % r.h.
- I2 Signal output 4...20 mA for temperature range 0...50 °C (R2 = factory setting), -35...+35 °C (R1) or -40...+70 °C (R3)
- BS, MS Signal output LG-Ni 1000 or T1 (passive, simulated) for temperature range 0...50 °C; the wires must not be interchanged

Note on connection terminals of the QFA2071:

Terminals G1(+) and I1(-) of the humidity output must always be connected to power, even if only terminals G2(+) and I2(-) of the temperature output are used! G1(+) and I1(-) are galvanically isolated towards G2(+) and I2(-).

Dimensions



Dimension in mm

Drilling plan

SIEMENS

QFA3100/4100 Series Relative Humidity Sensors for Critical Environments or Outdoor Use



QFA31xx







QFA31xx with AQF3100 Weather Shield



Replacement Sensing Element

Description

QFA3100 and QFA4100 Series sensors are used in HVAC systems where high accuracy and short response times for measuring relative humidity are required. The sensors maintain a +/- 2% RH accuracy from 0 to 100% RH.

Typical applications include:

- Pharmaceutical facilities
- Laboratories
- Hospitals
- Indoor swimming-pools
- Computer and data processing centers
- Greenhouses

Sensors are available with either 0 to 10V or 4 to 20 mA output signals. Options include an LCD display and additional analog output for temperature.

The QFA3100 Series sensors feature an enclosure with gaskets and may be installed outdoors with an AQF3100 weather shield (sold separately).

NOTE: Units with display are not intended for outdoor use.

The QFA4100 variants come with a threepoint, independently-certified calibration certificate. The certification is easily renewed by installing a new certified sensing element.

The AQY Series cables enable the sensing element to be remotely mounted up to 30 feet from the sensor.

Specifications – Humidity Element

Measurement range	0 to 100% RH
Accuracy	±2% RH, 0 to 100% RH @ 73°F (23°C)
Temperature effect	Less than 0.1% per degree C
Time Constant	< 20 seconds
Output signal	4 to 20 mA or 0 to 10 Vdc, 0 to100%RH, linear, proportional

Specifications–Temperature Element (for combination RH/T units only)

Measurement range (selectable) 32° to 122°F (0° to 50°C) (Default) -31° to 95°F (-35° to 35°C) -40° to 158°F (-40° to 70°C)	Jumper Position R2 R1 R3
Accuracy	0.54°F @ 73°F (±0.3°C @ 23°C)
Time Constant	8.5 minutes (dependent on airflow and wall coupling)
Output signal	4 to 20 mA or 0 to 10 Vdc, full range, linear, proportional

General Specifications

Installation	18 AWG cable length shared in conduit with other sensor wiring 750 ft (229 m) max.
Connections	Screw terminals
Voltage requirement	
0 to 10 Vdc output types	13.5 to 35 Vdc or 24 Vac <u>+</u> 20%
4 to 20 mA output types	13.5 to 35 Vdc
Power consumption	<1 VA
Material Type	Polycarbonate plastic
CE and UL listed	UL 873 standard for Temperature Indicating and Regulating Equipment

Ordering Information

Part Number	Description
QFA3100	Outdoor air humidity sensor (2%), 0 to 10 Vdc
QFA3101	Outdoor air humidity sensor (2%), 4 to 20 mA
QFA3160	Outdoor air humidity sensor (2%), 0 to 10 Vdc/Temp 0 to 10 Vdc
QFA3160D	Outdoor air humidity sensor (2%), 0 to 10 Vdc/Temp 0 to 10 Vdc with display
QFA3171	Outdoor air humidity sensor (2%), 4 to 20 mA Temp 4 to 20 mA
QFA3171D	Outdoor air humidity sensor (2%), 4 to 20 mA Temp 4 to 20 mA with display
QFA4160	Outdoor air humidity sensor (2%), 0 to 10 Vdc/Temp 0 to 10 Vdc (certified version)
QFA4171	Outdoor air humidity sensor (2%), 4 to 20 mA/Temp 4 to 20 mA (certified version)
QFA4171D	Outdoor air humidity sensor (2%), 4 to 20 mA/Temp 4 to 20 mA (certified version) with display

Ordering Information, Continued

Accessories	
AQF3101	Replacement filter cap
AQF3150	Replacement sensing element - standard
AQF4150	Replacement sensing element - certified
AQF3100	Weather shield for outdoor use
7466201040	Replacement 1/2-inch rigid conduit adapter
AQY2010	Remote sensing cable, 10 feet (3 m)
AQY2030	Remote sensing cable, 30 feet (9 m)

Dimensions



Figure 1. QFA31 Series Sensors Dimensions in Inches (Millimeters).

Dimensions, Continued



Figure 2. QFA41 Series Sensors Dimensions in Inches (Millimeters).



Figure 3. QFA31 Series Sensors with AQF3100 Dimensions in Inches (Millimeters).

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Duct Humidity and Temperature Sensor

QFM1660

Active sensor for acquiring the air humidity and temperature in air duct

- Operating voltage AC 24 V or DC 19...30 V
- Signal output DC 0...10 V for relative humidity
- Signal output DC 0...10 V for temperature
- Measuring accuracy <±0.8 °C @ 25 °C / ±5 % r.h. within the measuring range
- Range of use 0...50 °C / 10...90 % r.h. (non-condensing)

Use

The QFM1660 is suitable for use with most heating, ventilating, and air conditioning (HVAC) controllers. Common applications for the sensor are ventilation and air conditioning equipment in buildings.

Function

Relative humidity

The sensor acquires the relative humidity in the air duct via its capacitive humidity sensing element whose electrical capacitance changes as a function of the relative humidity.

The electronic measuring circuit converts the sensor's signal to a continuous DC 0...10 V signal, corresponding to a relative humidity range of 0...100 %.

Temperature

The sensor acquires the temperature in the air duct via its sensing element whose electrical resistance changes as a function of the temperature.

This change in resistance is converted to an active DC 0...10 V output signal corresponding to a temperature range of 0...50 °C.

Mechanical design

The duct sensor consists of a housing, a printed circuit board, connection terminals and an immersion rod with a measuring tip.

The measuring circuit is located on the printed circuit board inside housing, the connection terminals are on the board.

The sensing elements are located at the end of the measuring tip and protected by a filter cap on the measuring tip.

Cable entry is made via the screwed cable gland M16 supplied with the sensor.

Immersion rod and housing are made of plastic and are rigidly connected.

The sensor is directly screwed into the duct.

Type summary

Product no.	SSN no.	Operating voltage
QFM1660	S55720-S198	AC 24 V ±20 %; DC 1930 V

Product documentation

Title	Document ID
Mounting instructions	M3731
CE declarations	T3731

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address: http://siemens.com/bt/download

Notes

Engineering Powering the sensor requires a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty. When sizing and protecting the transformer, the local safety regulations must be complied with.

When sizing the transformer, the power consumption of the sensor must be taken into consideration.

For correct wiring, see the datasheets of the devices with which the sensor is used.

Observe permissible line lengths.

Cable routing and cable selection

Note that when routing cables, the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems.

Twisted pair cables are required for the secondary supply lines and the signal lines.

Mounting Location

Mount the sensor in the center of the duct wall. If used together with steam humidifiers, the distance to the humidifier must be minimum 3 m and maximum 10 m. Fit the sensor in the extract air duct if the application involves dew point shifting.

Mounting instructions

Mounting instructions are enclosed in the package.

Chemical vapors

It is of great importance to understand that a humidity sensor is a sensitive measure device and needs to be handled with care. Chemical vapors at high concentration in combination with long exposure times may offset the sensor reading.

Commissioning Check wiring before switching on power.

 \triangle We recommend not to use voltmeters or ohmmeters directly at the sensing element.

Disposal



•

The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

Dispose of the device through channels provided for this purpose.

Comply with all local and currently applicable laws and regulations.

Power supply	
Operating voltage	AC 24 V ±20 % or DC 1930 V (SELV)
	or
	AC/DC 24 V class 2 (US)
Frequency	50/60 Hz @ AC 24 V
Power consumption	≤1 VA

Functional data of humidity sensor	
Range of use	1090 % r.h. (non-condensing)
Measuring range	1090 % r.h.
Measuring accuracy	
1090 % r.h. @ 25 °C/20 °C	±5 % r.h.
Output signal, linear (terminal U1)	DC 010 V, corresponding to 0100 % r.h.

Functional data of temperature sensor	
Measuring range	050 °C
Measuring accuracy at AC 24 V	±0.8 °C @ 25 °C
Output signal, linear (terminal U2)	DC 010 V, corresponding to 050 °C

Ambient conditions and protection classification	
Degree of protection of housing	IP42 as per IEC 60529 in built-in state
Safety class	III as per EN 60730
Environmental conditions	
Transport	IEC 60721-3-2
Climatic conditions	Class 2K3
Temperature	• -2060 °C
Humidity	• 595 % r.h.
Mechanical conditions	Class 2M2
Operation	IEC 60721-3-3
Climatic conditions	Class 3K5
 Temperature (housing with electronics) 	• 050 °C
Humidity	• 1090 % r.h.
Mechanical conditions	Class 3M2

Standards, directives and approvals	
EU conformity (CE)	CB1T3731xx *)

*) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.

General	
Connection terminals for	1 × 2.5 mm ² or 2 × 1.5 mm ²
Materials	
Base/cover/plastic tube/filter tube	ABS
Packaging	PAP 20 cardboard
Weight with package	160 g


Dimensions



Dimensions in mm

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Duct sensors

QFM21..

for relative humidity and temperature

- Operating voltage AC 24 V / DC 13.5...35 V
- Signal output DC 0...10 V / 4...20 mA for relative humidity
- Signal output DC 0...10 V / 4...20 mA / LG-Ni 1000 for temperature
- Measuring accuracy $\pm 3~\%$ r. h. within the comfort range
- Range of use –15...+60 °C / 0...95 % r. h. (non-condensing)

Use

The QFM21.. duct sensors are for use in air ducts of ventilation and air conditioning plant for acquiring:

- The relative humidity and
- The temperature.

The sensors are used as:

- · Control sensors in the supply or extract air
- Reference sensors, e.g. for shifting the dew point
- Limit sensors, e.g. in connection with steam humidifiers
- Limit sensors, e.g. for measured value indication or for connection to a building automation and control system
- Sensors for enthalpy and absolute humidity, together with SEZ220 (see Data Sheet N5146)

Type summary

Type reference	Temperature measuring range	Temperature signal output	Humidity measuring range	Humidity signal output	Operating voltage
QFM2100	None	None	0100 %	active, DC 010 V	AC 24 V or DC 13.535 V
QFM2101	None	None	0100 %	active, 420 mA	DC 13.535 V
QFM2120	-35+50 °C	passive, LG-Ni 1000	0100 %	active, DC 010 V	AC 24 V or DC 13.535 V
QFM2160	050 °C / -35+35 °C or -40+70 °C	active, DC 010 V	0100 %	active, DC 010 V	AC 24 V or DC 13.535 V
QFM2171	050 °C / -35+35 °C or -40+70 °C	active, 420 mA	0100 %	active, 420 mA	DC 13.535 V

Ordering and delivery

When ordering, please give name and type reference, e.g.: Duct sensor **QFM2120** The sensor is supplied with mounting flange and cable entry gland M16.

Equipment combinations

All systems and devices capable of acquiring and handling the sensor's DC 0...10 V, 4...20 mA or LG-Ni 1000 output signal.

When using the sensors for minimum or maximum selection, for averageing, or to calculate enthalpy, enthalpy difference, absolute humidity, and dewpoint, we recommend to use the SEZ220 signal converter (see Data Sheet N5146).

Function

Relative humidity	The sensor acquires the relative humidity in the air duct via its capacitive humidity sensing element whose electrical capacitance changes as a function of the relative humidity. The electronic measuring circuit converts the sensor's signal to a continuous DC 010 V or 420 mA signal, which corresponds to 0100 % r. h.
Temperature	The sensor acquires the temperature in the air duct via its sensing element whose electrical resistance changes as a function of the temperature. Depending on the type of sensor this change in resistance is converted either to an active DC 010 V or 420 mA output signal corresponding to a temperature range of 0 50 °C, $-35+35$ °C, or $-40+70$ °C. The measuring range can be selected. The temperature is provided as a simulated passive LG-Ni 1000-output signal ($\triangleq -3550$ °C) as an alternative to the active output signal.
Simulated passive output signal	The measuring current of systems/devices for acquiring the electrical resistance of the passive sensor differs greatly and impacts self-heating of the temperature sensing element at the end of the measuring tip. To compensate the impact, the passive output signal is simulated with an electronic circuit.
Sensing elements, simulated LG-Ni 1000	Characteristic:

Legend

R

θ

- Resistance value in Ohm
- Temperature in degrees Celsius

Burden diagram





Mechanical design

The duct sensor consists of a housing, a printed circuit board, connection terminals, a mounting flange and an immersion rod having a measuring tip.

The 2-sectional housing comprises a base and a removable cover (snap-on design). The measuring circuit and the setting element are located on the printed circuit board inside the cover, the connection terminals on the base.

The sensing elements are located at the end of the measuring tip and protected by a filter cap.

Cable entry is made via the screwed cable gland M16 supplied with the sensor. Immersion rod and housing are made of plastic and are rigidly connected.

The sensor is fitted with the mounting flange supplied with the sensor. The flange is to be placed over the immersion rod and then secured in accordance with the required immersion length.



Measuring range Test function active 1|2|3 12 U1 BS-MS U2 11 00 10 V ≙ 20 °C 20 mA 0 0 0 0 0 0 5 V 12 mA 5 V 10 V ≙ 75 °C 12 mA 20 mA 0 V 5 V 4 mA 12 mA 1864Z05 5 V 0 V **≙**-35 °C 12 mA 4 mA 0 0 0

The setting element is located inside the cover. It comprises 6 pins and a jumper. It is used to select the required measuring range and to activate the test function.

The different jumper settings have the following meaning: • For the passive temperature measuring range: Jumper in the middle position (R2) = -35...+50 °C (factory setting) • For the active temperature measuring range: Jumper in the left position (R1) = -35...+35 °C, Jumper in the middle position (R2) = 0...50 °C (factory setting) Jumper in the right position (R3) = -40...+70 °C • For activating the test function: Jumper in the horizontal position: The values according to the table "Test function active" will be made available at the signal output. Malfunction • Should the temperature sensor become faulty a voltage of 0 V (4 mA) will be applied at signal output U2 (I2) or signal output BS-MS becomes high impedance (>1 MΩ) after 60 seconds, and the humidity signal at signal output U1 (I1) will reach 10 V (20 mA). • Should the humidity sensor become faulty a voltage of 10 V (20 mA) will be applied at signal output U1 (I1) after 60 seconds, and the temperature signal will remain active. Accessories

Name	Type reference
Filter cap (for replacement)	AQF3101

Engineering notes

	A transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required to power the sensor. When sizing and protecting the transformer, local safety regulations must be complied with. When sizing the transformer, the power consumption of the duct sensor must be taken into consideration. For correct wiring, refer to the Data Sheets of the devices with which the sensor is used. The permissible cable lengths must be considered.
Cable routing and cable selection	It must be considered for routing of cables that the longer the cables run side by side and the smaller the distance between them, the greater electrical interference. Shielded cables must be used in environments with EMC problems. Twisted pair cables are required for the secondary supply lines and the signal lines.
Note to QFM2171	Terminals $G1(+)$ and $I1(-)$ of the humidity output must always be connected to power, even if only terminals $G2(+)$ and $I2(-)$ of the temperature output are used!

Mounting notes

Location	Mount the sensor in the center of the duct wall. If used together with steam humidifiers, the minimum distance after the humidifier must be 3 m to max 10 m. Fit the sensor in the extract air duct if the application involves dew point shifting. Fit only the flange to the duct wall. The sensor is then inserted through the flange and engaged.		
Caution!	 To ensure degree of protection IP54, fit the sensor with the cable entry pointing downward. The sensing elements inside the measuring tip are sensitive to impact. Avoid any impact on mounting. 		
Mounting instructions	The mounting instructions are printed on the inside of the package of the device.		
Chemical vapors	It is of great importance to understand that a humidity sensor is a sensitive measure device and needs to be handled with care. Chemical vapors at high concentration in combination with long exposure times may offset the sensor reading.		
Commissioning notes			
	Check wiring before switching on power. The temperature measuring range must be selected on the sensor, if required. Wiring and the output signals can be checked by making use of the test function (refer		
	to "Mechanical design"). To ensure the accuracy of the temperature measurement of the QFM2120 the test function has to be activated and on the controller side the values have to be adjusted. We recommend not to use voltmeters or ohmmeters directly at the sensing element. In the case of the simulated passive output signals, measurements with commercially available meters cannot be made (measuring current too small).		
Disposal			
	The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.Dispose of the device through channels provided for this purpose.		

Comply with all local and currently applicable laws and regulations.

Technical data

Power supply	Operating voltage	AC 24 V ±20 % or DC13.535 V (SELV) or
		AC/DC 24 V class 2 (US)
	Frequency	50/60 Hz at AC 24 V
	External supply line protection	Fuse slow max. 10 A
		or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or
		Power source with current limitation of max. 10 A
	Power consumption	≤1 VA
Cable lengths for measuring signal	Perm. cable lengths	See data sheet of the device handling the signal
Functional data of	Range of use	095 % r. h. (non-condensing)
humidity sensor	Measuring range	0100 % r. h.
	Measuring accuracy at 23 °C and AC/DC 24 V in	
	095 % r. h.	±5 % r. h.
	3070 % r. h.	±3 %, r. h. typically
	Time constant at 050 °C and 1080 % r.h.	< 20 s
	Perm. air velocity	20 m/s
	Output signal, linear (terminal U1)	DC 010 V
	Output signal, linear (terminal I1)	4…20 mA 🚖 0…100 % r. h.
	Burden	See "Function"
Functional data of temperature sensor with QFM2160,	Measuring range	050 °C (R2 = factory setting), -35+35 °C (R1) or -40+70 °C (R3)
QFM2171	Measuring accuracy at AC/DC 24 V in	T0 3 K
	25 C	±0.3 K
	-35 +50 °C	±1K
		< 3.5 min in with 2 m/s moved air
	Output signal linear (terminal LI2)	$DC_0 = 10 V \triangle_0 = 50 °C / 35 + 35 °C$
		/-40+70 °C
		max. 1 mA
	Output signal, linear (terminal I2)	420 mA
		/-40+70 °C
	Burden	See "Function"
Functional data of temperature	Measuring range	-35+50 °C
sensor with QFM2120	Sensing element simulated, corresponding to QFM2120	LG-Ni 1000
	Measuring accuracy at AC/DC 24 V in the range of	
	23°C	±0.3 K
	1535 °C	±0.7 K
	-35+50 °C	±1 K
	Time constant	< 3.5 min. in with 2 m/s moved air
	Perm. measuring current with QFM2120	1.184.21 mA
Degree of protection	Protection degree of housing	IP54 according to EN 60529 in built-in state
	Protection class	III according to EN 60730-1
Electrical connections	Connection terminals for	$1 \times 2.5 \text{ mm}^2 \text{ or } 2 \times 1.5 \text{ mm}^2$
	Cable entry gland (enclosed)	M 16 x 1.5

Environmental conditions	Operation	IEC 60721-3-3	
	Climatic conditions	Class 3K5	
	Temperature (housing with electronics)	–15+60 °C	
	Humidity	095 % r. h. (non-condensing)	
	Mechanical conditions	Class 3M2	
	Transport	IEC 60721-3-2	
	Climatic conditions	Class 2K3	
	Temperature	−25+70 °C	
	Humidity	<95 % r. h.	
	Mechanical conditions	Class 2M2	
Materials and colors	Base	Polycarbonate, RAL 7001 (silver-grey)	
	Cover	Polycarbonate, RAL 7035 (light-grey)	
	Immersion rod	Polycarbonate, RAL 7001 (silver-grey)	
	Filter cap	Polycarbonate, RAL 7001 (silver-grey)	
	Mounting flange	PA66 – GF35 (black)	
	Cable entry gland	PA, RAL 7035 (light-grey)	
	Sensor (complete assembly)	Silicone-free	
	Packaging	Corrugated cardboard	
Directives and Standards	Product standard	EN 60730-1	
		Automatic electrical controls for household	
		and similar use	
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light-	
		industrial and industrial environments	
	EU Conformity (CE)	CE1T1864xx ²⁾	
	RCM Conformity	CE1T1864en_C1 2)	
	UL	UL 873 ¹⁾ , http://ul.com/database	
Environmental The product environmental declaration CE1E1864 ²⁾ contains data on envir		contains data on environmentally compatible prod-	
compatibility	uct design and assessments (RoHS compliance, materials composition, packaging, environmenta benefit, disposal).		
Weight	Incl. packaging		
	QFM21	Approx. 0.18 kg	
	1) Does not apply to the QFM2160 duct sensor!		

2) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.

Connection terminals



G, G0 Operating voltage AC 24 V (SELV) or DC 13.5...35 V

G1, G2 Operating voltage DC 13.5...35 V

U1 Signal output DC 0...10 V for 0...100 % r. h.

U2 Signal output DC 0...10 V for temperature range 0...50 °C (R2 = factory setting), -35...+35 °C (R1) or -40...+70 °C (R3)

- I1 Signal output 4...20 mA for 0...100 % r. h.
- I2 Signal output 4...20 mA for temperature range 0...50 °C (R2 = factory setting), -35...+35 °C (R1) or -40...+70 °C (R3)
- BS, MS Signal output LG-Ni 1000 for temperature range -35...+50 °C (passive, simulated); wires must not be interchanged

Note on connection terminals of the **QFM2171**:

Terminals G1(+) and I1(-) for the humidity output must always be connected to power, even if only the temperature output G2(+) and I2(-) is used!



Drilling plan with (without) mounting flange

Dimensions in mm

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Duct Relative Humidity and Temperature Sensor Modbus RTU QFM2150/MO

Duct relative humidity and temperature sensor with Modbus communication

- Modbus RTU (RS-485)
- Measuring accuracy 3 % r.h. within the comfort range
- On-event addressing via push button together with ClimatixTM controllers
- DIP switches setting together with other controllers

The duct sensor is used in air ducts of ventilation and air conditioning plant for acquiring:

- Relative humidity
- Temperature
- The sensor is used as:
- · Control sensor in the supply or exhaust air
- Reference sensors, for example, for shifting the dew point
- Limit sensors, for example, in connection with steam humidifiers
- Limit sensors, for example, for measured value indication or for connection to a building automation and control system

Technical design

Cable entry is made via the screwed cable gland M16 supplied with the sensor. The sensor is fitted with the mounting flange supplied with the sensor. The flange is placed over the immersion rod and then secured to meet the required immersion length.

Type summary

Product number	SSN NO.	Temperature measuring range	Operating voltage	Output signal
QFM2150/MO	S55720-S467	-4070 °C	AC 24 V ±20 %/ DC 13.535 V	Modbus RTU

Ordering and	When ordering, specify name and product number, for example: Duct sensor QFM2150/MO.
delivery	
•	

Accessory	Name	Type reference
	Filter cap (for replacement)	AQF3101

Notes

Engineering Powering the sensor requires a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty. When sizing and protecting the transformer, comply with all local safety regulations.

When sizing the transformer, determine the power consumption of the room sensor. For correct wiring, see the datasheets of the devices with which the sensor is used. Observe permissible line lengths.

Cable routing and cable selection

Note that when routing cables, the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems.

Twisted pair cables are required for the secondary supply lines and the signal lines.

Mounting Location

Mount the sensor in the center of the duct wall. If used together with steam humidifiers, the minimum distance from the humidifier must be 3 m to maximum 10 m.

Fit the sensor in the exhaust air duct if the application involves dew point shifting. Fit the flange to the duct wall. Then, insert the sensor through the flange and fasten.

- To ensure degree of protection IP54, the sensor must be mounted with the cable entry pointing downward.
- The sensing elements inside the measuring tip are sensitive to impact. Avoid any impact on mounting.

Mounting instructions

Mounting instructions are enclosed in the package.

NOTICE!

Chemical vapors

A humidity sensor is a sensitive measurement device and must be handled with great care. Chemical vapors at high concentration in combination with long exposure time may offset the sensor reading.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Function		
Communication	Modbus RTU (RS-485)	
Supported baud rate	9600; 19200; 38400; 57600; 76800; 115200	
Transmission format	1-8-E-1; 1-8-O-1; 1-8-N-1; 1-8-N-2	
Bus termination	120 ohm, jumper selection	

For detailed information about specific functions, see Basic documentation (A6V11610643 *).

Power supply	
Operating voltage	AC 24 V ±20 % or DC 13.535 V (SELV) or AC/DC 24 V class 2 (US)
Frequency	50/60 Hz at AC 24 V
External supply line protection	Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or Power source with current limitation of max. 10 A
Power consumption	≤ 1.5 VA

Functional data	
Humidity sensor	
Range of use	095 % r.h. (non-condensing)
Measuring range	0100 % r.h.
Measuring accuracy at 23 °C and AC/DC 24 V in 095 % r.h. 3070 % r.h.	±5 % r.h. ±3 % r.h. (typical)
Time constant at 050 °C and 1080 % r.h.	< 20 s
Perm. air velocity	20 m/s
Temperature sensor	
Measuring range	-4070 °C
Measuring accuracy at AC/DC 24 V in 23 °C 1535 °C -3550 °C	±0.3 K ±0.6 K ±1 K
Time constant	< 3.5 min in 2 m/s moved air

Ambient conditions and protection classification			
Protection degree of housing	IP54 according to EN 60529 in built-in state		
Protection class	III according to EN 60730-1		
Environmental conditions			
Transport	IEC 60721-3-2		
Climatic conditions	Class 2K3		
– Temperature	-2570 °C		
– Humidity	< 95 % r.h.		
Mechanical conditions	Class 2M2		
Operation	IEC 60721-3-3		
Climatic conditions	Class 3K5		
 Temperature (housing with electronics) 	-1560 °C		
– Humidity	095 % r.h. (non-condensing)		

Am	bient conditions and protection classification	
•	Mechanical conditions	Class 3M2

Standards, directives and approvals			
Product standard	EN 60730-1, EN 60730-2-9, EN 61000-6-2, EN 61000-6-3		
	use		
Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial and industrial environments		
EU conformity (CE)	A5W00037931A *)		
RCM conformity	A5W00037932A *)		
UL	UL 873, http://ul.com/database		
Environmental compatibility	The product environmental declaration (A5W90011832 *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		

General	
Cable lengths for measuring signals Permissible cable lengths	See data sheet of the device handling the signal
Electrical connections terminals	1 × 2.5 mm ² or 2 × 1.5 mm ²
Cable entry gland (enclosed)	M 16 × 1.5
Materials and colors	
Base	Polycarbonate, RAL 7001 (silver-grey)
Cover	Polycarbonate, RAL 7035 (light-grey)
Immersion rod	Polycarbonate, RAL 7001 (silver-grey)
Filter cap	Polycarbonate, RAL 7001 (silver-grey)
Mounting flange	PA 66 – GF35 (black)
Cable entry gland	PA, RAL 7035 (light-grey)
Sensor (complete assembly)	Silicone-free
Packaging	Corrugated cardboard
Weight including package	Approx. 210.8 g

*) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.





Dimensions in mm

SIEMENS



Duct sensors

QFM31..

for relative humidity (high accuracy) and temperature

- Operating voltage AC 24 V / DC 13.5...35 V
- Signal output DC 0...10 V / 4...20 mA for relative humidity and temperature
- Very high measuring accuracy across the entire measuring range
- Function test
- Capacitive humidity measurement
- Range of use -40...+70 °C / 0...100 % r. h. with LCD display -25...+70 °C / 0...100 % r.h.

The QFM31.. is for use in ventilation and air conditioning plants where high accuracy and short response times for measuring relative humidity are required. The measuring range covers the entire humidity range of 0...100 %.

Examples

Use

- Storage and production facilities in the paper, textile, pharmaceutical, food, chemical and electronics industry, etc.
- Laboratories
- Hospitals
- Computer and EDP centers
- Indoor swimming pools
- Greenhouses
- The QFM31.. is used as a
- · control sensors in the supply or extract air
- · limit sensor for maximum limitation of supply air humidity after a steam humidifier
- limit sensor, e.g. for measured value indication or for connection to a building automation and control system
- sensor for enthalpy and absolute humidity, together with the SEZ220 (see Data Sheet N5146)

Type summary

Type reference	Temperature measuring range	Temperature signal output	Humidity measuring range	Humidity signal output	Operating voltage	Measured value display
QFM3100	None	None	0100 %	active, DC 010 V	AC 24 V or DC 13,535 V	No
QFM3101	None	None	0100 %	active, 420 mA	DC 13,535 V	No
QFM3160	050 °C / −40+70 °C / −35+35 °C	active, DC 010 V	0100 %	active, DC 010 V	AC 24 V or DC 13,535 V	No
QFM3160D	050 °C / -40+70 °C / -35+35 °C	active, DC 010 V	0100 %	active, DC 010 V	AC 24 V or DC 13,535 V	Yes
QFM3171	050 °C / −40+70 °C / −35+35 °C	active, 420 mA	0100 %	active, 420 mA	DC 13,535 V	No
QFM3171D	050 °C / -40+70 °C / -35+35 °C	active, 420 mA	0100 %	active, 420 mA	DC 13,535 V	Yes

Ordering and delivery

When ordering, please give name and type reference, e.g.: Duct sensor **QFM3160** Place a separate order for the service set AQF3153 listed under accessories.

Equipment combinations

All systems and devices capable of acquiring and handling the sensor's DC 0...10 V or 4...20 mA output signal.

When using the sensors for minimum or maximum selection, for averaging, or to calculate enthalpy, enthalpy difference, absolute humidity, and dew point, we recommend to use the SEZ220 signal converter (see Data Sheet N5146).

Technical design

Relative humidityThe sensor acquires the relative humidity in the air duct via its capacitive humidity
sensing element whose capacitance varies as a function of the relative humidity of the
ambient air.
An electronic circuit converts the sensor's signal to a continuous DC 0...10 V or

4...20 mA signal, corresponding to a relative humidity of 0...100 %.

TemperatureThe sensor acquires the temperature in the air duct via its sensing element whose
electrical resistance changes as a function of the temperature.
This variation is converted to an active DC 0...10 V or 4...20 mA output signal,
depending on the type of sensor. The output signal corresponds to a selectable
temperature range of 0...50 °C, -35...+35 °C, or -40...+70 °C.

Burden diagram

Output signal, terminal I1 / I2



The duct sensor consists of a housing, a printed circuit board, connection terminals, a mounting flange and an immersion rod having a measuring tip. The two-part housing comprises a base and a screwed removable cover. A rubber seal is installed between the base and the cover in order to satisfy the requirements of IP 65 degree of protection. The measuring circuit and the setting element are accommodated on the printed circuit board inside the cover, the connection terminals on the base. The measuring tip is screwed on the immersion rod of the housing. The sensing elements are located at the end of the measuring tip and protected by the filter cap. Cable entry is made via the cable entry gland M16 (IP 54) supplied with the sensor, which can be screwed into the housing. Immersion rod and housing are made of plastic and rigidly connected. The sensor is fitted with the mounting flange supplied with the sensor. The flange is to be placed over the immersion rod and then secured in accordance with the required immersion length. Measured value display The types QFM3160D and QFM3171D provide the measured values on its LCD display. The following measured values are displayed alternately in intervals of 5 s: Temperature: in °C or °F Humidity: in % r. h. Setting element Measuring range Test function active

123 U1 U2 11 12 0 0 0 0 0 0 °F 🕄 °C 000 10 V 20 mA 12 mA 5 V 5 V 10 V 12 mA 20 mA 0 0 Display temperature unit 0 V 5 V 12 mA 4 mA 1882Z01en °F °C ၀ၴ၀ 0 5 V 0 V 12 mA 4 mA QFM31...D

The setting elements are located inside the cover. A setting element consists of 6 pins and a jumper. It is used for selecting the required temperature measuring range and for activating the test function. Types with LCD display have a second setting element with 4 pins and a jumper.

The different jumper positions have the following meaning:

- For the active temperature measuring range: Jumper in the left position (R1) = -35...+35 °C, Jumper in the middle position (R2) = 0...50 °C (factory setting) Jumper in the right position (R3) = -40...+70 °C
- For the active test function: Jumper in the horizontal position: The values available at the signal output are those given in the table "Test function active"
- For the measured value display (QFM31..D)

- Jumper vertical in the right position	=	°C (factory setting)
- Jumper vertical in the left position	=	°F

Malfunction	 Should the temperature sensor become faulty a voltage of 0 V (4 mA) will be applied at signal output U2 (I2) after 60 seconds, and the humidity signal at signal output U1 (I1) will reach 10 V (20 mA). Should the humidity sensor become faulty a voltage of 10 V (20 mA) will be applied at signal output U1 (I1) after 60 seconds, and the temperature signal will remain active. 		
Service set AQF3153	 The service set comprises three measuring tips without sensor element. Each tip signals a predefined temperature and humidity value to the basic unit: 85 % r. h., 40 °C 50 % r. h., 23 °C 20 % r. h., 5 °C The fixed values are available at the signal outputs. The accuracy of the values is the same as for the test function. The measuring tips can be exchanged in operation. 		
Accessories			
	Name	Type reference	
	Filter cap (for replacement)	AQF3101	
	Measuring tip (exchangeable for replacement)	AQF3150	
	Service set (for function test)	AQF3153	
	3 m cable for remote measurement	AQY2010	
Engineering notes			
	A transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required to power the sensor. When sizing and protecting the transformer, the local safety regulations must be complied with. When sizing the transformer, the power consumption of the duct sensor must be taken into consideration. For correct wiring of the sensor, refer to the Data Sheets of the devices with which the sensor is used. The permissible line lengths must be considered.		
Cable routing and cable selection	It must be considered for routing of cables that the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems. Twisted pair cables are required for the secondary supply lines and the signal lines.		
Note to QFM2171(D)	Terminals G1(+) and I1(–) for the humidity output must a even if only terminals G2(+) and I2(–) of the temperature $G(-)$	always be connected to power, e output are used!	

Mounting notes

Location	Mount the sensor in the center of the duct wall. If used together with steam humidifiers, the minimum distance after the humidifier must be 3 m to max 10 m. Fit the sensor in the extract air duct if the application involves dew point shifting. Fit only the flange to the duct wall. The sensor is then inserted through the flange and engaged.
Caution!	 The seal between base and cover must not be removed, or else degree of protection IP 65 will be no longer ensured.
	 The sensing elements inside the measuring tip are sensitive to impact. Avoid any such impact on mounting.
Mounting instructions	Mounting Instructions are printed on the inner side of the package.
Commissioning notes	
	Check wiring before switching on power. The temperature measuring range must be selected on the sensor, if required.
	Wiring and the output signals can be checked by making use of the test function (refer to "Mechanical design").
\triangle	We recommend not to use voltmeters or ohmmeters directly at the sensing element. In the case of the simulated passive output signals, measurements with commercially available meters cannot be made (measuring current too small).
Disposal	
X	The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.
∕⊩_©∖	 Dispose of the device via the channels provided for this purpose

• Dispose of the device via the channels provided for this purpose.

• Comply with all local and currently applicable laws and regulations.

Technical data

ACIDC 24 V class 2 (US) ACIDC 24 V class 2 (US) Frequency 50/60 Hz al AC 24 V Power consumption ≤1 VA External supply line protection Fue slow max. 10 A of Class attracting B, C, D according to of Cable lengths for the measuring signal Numidity sensor* Max. perm. cable lengths See data sheet of the device handling the signal signal Prunctional data "Humidity sensor* Measuring accuracy at 23 °C and ACIDC 24 V lin 0.100 % r.h. Time constant 20.05 % r.h. /CC Time constant Supply air velocity 20 nh S Output signal, linear (terminal U1) Dec10 V ≤ D., 100 % r.h. Burdon See function* Heasuring range -335 °C (R1)4070 °C (R3) Sensing element P 1000 Measuring accuracy at ACDC 24 V in 23.5 23 °C ±0.50 °C (R2)4070 °C (R3) Sensing element P 1000 Measuring accuracy at ACDC 24 V in 23.5 23 °C ±0.50 °C (R1)	Power supply	Operating voltage	AC 24 V +20 % or DC 13.535 V (SELV)
ACIDC 24 V class 2 (US) Frequency 50/60 Hz at AC 24 V Power consumption ≤1 VA External supply line protection Fuse slow max. 10 A or Cricuit breaker max. 13 A Crable lengths for the measuring signal Max. perm. cable lengths Functional data Measuring range **Umidity sensor* Measuring range Measuring range 0100 % r.h. **Umidity sensor* Measuring range Output signal, linear (terminal U1) DC 0100 % r.h. Temperature dependency ≤ 0.05 % r.h./°C Time constant < 20 s			or
Frequency50/060 Hz at AC 24 VPower consumption<1 VA			AC/DC 24 V class 2 (US)
Power consumption <11VA		Frequency	50/60 Hz at AC 24 V
External supply line protection Fuse slow max. 10 A or or Cable lengths for the measuring signal Max. perm. cable lengths See data sheet of the device handling the signal See data sheet of the device handling the signal Punctional data Measuring accuracy at 23 °C and AC/DC 24 V in 0.00 % r.h. "Humidity sensor" Measuring accuracy at 23 °C and AC/DC 24 V in 0.00 % r.h. Dutput signal, linear (terminal U1) DC 0100 % r.h. Temperature dependency 42.00 m/s Output signal, linear (terminal U1) DC 0100 % r.h. Burden See functional Measuring accuracy at AC/DC 24 V in 2.00 m/s 0.00 % r.h. Output signal, linear (terminal U1) Measuring accuracy at AC/DC 24 V in 2.00 m/s Output signal, linear (terminal U1) See functional Measuring accuracy at AC/DC 24 V in 2.3 K 10.3 K 23 °C 10.3 K 155 °C 10.6 K 5 °C 10.6 K 6 °C °C ?C		Power consumption	<1 VA
Cable lengths for the measuring signal Max. perm. cable lengths See data stream initiation of max. 10 A Cable lengths for the measuring signal Max. perm. cable lengths See data stream of the device handling the signal Functional data Measuring range 0100 % r.h. "Humidity sensor" Measuring range 0100 % r.h. Measuring range 0100 % r.h. 20 % r.h. Time constant < 20 s			
Cable lengths for the measuring signal Max. perm. cable lengths See data sheet of the device handling the signal Functional data Measuring range 0100 % r.h. "Humidity senso" Measuring range 0100 % r.h. "Temperature dependency < 0.05 % r.h.*CC			Fuse slow max. To A
Power source with current limitation of max.10 ACable lengthsSee data sheet of the device handling the signalSupport of the device handling the signalMax. perm. cable lengthsSee data sheet of the device handling the signal"Humidity sensor"Measuring accuracy at 23 °C and AC/DC 24 V in 0100% r.h.1.00 % r.h.Temperature dependency< 0.05 % r.h./*CTime constant< 20 sSupply air velocity20 m/sOutput signal, linear (terminal U1)De Co100 % r.h.Durbut signal, linear (terminal U1)Max. 20 m/sOutput signal, linear (terminal U1)Max. 20 m/sOutput signal, linear (terminal U1)Max. 20 m/sDurbut signal, linear (terminal U1)Max. 20 m/sWeasuring range050 °C (R2 = factory setting)."Temperature sensor"# do 3 K # 3.3 °C (R1), -40+70 °CWeasuring accuracy at AC/DC 24 V in 23 °C# do 3 K # do 3 KDegree of protectionProtection degree of housingProtection classIII according to EN 60730-1 # do 4 KProtection degree of housingProtection degree of housingDegree of protectionClase weat reminalsProtection degree of housingProtection degree of housingProtection degree of housing<			or Circuit breaker max. 13 A Characteristic B, C, D according to or
Cable lengths for the measuring signal See data sheet of the device handling the signal Functional data Measuring range $0100 \% r.h.$ "Humidity sensor" $0100 \% r.h.$ $\pm 2 \% r.h.$ Temperature dependency $< 0.05 \% r.h.$ $\pm 2 \% r.h.$ Temperature dependency $< 0.05 \% r.h./°C$ Time constant Gutput signal, linear (terminal U1) DC 0100 % r.h. DC 0100 % r.h. Output signal, linear (terminal U1) DC 0100 % r.h. Burden Weasuring range $050 \% (R.2 = factory setting).$ Duput signal, linear (terminal U1) Burden See "Function" Measuring range $050 \% (R.2 = factory setting).$ "Temperature sensor" Sensing element Pt 1000 Measuring accuracy at AC/DC 24 V in 23 °C $\pm 0.3 K$ So of $-35+35 \% C$ (1). $-40+70 \% C$ (R3) Sensing element Pt 1000 Measuring accuracy at AC/DC 24 V in 23 \% C $\pm 050 \% C$ ($-3.5+35 \% C$ ($-40+70 \% C$ Degree of protection Pt tocol acts Time constant $< 3.5 \min$ $< 050 \% C$ ($-35+35 / -40+70 \% C$ Burden See "Function" See There of the device handling the electron constant $< 3.5 \min A = 050 / - 35+35 / - 40+70 \% C$ Degree			Power source with current limitation of max.
Functional data Measuring range 0100 % r.h. "Humidity sensor" Measuring accuracy at 23 °C and AC/DC 24 V in 1100 % r.h. Image: Constant 4.2 % r.h. 1100 % r.h. Temperature dependency < 0.05 % r.h./°C	Cable lengths for the measuring signal	Max. perm. cable lengths	See data sheet of the device handling the signal
"Humidity sensor" Measuring accuracy at 23 °C and AC/DC 24 V in 0100 % r.h. +2 % r.h. Temperature dependency ≤ 0.05 % r.h./*C Time constant < 20 s	Functional data	Measuring range	0100 % r.h.
Temperature dependency $\leq 0.05 \% r.h./rC$ Time constant $< 20 s$ Supply air velocity20 m/sOutput signal, linear (terminal U1)DC 010 V $\cong 0100 \% r.h.$ max. 1 mAOutput signal, linear (terminal U1)See "Function"Punctional dataSee "Function""Temperature sensor" $ascuring range$ $050 "C (R2 = factory setting), 35+35 "C (R1), -40+70 "C (R3)Sensing elementP1 1000Measuring accuracy at AC/DC 24 V in23 "C\pm 0.3 K\pm 0.6 K23 "C\pm 0.6 K-35+75 "C + 10.6 K-35+75 "C + 10.0 K-3$	"Humidity sensor"	Measuring accuracy at 23 °C and AC/DC 24 V in 0100 % r.h.	±2 % r. h.
Time constant $< 20 \text{ s}$ Supply air velocity20 m/sOutput signal, linear (terminal U1)DC 010 V \cong 0100 % r.h.max. 1 mAOutput signal, linear (terminal I1)BurdenSee "Function"BurdenSee "Function"Measuring range050 °C (R2 = factory setting), $-35+35 °C$ (R1), $-40+70 °C$ (R3)Sensing elementPt 1000Measuring acuracy at AC/DC 24 V in 23 °C $\pm 0.3 \text{ K}$ $1535 °C$ 23 °C $\pm 0.3 \text{ K}$ $1535 °C\pm 0.6 \text{ K}-35+70 °CTime constant<3.5 min. in with 2 m/s moved airOutput signal, linear (terminal U2)Degree of protectionProtection classProtection classIll according to EN 60529 in the built-instateElectrical connectionsScrew terminalsElectrical connections1 \times 2.5 \text{ mm}^2 or 2 \times 1.5 \text{ mm}^2Cable entry gland (enclosed)M 16 x 1.5ConditionsClimatic conditionsClimatic conditionsClass 4K2 to IEC 60 721-34-40+70 °CLGD display readable-25+70 °CTransport toClimatic conditionsClass 3M2 to IEC 60 721-34-40+70 °CClimatic conditions$		Temperature dependency	≤ 0.05 % r.h./°C
Supply air velocity20 m/sOutput signal, linear (terminal U1)DC 010 V \cong 0100 % r.h.max. 1 mAOutput signal, linear (terminal I1)BurdenSee "Function"Measuring range050 ° C (R2 = factory setting),"35+35 °C (R1)40+70 °C (R3)Sensing elementPt 1000Measuring accuracy at AC/DC 24 V in 23 °C23 °C±0.3 K1535 °C±0.6 K-35+70 °C±0.8 KTime constant< 3.5 min. in with 2 m/s moved air		Time constant	< 20 s
Punctional dataOutput signal, linear (terminal U1)DC 010 V \cong 0100 % r.h. max. 1 mAFunctional dataOutput signal, linear (terminal I1)420 mA \cong 0100 % r.h. Burden"Temperature sensor"050 °C (R2 = factory setting), 35+35 °C (R1), -40+70 °C (R3)Sensing elementPt 1000Measuring accuracy at AC/DC 24 V in 23 °C±0.3 K ±0.3 K ±1535 °C ±0.6 K 35+35 °C / -40+70 °C ±0.8 KTime constantC 100 % r.h. max.1 mAOutput signal, linear (terminal U2)DC 010 V \cong 050 °C /-35+35 °C /-40+70 °C max.1 mADegree of protectionProtection classProtection classIII according to EN 60730-1 Protection classProtection classIII according to EN 60730-1 Defate er value of the output signal, linear (terminal I2) BurdenLed tional diste1 × 2.5 mm² or 2 × 1.5 mm² Cable entry gland (enclosed)Electrical connectionsClass effections Class 4K2 to IEC 60 721-3-4 Temperature (housing with electronics) Class 3M2 to IEC 60 721-3-3 Temperature (housing with electronics) Class 2M2 to IEC 60 721-3-3Invicing with electronicsClass 3M2 to IEC 60 721-3-3 Tarksport to Climatic conditionsClass 2M3 to IEC 60 721-3-2 Climatic conditionsClass 2M3 to IEC 60 721-3-2 Climatic conditions		Supply air velocity	20 m/s
Functional data "Temperature sensor"Output signal, linear (terminal 11) Burden $420 \text{ mA} \stackrel{\frown}{=} 0100 \% \text{ r.h.}$ See "Function"Functional data "Temperature sensor"Measuring range $050 \text{ °C} (R2 = \text{factory setting}),$ $-35+35 ^{\circ} C (R1), -40+70 ^{\circ} C (R3)$ Sensing elementPt 1000Measuring accuracy at AC/DC 24 V in 23 °C $23 ^{\circ} C$ $\pm 0.3 \text{ K}$ $1535 ^{\circ} C$ $-35+70 ^{\circ} C$ Z3 °C $-35+70 ^{\circ} C$ $\pm 0.8 \text{ K}$ $\pm 0.6 \text{ K}$ $-35+35 ^{\circ} C / -40+70 ^{\circ} C$ max. 1 mAOutput signal, linear (terminal U2)DC 010 V $\cong 050 / -35+35 ^{\circ} C / -40+70 ^{\circ} C$ BurdenDegree of protectionProtection classProtection classIII according to EN 60730-1 Protection classProtection class1 × 2.5 mm² or 2 × 1.5 mm² Cable entry gland (enclosed)Electrical connectionsCirew terminals Cable entry gland (enclosed)Environmental conditionsOperation to Class 4K2 to IEC 60 721-34 Temperature (housing with electronics) LCD display readable LCD display readable LCD display readable Class 3K2 to IEC 60 721-3-4 Class 3K2 to IEC 60 721-3-3 Temperature (housing with electronics) LCD display readable Class 3K2 to IEC 60 721-3-3Temperature (housing with electronics) LCD display readable HumidityClass 3K2 to IEC 60 721-3-3 Class 3K2 to IEC 60 721-3-2 Climatic conditions		Output signal, linear (terminal U1)	DC 010 V
Functional data Measuring range $050 \ ^{\circ}C \ (R2 = factory setting), -35+35 \ ^{\circ}C \ (R1), -40+70 \ ^{\circ}C \ (R3)$ Sensing element Pt 1000 Measuring accuracy at AC/DC 24 V in 23 \ ^{\circ}C \ ±0.3 K \ ±0.3 K \ ±0.3 K \ ±555 \ ^{\circ}C \ ±0.6 K \ -35+70 \ ^{\circ}C \ ±0.8 K \ \hline Time constant <3.5 min. in with 2 m/s moved air		Output signal, linear (terminal I1) Burden	420 mA
Sensing elementPt 1000Measuring accuracy at AC/DC 24 V in 23 °C ± 0.3 K ± 0.3 K 1535 °C ± 0.3 K 	Functional data "Temperature sensor"	Measuring range	050 °C (R2 = factory setting), -35+35 °C (R1), -40+70 °C (R3)
Measuring accuracy at AC/DC 24 V in 23 °C ± 0.3 K ± 0.6 K $-35+70 °C$ 1535 °C ± 0.6 K Time constant70.8 KTime constant < 3.5 min. in with 2 m/s moved air Output signal, linear (terminal U2)DC 010 V $\triangleq 050 °C / -35+35 °C / -40+70 °C$ 		Sensing element	Pt 1000
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		Measuring accuracy at AC/DC 24 V in	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		23 °C	±0.3 K
Image: InstantImage: InstantImage: InstantTime constant<3.5 min. in with 2 m/s moved air		1535 °C	±0.6 K
Inite Constant \sim 3.3 min. In which 2 mis moved allOutput signal, linear (terminal U2)DC 010 V $\cong 050 °C / -35+35 °C / -40+70 °C$ max. 1 mAOutput signal, linear (terminal I2) Burden420 mA $\cong 050 / -35+35 / -40+70 °C$ See "Function"Degree of protectionProtection classProtection classIII according to EN 60730-1 Protection degree of housingIP65 according to EN 60529 in the built-in stateElectrical connectionsScrew terminals1 × 2.5 mm² or 2 × 1.5 mm²Cable entry gland (enclosed)M 16 × 1.5Environmental conditionsOperation to Climatic conditionsClimatic conditionsClass 4K2 to IEC 60 721-3-4 -40+70 °C LCD display readable -25+70 °C LCD display readable HumidityMechanical conditionsClass 3M2 to IEC 60 721-3-3Transport to Climatic conditionsIEC 60 721-3-2 Climatic conditionClimatic conditionsClass 2K3 Class 2K3			$\pm 0.0 \text{ K}$
Degree of protectionProtection classIII according to EN 60730-1Degree of protectionProtection classIII according to EN 60730-1Protection classIII according to EN 60730-1Protection degree of housingIP65 according to EN 60529 in the built-in stateElectrical connectionsScrew terminals1 × 2.5 mm² or 2 × 1.5 mm²Cable entry gland (enclosed)M 16 x 1.5EnvironmentalOperation toConditionsClass 4K2 to IEC 60 721-3-4Temperature (housing with electronics)-40+70 °CLCD display readable-25+70 °CHumidity0100 % r. h. (with condensation)Mechanical conditionsClass 3M2 to IEC 60 721-3-3Transport toIEC 60 721-3-2Climatic conditionClass 2K3Transport toIEC 60 721-3-2Climatic conditionClass 2K3		Output signal linear (terminal LI2)	
Output signal, linear (terminal I2) 420 mA $\triangleq 050 / -35+35 / -40+70 °C$ Burden Degree of protection Protection class III according to EN 60730-1 Protection degree of housing IP65 according to EN 60529 in the built-in state Electrical connections Screw terminals 1 × 2.5 mm ² or 2 × 1.5 mm ² Cable entry gland (enclosed) M 16 x 1.5 Environmental conditions Climatic conditions Class 4K2 to IEC 60 721-3-4 Temperature (housing with electronics) -40+70 °C LCD display readable -25+70 °C Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3		Ouput signal, inear (terminal 02)	≙ 050 °C / −35+35 °C / −40+70 °C max. 1 mA
Degree of protection Protection class III according to EN 60730-1 Protection degree of housing IP65 according to EN 60529 in the built-in state Electrical connections Screw terminals 1 × 2.5 mm² or 2 × 1.5 mm² Cable entry gland (enclosed) M 16 x 1.5 Environmental conditions Class 4K2 to IEC 60 721-3-4 Comportation to Climatic conditions CLCD display readable -25+70 °C Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3		Output signal, linear (terminal I2) Burden	420 mA
Designer of protocolor Infection class Infection class Protection degree of housing IP65 according to EN 60529 in the built-in state Electrical connections Screw terminals 1 × 2.5 mm² or 2 × 1.5 mm² Cable entry gland (enclosed) M 16 x 1.5 Environmental conditions Class 4K2 to IEC 60 721-3-4 Comperature (housing with electronics) -40+70 °C LCD display readable -25+70 °C Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3	Degree of protection	Protection class	III according to EN 60730-1
Electrical connections Screw terminals 1 × 2.5 mm² or 2 × 1.5 mm² Cable entry gland (enclosed) M 16 x 1.5 Environmental conditions Operation to Climatic conditions Class 4K2 to IEC 60 721-3-4 Temperature (housing with electronics) -40+70 °C LCD display readable -25+70 °C Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3		Protection degree of housing	IP65 according to EN 60529 in the built-in state
Cable entry gland (enclosed) M 16 x 1.5 Environmental conditions Operation to Conditions Climatic conditions Climatic conditions Class 4K2 to IEC 60 721-3-4 Temperature (housing with electronics) -40+70 °C LCD display readable -25+70 °C Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3	Electrical connections	Screw terminals	$1 \times 2.5 \text{ mm}^2 \text{ or } 2 \times 1.5 \text{ mm}^2$
Environmental conditions Operation to Climatic conditions Climatic conditions Class 4K2 to IEC 60 721-3-4 Temperature (housing with electronics) LCD display readable -25+70 °C Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to Climatic condition Class 2K3		Cable entry gland (enclosed)	M 16 x 1.5
conditions Climatic conditions Class 4K2 to IEC 60 721-3-4 Temperature (housing with electronics) -40+70 °C LCD display readable -25+70 °C Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3	Environmental	Operation to	
Temperature (housing with electronics) -40+70 °C LCD display readable -25+70 °C Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3	conditions	Climatic conditions	Class 4K2 to IEC 60 721-3-4
Humidity 0100 % r. h. (with condensation) Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3		Temperature (housing with electronics)	-40+70 °C
Mechanical conditions Class 3M2 to IEC 60 721-3-3 Transport to IEC 60 721-3-2 Climatic condition Class 2K3		LCD display readable	-25+70 C 0 100 % r b (with condensation)
Transport toIEC 60 721-3-2Climatic conditionClass 2K3Climatic conditionClass 2K3		Mechanical conditions	Class 3M2 to IEC 60 721-3-3
Climatic condition Class 2K3		Transport to	IEC 60 721-3-2
		Climatic condition	Class 2K3
-40+70		Temperature	-40+70 °C
Mechanical conditions		Mechanical conditions	S 35 % 1. 11. Class 2M2

Base	Polycarbonate, RAL 7001 (silver-grey)	
Cover	Polycarbonate, RAL 7035 (light-grey)	
Immersion rod	Polycarbonate, RAL 7001 (silver-grey)	
Filter cap	Polycarbonate, RAL 7001 (silver-grey)	
Mounting flange	PA66 – GF35 (black)	
Cable entry gland	PA, RAL 7035 (light-grey)	
Sensor (complete assembly)	Silicone-free	
Packaging	Corrugated cardboard	
Product standard	EN 60730-1	
	Automatic electrical controls for household and similar use	
Electromagnetic compatibility (Applications)	For use in residential, commerce, light- industrial and industrial environments	
EU Conformity (CE)	CE1T1882xx *)	
RCM Conformity	CE1T1864en_C1 ^{*)}	
UL	UL 873, http://ul.com/database	
The product environmental declaration CE1E1882 ^{')} contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		
Incl. packaging		
Without LCD display	0.208 kg	
With LCD display	0.225 kg	
AQF3150	0.050 kg	
AQF3153	0.066 kg	
	Base Cover Immersion rod Filter cap Mounting flange Cable entry gland Sensor (complete assembly) Packaging Product standard Electromagnetic compatibility (Applications) EU Conformity (CE) RCM Conformity UL The product environmental declaration CE1E1882 ^{°1} corproduct design and assessments (RoHS compliance, n benefit, disposal). Incl. packaging Without LCD display With LCD display AQF3150 AQF3153	

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals



G.	G0	Operating voltage	AC 24 V (SELV) or DC 13.5	.35 V

G1, G2 Operating voltage DC 13.5...35 V

- U1 Signal output DC 0...10 V for relative humidity 0...100 %
- U2 Signal output DC 0...10 V for temperature range 0...50 °C (R2 = factory setting), -35...+35 °C (R1) or -40...+70 °C (R3)
- I1 Signal output 4...20 mA for relative humidity 0...100 %
- I2 Signal output 4...20 mA for temperature range 0...50 °C (R2 = factory setting), -35...+35 °C (R1) or -40...+70 °C (R3)

Note on connection terminals of the **QFM3171(D)**:

Terminals G1(+) and I1(-) for the humidity output must always be connected to power, even if only the temperature output G2(+) and I2(-) is used!

Dimensions

Dimensioning without (with) LCDdisplay





Drilling template with (without) mounting flange



Dimensions in mm

SIEMENS



Symaro™

Duct Relative Humidity and Temperature Sensor Modbus RTU QFM3150/MO

Duct relative humidity (high accuracy) and temperature sensor with Modbus communication

- Modbus RTU (RS-485)
- High measuring accuracy across the entire measuring range
- On-event addressing via push button together with ClimatixTM controllers
- DIP switches setting together with other controllers

The duct sensor is used in ventilation and air conditioning plants where high accuracy and short response times for measuring relative humidity are required. The measuring range covers the entire humidity range of 0...100 %.

Examples

- Storage and production facilities in the paper, textile, pharmaceutical, food, chemical and electronics industry, and so on.
- Laboratories
- Hospitals
- Computer and EDP centers
- Indoor swimming pools
- Greenhouses

The sensor is used as a

- control sensor in the supply or exhaust air
- limit sensor for maximum limitation of supply air humidity after a steam humidifier
- limit sensor, for example, for measured value indication or for connection to a building automation and control system

Technical design

Cable entry is made via the screwed cable gland M16 supplied with the sensor, which can be screwed into the housing.

The sensor is fitted with the mounting flange supplied with the sensor. The flange is placed over the immersion rod and then secured to meet the required immersion length.

Service set AQF3153

The service set has three measuring tips without sensor element. Each tip signals a predefined temperature and humidity value to the basic unit:

- 85 % r.h., 40 °C
- 50 % r.h., 23 °C
- 20 % r.h., 5 °C

The fixed values are available at the signal outputs. The values and the test function have the same accuracy. The measuring tips can be exchanged in operation.

Type summary

Product number	SSN NO.	Temperature measuring range	Operating voltage	Output signal	
QFM3150/MO	S55720-S468	-4070 °C	AC 24 V ±20 %/ DC 13.535 V	Modbus RTU	

Ordering and
deliveryWhen ordering, specify name and product number, for example: Duct sensor QFM3150/MO.
Service set AQF3153 (see Accessories) must be ordered separately.

Accessories

Name	Type reference
Filter cap (for replacement)	AQF3101
Measuring tip (exchangeable for replacement)	AQF3150
Service set (for function test)	AQF3153
3 m cable for remote measurement	AQY2010

Engineering Powering the sensor requires a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty. When sizing and protecting the transformer, comply with all local safety regulations.

When sizing the transformer, determine the power consumption of the room sensor. For correct wiring, see the datasheets of the devices with which the sensor is used. Observe permissible line lengths.

Cable routing and cable selection

Note that when routing cables, the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems.

Twisted pair cables are required for the secondary supply lines and the signal lines.

Mounting Location

Mount the sensor in the center of the duct wall. If used together with steam humidifiers, the minimum distance from the humidifier must be 3 m to maximum 10 m.

Mount the sensor in the exhaust air duct if the application involves dew point shifting. Mount the flange to the duct wall. Then, insert the sensor through the flange and fasten.

- The degree of protection IP65 is not ensured if the seal between the base and cover is removed.
- The sensing elements inside the measuring tip are sensitive to impact. Avoid any impact on mounting.

Mounting instructions

•

Mounting instructions are enclosed in the package.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Function			
Communication	Modbus RTU (RS-485)		
Supported baud rate	9600; 19200; 38400; 57600; 76800; 115200		
Transmission format	1-8-E-1; 1-8-O-1; 1-8-N-1; 1-8-N-2		
Bus termination	120 ohm, jumper selection		

For detailed information about specific functions, see Basic documentation (A6V11610643 *).

Power supply	
Operating voltage	AC 24 V ±20 % or DC 13.535 V (SELV) or AC/DC 24 V class 2 (US)
Frequency	50/60 Hz at AC 24 V
External supply line protection	Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or Power source with current limitation of max. 10 A
Power consumption	≤ 1.5 VA

Functional data				
Humidity sensor				
Measuring range	0100 % r.h.			
Measuring accuracy at 23 °C and AC/DC 24 V in 0100 % r.h.	±2 % r.h.			
Temperature dependency	≤ 0.05 % r.h./°C			
Time constant	< 20 s			
Supply air velocity	20 m/s			
Temperature sensor				
Measuring range	-4070 °C			
Measuring accuracy at AC/DC 24 V in 23 °C 1535 °C -35+70 °C	±0.3 K ±0.6 K ±0.8 K			
Time constant	< 3.5 min in 2 m/s moved air			

Ambient conditions and protection classification				
Protection degree of housing	IP65 according to EN 60529 in built-in state			
Protection class	III according to EN 60730-1			
Environmental conditions Transport	IEC 60721-3-2			
Climatic conditions	Class 2K3			
– Temperature	-4070 °C			
– Humidity	< 95 % r.h.			
Mechanical conditions	Class 2M2			
Operation	IEC 60721-3-3			
Climatic conditions	Class 3K7			
 Temperature (housing with electronics) 	-4070 °C			
– Humidity	0100 % r.h. (with consdensation)			
Mechanical conditions	Class 3M2 to IEC 60721-3-3			

Standards, directives and approvals	
Product standard	EN 60730-1, EN 60730-2-9, EN 61000-6-2, EN 61000-6-3 Automatic electrical controls for household and similar use
Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial and industrial environments
EU conformity (CE)	A5W00037931A *)
RCM conformity	A5W00037932A *)
UL	UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration (A5W90011832 *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

General			
Cable lengths for measuring signals Perm. cable lengths	See data sheet of the device handling the signal		
Electrical connections screw terminals	1 × 2.5 mm ² or 2 × 1.5 mm ²		
Cable entry gland (enclosed)	M 16 × 1.5		
Materials and colors			
Base	Polycarbonate, RAL 7001 (silver-grey)		
Cover	Polycarbonate, RAL 7035 (light-grey)		
Immersion rod	Polycarbonate, RAL 7001 (silver-grey)		
Filter cap	Polycarbonate, RAL 7001 (silver-grey)		
Mounting flange	PA 66 – GF35 (black)		
Cable entry gland	PA, RAL 7035 (light-grey)		
Sensor (complete assembly)	Silicone-free		
Packaging	Corrugated cardboard		
Weight including package	Approx. 234.6 g		

*) The documents can be downloaded from http://siemens.com/bt/download.





SIEMENS



QFM41..

for relative humidity and temperature with calibration certificates

- Operating voltage AC 24 V / DC 13.5...35 V
- Signal output DC 0...10 V / 4...20 mA for relative humidity and temperature
- Very high measuring accuracy throughout the entire measuring range
- Capacitive humidity measurement
- Test function for loop test
- Range of use -40...+70 °C / 0...100 % r. h.

Use

The QFM41.. sensor is used in ventilation and air conditioning plants requiring:

- Very high accuracy and reliability for measuring relative humidity and temperature
- Regular recalibration and readjustment of the sensors

Examples:

- Storage and production facilities in the paper, textiles, pharmaceutical, chemical, electronics industries, etc.
- Laboratories
- Hospitals
- Computer centers
- Greenhouses

Type summary

Type reference	Temperature measuring range	Temperature signal output	Humidity measuring range	Humidity signal output	Operating voltage
QFM4101	-	-	0100 %	active, 420 mA	DC 13.535 V
QFM4160	050 °C, -40+70 °C or -35+35 °C	active, DC 010 V	0100 %	active, DC 010 V	AC 24 V or DC 13.535 V
QFM4171	050 °C, -40+70 °C or -35+35 °C	active, 420 mA	0100 %	active, 420 mA	DC 13.535 V

Ordering and delivery

When ordering, please give name and type reference, e.g.: Room sensor QFM4160 Place a separate order for the service set AQF3153 listed under accessories. The circular connector with its screwed plug is delivered uninstalled. **Equipment combinations** All systems and devices capable of acquiring and handling the sensor's DC 0...10 V or 4...20 mA output signal. When using the sensors for minimum or maximum selection, for averaging, or to calculate enthalpy, enthalpy difference, absolute humidity, and dew point, we recommend to use the SEZ220 signal converter (see Data Sheet N5146). **Technical design Relative humidity** The sensor acquires the relative humidity in the air duct via its capacitive humidity sensing element whose capacitance varies as a function of the relative humidity of the ambient air. An electronic circuit converts the sensor's signal to a continuous DC 0...10 V or 4...20 mA signal, corresponding to a relative humidity of 0...100 % r. h. Temperature The sensor acquires the temperature in the air duct via its sensing element whose electrical resistance changes as a function of the temperature.

This variation is converted to an active DC 0...10 V or 4...20 mA output signal, depending on the type of sensor. The output signal corresponds to a selectable temperature range of 0...50 °C, -35...+35 °C or -40...+70 °C.

Load diagram

Output signal, terminal I1 / I2



The duct sensor consists of a housing, a printed circuit board, connection terminals, an immersion rod having a measuring tip and a circular connector. The two-part housing comprises a base and screwed removable cover.

A rubber seal is installed between the base and the cover in order to satisfy the requirements of IP 65 degree of protection.

The measuring circuit and the setting element are accommodated on the printed circuit board inside the cover the connection terminals on the base.

The measuring tip is screwed on the immersion rod of the housing.

The sensing elements are located at the end of the measuring tip protected by a screwon filter cap.

Cable entry is made via the circular connector, which consists of coupling piece with M16 thread and screwed plug. The coupling piece is secured to the housing and internally wired.

Immersion rod and housing are made of plastic and rigidly connected.

The sensor is fitted with the mounting flange supplied with the sensor. The flange is to be placed over the immersion rod and then secured in accordance with the required immersion length.

Setting element

C Range 1 2 3 0 0 0 0	Measuring range		Te U1	est fur U2	iction ac I1	tive I2
		0000 0000	10 V	5 V	20 mA	12 mA
		0000	5 V	10 V	12 mA	20 mA
		0 0 0 0 0 0	0 V	5 V	4 mA	12 mA
			5 V	0 V	12 mA	4 mA

The setting element is located inside the cover. It consists of 6 pins and a shorting plug. It is used for selecting the required temperature measuring range and for activating the test function.

The different jumper positions have the following meaning:

- For the active temperature measuring range:
- Jumper in the left position (R1) = -35...+35 °C,
 Jumper in the mid position (R2) = 0...50 °C (factory setting)
 Jumper in the right position (R3) = -40...+70 °C
 For the active test function:

Jumper in the horizontal position: The values available at the signal output are those given in the table "Test function active"

- Malfunction
- Should the temperature sensor become faulty a voltage of 0 V (4 mA) will be applied at signal output U2 (I2) after 60 seconds, and the humidity signal at signal output U1 (I1) will reach 10 V (20 mA).
- Should the humidity sensor become faulty a voltage of 10 V (20 mA) will be applied at signal output U1 (I1) after 60 seconds, and the temperature signal will remain active.
- Calibration certificates The sensor and its exchangeable AQF4150 measuring tip are numbered, registered and calibrated prior to delivery. Calibration is traceable to national standards, e.g. METAS, NIST, LNE, PTB. The associated calibration certificates are supplied with the sensor.

Service set AQF3153	 The service set comprises three measuring nals a predefined temperature and humidity 85 % r. h., 40 °C 50 % r. h., 23 °C 20 % r. h., 5 °C The fixed values are available at the signal of the test function. The measuring tips can be The service set allows for easy and quick loor Vertical Market Pharma and offered by their 	tips without sensor element. Each tip sig- value to the basic unit: butputs. The accuracy is the same as for exchanged in operation. op test performance as recommended by calibration service in various countries.	
Accessories			
	Name	Type reference	
	Measuring tip certified (exchangeable)	AQF4150	
	Service set (for loop test)	AQF3153	
	Filter cap (for replacement)	AQF3101	
	3 m cable for remote measurement	AQY2010	
Engineering notes			
Cable routing and cable selection Note to QFM4171	A transformer for safety extra low-voltage (S duty is required to power the sensor. When s local safety regulations must be complied wi When sizing the transformer, the power cons into consideration. For correct wiring of the sensor, refer to the sensor is used. The permissible line lengths must be conside It must be considered for routing of cables th and the smaller the distance between them, Shielded cables must be used in environmen Twisted pair cables are required for the secon Terminals G1(+) and I1(-) for the humidity o even if only terminals G2(+) and I2(-) of the	ELV) with separate windings for 100 % sizing and protecting the transformer, the th. sumption of the duct sensor must be taken Data Sheets of the devices with which the ered. hat the longer the cables run side by side the greater the electrical interference. hts with EMC problems. ondary supply lines and the signal lines. utput must always be connected to power, temperature output are used!	
would indes			
Location	Mount the sensor in the center of the duct wall. If used together with steam humidifiers, the minimum distance after the humidifier must be 3 m to max 10 m. Fit the sensor in the extract air duct if the application involves dew point shifting. Fit only the flange to the duct wall. The sensor is then inserted through the flange and engaged.		
Caution!	 The seal between base and cover must not be removed, or else degree of protection IP 65 will be no longer ensured. The sensing elements inside the measuring tip are sensitive to impact. Avoid any such impact on mounting. 		
Mounting instructions	Mounting Instructions are printed on the inner side of the package.		
Commissioning notes

Check wiring before switching on power. The temperature measuring range must be selected on the sensor, if required.

Wiring and the output signals can be checked by making use of the test function (refer to "Mechanical design").



We recommend not to use voltmeters or ohmmeters directly at the sensing element. In the case of the simulated passive output signals, measurements with commercially available meters cannot be made (measuring current too small).

Disposal



The devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Power supply	Operating voltage	AC 24 V ±20 % or DC 13,535 V (SELV)
		AC/DC 24 V class 2 (US)
	Frequency	50/60 Hz at AC 24 V
	Power consumption	≤1 VA
	External supply line protection	Fuse slow max. 10 A
		or Circuit breaker max. 13 A Characteristic B, C, D according to or
		Power source with current limitation of max. 10 A
Cable lengths for the measuring signal	Max. perm. cable lengths	refer to Data Sheet of the device handling the signal
Functional data	Measuring range	0100 % r.h.
"Humidity sensor"	Measuring accuracy at 23 °C and AC/DC 24 V in 0100 % r.h.	±2 % r.h.
	Temperature dependency	≤0.05 % r.h./°C
	Time constant	< 20 s
	Supply air velocity	20 m/s
	Output signal, linear (terminal U1)	DC 010 V ≙ 0100 % r.h., 1 mA max.
	Output signal, linear (terminal I1) Burden	420 mA
Functional data "Temperature sensor"	Measuring range	050 °C (R2 = factory setting), -35+35 °C (R1), -40+70 °C (R3)
	Sensing element	Pt 1000
	Measuring accuracy at AC/DC 24 V in 23 °C	±0.3 K
	1535 °C	±0.6 K
	–35+70 °C	±0.8 K
	Time constant	< 3.5 min. in with 2 m/s moved air
	Output signal, linear (terminal U2)	DC 010 V
	Output signal, linear (terminal l2) Burden	420 mA
Degree of protection	Protection class	III according to EN 60730-1
	Protection degree of housing	IP65 according to EN 60529 in the built-in state
Electrical connections	Connector with screwed plug Screw terminals for Cable entry	Lumberg RSC 4/9 0.75 mm ² max. 48 mm dia.
Environmental conditions	Operation to Climatic conditions Temperature (housing with electronics) Humidity Mechanical conditions	class 4K2 to IEC 60 721-3-4 -40+70 °C 0100 % r. h. (with condensation) class 3M2 to IEC 60 721-3-3
	Transport to Climatic condition Temperature Humidity Mechanical conditions	IEC 60721-3-2 class 2K3 -40+70 °C <95 % r.h. class 2M2

Materials and colors	Base	polycarbonate, RAL 7001 (silver-grey)		
	Cover	polycarbonate, RAL 7035 (light-grey)		
	Immersion rod	polycarbonate, RAL 7001 (silver-grey)		
	Filter cap	polycarbonate, RAL 7001 (silver-grey)		
	Mounting flange	PA66 – GF35 (black)		
	Circular connector Connector with screwed plug Contact carrier and body Knurled nut and contact Coupling piece Contact carrier Casing and contact	Lumberg RSC 4/9 PA, black CuZn, nickel-plated Lumberg RKFM 4/0,5 M TPU CuZn, nickel-plated		
	Sensor (complete assembly)	silicon-free		
	Packaging	corrugated cardboard		
Directives and Standards	Product standard	EN 60730-1		
		Automatic electrical controls for household and similar use		
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light- industrial and industrial environments		
	EU Conformity (CE)	CE1T1883xx ^{*)}		
	RCM Conformity	CE1T1864en_C1 ^{*)}		
	UL	UL 873, http://ul.com/database		
Environmental compatibility	The product environmental declaration CE1E1882 ^{°)} contains data on environmentally compatible pro- duct design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).			
Weight	Weight Incl. packaging 0.244 kg AQF3153 0.066 kg AQF3153 0.050 kg			

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals



Note on connection terminals of the QFM4171:

Terminals G1(+) and I1(-) for the humidity output must always be connected to power, even if only the temperature output G2(+) and I2(-) is used!



Drilling template with (without) mounting flange

Dimensions in mm

SIEMENS



Condensation monitor

QXA2100 QXA2101

Monitor to prevent damage caused by condensation on chilled ceilings and HVAC plants with AC/DC 24 V power.

Application

- Monitors condensation build up in buildings with chilled ceilings or ventilation, air conditioning, and heating plants
- Prevents condensation on chilled ceilings
- Prevents condensation at critical points in HVAC plants or buildings (ducts, fans, etc.)
- Prevents condensation on surfaces
- Use as a condensation switch

With the sensing element, the condensation monitor records relative humidity close to the dew point (=100 % r. h.). The resistance of the sensing element raises sharply between 90...100 % r. h. The electronics switch the relay prior to reaching the dew point. For example, switching the relay (2-point output) has the following effect on chilled ceiling applications:

- 1. The cool output is switched off through valve position or controller until the condensation signal disappears.
- Water flow temperature is increased immediately to a selectable value (e.g. 1 to 2 K) and then slowly lowered after the signal disappears.

The specific control function is required on the controller for this application.



The diagram shows the relay status when power is on. When power is off the relay contact Q11-Q12 is closed. The detector does not withstand continuous condensation.

Note

Key

Technical design

The device is planned for AC/DC 24 V power with potential free AC/DC 1...30 V changeover contact or with extension module AQX2000 for AC 230 V power with potential free AC/DC 12...250 V changeover contact.

QXA2100

Housing with snap-on cover made of pure white, flame retardant thermoplastics with spring-loaded humidity sensing element, holding relay with changeover contact, connection terminals, and Pg 11 cable entry glands made of plastic.



Key

2 Fixing screw with strap-on band

3 Terminal block

- 4 Nose of snap-on facility
- 5 Slot for lifting the cover with the help of a screwdriver
- 6 Connection label

QXA2101

The same as QXA2100, but with remote sensor head (fixed cable connection of 1 m) rather than a directly integrated sensor.

View: Sensor head on the mounting side







- Sensing element
- 2 Tensioning strap

1

3 Connector cable 1 m to base housing

AQX2000

The AQX2000 extension module consists of base, top section, and printed circuit board with lateral connection terminals.



Note

RXZ40.1

The AQX2000 extension module is not supplied anymore.

The RXZ40.1 terminal cover is available as an option for the AQX2000 extension module. It provides protection against electric shock and keeps terminals free from dust and dirt.

When fitting the terminal cover, ensure that it engages correctly.



Removal of terminal cover

Type summary

	Туре	Order number	Designation
	QXA2100	S55770-T375	Condensation monitor.
	QXA2101	S55770-T376	Condensation monitor with offset sensor
Scope of delivery	 a QXA21 a QXA21 a tension thermal c mounting 	00 condensation detector of 01 condensation detector of ing strap for pipe diameters onductive paste. instructions.	or with offset sensor. s of 10100 mm.
Accessories	Туре	Order number	Designation
	AQX2000	BPZ:AQX2000	Extension module *)
	RXZ40.1	BPZ:RXZ40.1	Terminal cover
	^{*)} Not supplied a	nymore	
Equipment combinations	 All devices that can work with AC/DC 24 V power and the condensation signal from the potential free AC/DC 130 V relay changeover contact with the help of the AQX2000 extension module, with AC 230 V power, it can work the condensation signal from potential free AC/DC 12250 V relay changeover contact. 		
Notes			
Engineering	The AQX2000*) extension module is operated with AC 230 V power. It provides AC 24 V power for the condensation detector and the condensation signal on the potential free AC/DC 12250 V relay changeover contact.		
	*) not available any more		
Mounting Condensation detector QXA2100/QXA2101	 Pipe mounting with tensioning strap (pipe diameter 10100 mm) Surface-mounting on walls or ceilings with 4 screws The condensation monitor performs its function only if the humidity sensing element assumes the same temperature as the surface to be protected against condensation. Please note: Apply a thin layer of thermal conductive paste on the mounting surface Mount at the coldest spot of the chilled ceiling (plant) Mount on the water inlet pipe on water-cooled chilled ceilings 		
Note	Protect the sensing element against aggressive chemicals and dirt, since this can adversely affect the proper operation of the monitor and significantly shorten its life. The condensation detector is supplied with mounting instructions		pressive chemicals and dirt, since this can the monitor and significantly shorten its life. /ith mounting instructions.
Mounting AQX2000 extension module AC 230 V	Top hat raiWall mounMaximum cat	ls EN 60 715–TH 35-7.5 ted (with the help of screws ble length to condensation	s) detector: 20 m

Installation	 Electrical voltage Electric shock Work on electrical installations may only be carried out by qualified electricians or by instructed persons working under the guidance and supervision of a qualified electrician, in accordance with the electrical regulations. Terminal cover RXZ40.1 must be used when using the AQX2000 extension module outside a closed panel.
A Caution!	 Electrical wiring can loosen from the terminals Fire hazard or risk of injury from electrical shock or short circuiting Strain relief required on AC 230 V terminals. Fix wiring with cable bindings (see image below) to the tabs in the housing base.
Commissioning	A functional test can be conducted if needed, by exhaling slowly onto the sensing element several times to simulate condensation.
Note	Do not expose the sensing element to tap water as this can cause electrolytic corrosion.
Power lines AC 230 V	Local regulations regulate sizing and fusing of power lines. Power lines must be fused in the extension module AQX2000 with strain relief (see Engineering).
Disposal	 The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage. Dispose of the device through channels provided for this purpose. Comply with all local, applicable regulations

QXA2100, QXA2101

Power supply G (G+), G0 (G-)	Operating voltage	SELV/PELV AC/DC 24 V ±20 %
	Frequency	50/60 Hz
	Power consumption	Max. 1 VA
	External fuse	 Transformer with secondary current limit of max. 10 A or external secondary current fuse with max. T 10 A non-renewable fuse or max. C 13 A circuit breaker Required under all circumstances
Functional data	Switching point on increase in humidity	
	Switching point on increase in numbery	95 ±4 % r. h.
	Switching differential (fixed)	Approx. 5 % r. n.
	Response time in static air	
	99 to 80 % r. h	Max. 3 min Max. 2 min
Output 011 012 014		Max. 3 min
	Current range at AC/DC 24 V	$0.02 \pm 1.(1) \Delta$
	Starting current at AC/DC 24 V	5,021(1) A
	Switching capacity	min $AC/DC = 1 V = 1 mA$
		max. AC/DC 30 V. 1 A
	External fuse	External fuse at max. T 4 A non-
		renewable fuse required
Connections	Mechanical	strap-on band for pipe Ø 10100 mm
	Electrical connections	
	Screw terminals for	1.5 mm ²
Protective data	Housing	IP 40 per EN 60 529
	Protection class	III as per EN 60 730
En instante i se ditione	Terrerette	
Environmental conditions	Climatic conditions	IEC 60 721-3-2 Class 2K2
	Temperature	
	Humidity	-25+00 C
	Mechanical conditions	Class 2M2
	Operation to	IEC 60 721-3-3
	Climatic conditions	Class 3K5
	Temperature (housing with electronics)	−5+50 °C
	Humidity	595 % r. h. (noncondensing)
	Mechanical conditions	Class 3M2
Directives, standards	Product standard Automatic electronic controls for household and similar	use
		EN 60730-1
	EU conformity (CE)	A5W00004359 ¹⁾
	RCM conformity	CB1T3302en_C1 ''
	EAC compliance	Eurasian compliance
Materials and colors	Housing	Thermoplastic, pure white, flame retardant
		0.400 hm
Dimensions (weight)	Including packaging QXA2100	0.126 Kg
	QXA2101	U. 120 Kg

¹⁾ Documents can be downloaded at <u>http://siemens.com/bt/download</u>.

AQX2000

Power L, N Operating voltage AC 230 V ±10 % Frequency 50/60 Hz Power consumption Max. 4 VA External fuse External secondary current fuse with max. T 10 A non-renewable fuse or max. C 13 A circuit breaker **Required under all circumstances** Status signal input D, GND Inputs Contact voltage DC 37 V (SELV/PELV)) Contact current 13 mA Voltage output G, G0 Outputs Rated voltage range AC 24 V ±20 % (SELV/PELV) Frequency at AC 24 V 50/60 Hz durable max. 1 VA Relay output Q11, Q12, Q14 Potential free changeover contact Not suitable for connecting to SELV/PELV circuits Line fusing requires strain relief AC/DC 12...250 V 0.01...6 A Rated voltage range Min. AC/DC 12 V, 10 mA Rated current range Max. AC/DC 250 V, 6 A Switching capacity 1500 V Insulation against power (L, N) External fuse External secondary current fuse with max. T 6 A non-renewable fuse or max. C 6 A circuit breaker Required under all circumstances Connections Electrical connections Screw terminals for Max. 2 x 1.5 mm² or 1 x 2.5 mm² Wire length to QXA2100, QXA2101 Max. 20 m Degree of protection of housing Protective data With terminal cover and wall-mounting without top hat rail IP30 to EN 60 529 Safety class to EN 60 730 device suited for use with equipment of safety classes I and II IEC 60 721-3-3 **Environmental conditions** Operation to Climatic conditions Class 3K5 Temperature (housing with electronics) –5...+50 °C Humidity <85 % r. h. Mechanical conditions Class 3M2 IEC 60 721-3-2 Transport to Climatic conditions Class 2K2 Temperature -25...+60 °C Humidity <95 % r. h. Mechanical conditions Class 2M2 Product standard Directives, standards Automatic electronic controls for household and similar use EN 60730-1 EU conformity (CE) CE1T1542xx RCM conformity CB1T3302en_C1 1) EAC compliance Eurasian compliance ABS + PC Housing Materials Terminal cover ABS + PC Dimensions (weight) Including packaging 0.2 kg

¹⁾ Documents can be downloaded at <u>http://siemens.com/bt/download</u>.

Connection diagrams



Dimensions

QXA2100



QXA2101



AQX2000





Dimensions in mm

Top hat rails

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QFA1...





QFA1001

QFA1000

Room Hygrostats

for relative humidity

- Hygrostat with single-pole microswitch
- Humidity measuring element made of stabilized plastic texture
- Setpoint knob for the upper switching point
- For controlling humidification equipment
- For controlling dehumidification equipment
- For mounting directly on the wall or on a recessed conduit box

Use

The room hygrostats are used for controlling and monitoring relative humidity in ventilation or air conditioning plant.

They ensure room humidity control within the selectable range of 30 to 90 % relative humidity by controlling humidification or dehumidification equipment.

They can also be used for monitoring minimum or maximum humidity levels.

Type summary

Туре	Setpoint setting	Switching differential ¹⁾		Setpoint
reference	range	Statically	Dynamically	knob
QFA1000	3090 % r. h.	Approx. 4 % r.h.	6 % r.h.	Internally
QFA1001	3090 % r. h.	Approx. 4 % r.h.	6 % r.h.	Externally

1) The static switching differential is determined at a constant ambient humidity by turning the setting knob.

The dynamic switching differential is determined by changing the ambient humidity while maintaining the same setpoint adjustment; only the dynamic switching differential is of practical value. When ordering, please give name and type reference, e.g.: Room hygrostat **QFA1001**

Mode of operation

The room hygrostat acquires the relative humidity of the ambient air via its humidity measuring element, which is made of stabilized plastic texture. This plastic band actuates a microswitch depending on the relative humidity. The microswitch has a fixed switching differential X_{Sd} and a potential-free contact output. If the actual humidity deviates from the adjusted setpoint, the hygrostat switches the humidification or dehumidification equipment as shown in the following function diagram.

Function diagram



Due to the measuring element's aging effect, the switching point drifts slowly and constantly. For this reason, recalibration may be required in due time. At temperatures other than the calibration temperature, the switching point drifts systematically (temperature influence). Also, in the case of fast humidity changes, the switching point will temporarily be shifted.

Mechanical design	
QFA1001	The room hygrostat is designed for wall mounting. It fits on most commercially available recessed conduit boxes. The cables are introduced either from the rear (recessed conduit boxes) or from above (surface-run wires), after knocking out the cable inlet tongues. The unit consists of base and cover. Base and cover can be separated (snap-on connection). The base accommodates the humidity measuring element, setpoint setting element with setting spindle, scale, microswitch and screw terminals.
	The cover carries the removable setpoint knob with its imprinted scale.
QFA1000	This model is of the same basic design as the QFA1001, but there is no external setpoint knob. The setpoint can only be adjusted when the cover is removed.



II according to EN 60730-1

max. 2 x 1.5 mm²

Degree of protection

Protection class

Screw terminals for

Electrical connection

Environmental conditions	Perm. ambient temperature	040 °C
	Noncondensing	−25+40 °C
Materials and colors	Base	PPS Fortron, glassfiber-reinforced, black
	Cover	PC Lexan 940, pure-white
	Humidity measuring element	plastic texture
Directives and Standards	Product standard	EN 60730-1
		Automatic electrical controls for household
		and similar use
	EU Conformity (CE)	CE1T1518xx ²⁾
Weight	QFA1001	0.090 kg
	QFA1000	0.090 kg

1) Can be improved by recalibrating on site

2) The documents can be downloaded from http://siemens.com/bt/download.

Connection diagrams

Internal diagram



Humidification Dehumidification

1-2 1-3

1518A01

Connection diagrams

Diagram 1: Humidification







Dimensions

QFA1000, QFA1001





Dimensions in mm

SIEMENS

	Duct H for relative hur	ygrostats	i		QF	- M 81
	Trans	222222244		Kints		222222441
	QFM81.2	21		QFM	181.2	
	On/off hygros with temperat midity measu with stabilize sensitive to d for the contro for the contro for the contro	stat with microsw ture-compensated rements, d sensing strip (g ust and contamin of of humidificatio of dehumidificatio in ventilating duc	ntch, d humidity se ood linearity ated air), n equipment, tion equipme ts or rooms	nsor for tempe , very stable ev , , nt,	rature-inde en at high I	pendent hu- numidity, in-
Use	The duct hygrover ventilating and	ostats are designed l air conditioning pl	d for controllin ants.	g and monitoring	g the relative	e humidity in
	They control the humidity content of the air within an adjustable range of 15 to 95 % r.h.					
	In air conditior maximum limit	ning plants with hur er in the supply air	nidification, th [·] duct.	e duct hygrostat	can also be	e used as a
	In laboratories mum limiter in	or production facil the supply air duct	ities, the duct	hygrostat can al	so be used	as a mini-
Type summary		I	1	I	1	
	Туре	Order number	Setpoint range (W _h)	Switching differential (X _d)	Degree of pro- tection	Setpoint adjust- ment
	QFM81.2	BPZ:QFM81.2	1595 % r.h.	approx. 4 % r.h.	IP30	externally
	QFM81.21	BPZ:QFM81.21	1595 % r.h.	approx. 4 % r.h.	IP55	internally
Ordering and delivery	When ordering duct hygrostat The delivery c a sealing ring	g, please give name QFM81.2. omprises the hygro (for duct mounting)	e and type ref ostat, a mount	erence; for exam ing flange (for du	nple: uct or wall m	ounting) and

162

Mode of operation

The hygrostat acquires the relative humidity of the air with its humidity sensor, which is a stabilized plastic texture strip. The strip actuates a microswitch with a fixed switching differential X_d and a potential-free contact output (S.P.D.T.), depending on the relative humidity of the air. If the actual humidity deviates from the adjusted setpoint, the hygrostat switches the associated humidification or dehumidification equipment on or off as shown in the following function diagram.





If the relative humidity exceeds the adjusted setpoint, the potential-free contact of the microswitch will change over from 1-2 to 1-3. If the relative humidity falls by the amount of the fixed switching differential X_d, the contact will return to the position 1-2.

Mechanical design QFM81.2 The hygrostat consists of base with immersion sensor stem and cover. The cover is secured to the base with a screw. The stem accommodates the temperature-compensated humidity sensing element (stabilized plastic texture strip). The strip is mechanically linked to the microswitch via a transfer lever. Transfer lever, microswitch, setpoint setting element and connection terminals for connecting the humidification or dehumidification equipment are mounted on a printed circuit board inside the base. The connection terminals are protected by a hinged cover to avoid direct access when the cover is removed. The cover has a hole for the setpoint knob. The hygrostat is designed for mounting in air ducts, but can also be mounted on a wall. For both mounting methods, a mounting flange is required, which is supplied with the unit. Same design as the QFM81.2, but with an additional transparent cover on the hole for QFM81.21 the setpoint knob, cable gland Pg 11, and seal under the unit cover. Setting elements On both units, the setpoint is adjusted with the setpoint knob. The setting scale is on the Setpoint knob unit cover. With the QFM81.21, the setpoint can be adjusted only when the cover is removed.

Mounting notes

Air duct mounting

If the duct hygrostat is used for control, it is to be mounted in the extract air duct after the room to be controlled.

If the duct hygrostat is used for monitoring the maximum or minimum humidity level, it is to be mounted in the supply air duct.

Mounting positions

The immersion sensor stem must be mounted either horizontally or vertically with the stem pointing downward. It may never be mounted with the stem pointing upward. To ensure accurate humidity measurements, it must be made certain that the air to be measured is sufficiently mixed at the point of measurement.



The mounting orientation is dependent on the air velocity in the ductwork: at <5 m/s, the holes in the stem must face the air flow; at >5 m/s, they must be perpendicular to the direction of air flow (see illustration above).

Minimum immersionWhen mounting the hygrostat in air ducts, the minimum immersion length of the stem
(130 mm) must be observed. The mounting flange supplied with the unit allows the im-
mersion length to be adjusted between 130 and 156 mm.

Wall mountingThe hygrostat should be mounted on an inner wall approximately 1.5 m above the floor
and at least 0.5 m from the next wall.

The unit is supplied with mounting instructions.

At the location where the unit is mounted, there should be a natural circulation of room air (no draughts, no corners of the room, not behind curtains, not too close to doors and windows, and not on an outer wall). Sources of heat and refrigeration (radiators, computers, TV sets, concealed heating pipes, hot or cold water pipes) must be in an adequate distance.

The hygrostat should not be exposed to direct solar radiation. For wall mounting, the mounting flange supplied with the hygrostat must be used.

Mounting instructions

Disposal

The device is considered an electronic device for disposal in accordance with European Directive and may not be disposed of as domestic waste.



- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Setpoint range	1595 % r.h.
Control mode	on/off
Switching differential	approx. 4 % r.h. (fixed)
Type of switch	potential-free microswitch (S.P.D.T.)
Contact rating	
Maximum	5 (3) A, AC 250 V
Minimum	100 mA, AC 24 V
External supply line protection (EU)	Fuse slow max. 10 A
	or
	Circuit breaker max.6 A
	Characteristic B, C, D
	according to EN 60898
	or
	Power source with current limitation of max
	10 A
Temperature influence	compensated
Long-term stability	approx 1.5 % r.h./a
Balancing	at 55 % r.h 23 °C
Time constant (v = 0.2 m / s)	approx. 3 min
Perm. air velocity	10 m/s
Perm. ambient temperature	
Operation	070 °C
Storage / transport	−30…+70 °C
Degree of protection	
Protection class	II according to EN 60730-1
Protection degree of housing	
QFM81.2	IP30 according to EN 60529
QFM81.21	IP55 according to EN 60529
Directives and Standards	
Product standard	EN 60730-1
	Automatic electrical controls for house-
	hold and similar use
Electromagnetic compatibility (Application	s) For use in residential, commerce, light-
	industrial and industrial environments
EU Conformity (CE)	CM1T1514xx ³
Connection terminals for	0.5 mm dia. min.
	$2 \times 1.5 \text{ mm}^2 \text{ max}.$
Environmental compatibility:	
I ne product environmental declaration OE-	1-99.41761e ⁷ contains data on environmen-
alitical pockaging onvironmental bonefit di	
Metoriale	sposar).
Sensing element	Polymer
Casing with stem	PPS Fortron 11401.6 glass fibrarain-
forced	
Cover	PC Lexan 940

PC Makrolon 2014R, transparent

approx. 0.34 kg maintenance-free, can be recalibrated

*) The documents can be downloaded from http://siemens.com/bt/download.

Transparent cover

Weight

Maintenance

(only with QFM81.21)

Internal diagram



1–2 Humidification

1–3 Dehumidification

Dimensions







Dimensions in mm

SIEMENS

QPA10..

QPA20..



Room air quality sensors

- Maintenance-free CO₂ sensing element (depending on type) based on optical infrared absorption measurement (NDIR¹⁾)
- Or with VOC²⁾ sensing element based on a heated tin dioxide semiconductor
- CO₂ temperature (active or passive) and CO₂ humidity-temperature multisensor
- No recalibrations required
- Operating voltage AC 24 V or DC 15...35 V
- Signal outputs DC 0...10 V or DC 0...5 V or 4...20 mA adjustable
- Selectable passive temperature sensing element
- 1) NDIR = Non dispersive infrared
- 2) VOC = volatile organic compounds (also called mixed gas)

Use

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

- CO₂ concentrations as an indication of occupancy in rooms where smoking is prohibited.
- VOC concentrations as an indication of odors such as tobacco smoke, body odor, or material fumes in the room.
- Relative humidity in the room.
- Room temperature.
- Sensors QPA10... and QPA20... can be used as a:
- Control sensor.
- Transmitter for building automation and control systems and / or display units (QPA20...D only).

Typical use:

- Acquisition of CO₂ and VOC concentrations: In party rooms, lounges, fair pavilions and exhibition halls, restaurants, canteens, shopping malls, athletic centers, sales rooms, and conference rooms.
- Acquisition of CO₂ concentrations: In rooms with varying occupancy levels where smoking is prohibited, e.g. museums, theaters, movie theaters, auditoriums, office spaces, and school rooms.

Important!

QPA20... sensors may not be deployed as safety devices, e.g. as gas or smoke warning devices!

Type summary

Product number	CO₂ measuring range	VOC time constant	Temperature measuring range	Humidity measuring range	Display of measured value
QPA1000		Slow (R1) Normal (R2) Fast (R3)			
QPA2000	02000 ppm				No
QPA2002	02000 ppm	Slow (R1) Normal (R2) Fast (R3)			No
QPA2002D	02000 ppm	Slow (R1) Normal (R2) Fast (R3)			Yes
QPA2060	02000 ppm		050 °C / –35+35 °C		No
QPA2060D	02000 ppm		050 °C / -35+35 °C		Yes
QPA2062	02000 ppm		050 °C / -35+35 °C	0100 %	No
QPA2062D	02000 ppm		050 °C / -35+35 °C	0100 %	Yes
QPA2080	02000 ppm		Depending on connect- ed sensing element		No
QPA2080D	02000 ppm		Depending on connect- ed sensing element		Yes*

* The passive temperature measured value is not displayed

Ordering

When ordering, please give name and product number, e.g.: Room air quality sensor **QPA2002**

Equipment combinations

All systems and devices capable of processing the following sensor signals: • DC 010 V or DC 05 V or 420 mA passive sensor signals for sensor QPA2080
Symaro TM air quality sensors acquire the CO_2 concentration by infrared absorption measurement (NDIR).
The resulting output signal DC 010 V or DC 05 V or 420 mA is proportionate to the CO_2 content of ambient air.
$ \begin{array}{c} $

VOC concentration (QPA1000)

Symaro[™] air quality sensors determine the mixed gas concentration (VOC) using metal-oxide semiconductor sensing elements. The sensors measure precisely at all times and with no maintenance and recalibration required thanks to an integrated compensation mechanism, saving service costs.

The sensor provides a DC 0...10 V or DC 0...5 V or 4...20 mA output signal proportionate to the VOC content of the ambient air.





X2

0

400 800 1200 1600 2000

[mA] [V] 20 10 16.8 8 13.6 6 10.4 4 7.2 2 4 0

Time constant "VOC signal"

Select the time constant for VOC measurement by limiting the maximum slew rate for the VOC signal. The jumper X130 (measuring range) fine tunes the time constant for VOC ventilation demand.

The center position (R2) produces a normal slew rate of max. 10% change to the VOC signal per minute (factory setting). The other 2 position reduce (R1, 2.5% VOC/min) or increase (R3, 40% VOC/min) the maximum slew rate. A smaller slew rate (R1) filters out short-term VOC concentration peaks, e.g. caused by a highly perfumed person passing by. The sensor reacts immediately and quickly to changes in VOC concentration at the higher slew rate (R3).

Time constant t_{63} selected by jumper X130 corresponds to <13 min (R1), <3.5 min (R2), or <1 min (R3) for a sudden change to 50% VOC.

The sensor acquires and evaluates the CO₂ / VOC concentration and transforms it to a (QPA2002 and QPA2002D) ventilation demand signal.

> It represents the result of maximum selection of the CO₂ measuring signal and the filtered VOC measuring signal. With maximum selection, the 2 demand signals are compared and provided as common air quality demand.

The ventilation demand signal is provided via output X2 as a DC 0...10 V or DC 0...5 V or 4...20 mA signal to be supplied to the ventilation controller.

1961D02_01

Max

[ppm CO₂]

[% VOC]

Ventilation demand diagram (output X2)

CO₂/VOC concentration

Relative humidity (QPA2062 and **QPA2062D**)

The sensor acquires the relative humidity in the room with a capacitive humidity sensing element whose capacitance changes as a function of relative humidity. An electronic measuring circuit converts the signal from the sensing element to a continuous DC 0...10 V or DC 0...5 V or 4...20 mA signal, corresponding to a relative humidity range of 0...100 %.

Temperature active (QPA206...)

The sensor acquires the room temperature with a sensing element whose electrical resistance changes as a function of the temperature. The change is converted to an active DC 0...10 V or DC 0...5 V or 4...20 mA output signal (0...50 °C or −35...+35 °C).

Temperature passive (QPA2080...)

The sensor measures the room temperature using a sensing element where electrical resistance changes with the temperature of the ambient air. The sensing element is on the device's rear side and connected at the appropriate

connection terminals.

The following sensing elements are included with the device:

- LG-Ni1000
- Pt1000
- Pt100
- NTC 10kOhm

Sensing element

Characteristic curve:





Characteristic curve:







Accuracy:



Accuracy:



Pt 1000 (KI. B)



1745D0⁻

0 10 20 30 40 50 60 [°C]

9

Characteristic curve:

R [Ω]

140

120

100

80

-10





Mechanical design

The units are designed for wall mounting and can be deployed with most types of commercially available recessed conduit boxes. The cables can be introduced from the rear (concealed wiring), from below or above (surface-run wires) through knockout openings.

The units consist of 2 major sections: Casing and base plate. Both snap together but can be detached again.

The measuring circuit, the sensing elements, and the setting elements are located on a printed circuit board in the unit.

The mounting base carries the connection terminals.





The setting elements can be accessed after removing the mounting base.

for the measuring range	Meaning of the different jumper positions:		
with QPA2000	 For the CO₂ measuring range: Jumper in the mid position (R2) 	=	02000 ppm (factory setting)
with QPA1000, QPA2002 and QPA2002D	 For VOC: Jumper in the upper position (R1) Jumper in the mid position (R2) 	= =	VOC time constant "slow" VOC time constant "normal" (factory setting)
	 Jumper in the lower position (R3) 	=	VOC time constant "fast"
with QPA206	 For the temperature measuring range: Jumper in the upper position (R1) 	=	–35+35 °C

for output for all QPA	 Jumper in the mid position (R2) = O1 O2 O3 	050 °C (factory setting) = 420 mA = DC 010 V = DC 05 V	
for the active test function	Jumper for the measuring range in the vertical position: The signal output delivers the values according to table "Test function active".		
for selection of the temperature unit on the display	 For the unit of temperature: Jumper in the horizontal, lower position = °C (factory setting) Jumper in the horizontal, upper position = °F 		
Behavior in the event			
QPA1	 In the event of VOC failure, DC 10 V or 5 V or 2 (after 60 seconds). 	20 mA is present at signal output X1	
QPA2	 In the event of CO₂ failure, DC 10 V or 5 V or 2 (after 60 seconds). 	0 mA is present at signal output X1	
QPA2002	 In the event of CO₂ or VOC failure, DC 10 V or 5 V or 20 mA is present at signal output X2 (after 60 seconds) 		
QPA2060 and QPA2060D	 If the temperature sensor becomes faulty, 0 V or 0 mA is present at signal output X2 (after 60 seconds) 		
QPA2062 and QPA2062D	 If the temperature sensor becomes faulty, 0 V or 0 mA is present at signal output X3, and the humidity signal at signal output X2 increases to DC 10 V or 5 V or 20 mA (after 60 seconds). If the humidity sensor becomes faulty, DC 10 V or 5 V or 20 mA is present at signal output X2 (after 60 seconds), and the temperature signal remains active. 		
Display of measured values	With sensors type QPA2002D , QPA2060D and Q be read on an LCD. The following measured value - CO_2 : In ppm - CO_2 + VOC: As a bar chart: 4 bars $\triangleq X2 = 2$ 20 bars $\triangleq X2 = -$ - Temperature: In °C or °F	PA2062D , the measured values can es are displayed: 2 V or 1 V or 7.2 mA, 10 V or 5 V or 20 mA)	
	The passive, measured temperature value cannot	be displayed on type QPA2080D .	
Engineering notes			
	Room sensors with active outputs have a high pow ature measurement. The measuring accuracy is impacted by the follow - Prevailing air flow - Wall surface (rough, smooth) - Wall texture (wood, plaster, concrete, brick) - Wall texture (wood, plaster, concrete, brick) - Wall type (interior, exterior). This application-specific measuring inaccuracy is of approx. 1 operating hour, and it can be adjusted a controller). No correction on the local LCD.	ver loss, which can influence temper- ring factors: constant for an installed sensor after s needed in a higher system (e.g. safety extra low-voltage (SELV) with d fuse it in compliance with local safe-	
	ty regulations. When sizing the transformer, consider the power of mation about wiring, see the data sheets of the de Observe maximum permissible cable lengths.	consumption of the sensor. For infor- vices with which the sensor is used.	

Cable routing and cable selection	When laying the cables, remember that electrical interference is greater the longer the cables run parallel and the smaller the distance between them. On applications with	
EMC problems, use shielded cables. For secondary power lines and signal lines twisted-pair cables.		
Mounting notes		
Mounting location	Inner wall of the room to be ventilated, not in niches, not behind curtains, not above or near heat sources, and not exposed to direct light from spot lights. Do not expose the sensor to direct solar radiation. Seal the end of the conduit at the sensor to prevent false measurements due to drafts through the conduit.	
Mounting instructions	Mounting instructions are enclosed in the package.	
Commissioning notes		
	 The sensor's functions can be checked 30 minutes after applying power: Checking the CO₂ function: In well ventilated rooms, the sensor shows the CO₂ concentration of the outside air. This is typically 360 ppm (the sensor's measuring accuracy must be considered). Also, a basic functional check can be made by exhaling on the sensor. In this case, remember that the sensor's rate of response is purposely delayed (time constant t₆₃ = 5 min). Checking the VOC function: Touch the sensor with a cotton ball dowsed in alcohol (e.g. gas from a cigarette lighter, without lighting a flame). Ventilation should start when the preset switching level of the connected controller is reached. After applying power to the types of sensor with display, Init appears for about 6 seconds. 	
Disposal		
	The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage. • Dispose of the device via the channels provided for this purpose	

Dispose of the device via the channels provided for this purpose.Comply with all local and currently applicable laws and regulations.

Technical data

Power supply	Operating voltage	AC 24 V ±20 % oder DC1535 V (SELV) or
		AC/DC 24 V class 2 (US)
	Frequency	50/60 Hz at AC 24 V
	External supply line protection (EU)	Fuse slow max. 10 A or
		Circuit breaker max. 13 A Characteristic B, C, D according to or
		Power source with current limitation of max. 10 A
	Power consumption	At "U" output signal "I" output signal
	QPA1000	Max. <1.6 VA Max. <3.5 VA
	QPA2000, QPA 2080, QPA2080D, QPA2060, QPA2060D	Max. <0.9 VA Max. <3.2 VA
	QPA2002, QPA2002D	Max. <1.8 VA Max. <3.9 VA
	QPA2062, QPA2062D	Max. <0.9 VA Max. <3.4 VA
Cable lengths for measuring signal	Perm. cable lengths	See data sheet of the device handling the signal
Functional data "CO2"	Measuring range	02000 ppm
	Measuring accuracy at 23 °C and 1013 hPa	$\leq \pm$ (50 ppm + 2 % of measured value)
	Temperature dependency in the range of -545 °C	±2 ppm / °C (typically)
	Long-time drift	${\leq}{\pm}5\%$ of measuring range / 5 years (typically)
	Time constant t ₆₃	<5 min
	Output signal, linear (terminal X1)	DC 010 V or DC 05 V ≙ 02000 ppm, max. ±1 mA
		420 mA = 02000 ppm, max. 500 Ohm
	Recalibration-free	8 years
Functional data "VOC"	Measuring range	0100% VOC
	Time constant t_{63} VOC (CO ₂ see above)	<13 min (R1), <3.5 min (R2), <1 min (R3)
	Output signal, linear (terminal X1)	DC 010 V or DC 05 V ≌ 0100%, max. ±1 mA
		420 mA
Functional data "Maximum selection from CO ₂ and VOC" for QPA2002 and QPA2002D	Output signal, linear (terminal X2)	DC 010 V or DC 05 V
		420 mA
Functional data "Rel. Humidity"	Range of use	095 % r.h. (non-condensing)
for QPA2062 and QPA2062D	Measuring range	0100 % r.h.
	Measuring accuracy at 23 °C and DC 24 V 095 % r.h.	±5 % r.h.
	3070 % r.h.	±3 % r.h. (typically)
	Temperature dependency	≤0.1 % r.h./°C
	Time constant	approx. 20 s
	Output signal, linear (terminal X2)	DC 010 V or DC 05 V
		420 mA
Functional data "Temperature"	Measuring range	050 °C (R2) or -35+35 °C (R1)
with QPA206	Measuring accuracy at DC 24 V in the range of 23 °C	± 0.3 K at "U" output signal (typically)
	15 35 °C	±0.4 K at "I" output signal (typically)
	-35 +50 °C	±0.0 K +1 K
	Time constant tea	8.5 min
Functional data "Temperature"	Sensing range	See "Mode of operation"
with QPA208		See "Mode of operation"
	Time constant teo	8.5 min
	Correction Intrinsic heat	1.4 K for "U" output signal (typically)
	Output signal (terminal B_M)	Passive
Display of measured value	With QPA2002D, QPA2060D, QPA2062D, QPA2080D	LCD
	· · · · · · · · · · · · · · · · · · ·	

Indoor air quality sensors QPA10.., QPA20..

Degree of protection	Protection degree of hou	ising	IP30 according to EN 60529
	Protection class		III according to EN 60730-1
Electrical connections	Screw terminals for		$1 \times 2.5 \text{ mm}^2 \text{ or } 2 \times 1.5 \text{ mm}^2$
Environmental conditions	Operation to Climatic conditions Temperature (housi Humidity Mechanical conditions	ing incl. electronics)	IEC 60721-3-3 Class 3K3 050 °C 095 % r.h. (non-condensing) class 3M2
	Transport to Climatic conditions Temperature Humidity Mechanical conditions	i	IEC 60721-3-2 Class 2K3 -25+70 °C <95 % r.h. Class 2M2
Materials and colors	Cover		ASA + PC, NCS S 0502-G (white) equates to RAL9010
	Housing		ASA + PC, NCS 2801-Y43R (grey) equates to RAL7035
	Mounting plate		PC, NCS 2801-Y43R (grey) equates to RAL7035
	Sensor (complete)		Silicone-free
	Packaging		Corrugated cardboard
Directives and Standards	Product standard	EN 60730-1	Automatic electrical controls for household and similar use
	Electromagnetic compat	ibility (Applications)	For use in residential, commerce, light- industrial and industrial environments
	EU Conformity (CE)		CE1T1961xx ^{*)}
	RCM Conformity		CE1T1961en_C1 *)
	UL		UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration CE1E1961 ^{°)} contains data on environmentally compatible prod- uct design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		
Weight	Incl. packaging Without display With display		Approx. 0.10 kg Approx. 0.12 kg
	ppm = parts per million (number of parts per one million parts)		
	*) The documents can be	downloaded from http://siemen	s.com/bt/download.

Connection terminals



QPA2002, QPA2002D





QPA2060, QPA2060D





Dimensions



Dimensions in mm

Drilling plan

SIEMENS



Indoor Air Quality Controller QPA84

- With integrated VOC (Volatile Organic Compounds) sensor
- Operating voltage AC 230 V,
- Two-position output (non-potential-free relay contact)

Use

In ventilation plant to optimize the indoor air quality and the consumption of energy by providing demand-controlled ventilation.

The QAP84 indoor air quality controller has been designed for use in basic ventilation plant where there is a need to remove annoying odours from a room, depending on demand, primarily in rooms with greatly varying occupancy levels and / or odours, thereby optimizing the ventilation time and ensuring good air quality. The controller is used especially in applications where a fan or an air damper actuator is controlled either manually or by a time switch.

Typical spaces and applications:

- Small restaurants, pubs, bistros
- Lounges
- Recreation spaces and smoking areas
- Kitchens
- Changing rooms and cloakrooms
- · Controlled ventilation of living spaces

Application examples

Example with extract air fan



Functions

The integrated VOC sensor measures concentrations of odorous substances and gases, such as tabacco smoke, human body odours, kitchen odours, carbon monoxide, methane, ethanol, acetone, methanol, etc., in the room air.

The concentrations measured by the sensor are compared with the setpoint. If the setpoint is exceeded, the fan or the air damper actuator will be switched on via control output Y1. When the air quality improves as a result of the ventilation or other influencing factors, the device connected to control output Y1 will be deactivated again.

The QPA84 is supplied with a factory-set setpoint. As soon as the controller is connected to power, the self-adaptation algorithm ensures that the indoor air quality setpoint will be matched to the local supply air quality.

The switching on / off behaviour of control output Y1 can be changed by means of a shorting plug:

Position of shorting plug	Action
- 0 + (1271201	Very good air quality level, increased energy consumption ¹⁾
• • • • • • • • • • • • • • • • • • •	Good air quality level, optimum energy consumption ¹⁾ (factory setting)
- 0 + (157203	Acceptable air quality level, minimum energy consumption ¹⁾

1) Energy consumption resulting from heating or cooling and fan operation.

Caution!

To change the position of the shorting plug, the housing cover must be removed. This work must be carried out by an authorized electrician since there is a risk of touching mains–carrying wires or parts.

Ordering

Product number	Stock number	Designation
QPA84	BPZ:QPA84	Indoor air quality controller
When ordering, please give name and type reference.		

Equipment combinations

For indoor air quality control with extract air dampers: OpenAir[™] two-position air damper actuators **GCA32..** see data sheet N4613 The controller consists of three major parts: the mounting plate made of plastic, the housing which accommodates the sensor and the control electronics, and the housing cover which is also made of plastic. Using suitable screws, the mounting plate is secured to a commercially available recessed conduit box. The housing engages in the mounting plate and is then secured by means of two catches. After wiring, the housing cover is also secured with two catches.

Sensor, connection and setting elements

1



Engineering notes

Power supply to the QPA84 should not be interrupted during operation (e.g. by a manual switch or time switch program). If interrupted, the controller will lose the adapted indoor air quality setpoint (the optimum setpoint for the room).

Caution!

- The QPA84 may not be used for safety-related gas measurements!
- The screw terminals are only suited for installation wires. Stranded wires are not permitted!
- A 10 A prefuse must be used in the power supply line (L) to the controller.
- The two terminals for the protective earth (interconnected inside the unit) are merely used for earthing a regulating unit of safety class I connected to output Y1

The maximum permissible switching current (I) at output Y1 must be observed. It is dependent on the ambient temperature (T) of the QPA84:



	A WARNING
<u>_</u>	No internal line protection for supply lines to external consumers Risk of fire and injury due to short-circuits
	 Adapt the line diameters as per local regulations to the rated value of the installed fuse.

Caution!	Mounting location: in the room. The location where the controller is mounted should be representative of the indoor air quality level, e.g. on an open wall, 1.5 to 3 m above the floor. The controller should not be mounted in niches or bookshelves, not behind cur- tains, etc., or in locations where people are continuously present (within one to two meters), such as speaker's desks, working places, etc. The permissible environmental conditions must be observed. The controller is supplied complete with detailed mounting instructions. The controller must be installed by an authorized electrician.
Commissioning notes	
	 The VOC sensing element requires about one minute to attain the right operating temperature. Control output Y1 can be activated by the electronics, depending on the mixed-gas concentration in the room. The proper functioning of the QPA84 can then be checked as follows: Hold a cloth or cotton-wool pad saturated with alcohol in front of the unit's ventilation slots, or Let gas from a cigarette lighter enter the ventilation slots Then, control output Y1 will be activated after a short period of time.
Operating notes	
	After about two days, the QPA84 will assume the setpoint that ensures optimum

After about two days, the QPA84 will assume the setpoint that ensures optimum indoor air quality. This is accomplished by the setpoint adaptation algorithm. The algorithm adjusts the setpoint periodically. For this reason, the power supply to the controller should not be interrupted. The unit is maintenance-free.

Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.
Technical data

Power supply	Operating voltage Mains frequency Power consumption External supply line protection	AC 230 V +10 % -15 % 50 / 60 Hz ±4 % 0.5 VA Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898
Control output Y1	Breaking voltage Switching current ¹⁾	non-potential-free switching contact AC 230 V max. 8 A (res.)
	External supply line protection	Refer to section "Power Supply"
Terminals	Connection terminals Cable lengths L, N, PE, Y1	screw terminals for wires of 1 to 2.5 mm ² depending on the load and in compliance with local regulations
Degree of protection	Protection class Protection degree of housing	l according to EN 60730-1 IP30 according to EN 60529
Environmental conditions	Operation Climatic conditions Temperature Humidity Mechanical conditions Transport Climatic conditions Temperature Humidity Mechanical conditions Product standard Electromagnetic compatibility (Applications) EU Conformity (CE)	to IEC 60721-3-3 class 3K5 $-5 \dots +50$ °C (non-condensing) <85 % r.h. class 3M2 to IEC 60721-3-2 class 2K3 $-25 \dots +65$ °C <95 % r.h. class 2M2 EN 60730-1 Automatic electrical controls for household and similar use For use in residential, commerce, light-industrial and industrial environments CM2T1571xx ²
Dimensions	Refer to "Dimensions"	
Weight	Incl. packing	0.28 kg
	1) The maximum permissible switching currer QPA84 (refer to "Engineering notes")	nt is dependent on the ambient temperature of the

2) The documents can be downloaded from http://siemens.com/bt/download

Internal diagrams



Dimensions

Dimensions in mm



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QPM2102D

QPM2160D, QPM2162D QPM1100, QPM2100, QPM2102

QPM2160, QPM2180

QPM11..

QPM21..

Duct Air Quality Sensors

- Maintenance-free CO₂ sensing element (depending on the type) based on optical infrared absorption measurement (NDIR¹)
- Or with VOC²⁾ sensing element, based on a heated tin dioxide semiconductor
- CO₂ temperature (active or passive) and CO₂ humidity-temperature multisensor
- No recalibrations required
- Operating voltage AC 24 V or DC 15...35 V
- Signal outputs DC 0...10 V or DC 0...5 V or 4...20 mA adjustable
- Selectable passive temperature sensing element

1) NDIR = Non dispersive infrared

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

Use

In air ducts of ventilation and air conditioning plant to enhance room comfort and to optimize energy consumption by providing demand-controlled ventilation. The sensor acquires:

- CO₂ concentrations
- VOC concentrations as an indication of odors in the duct air, such as tobacco smoke, body odor, or material fumes
- The relative humidity of the duct air
- The duct air temperature

Sensors QPM1100 and QPM21... can be used as a:

- Control sensor in the supply or extract air duct
- Transmitter for building automation and control systems and / or display units (QPM21...D only).

Typical use:

- Acquisition of CO₂ and VOC concentrations:
- In party rooms, lounges, fair pavillions and exhibition halls, restaurants, canteens, shopping malls, sports gymnasiums, sales rooms, and conference rooms

 Acquisition of CO₂ concentrations: In ventilation plant of rooms with varying occupancy levels where smoking is prohibited, such as museums, theatres, movie theatres, auditoriums, office spaces and school rooms

Important!

- The QPM21... sensors are not suited for use as safety devices, such as gas or smoke warning devices!
- The sensors must not be used outdoors!

	CO	MOG	Townshive	l luvesialitur	
Type reference	CO2	VUC	i emperature	Humiaity	Measured value
	measuring range	time constant	measuring range	measuring range	display
QPM1100		Slow (R1)			
		Normal (R2)			
		Fast (R3)			
QPM2100	02000 ppm				no
QPM2102	02000 ppm	Slow (R1)			
		Normal (R2)			no
		Fast (R3)			
QPM2102D	02000 ppm	Low (R1)			
		Normal (R2)			yes
		High (R3)			
QPM2160	02000 ppm		050 °C / –35+35 °C		no
QPM2160D	02000 ppm		050 °C / –35+35 °C		yes
QPM2162	02000 ppm		050 °C / –35+35 °C	0100 %	no
QPM2162D	02000 ppm		050 °C / –35+35 °C	0100 %	Yes
QPM2180	02000 ppm		Depending on connected		no
			sensing element		10

Type summary

Ordering

When ordering, please give name and type reference, e.g.: Duct air quality sensor **QPM2102** The sensor is supplied complete with mounting flange and cable entry gland M16.

Equipment combinations

All systems and devices capable of processing the following sensor signals:

- DC 0...10 V or DC 0...5 V or 4...20 mA
- passive sensor signals for sensor QPM2180

CO₂ concentrations

The SymaroTM air quality sensors acquire the CO_2 concentration by infrared absorption measurement (NDIR).

The resulting output signal of DC 0...10 V or DC 0...5 V or 4...20 mA is proportional to the CO_2 content of the ambient air.

Function diagram CO₂ (output X1)



VOC concentration (QPM1100)

Symaro[™] air quality sensors determine the mixed gas concentration (VOC) using metal-oxide semiconductor sensing elements. The sensors measure precisely at all times and with no maintenance and recalibration required thanks to an integrated compensation mechanism, saving service costs.

The sensor provides a DC 0...10 V or DC 0...5 V or 4...20 mA output signal proportionate to the VOC content of the ambient air.













Mechanical design

The duct air quality sensor consists of housing, printed circuit board, connection terminals, mounting flange and immersion rod with measuring probe.

The 2-sectional housing is comprised of base and removable cover (without display: snap-on design; with display: screwed fastening). The measuring circuit and the setting elements are located on the printed circuit board inside the cover, the connection terminals on the base.

The humidity and temperature sensing elements are located at the end of the measuring probe and are protected by a filter cap.

Cable entry is made via the cable entry gland M16 (IP 54) supplied with the sensor, which screws into the housing.

Immersion rod and housing are made of plastic and are rigidly connected.

The sensor is fitted with the mounting flange supplied with the sensor. The flange is to be placed over the immersion rod and then secured in accordance with the required immersion length.

Setting elements ...

		X120			
				mA-Test	
	01 420 mA → 02 010 V	000	V-Test 010 V	0`00	V-Test 05 V
X120 000 000 X130	O3 05 V		Test fun	ction activ	/e
°F ::: °C	R1 Range 1	X130	X1	X2	X3
	→ R2 Range 2	000	0 V / 0 V 4 mA	2.5 V / 5 V 12 mA	5 V / 10 V 20 mA
	R3 Range 3 Delivery condition	000	2.5 V / 5 V 12 mA	5 V / 10 V 20 mA	0V / 0V 4 mA
5	Display		5 V / 10 V 20 mA	0 V / 0 V 4 mA	2.5 V / 5 V 12 mA
19662215_c	• • F • • • C		2.5 V / 5 V 12 mA	2.5 V / 5 V 12 mA	2.5 V / 5 V 12 mA

The setting elements are located inside the cover

The different vertical plug positions have the following meaning:

for the measuring range	The different vertical plug positions have the following meaning:		
with QPM2100	 For the CO₂ measuring range: Shorting plug in the mid position (R2) 	= 02000 ppm (factory setting)	
with QPM1100, QPM2102 and QPM2102D	 For VOC weighting: Shorting plug in the left position (R1) Shorting plug in the mid position (R2) 	 VOC sensitivity " slow " VOC sensitivity "normal" (factory setting) 	
	 Shorting plug in the right position (R3) 	= VOC sensitivity " fast "	
with QPM2160/2160D and QPM2162/2162D	 For the temperature measuring range: Shorting plug in the left position (R1) Shorting plug in the mid position (R2) 	= −35+35 °C = 050 °C (factory setting)	
for output for all QPM	01 02 03	= 420 mA = DC 010 V = DC 05 V	
…for the active test function	Shorting plug for the measuring range in the h The signal output delivers the values accordir	norizontal positions: ng to table "Test function active".	
for selection of the	• For the unit of temperature:		

temperature unit on the display

- Jumper in the vertical, right position = °C (factory setting) - Jumper in the vertical, left position = °F

Behavior in the event of fault			
QPM1100	 In the event of X1 (after 60 set 	VOC failure, DC 10 V or 5 V or 20 mA will be present at signal output conds)	
QPM2	 In the event of X1 (after 60 see 	CO_2 failure, DC 10 V or 5 V or 20 mA will be present at signal output conds)	
QPM2102/2102D	 In the event of CO₂ or VOC failure, DC 10 V or 5 V or 20 mA will be present at signal output X2 (after 60 seconds) 		
QPM2160/2160D	 Should the tem output X2 	perature sensor become faulty, 0 V or 0 mA will be present at signal	
QPM2162/2162D	 Should the tem output X3, and or 20 mA (after Should the hun at signal output 	perature sensor become faulty, 0 V or 0 mA will be present at signal the humidity signal at signal output X2 will increase to DC 10 V or 5 V 60 seconds) hidity sensor become faulty, DC 10 V or 5 V or 20 mA will be present t X2 (after 60 seconds), and the temperature signal will remain active	
Display of measured values	With sensors type be read on an LC - CO ₂ : - CO ₂ + VOC: - Temperature: - Humidity:	e QPM2102D, QPM2160D and QPM2162D, the measured values can ED. The following measured values are displayed: In ppm As a bar chart: 4 bars ≙ X2 = 2 V or 1 V or 7,2 mA 20 bars ≙ X2 = 10 V or 5 V or 20 mA In °C or °F In % r.H.	

Accessories

	Name	Type reference	
	Filter cap (for replacement)	AQF3101	
Engineering notes			
	To power the sensor, a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty is required. When sizing and protecting the transformer, local safety regulations must be complied with. When sizing the transformer, the power consumption of the duct sensor must be taken into consideration. For correct wiring, refer to the Data Sheets of the devices with which the sensor is used. The permissible cable lengths must be observed.		
Cable routing and cable selection	When laying the cables, it must be observed that the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems. Twisted pair cables are required for the secondary supply lines and the signal lines.		
Mounting notes			
Mounting location and orientation	To ensure degree of protection IP54 resp. IP65, the sensor must be fitted with the cable entry pointing downward! The sensor should be mounted in locations where it can be easily accessed for service.		
Note!	 If used in connection with steam humidifiers, the distance to the humidifier must be a minimum of 3 m. If permitted by the installation, the distance should be as great as possible, but no more than 10 m The sensing elements in the immersion rod are susceptible to impact and shock. An impact or shock should therefore be avoided 		

	 The sensor must not be mounted in ventilation plant on top of a building (impact of solar radiation)! To ensure correct operation, the sensor's ambient temperature must lie in the range of -5+45 °C 				
Mounting instructions	Mounting Instructions are enclosed in the	e package.			
Commissioning notes					
Checking the CO_2 function	The sensor's functions can be checked 30 minutes after applying power: • In well ventilated rooms, the sensor shows the CO_2 concentration of the outside air. Typically, this is 360 ppm (the sensor's measuring accuracy must be considered). Al- so, a basic functional check can be made by exhaling on the sensor. In that case, it must be taken into account that the sensor's rate of response has been purposely de- layed (time constant t ₆₃ = 5 min)				
Checking the VOC function	 Touch the sensor with a cotton ball dowsed in alcohol (e.g. gas from a cigarette lighter, without lighting a flame) Ventilation should start when the preset switching level of the connected controller is reached. 				
Disposal					
X	The device is considered electrical and e applicable European Directive and may n	lectronic equipment fo lot be disposed of as d	r disposal in terms of the lomestic garbage.		
	 Dispose of the device via the channels provided for this purpose. Comply with all local and currently applicable laws and regulations. 				
Technical data					
Power supply	Operating voltage	AC 24 V ±20 % or DC1535 V (SELV) or			
	External supply line protection (EU)	Fuse slow max 10 A			
		or Circuit breaker max. 13 Characteristic B, C	A , D according to		
		Power source with curr	ent limitation of max. 10 A		
	Power consumption	At "U" output signal	"I" output signal		
	QPM1100	Max. <1.6 VA	Max. <3.5 VA		
	QPM2100, QPM2180, QPM2160, QPM2160D	Max. <0.9 VA	Max. <3.2 VA		
	QPM2102, QPM2102D	Max. <1.8 VA	Max. <3.9 VA		
	QPM2162, QPM2162D	Max. <0.9 VA	Max. <3.4 VA		
Cable lengths for	Perm. cable lengths	Refer to Data Sheet of	the device		
measuring signal		handling the signal	<u> </u>		
Functional data "CO2"	Measuring range	02000 ppm			
	Measuring accuracy at 23 °C and 1013 hPa	≤±(50 ppm + 2 % of me	easured value)		
	Temperature dependency				
	in the range of -545 °C	\pm 2 ppm / °C (typically)			
	Long-time drift	≤±5% of measuring rar	nge / 5 years (typically)		
	Time constant t ₆₃	<5 min			
	Output signal, linear (terminal X1)	DC 010 V ≙ 02000	ppm,		
		max. ±1 mA			
		420 mA ≙ 02000 p	pm, max. 500 Ohm		
	Recalibration-free	8 years			
Functional data "VOC"	Measuring range	0100% VOC			
	Time constant t_{63} VOC (CO ₂ see above)	<13 min (R1), <3.5 min	(R2), <1 min (R3)		

	Output signal, linear (terminal X1)	DC 010 V or DC 05 V \cong 0100%, max. ±1 mA
Functional data "Maximum selection of CO₂ and	Output signal, linear (terminal X2)	420 HA ⊆ 0100 %, Hax. 500 OHH DC 010 V or DC 05 V ≙ max. of 02000 ppm, CO ₂ or 0100% VOC, max. +1 mA
VOC" with QPM2102 and QPM2102D		420 mA
	Range of use	095 % r.h. (noncondensing)
Functional data "r h "	Measuring range	0100 % r.h.
with QPM2162D	Measuring accuracy at 23 °C and DC 24 V 095 % r.h. 3070 % r.h.	± 5 % r.h. ± 3 % r.h. (typically)
	Time constant t ₆₃	Approx. 20 s
	Output signal, linear (terminal X2)	DC 010 V or DC 05 V ≙ 0100 % r.h., max. ±1 mA
		420 mA
Functional data "Tempera-	Range of use	−5+45 °C
ture" with QPM2160/ QPM2160D and QPM2162/	Measuring range	050 °C (R2) or – 35+35 °C (R1)
QPM2162D	Measuring accuracy at DC 24 V in the range of	
	23 °C	±0.3 K (typically)
	1535 °C	±0.6 K
	_35+50 °C	±1 K
	Time constant	<3.5 min. in with 2 m/s moved air
	Output signal, linear (terminal X2 or X3)	DC 010 V or DC 05 V ≙
		050 °C / −35+35 °C max. ±1 mA
		420 mA
		max. 500 Ohm
Functional data "Tempera-	Sensing range	See "Mode of operation"
ture" with QPM218	Measuring accuracy	See "Mode of operation"
	Time constant t ₆₃	<3.5 min. at 2 m/s of circulated air
	Output signal (terminal B, M)	Passive
Air velocity	Max. air velocity V _{max.}	10 m/sec.
Degree of protection	Protection degree of housing	IP65 according to EN 60529
	QPM2102D, QPM2160D, QPM2162D	in the built-in state
	QPM1100, QPM2100, QPM2102, QPM2160,	IP54 according to EN 60529
	QPM2162, QPM2180	in the built-in state
	Protection class	III according to EN 60730-1
Electrical connections	Screw terminals for	$1\times2.5~mm^2$ or $2\times1.5~mm^2$
Environmental conditions	Operation to	IEC 60721-3-3
	Climatic conditions	Class 3K3
	Temperature (housing incl. electronics)	050 °C
	Humidity	095 % r.h. (noncondensing)
	Mechanical conditions	Class 3M2
	Transport to	IEC 60721-3-2
	Climatic conditions	class 2K3
	I emperature	-25+70 °C
	Mechanical conditions	< 95 % 1.11. Class 2M2
Matariala and colora	Base	Polycarbonata PAL 7001 (cilyor grov)
		Polycarbonate, RAL 7001 (Silvel-grey)
		Polycarbonate, KAL 7035 (light-grey)
	Immersion rod	Polycarbonate, RAL 7001 (silver-grey)
	Filter cap	Polycarbonate, RAL 7001 (silver-grey)
	Mounting flange	PA66 – GF35 (black)
	Cable entry gland	PA, RAL 7035 (light-grey)

	Sensor (complete assembly)	Silicone-free	
	Packaging	Corrugated cardboard	
Directives and Standards	Product standard	EN 60730-1	
		Automatic electrical controls for household and similar use	
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial and industrial environments	
	EU Conformity (CE)	CE1T1962xx*)	
	RCM Conformity	CE1T1961en_C1 *)	
	UL	UL 873, http://ul.com/database	
Environmental compatibility	The product environmental declaration CE1E1962 ^{°)} contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		
Weight	Incl. packaging		
	QPM1100, QPM2100, QPM2102	Approx. 0.25 kg	
	QPM2160, QPM2162, QPM2180	Approx. 0.25 kg	
	QPM2102D	Approx. 0.27 kg	
	QPM2160D, QPM2162D	Approx. 0.27 kg	
	ppm = parts per million (number of parts per or *) The documents can be downloaded from <u>htt</u>	ne million parts) <u>p://siemens.com/bt/download</u> .	
Connection terminals			



QPM2102/2102D





QPM2160/2160D





- G0 System ground and measuring neutral
- Signal output DC 0...10 V or DC 0...5 V X1
- Signal output DC 0...10 V or DC 0...5 V X2

Х3

- Signal output DC 0...10 V or DC 0...5 V Passive temperature output (interchangeable) В, М

Dimensions





21 60







Drilling plan

Dimensions in mm

SIEMENS



Symaro™

Duct Air Quality Sensors Modbus RTU QPM2150/MO

QPM2102/MO QPM2152/MO

Duct air quality sensors with Modbus communication

- Modbus RTU (RS-485) •
- Maintenance-free CO2 sensing element •
- No recalibrations required •
- On-event addressing via push button together with ClimatixTM controllers
- DIP switches setting together with other controllers •

The duct sensor is used in air ducts of ventilation and air conditioning plants to enhance room comfort and to optimize energy consumption by providing demand-controlled ventilation. The sensor acquires:

- CO₂ concentrations
- VOC concentrations as an indication of odors in the duct air, such as tobacco smoke, body odor, or material fumes
- The relative humidity of the duct air
- The duct air temperature

NOTICE!

- The sensors cannot be used as safety devices, such as gas or smoke warning devices!
- Do not use sensors outdoors!

Technical design

The cable entry is made via the cable entry gland M16 (IP54) supplied with the sensor, which screws into the housing.

The sensor is fitted with the mounting flange supplied with the sensor. The flange is placed over the immersion rod and then secured to meet the required immersion length.

Type summary

Product number	SSN NO.	CO ₂ measuring range	IAQ measuring range	Temperature measuring range	Humidity measuring range	Operating voltage	Output signal
QPM2102/MO	S55720- S469	02000 ppm	0100 %			AC 24 V ±20 %/ DC 13.535 V	Modbus RTU
QPM2150/MO	S55720- S470	02000 ppm		-35…50 ℃		AC 24 V ±20 %/ DC 13.535 V	Modbus RTU
QPM2152/MO	S55720- S471	02000 ppm		-35…50 ℃	0100 % r.h.	AC 24 V ±20 %/ DC 13.535 V	Modbus RTU

Ordering When ordering, specify name and product number, for example: Duct air quality sensor QPM2102/MO.

The sensor is supplied with mounting flange and cable entry gland M16.

Accessory	Name	Type reference
	Filter cap (for replacement)	AQF3101

Notes

Engineering Powering the sensor requires a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty. When sizing and protecting the transformer, comply with all local safety regulations.
 When sizing the transformer, determine the power consumption of the room sensor.
 For correct wiring, see the datasheets of the devices with which the sensor is used.
 Observe permissible line lengths.

Cable routing and cable selection

Note that when routing cables, the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference. Shielded cables must be used in environments with EMC problems.

Twisted pair cables are required for the secondary supply lines and the signal lines.

Mounting

Mounting location and orientation

To ensure degree of protection IP54, the sensor must be fitted with the cable entry pointing downward!

Mount the sensor where it can be easily accessed for service.

- If used in connection with steam humidifiers, the distance to the humidifier must be a minimum of 3 m. If permitted by the installation, the distance should be as great as possible, but no more than 10 m.
- Avoid any impact or shock to the sensing elements in the immersion rod.
- To avoid sunlight damage, do not mount the sensor on a rooftop. To ensure correct operation, the sensor's ambient temperature must be in the range of -5...45 °C.

Mounting instructions

Mounting instructions are enclosed in the package.

Commissioning The sensor's functions can be checked 30 minutes after applying power.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

• Dispose of the device through channels provided for this purpose.

• Comply with all local and currently applicable laws and regulations.

Technical data

Function	
Communication	Modbus RTU (RS-485)
Supported baud rate	9600; 19200; 38400; 57600; 76800; 115200
Transmission format	1-8-E-1; 1-8-O-1; 1-8-N-1; 1-8-N-2
Bus termination	120 ohm, jumper selection

For detailed information about specific functions, see Basic documentation (A6V11610643 *).

Power supply	
Operating voltage	AC 24 V ±20 % or DC 13.535 V (SELV) or AC/DC 24 V class 2 (US)
Frequency	50/60 Hz at AC 24 V
External supply line protection (EU)	Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or Power source with current limitation of max. 10 A
Power consumption QPM2102/MO QPM2150/MO, QPM2152/MO	< 3 VA < 2.5 VA

Functional data (CO ₂)		
Measuring range	02000 ppm	
Measuring accuracy at 23 °C and 1013 hPa	$\leq \pm$ (50 ppm + 2 % of measured value)	
Temperature dependency in the range of -545 ℃	±2 ppm / °C (typically)	
Long time drift	< ±5 % of measuring range / 5 years (typical)	
Time constant t ₆₃	< 5 min	
Recalibration-free	8 years	

Functional data (IAQ, maximum selection of CO2 and VOC with QPM2102/MO)		
Measuring range 0100 %		
Time constant t ₆₃ VOC	< 13 min (Slow), < 3.5 min (Medium), < 1 min (Fast)	

Functional data (Temperature with QPM2150/MO and QPM2152/MO)		
Range of use	-545 °C	
Measuring range	-3550 °C	
Measuring accuracy at DC 24 V in the range of 23 °C 1535 °C -3550 °C	±0.3 k (typical) ±0.6 k ±1 k	
Time constant t ₆₃	< 3.5 min in 2 m/s moved air	

Functional data (Humidity with QPM2152/MO)		
Range of use	095 % r.h. (non-condensing)	
Measuring range	0100 % r.h.	
Measuring accuracy at 23 °C and AC/DC 24 V 095 % r.h. 3070 % r.h.	±5 % r.h. ±3 % r.h. (typical)	
Time constant t ₆₃	Approx. 20 s	

Functional data Max. air velocity V_{max}

10 m/sec

Ambient conditions and protection classification			
Protection degree of housing		IP54 according to EN 60529 in built-in state	
Protection class III ac		III according to EN 60730-1	
Environmental conditions			
Transport		IEC 60721-3-2	
•	Climatic conditions	Class 2K3	
	– Temperature	-2570 °C	
	– Humidity	< 95 % r.h.	
•	Mechanical conditions	Class 2M2	
Operation		IEC 60721-3-3	
•	Climatic conditions	Class 3K5	
	 Temperature (housing with electronics) 	-545 °C	
	– Humidity	095 % r.h. (non-condensing)	
•	Mechanical conditions	Class 3M2	

Standards, directives and approvals	
Product standard	EN 60730-1, EN 60730-2-9, EN 61000-6-2, EN 61000-6-3 Automatic electrical controls for household and similar use
Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial and industrial environments
EU conformity (CE)	A5W00037934A *)
RCM conformity	A5W00037935A *)
UL	UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration (A5W90011832 *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

General		
Cable lengths for measuring signals Perm. cable lengths	See data sheet of the device handling the signal	
Electrical connections screw terminals	1 × 2.5 mm ² or 2 × 1.5 mm ²	
Materials and colors		
Base	Polycarbonate, RAL 7001 (silver-grey)	
Cover	Polycarbonate, RAL 7035 (light-grey)	
Immersion rod	Polycarbonate, RAL 7001 (silver-grey)	
Filter cap	Polycarbonate, RAL 7001 (silver-grey)	
Mounting flange	PA 66 – GF35 (black)	
Cable entry gland	PA, RAL 7035 (light-grey)	

General		
Sensor (complete assembly)	Silicone-free	
Packaging	Corrugated cardboard	
Weight including package QPM2102/MO QPM2150/MO QPM2152/MO	Approx. 263.6 g Approx. 268.1 g Approx. 267.2 g	

*) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.





Dimensions in mm

SIEMENS



Fine Dust Room SensorsQSA2700DThese sensors acquire the PM2.5 and
PM10 concentrations in a room.QSA2700
AQS2700

- Operating voltage AC/DC 24V
- Signal output 0 to 10 Vdc for PM2.5 and PM10
- Communicative output, Modbus RS485
- Range of use 32°F to 122°F (0 to 50°C)/5 to 95% r.h. (non-condensing)

The fine dust room sensor is designed to measure and transmit indoor concentrations of PM2.5 and PM10.

- 0 to 10V and Modbus output
- Configurable Modbus parameters
- Quick configuration (on-event addressing) with Siemens Climatix[™] controller
- QSA2700:
 - 3-color LED service indication
- QSA2700D:
 - 2.4-inch color LCD screen for PM2.5 and PM10 values and AQI indication
 - Energy efficient mode: The screen is off if no obstacle is in front of the sensor (within 3 feet [1 m] for several minutes)
 - Micro USB 5 Vdc for display
 - Four selectable languages: English, Chinese, German, French
 - Three selectable Air Quality Index classes

Type summary

Product number	Order number	Description	Display
QSA2700	S55720-S457	Room sensor for detection of PM2.5 and PM10	3-color LED service indication
QSA2700D	S55720-S458	Room sensor with LCD display for detection of PM2.5 and PM10	2.4-inch color LCD screen for PM2.5 values, Air Quality Index, and service
AQS2700	S55720-S459	Sensor module for replacement	

Order and delivery

When ordering, provide the name and product number, for example: fine dust room sensor QSA2700.

Each product includes 1 fine dust room sensor (with a pre-installed AQS2700), 1 plastic mounting plate and 2 screws.

Functions

Device overview



1	Hole for wiring (top) for surface mounting
2 [QSA2700 only]	LED
3 [QSA2700D only]	LCD display
4	● ← ← (power supply for display only)
5 [QSA2700D only]	Proximity sensor
6	Push button
7	Hole for wiring (bottom) for surface mounting
8	Hole for attaching the mounting plate to the housing
9	Air outlet
10	Air inlet

LED colors and patterns (QSA2700)

Color	Pattern Description	
Green	Permanently on	Working properly, Modbus configured
Yellow	Permanently on	Working properly, Modbus with factory settings
Red	Permanently on Error 1, replace sensor module	
Red	Flashing (0.5 s on/0. 5 s off) Error 2, communication error	
Red/yellow	Flashing (0.5 s red/0. 5 s yellow)	Possible inaccurate measurement

Modbus configuration

Push button

operations

for Modbus

resetting and

configuration

The device is configurable by a Modbus master device. Configure the device before mounting. See Modbus registers (Software version 1.2.12) [\rightarrow 9] and Modbus registers (Software version 1.3.13) [\rightarrow 10] for more information.

QSA2700:

On-event addressing is a rapid configuration approach working together with Siemens Climatix[™] controllers.

The sensor is wired and connected to the Climatix [™] controller via Modbus.

Press the button for	LED	Action	More details
1 to 5 seconds	Constant red	Press and hold the button	
5 to 10 seconds	LED off	Release the button	 Entering the addressing mode, LED flashes yellow for 30 seconds. Address is temporarily set to 246. Communication is established automatically when: Baud rate is 19200 (default). Format is 1-8-E-1 (default). Address is 246. Then: Master writes the Modbus parameters. Master writes 1 into register 4x0768 (Bus configuration command) to activate the change. After a successful pairing, the LED flashes green for 60 seconds, then turns to permanent green. Otherwise, the LED turns back to its
	LED flashes yellow for 0 to 30 seconds	Short press the button to set the address to 246 .	If the LED is flashing, a short press of the push button sets the address to 246 . The LED is off for 2 seconds, then turns yellow for 2 seconds and then turns to permanent green. The address is 246 . Further configuration should be carried out from the controller side.

Enter addressing mode and configuration workflow using push buttons

Reset Modbus settings or cancel resetting

Press the button for	LED	Action	More details
1 to 5 seconds	Constant red	Press and hold the button	
5 to 10 seconds	LED off	Press and hold the button	
10 to 13 seconds	Flash yellow	Reset Modbus setting to factory default if releasing the button ¹⁾	Release the button while the LED still flashes yellow. LED keeps flashing yellow for 3 seconds. then turns red for 1 second. The reset is completed. LED turns to
			permanent yellow.
>13 seconds	Returns to the initial status	Cancel resetting if releasing the button	Release after 13 seconds, resetting is cancelled.

Remark:

¹⁾ Only Modbus address, baud rate and transmission format are reset to factory default.

QSA2700D:

- 1. From the normal display page, press the push button for 2 to 10 seconds to enter the Modbus parameter page.
- 2. Then, following the display indication, press the button for 2 to 10 seconds to enter the page for Modbus configuration.
- 3. Select the desired operation by briefly pressing the button.
- 4. Following the display indication, activate the operation by pressing the button for:
 - 2 to 10 seconds, to configure manually;
 - 5 to 10 seconds, to configure the device via Climatix[™] or LCD operation interface;
 - 10 to 20 seconds, to reset the Modbus settings.

Mechanical design



1	Mounting plate
2	Two screws
3	Fine dust room sensor

Product documentation

Title	Document Type	Document Number
Installation, basic operation, parameters	Mounting instructions	A6V11160930
Operation, maintenance, troubleshooting	Basic documentation	A6V11160936
CE declaration	CE declaration	A6V11277342
Product environmental declaration	Product environmental declaration	A6V11284595
QSA Series Fine Dust Sensors with Selectable Measuring Range	Submittal sheet	A6V11380383

All documentation can be downloaded at http://siemens.com/bt/download.

Notes

Security

National safety regulations
Failure to comply with national safety regulations may result in personal injury and property damage.
Observe national provisions and comply with the appropriate safety regulations.

Engineering notes

Shielded cables must be used in environments with EMC problems.

Mounting



- The sensor is suitable for conduit box mounting, dry wall mounting (with mounting hole for wires concealed) and surface mounting.
- The recommended height is 5 ft (150 cm) above the floor, especially for type with display.
- Do not mount the sensor in recesses, shelves, behind curtains or doors, or above heat sources.
- Avoid direct solar radiation.
- Seal the conduit box or the installation tube if any, as air currents can affect sensor readings.
- Make sure ambient conditions are within 32 to 122°F (0 to 50°C)/5 to 95% r.h. (no condensation).
- Do not mount device in places full of oily smoke, for example, in a kitchen.
- Peel off the protective film on air inlet and air outlet before using.
- The air inlet and outlet must be free of any blockage.

Proximity sensor	 The QSA2700D includes a built-in proximity sensor and enters into energy efficient mode if no obstacle is detected in front of the sensor (within 3 feet [1 m] for several minutes). In energy efficient mode, the screen is off and the sensor is working and transmitting the signals at regular intervals. Otherwise, the screen is activated and the sensor is in continuous working mode. The QSA2700 does not have a proximity sensor and is working continuously. Keep the proximity sensor area clean as dirt may affect the detection performance.
Replacing the AQS2700	Sensor module accuracy is influenced by ambient environment. Replace the module every 1 to 3 years depending on the local environment. In environments with continuously high PM2.5 concentrations (that is greater than 300 µg/m ³ , for example, a smoking room), replace the module more often. To replace the sensor module:

1. Detach the housing from the mounting plate using a flat-blade screwdriver.



2. Remove the module by hand and replace it with a new one.





Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose. • •
- Comply with all local and currently applicable laws and regulations.

Technical data

Power supply

Operating voltage	AC 24V ±20% / DC 13.5 to 35V
Frequency	50/60 Hz @ AC 24V
Power consumption	4 VA

Functional data for PM2.5

Measuring range (selectable) QSA2700D: Select using user interface QSA2700: Select using Modbus register 216	 0 to 500 μg/m³ 0 to 300 μg/m³ 0 to 100 μg/m³ 0 to 50 μg/m³
Unit to unit variability	Max of ±15 $\mu g/m^3$ and ±15% of reading @ 77°F (25°C) and 50% r.h.
Analog output signal, (terminal U1)	0 to 10 Vdc, linear, corresponding to selected measuring range

Functional data for PM10

Measuring range (selectable) QSA2700D: Select using user interface QSA2700: Select using Modbus register 216	 0 to 500 μg/m³ (Default) 0 to 300 μg/m³ 0 to 100 μg/m³ 0 to 50 μg/m³
Unit to unit variability	Max of ±15 $\mu g/m^3$ and ±15% of reading @ 77°F (25°C) and 50% r.h.
Analog output signal, (terminal U2)	0 to 10 Vdc, linear, corresponding to selected measuring range

Connections

Г

Interface		
Micro USB	5V power connection for display only	
Wiring connections		
Screw terminals	Solid wires or prepared stranded wires: 18 to 26 AWG ²	
Slotted screws	Size 1, tightening torque 0.6 Nm (0.44 lb-ft).	
Wiring lengths for signals.	1970 ft (600 m)	

Communication

Communication Protocol	RS485 ModBus
Transmit Mode	RTU
Baud rate (configurable)	9600, 19200 (default), 38400 and 57600 BPS
Modbus address (configurable)	1 (default) to 247
Data	8 bits (0 to 255)
Parity (configurable, following the Transmission Format)	No Parity or Odd or Even (default)
Stop bits (configurable, following the Transmission Format)	1 (default) or 2
Max. cable length	1000 m (±200 m)
Identity	Slave

Transmission Format (start bit - data bits – parity – stop bit)	0=1-8-E-1 (default) / 1=1-8-O-1/ 2=1-8-N-1 / 3=1-8-N-2
Bus Termination	No
Reset button	Yes

Modbus registers (Software version 1.2.12)

The following Modbus registers are used in software version 1.2.12 and earlier.

Holding Register (16-bit) No.	Name	Description	Default	R/W
257	PM2.5 value	Range: 0 to 500		R
258	PM10 value	Range: 0 to 500		R
260	Sensor working status	0: Normal; 1: Replace sensor module; 2: Communication error		R
296	Software version	Major version		R
297	Software version	Minor version		R
298	Software version	Build version		R
764	Modbus address	1 to 247	1	R/W
765	Baud rate	1= 9600 bps; 2 = 19200 bps; 3 = 38400 bps; 4 = 57600 bps	2	R/W
766	Transmission format (start bit – data bits – parity – stop bit)	0 = 1-8-E-1; 1 = 1-8-O-1; 2 = 1-8-N-1; 3 = 1-8-N-2	0	R/W
768	Bus configuration command	0 = Ready; 1 = Load; 2 = Discard	0	R/W

Remarks:

- The register number is counted from **1**.
- Register number **768** (Bus configuration command) is for Climatix[™] on-event addressing configuration.
- Software version format: major version is 1 byte, minor version is 1 byte and build version is 2 bytes, such as [2.01.33] = 0x02010021.

Modbus registers (Software version 1.3.13)

The following Modbus registers are used in software version 1.3.13 and later.

Holding Register	Name	Description	Default	R/W
(16-bit) No.				
9	PM2.5 value	Range: 0 to 500		R
10	PM2.5 reliablility	0: No error 1: Bad reliability or not available		R
11	PM10 value	Range: 0 to 500		R
12	PM10 reliablility	0: No error 1: Bad reliability or not available		R
201	PM2.5 (µg/m³): Min. value in rolling 24hours			R
202	PM2.5 (µg/m³): Average value in rolling 24hours			R
203	PM2.5 (µg/m³): Max. value in rolling 24hours			R
204	Number of particles PM0.3…PM0.5	In pcs for particle size between 0.3 to 0.5 micron		R
205	Number of particles PM0.5…PM1.0	In pcs for particle size between 0.5 to 1.0 micron		R
206	Number of particles PM1.0…PM2.5	In pcs for particle size between 1.0 to 2.5 micron		R
207	Number of particles PM2.5…PM5.0	In pcs for particle size between 2.5 to 5.0 micron		R
209	Sensor working status	0: Normal; 1: Replace sensor module; 2: Communication error		R
216	Analog output range	0: 0 to 500 μg/m ³ (default); 1: 0 to 300 μg/m ³ ; 2: 0 to 100 μg/m ³ ; 3: 0 to 50 μg/m ³	0	R/W
217	Temperature value via bus	-40 to 248°F (-40 to 120°C Resolution increment is 1 °C		R/W
218	Relative humidity value via bus	0 to 100% Resolution increment is 1 °C		R/W
219	Data receiving interval via bus (in min) for temperature & relative humidity	1 to 60 (min)	20	R/W
221	Enable temperature and relative humidity display via bus	0: disable (default) 1: enable	0	R/W
1286	Software version	Major and minor version		R
1287	Software version	Build version		R
764	Modbus address	1 to 247	1	R/W

Holding Register (16-bit) No.	Name	Description	Default	R/W
765	Baud rate	1= 9600bps; 2 = 19200bps; 3 = 38400bps; 4 = 57600bps	2	R/W
766	Transmission format (start bit – data bits – parity – stop bit)	0 = 1-8-E-1; 1 = 1-8-O-1; 2 = 1-8-N-1; 3 = 1-8-N-2	0	R/W
768	Bus configuration command	0 = Ready; 1 = Load; 2 = Discard	0	R/W

Remarks:

- The register number is counted from **1**.
- The precondition for valid displays of temperature (register **217**) and r.h. (register **218**) is shown below:
 - Register **221** is enabled.
 - Display value **PM2.5 & PM10 in µg/m³** is selected as display format.
 - Register values are transmitted from the master.
- In the case of a multiple writing command from the master with invalid values, the sensor rejects the command with an error notice. The register values remain unchanged.
- Bus configuration command (**768**) is for on-event addressing only.
- Software version format: major version is 1 byte, minor version is 1 byte and build version is 2 bytes, such as [2.01.33] = 0x02010021.

Housing	Degree of protection of housing	IP30	
protection class			
Operation	Temperature	32 to 122°E (0 to 50°C)	
conditions	Humidity	52 to 95% r h (no condensation)	
	Traniary		
Storago and			
transportation	Temperature	-4 to 158°F (-20 to 70°C)	
conditions	Humidity	0 to 95% r. h. (no condensation)	
o o na			
Standards	Electromagnetic compatibility	CE standard EN 60730-1	
	Immunity	EN 61 000-6-2	
	Emissions	EN 61 000-6-3	
	EU conformity declaration	A6V11277342 *)	
	*) The document can be downl	oaded at http://siemens.com/bt/download .	
General data	Color	White	
	vveignt	140 g	
Display	Screen	Color, no touch	
(QSA2700D)	Working status	Only active when people in front within 3 feet [1 m] (±10%); screen turns off	

Working status	Only active when people in front within 3 feet [1 m] (±10%); screen turns of after a few minutes if no presence is detected.	
Resolution	1 μg/m ³ increments	
Display	Display PM2.5 value (if value > 500 μg/m³, then display 500+ μg/m³) Air Quality Index corresponding to measured PM2.5 value	
Language (selectable)	English, Chinese (simplified), German, French	

Error info

Error info	0-10 V output	Modbus	LED indication	LCD
Replace sensor module	Present V (2 s) and 10V (2 s) one by one in turn	Value of register 209 changes from 0 to 1	Red permanently on	Replace Sensor Module
Communication error	Present 0V (5 s) and 10V (5 s) one-by-one in turn	Value of register 209 changes from 0 to 2	Red flashing (0.5 s on/ 0.5 s off)	Communication error
Warning for possible inaccurate measurement	Present the measured value	Value of register 209 remains 0 without change	Red/yellow flashing (0.5 s red 0.5 s yellow)	PM2.5 120 ! µg/m³ Unhealthy

Diagrams

Wiring



Dimensions



NOTE: Use an ARG70 adapter plate (sold seperately) to mount a QSA2700/QSA2700D sensor on a 2" × 4" box.

SIEMENS



Symaro™ Fine Dust Duct Sensors

The sensors acquire PM2.5 and PM10 concentrations, relative humidity and temperature

QSM2100 QSM2162 AQS2100

- Operating voltage AC 24 V or DC 15...35 V
- Signal outputs DC 0...10 V or DC 0...5 V or 4...20 mA adjustable
- Range of use -5...45 °C / 5...95 % r.h. (non-condensing)
Use

In air ducts of ventilation and air conditioning plants to enhance room comfort and optimize energy consumption by providing demand-controlled ventilation. The sensor acquires:

- PM2.5 & PM10 concentrations
- Relative humidity of duct air

• Duct air temperature

NOTICE!

- Do not use the sensors as safety devices, such as gas or smoke warning devices!
- Do not use the sensors outdoors!

Type summary

Туре	Order number	Description
QSM2100	S55720-S491	Fine dust duct sensor for PM2.5 and PM10
QSM2162	S55720-S492	Fine dust duct sensor for PM2.5 and PM10, temperature, relative humidity

Order and
deliveryWhen ordering, provide both name and type reference, e.g. fine dust duct sensor QSM2100.The sensor is supplied complete with mounting flange, cable entry gland M16 and a pre-
installed AQS2100 in fine dust duct sensor.

Accessory	Name	Туре	Order number
	Filter cap (for QSM2162 replacement)	AQF3101	_
	Fine dust duct sensor module for replacement	AQS2100	S55720-S493

The accessory must be ordered separately.

Product documentation

Title	Document ID:
Mounting instructions (QSM21)	A6V11892999
Mounting instructions (AQS2100)	A6V11910876
CE declaration	A5W00096641
RCM declaration	A5W00096643
Product environmental declaration	A5W00099435

All documentation can be downloaded at http://siemens.com/bt/download.

Equipment combinations

All systems and devices capable of processing the following sensor signals:

• DC 0...10 V or DC 0...5 V or 4...20 mA

Functions

Fine dust (PM2.5 & PM10)	The duct sensor acquires PM2.5 & PM10 concentrations. The output value is the moving average of latest sensor data within 10 s.
Relative humidity (QSM2162)	The duct sensor acquires the relative humidity in the air duct via its capacitive humidity sensing element whose electrical capacitance changes as a function of relative humidity. The electronic measuring circuit converts the sensor's signal to a continuous DC 010 V or DC 05 V or 420 mA signal, corresponding to a relative humidity range of 0100 %.
Temperature (QSM2162)	The duct sensor acquires the temperature in the air duct via its sensing element whose elec- trical character changes as a function of the temperature.
	The change is converted to an active DC 010 V or DC 05 V or 420 mA output signal (\triangleq 050 °C or -35+35 °C).

Mechanical design

Setting element

The fine dust duct sensor consists of a housing, a printed circuit board, connection terminals, a mounting flange, and an immersion rod. The immersion rod of the QSM2162 has a measuring tip.

The bisectional housing consists of a base and a removable cover (snap-on design). The measuring circuit and the setting elements are located on the printed circuit board inside the cover, the connection terminals are located on the base.

The humidity and temperature sensing elements are located at the end of the measuring probe and are protected by a filter cap.

Cable entry is made via the cable entry gland M16 (IP54) supplied with the sensor, to be screwed into the housing.

Immersion rod and housing are made of plastic and are rigidly connected.

The sensor is fitted with the mounting flange supplied with the sensor. The flange must be placed over the immersion rod and then secured as per the required immersion depth.



Note

The setting elements are located inside the cover.

PM2.5 and PM10 have same DIP switch settings.

DIP switch configuration The sensor has two sets of DIP switches: S1 and S2. The different DIP switch positions mean the following:



Test mode	V/I o	utput	PM2.5/PM10 range selection		Output parameter selection	Temperature range selection	Work mode	Function
1	2	3	4	5	6	7	8	
_	OFF	OFF	-	-	-	-	_	DC 0…10 V (default)
_	OFF	ON	_	-	-	-	-	DC 05 V
_	ON	OFF	_	_	-	-	-	420 mA
_	ON	ON	_	-	-	-	-	Back to default
_	-	-	OFF	OFF	_	_	-	0…500 µg/m3 (default)
_	_	-	OFF	ON	-	_	_	0300 µg/m³
_	_	-	ON	OFF	-	_	_	0100 µg/m³
_	_	_	ON	ON	_	_	_	050 µg/m³
-	_	_	_	_	OFF	_	_	PM2.5 + r.h. + temperature (default) ²⁾
-	-	_	_	_	ON	_	_	PM2.5 + PM10 + temperature ²⁾
_	_	I	_	_	-	OFF	-	050 °C (default) ²⁾
_	-	-	-	_	-	ON	_	-3535 °C ²⁾
-	_	-	_	-	-	_	OFF	Continuous work mode (default)
_	_	-	_	-	-	_	ON	Smart work mode
ON	_	-	_	-	OFF	OFF	-	Test MODE 1 ¹⁾
ON	_			_	OFF	ON	_	Test MODE 2 ¹⁾
ON	_	_	_	_	ON	OFF	_	Test MODE 3 ¹⁾
ON		_		-	ON	ON	_	Test MODE 4 ¹⁾

Note:

¹⁾ For detailed information on the test mode, see Activating test function [> 5].

²⁾ These functions are only for QSM2162.

Activating test function

Use the test function to check whether the sensor value inaccuracy is caused by the analog output error. Users can configure DIP1, DIP6 and DIP7 to check if the actual signal output of terminals (X1, X2, X3) corresponds to the values defined in Test function active [\triangleright 5] table. Test function of X3 is valid only for QSM2162.

S1



Test function active						
	DIP		X1	X2	X3	
DIP1 (ON)	DIP6 (OFF)	DIP7 (OFF)	0 V / 0 V 4 mA	5 V / 2.5 V 12 mA	10 V / 5 V 20 mA	
DIP1 (ON)	DIP6 (OFF)	DIP7 (ON)	5 V / 2.5 V 12 mA	10 V / 5 V 20 mA	0 V / 0 V 4 mA	
DIP1 (ON)	DIP6 (ON)	DIP7 (OFF)	10 V / 5 V 20 mA	0 V / 0 V 4 mA	5 V / 2.5 V 12 mA	
DIP1 (ON)	DIP6 (ON)	DIP7 (ON)	5 V / 2.5 V 12 mA	5 V / 2.5 V 12 mA	5 V / 2.5 V 12 mA	



PM2.5 calibration mode ¹⁾		Function
1	2	
OFF	OFF	Mode 1 (default)
OFF	ON	Mode 2
ON	OFF	Mode 3
ON	ON	Reserved

Note:

¹⁾ Mode 1 is for standard use. Mode 2 and Mode 3 are for advanced application.

- Mode 1: The sensor is calibrated using the TSI device as reference in Arizona A1 dust.
- Mode 2: The sensor is calibrated using the GRIMM device as reference in Arizona A1 dust.
- Mode 3: The sensor is calibrated using the GRIMM device as reference in KCL dust.

S2

Malfunction

QSM2100 (PM2.5 + PM10) QSM2162 (PM2.5 + PM10 + temperature) In the following table:

- High means the signal output of terminal is 10 V/5 V/20 mA after 60 s.
- Low means the signal output of terminal is 0 V/0 V/4 mA after 60 s.

Malfunction		Product			
	X1 (PM2.5)	X2 (PM10)	X3 (Temperature)	QSM2100	QSM2162
PM2.5	High	High	High	_	\checkmark
communication error	High	High	_	√*)	_
PM2.5 sensor module replacement warning	High	Low	Normal output	_	\checkmark
	High	Low	_	\checkmark	-
Temperature sensor fault	Normal output	Normal output	High	_	\checkmark

Notes:

^{*)} If the signal output of X1 & X2 is 10 V or 20 mA, the cause of the error is one of the following:

- The selected measuring range of PM2.5 & PM10 is below the measured PM2.5 or PM10 value. E.g., if the selected measure range is $0...50 \ \mu g/m^3$, but the measured PM2.5 or PM10 value is $100 \ \mu g/m^3$, the signal output of X1 & X2 will be $10 \ V$ or $20 \ mA$. Selecting a higher range resolves this error.
- If the signal output is still 10 V or 20 mA after changing the selected measuring range, the cause is a PM2.5 communication error.

QSM2162 (PM2.5 + r.h. + temperature)

- (PM2.5 In the following table:
 - High means the signal output of terminal is 10 V/5 V/20 mA after 60 s.
 - Low means the signal output of terminal is 0 V/0 V/4 mA after 60 s.

Malfunction	Signal output					
	X1 (PM2.5)	X2 (r.h.)	X3 (Temperature)			
PM2.5 communication error	High	High	High			
PM2.5 sensor module replacement warning	High	High	Low			
Temperature sensor fault	Normal output	High	Low			
Humidity sensor fault	Normal output	High	Normal output			

Sensor data refresh frequency

The sensor data refresh frequency only applies to smart work mode (DIP8 = ON). It is defined as per the real-time concentration of PM2.5 & PM10 and the interval is 3...8 min. The data is updated under the following conditions:

		Interval						
	8 min 7 min 6 min 5 min 4 min 3 min Cont						Continuous	
Concentration	Differential between real-time and last measurement							
< 100 µg/m ³	±2 µg/m ³	±4 µg/m ³	±6 µg/m³	±8 µg/m ³	±10 µg/m ³	±12 µg/m ³	Bigger	
> 100 µg/m ³	±2 %	±4 %	±6 %	±8 %	±10 %	±12 %	Bigger	

Security



CAUTION

National safety regulations

Failure to comply with national safety regulations may result in personal injury and property damage.

• Observe national provisions and comply with the appropriate safety regulations.

Engineering

Powering the sensor requires a transformer for safety extra low-voltage (SELV) with separate windings for 100 % duty. When sizing and protecting the transformer, comply with all local safety regulations.

When sizing the transformer, consider the sensor's power consumption.

For correct wiring, see the related device data sheets.

Observe all permissible line lengths.

Cable routing and cable selection

Note that when routing cables, the longer the cable runs and the closer the cables, the greater the electrical interference. Use shielded cables in EMC-prone environments. Twisted pair cables are required for both secondary supply lines and signal lines.

Mounting To ensure degree of protection IP54, the sensor must be fitted with the cable entry pointing downward!

Mounting location and orientation

Mount the sensor where it can be easily accessed by service.

• If used after humidifier, a certain distance is required between humidifier and sensor, so that the vapor or mist generated by the humidifier can evaporate before reaching the sensor. This distance is marked on the diagram as B_M. The minimum distance between the humidifier and the sensor must be no less than B_M.



- Avoid any impact or shock to the sensing elements in the immersion rod.
- To avoid sunlight damage, do not mount the sensor on a rooftop. To ensure correct operation, the sensor's ambient temperature must be in the range of -5...45 °C.

• The air inlet must be placed facing the air flow in order to achieve the uniformity and accuracy expected.





• Do not install the sensor in a vertical duct.



Mounting instruc- Mounting instructions are enclosed in the package. tions

Replacing AQS2100

NOTICE! Only trained engineers may replace the sensor module.

The sensor module must be replaced under the following conditions:

- QSM2162 (PM2.5 + r.h. + temperature): An output signal of 10 V/5 V/20 mA is provided at signal outputs X1 and X2 and an output signal of 0 V/4 mA at signal output X3.
- QSM2100/QSM2162 (PM2.5 + PM10 + temperature): An output signal of 10 V/5 V/20 mA is provided at signal output X1 and an output signal of 0 V/4 mA at signal output X2.

Replacing the sensor module:

NOTICE! As the replacement on QSM2162 and QSM2100 is identical, the steps to replace the QSM2162 sensor module serve as an example.

1. Detach the sub-housing from the main housing.

CAUTION! Avoid touching any exposed electrical elements.



2. Remove the module by hand.



3. Replace the module by the new one.



4. Install the sub-housing on the main housing.



 NOTICE

 Turn off the device before replacing the sensor module.

 If not possible, insert a new sensor module 10 s after the old one is removed.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

FCC This device complies with part 15 of the FCC rules. Operation is subject to the following two (Federal conditions:

- Communications Commission)
- 1. This device may not cause harmful interference;
- 2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FDA This device complies with IEC/EN 60825-1:2014, 21 CFR 1040.10 and 1040.11 except for (Food and Drug conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, Administration) 2019. It is subject to the following conditions:

- Class 1 laser product •
- LASER RADIATION for laser module •
- 655 nm, CW (continuous wave), for laser leakage < class 1 laser product limit (0.39 mW) •

NOTE: The sensor module of fine dust duct sensor is fully enclosed, so no potentially hazardous radiation is accessible during use. In order to avoid inadvertent exposure to hazardous laser radiation, do not disassemble the housing of sensor module during operation or maintenance. If the housing is broken, do not use and replace with a new module.

Open Source All open source software components used within the product (including their copyright holders and the license conditions) can be found from the website Software (OSS) http://www.siemens.com/download?A6V11998673.

Power supply					
Operating voltage	AC 24 V ±20 % or DC 1535 V (SELV) or AC/DC 24 V class 2 (US)				
Frequency	50/60 Hz at AC 24 V				
External supply line protection (EU)	Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or Power source with current limitation of max. 10 A				
Power consumption QSM2100 QSM2162	3.2 VA 3.8 VA				

Functional data (PM2.5)						
Measuring range (selectable)	 0500 μg/m³ (default) 0300 μg/m³ 0100 μg/m³ 050 μg/m³ 					
Unit to unit variability	 0100 μg/m³: ±13 μg/m³, 100500 μg/m³: ±15 % of reading @ 1535 °C and 2070 % r.h. Duct air speed: 210 m/s Direction of air inlet & outlet (after mounting): facing air flow 					
Analog output signal, (terminal X1)	 DC 010 V or DC 05 V ⇒ (0500 µg/m³)/(0300 µg/m³)/(0100 µg/m³)/(050 µg/m³), max. ±1 mA 420 mA ⇒ (0500 µg/m³)/(0300 µg/m³)/(0100 µg/m³)/(050 µg/m³), max. 500 ohm 					
Data update interval **)	 Continuous work mode (default) 38 min (smart work mode) 					

Functional data (PM10)	
Measuring range (selectable)	 0500 μg/m³ (default) 0300 μg/m³ 0100 μg/m³ 050 μg/m³
Unit to unit variability	 0100 μg/m³: ±15 μg/m³, 100500 μg/m³: ±20 % of reading @ 1535 °C and 2070 % r.h. Duct air speed: 210 m/s Direction of air inlet & outlet: facing air flow
Analog output signal, (terminal X2)	 DC 010 V or DC 05 V ²/₌ (0500 µg/m³)/(0300 µg/m³)/(0100 µg/m³)/(050 µg/m³), max. ±1 mA 420 mA ²/₌ (0500 µg/m³)/(0300 µg/m³)/(0100 µg/m³)/(050 µg/m³), max. 500 ohm
Data update interval **)	Continuous work mode (default)38 min (smart work mode)

Functional data (temperature with QSM2162)			
Range of use	-545 °C		
Measuring range	050 °C/-3535 °C		
Measuring accuracy at DC 24 V in the range of 2025 °C 1535 °C -3550 °C	±0.3 k (typical) ±0.6 k ±1 k		
Time constant t ₆₃	< 3.5 min in 2 m/s moved air		
Output signal, linear (terminal X3)	 DC 010 V or DC 05 V ≙ 050 °C/-3535 °C, max. ±1 mA 420 mA ≙ 050 °C/-3535 °C, max. 500 ohm 		

Functional data (humidity with QSM2162)			
Range of use	595 % r.h. (non-condensing)		
Measuring range	0100 % r.h.		
Measuring accuracy at 23 °C and DC 24 V 095 % r.h. 3070 % r.h.	±5 % r.h. ±3 % r.h. (typical)		
Time constant t ₆₃	Approx. 20 s		
Output signal, linear (terminal X2)	 DC 010 V or DC 05 V = 0100 % r.h., max. ±1 mA 420 mA = 0100 % r.h., max. 500 ohm 		

Functional data	
Max. air velocity V _{max}	10 m/sec

Ambient conditions and protection classification			
Protection degree of housing	IP54 as per EN 60529 in built-in state		
Protection class	III as per EN 60730-1		
 Environmental conditions Transport Climatic conditions Temperature Humidity Mechanical conditions Operation Climatic conditions Temperature (housing with electronics) Humidity Mechanical conditions 	IEC 60721-3-2 Class 2K3 -2570 °C < 95 % r.h. Class 2M2 IEC 60721-3-3 Class 3K5 -545 °C 595 % r.h. (non-condensing) Class 3M2		

Standards, directives and approvals			
Product standard	EN 60730-1, EN 60730-2-9, EN 61000-6-2, EN 61000-6-3 Automatic electrical controls for household and similar use		
Electromagnetic compatibility (applications)	For use in residential, commerce, light-industrial and industrial environments		
EU conformity (CE)	A5W00096641 *)		
RCM conformity	A5W00096643 *)		
Environmental compatibility	The product environmental declaration (A5W00099435 *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		

General	
Cable lengths for measuring signals Perm. cable lengths	See device data sheet for signal handling
Electrical connections screw terminals	1 × 2.5 mm ² or 2 × 1.5 mm ²
Materials and colors	
Base	Polycarbonate, RAL 7001 (silver-gray)
Cover	Polycarbonate, RAL 7035 (light-gray)
Immersion rod	ABS, RAL 7001 (silver-gray)
Filter cap	Polycarbonate, RAL 7001 (silver-gray)
Mounting flange	PA 66 – GF35 (black)
Cable entry gland	PA, RAL 7035 (light-gray)
Sensor (complete assembly)	Silicone-free
Packaging	Corrugated cardboard
Weight including package QSM2100 QSM2162 AQS2100	344.4 g 356 g 59 g

*) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.

**) For detailed information on data update intervals, see Sensor data refresh frequency [> 6].

Connection terminals



Operating voltage AC 24 V (SELV) or DC 15...35 V

G0 Ground and measuring neutral

G

- X1 Signal output DC 0...10 V, DC 0...5 V or 4...20 mA
- X2 Signal output DC 0...10 V, DC 0...5 V or 4...20 mA
- X3 Signal output DC 0...10 V, DC 0...5 V or 4...20 mA

Dimensions



60

49

50

Ę

28

82

M16 x 1.5

A6V11893002M00

Dimensions in mm

1 910

SIEMENS



Differential pressure sensor

QBM2030-...

for air and non-aggressive gases

- Pressure-linear characteristic with selectable pressure measuring range
- Operating voltage AC 24 V or DC 13.5...33 V
- Output signal DC 0...10 V
- Zero-point adjustment
- Simple and fast mounting thanks to integrated mounting brackets in the housing
- Maintenance free
- Calibrated and temperature-compensated measuring signal
- Supplied with tubing connection set

Application

The differential pressure sensor acquires differential, over and under pressure of air and nonaggressive gases.

Fields of application

- Measuring the slightest differential pressures in ventilation and air conditioning ducts
- Check air flows
- Monitor filters and control fans

Type summary

Type (ASN)	Product number (SSN)	Pressure measuring ranges			Output signal
		Measuring range 1	Measuring range 2	Measuring range 3	
QBM2030-1U	S55720-S244	±50 Pa	±100 Pa	0…100 Pa	010 V DC
QBM2030-5	S55720-S245	0200 Pa	0250 Pa	0…500 Pa	010 V DC
QBM2030-30	S55720-S246	01000 Pa	01500 Pa	03000 Pa	010 V DC

Conversion Pa - bar 100 Pa = 1 hPa = 1 mbar

Ordering and delivery

When ordering a differential pressure sensor, please specify the quantity, type, and product name.

Example Type (ASN)		Product number (SSN)	Product designation	
	QBM2030-1U	S55720-S244	Differential pressure sensor.	

The differential pressure sensor is supplied with a connection set consisting of 2 m plastic tubes, 2 air duct probes (ABS) and 4 fixing screws. Additional accessories may be ordered separately.

Accessories

Additional sets of air duct probes are available depending on measuring requirements. Various mounting brackets are also available depending on installation location.

Туре	Name	Data sheet
AQB2000	Mounting bracket, for mounting sensors in iso- lated air ducts	N1590
AQB21.2	Top hat rail adapters (5 pieces) for DIN top hat rails, HT 35-7.5	N1590
FK-PZ1	Air duct probe, short, stainless steel, with elastic lead-through for simple, quick, and airtight mounting.	N1589
FK-PZ2	Air duct probe, long, aluminum, with orifice plates for precise measuring requirements	N1589

Mode of operation

The sensor acquires the differential pressure using a silicon rubber membrane and ceramic lever. The sensor generates as per the deflection, a linear and temperature-compensated output signal DC 0...10 V.

The differential pressure sensor consists of:

- Sensor housing with mounting bracket, cable entry, and removable snap-on cover with safety screw
- Pressure chamber with membrane and ceramic lever
- Printed circuit board with connection terminals and DIP switch for selecting measuring range (see "Commissioning notes")
- Zero-point adjustment button (see "Commissioning notes")

Setting, and connection elements



- 1 2 DIP switch for selecting the measuring range
- 2 Cable gland entry Pg 11 (without cable strain relief)
- 3 Push-button for zero-point adjustment
- 4 Connection nipples (see "Mounting notes")
- 5 Connection terminals
- 6 Safety screw for hinged cover
- 7 LED to display zero-point adjustment

Engineering notes

The transformer used must be suited for safety extra low voltage (SELV). It must have separate windings and be designed for 100 % duty. Transformer size and fuse must comply with local safety regulations.

Observe maximum permissible cable lengths. If cable lengths exceed 50 meters and run parallel to the mains cables: Use shielded cables!

Mounting notes

The differential pressure sensor is suited for direct mounting on air ducts, walls, ceilings, or in control panels.

The supplied 2 meter PVC tubing can be modified to the duct connection on the plant.

To achieve the housing protective class indicated under "Technical data", the differential pressure sensors must be mounted with the nipples facing down. In addition, they should be higher than the air duct probes.

Caution If the pressure connection nipples point upward or are at a lower level than the air duct probes, condensation can collect inside the sensor, causing damage to the device.

The pressure tubing for the sensor nipples are connected as follows to the differential pressure sensors:

On the air duct side	On the pressure sensor side
Tubing with higher pressure side (lower vacuum)	Connect to pressure nipple "P1" or "+"
Tubing with lower pressure side (higher vacuum)	Connect to pressure nipple "P2" or ""

The sensor is supplied with mounting instructions. For detailed information on installation and mounting position, refer to the <u>Sensor</u> Installation Guide in BT download center.

Commissioning notes

Note

⚠ Caution	The values indicated under "Technical data" apply only to <u>vertically mounted</u> differ- ential pressure sensors (connection nipples pointing down).					
Sensor calibration	Value deviations bottom). These o ment.	Value deviations are possible for <u>horizontal mounting</u> (housing cover on top or bottom). These deviations can be compensated for by using the zero-point adjust-ment.				
Zero-point adjustment	See also Setting, and connection elements					
	 Wiring conne Press the zer briefly lights u Connect pres 	 Wiring connection terminals – Do not connect pressuring tubing at this time. Press the zero-point adjustment button for more than 2 seconds until the LED briefly lights up Connect pressure tubing 				
Set measuring range	A DIP switch is used to individual adjust the pressure measuring range. The various DIP switch positions are described on the inside of the hinged cover.					
Adjustable pressure	DIP setting	QBM2030-1U	QBM2030-5	QBM2030-30		
ranges	• •	0100 Pa	0500 Pa	03000 Pa	-	
		+/- 100 Pa	0250 Pa	0…1500 Pa		
		+/- 50 Pa	0200 Pa	0…1000 Pa	•	
	* Factory setting					

Disposal



The devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Electrical interface	Power supply	Safety extra low voltage (SELV/PELV)
	Operating voltage	AC 24 V ±15 %, 50/60 Hz or DC 13.533 V
	Power consumption	<0.5 VA
	Current draw	<10 mA
	External supply line protection	Fuse slow max. 10 A
		or
		Circuit breaker max. 13 A
		Characteristic B, C, D according to EN 60898
		or
		Power source with current limitation of
		max. 10 A
	Output voltage	DC 010 V
	Burden (R _{Load})	>10 kΩ
	Output	Not galvanically separated, 3-wire connection,
		short-circuit proof, protected against reverse
		polarity
Functional data	Measuring range	refer to "Type summary"
	Sensing element	Piezo-resistive (silicone membrane, ceramic
	-	bar)
	Measuring accuracy at recommended mounting	(FS = Full Scale)
	position and 20 °C ambient temperature	
	Total error	<±3 % FS
	TC zero point	<±0.1 % FS/°C
		<±0.06 % FS/°C
	Reaction time	1 s
	l olerable overload on one side	
	011 P 1	5,000 Pa
		(10,000 Pa for types QBM2030-5, -30)
	on P2	400 Pa
	Rupture pressure	
	070 °C	1.5 × overload
	at room temperature	2 × overload
	Media	Air and non-aggressive gases
	Admissible medium temperature	070 °C
	Maintenance	Maintenance free
Connections	Electrical connection	
	Screw terminals for	max. 1.5 mm ² (wire or stranded wire)
	Cable lead	Cable gland entry Pg 11 (without cable strain
		relief)
	Pressure connection	PVC nipples \emptyset 6.2 mm
Degree of protection	Protection degree of housing at recommended	IP42 according to EN 60529
	installation	Ŭ
	Protection class	III according to EN 60730-1
Environmental conditions	Permissible ambient temperature	
	Operation	070 °C
	Transport/storage	-25…+70 °C
	Permissible ambient humidity	<90 % r.h. (without condensation)
Directives, standards	Product standard	EN 61326-1
		Electrical equipment for measurement, control
		and laboratory use. EMC requirements.
		General requirements
	EU Conformity (CE)	CE1T1910xx 01 *)
	RCM Conformity	CE1T1910en C1 *)
Environmental	The product environmental declaration CE1F1910) contains data on environmentally compatible
compatibility	product design and assessments (RoHS compliand	ce, materials composition, packaging, environmen-
Dimensions (weight)	tal benefit, disposal).	0.192 kg
		U. 100 KY

*) The documents can be downloaded from http://siemens.com/bt/download.



Operating voltage AC 24 V or DC 13.5...33 V GND, measuring neutral

G (+) M (0)

U (7) Measuring signal DC 0...10 V

Dimensions

Air duct probes



QBM2030





Dimensions in mm

SIEMENS



Differential pressure sensor

for air and non-aggressive gases

QBM3020-.. QBM3120-..

- High degree of measuring accuracy
- Adjustable characteristic curve (pressure-linear or extracting-the-root)
- Operating voltage: QBM3020-..: AC 24 V / DC 13.5...33 V
- QBM3120-..:
- Output signal:
- QBM3020-..: DC 0...10 V
- QBM3120-..: 4...20 mA

DC 8...33 V

- Zero-point adjustment
- Simple and fast mounting thanks to integrated fixing angle bar in the housing
- · Maintenance free thanks to excellent long-term stability
- Calibrated and temperature-compensated measuring signal
- Supplied with plastic tubing
- Very short response time
- Actual value display*
- * Depending on type

Application

The differential pressure sensor acquires differential, over and under pressure of air and nonaggressive gases if a high degree of measuring accuracy and quality is required. It is also suited for measuring volume flow via differential pressure since the output signal can be set to extracting-the-root.

Fields of application

- Measuring the slightest differential pressures in ventilation and air conditioning ducts
- Check air flows
- Monitor filters and control fans
- Pressure supervision in labs, production, and clean rooms
- For acquiring variable air flow in VAV plants on the supply and extract air side

Type (ASN)	Product number (SSN)	Pressure measuring ranges		Output signal
		Standard	End value can be set ²	
QBM3020-1U	S55720-S233	-50+50 Pa	± (3050) Pa	DC 010 V
QBM3020-1	S55720-S234	0100 Pa	50100 Pa	DC 010 V
QBM3020-3	S55720-S235	0300 Pa	100300 Pa	DC 010 V
QBM3020-5	S55720-S236	0500 Pa	300500 Pa	DC 010 V
QBM3020-10	S55720-S237	01000 Pa	5001000 Pa	DC 010 V
QBM3020-25	S55720-S238	02500 Pa	16002500 Pa	DC 010 V
QBM3020-1D ¹	S55720-S239	0100 Pa	50100 Pa	DC 010 V
QBM3020-3D ¹	S55720-S240	0300 Pa	100300 Pa	DC 010 V
QBM3020-5D ¹	S55720-S241	0500 Pa	300500 Pa	DC 010 V
QBM3020-10D ¹	S55720-S242	01000 Pa	5001000 Pa	DC 010 V
QBM3020-25D ¹	S55720-S243	02500 Pa	16002500 Pa	DC 010 V
QBM3120-1U	S55720-S442	-50+50 Pa	± (3050) Pa	420 mA
QBM3120-1	S55720-S443	0100 Pa	50100 Pa	420 mA
QBM3120-3	S55720-S444	0300 Pa	100300 Pa	420 mA
QBM3120-5	S55720-S445	0500 Pa	300500 Pa	420 mA
QBM3120-10	S55720-S446	01000 Pa	5001000 Pa	420 mA
QBM3120-25	S55720-S447	02500 Pa	16002500 Pa	420 mA
QBM3120-1D ¹	S55720-S448	0100 Pa	50100 Pa	420 mA
QBM3120-3D ¹	S55720-S449	0300 Pa	100300 Pa	420 mA
QBM3120-5D ¹	S55720-S450	0500 Pa	300500 Pa	420 mA
QBM3120-10D ¹	S55720-S451	01000 Pa	5001000 Pa	420 mA
QBM3120-25D ¹	S55720-S452	02500 Pa	16002500 Pa	420 mA

Type summary

¹ Type with digital display (in Pa)

² Relevant for application using extracting-the-root characteristic

Conversion

100 Pa = 1 hPa = 1 mbar)

Ordering and delivery

When ordering a differential pressure sensor, please specify the quantity, type, and product name.

Example	Type (ASN)	Product number (SSN)	Product designation
	QBM3020-3	S55720-S235	Differential pressure sensor.

The differential pressure sensor is supplied with 2-meter plastic tubing. Additional accessories may be ordered separately.

Additional sets of air duct probes are available depending on measuring requirements. Various mounting brackets are also available depending on installation location.

Туре	Name	Data sheet
AQB2000	Mounting bracket, for mounting sensors in isolated air ducts	N1590
AQB21.2	Top hat rail adapters (5 pieces) for DIN top hat rails, HT 35-7.5	N1590
FK-PZ1	Air duct probe, short, stainless steel, with elastic lead- through	N1589
FK-PZ2	Air duct probe, long, aluminum, with orifice plates for precise measuring requirements	N1589

Mode of operation

The sensor acquires the differential pressure using a silicon rubber membrane and ceramic bar. Depending on the type of sensor, the sensor generates a linear or extracting-the-root signal DC 0...10 V with the QBM3020-.. or 4...20 mA with the QBM3120-.. which is calibrated and compensated for temperature.

The individual adjustment of the pressure measurement range for extracting-the-root sensors is done by means of a potentiometer.

The differential pressure sensor consists of:

- Sensor housing with mounting bracket, cable entry, and removable snap-on cover with safety screw
- Pressure chamber with membrane and ceramic lever
- PCB with terminal connections, DIP switch to switch the characteristic curve (see Commissioning notes) and potentiometer for optional end value setting on extracting-the-root characteristic (0...10 V output or 4...20 mA output respectively)
- \bullet LCD on QBM3020..D and on QBM3120-..D
- Zero-point adjustment button to compensate for mounting position (see "Commissioning notes")

Display, setting and connection elements



- 1 Cable entry gland Pg 11 with cable strain relief
- 2 Push-button for zero-point adjustment
- 3 LCD (**QBM3020-..D** and **QBM3120-..D**), to digitally display the sensor signal in Pascal
- 4 DIP switch to change the characteristic (see "Set characteristic curve under "Commissioning notes")
- 5 Connection nipples (see "Mounting notes")
- 6 Potentiometer to set amplification at extracting-the-root output characteristic
- 7 Terminal block
- 8 Safety screw for hinged cover
- 9 LED for zero-point adjustment

Key

The transformer used must be suited for safety extra low voltage (SELV) when using an AC power supply. It must have separate windings and be designed for 100 % duty. Transformer size and fuse must comply with local safety regulations. Observe maximum permissible cable lengths.

If cable lengths exceed 50 meters and run parallel to the mains cables: Use shielded cables!

Mounting and Installation notes

The differential pressure sensor is suited for direct mounting on air ducts, walls, ceilings, or in control panels.

The supplied 2 meter plastic tubing can be modified to the duct connection on the plant. To achieve the housing protective class indicated under "Technical data", the differential pressure sensors must be mounted with the pressure nipple facing down. In addition, they should be higher than the air duct probes.

Caution If the pressure connection nipples point upward or are at a lower level than the air duct probes, condensation can collect inside the sensor, causing damage to the device.

Note

The pressure tubing for the sensor nipples are connected as follows to the differential pressure sensors:

On the air duct side	On the pressure sensor side
Tubing with higher pressure side (lower vacuum)	Connect to pressure nipple "P1" or "+"
Tubing with lower pressure side (higher vacuum)	Connect to pressure nipple "P2" or ""

The sensor is supplied with mounting instructions.

For detailed information on installation and mounting position, refer to the <u>Sensor In-</u> <u>stallation Guide</u> in BT download center.

▲ Caution

- Power supply by SELV or class 2 power supply with limited output of 15 W or less (UL requirement)
- Use only copper wiring

Commissioning notes

⚠ Caution	The values indicated under "Technical data" apply only to <u>vertically mounted</u> differential pressure sensors (connection nipples pointing down).	
Sensor calibration	Value deviations are possible for <u>horizontal mounting</u> (housing cover on top or bottom). These deviations can be compensated for by using the zero-point adjustment. See "Zero-point adjustment" below.	
Set characteristic curve	The settings of the characteristic curve (pressure-linear / extracting-the-root) using a DIP switch.	
	DIP switch	Characteristic curve
	*	Pressure-linear characteristic curve
		Extracting-the-root characteristic curve
	* Factory setting	g
Zero-point adjustment	See also Displa	ay, setting and connection elements
	 Wiring connection terminals – Do not connect pressure tubing at this time. Press the zero-point adjustment button for more than 2 seconds until the LED briefly lights up. The zero-point adjustment is additionally indicated on types with LCDs with "0 Pa". A menu opens if you press the zero-point button for less than 2 seconds on LCD types. It closes automatically by multiple presses or a waiting period of 8 seconds. Connect pressure tubing 	

Disposal



The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Electrical interface	Power supply	Safety extra low voltage (SELV/PELV) or class 2 (UL)
QBM3020	Operating voltage	AC 24 V ±15 %, 50/60 Hz or DC 13.533 V
3-wire connection	Power consumption	<0.5 VA
	Current draw	<10 mA
	External supply line protection	Fuse slow max 10 A
		or
		Circuit breaker max. 13 A
		Characteristic B. C. D according to EN 60898
		or
		Power source with current limitation of max. 10 A
	Output voltage	DC 0 10 V
	Burden (R _{Load})	>10 kΩ
	Output	Not galvanically separated. 3-wire connection.
	- 1	short-circuit proof, protected against reverse
		polarity
QBM3120	Operating voltage	DC 833 V
2-wire connection	for ohm loads of up to 500 Ω	DC 1833 V
	Power consumption	<0.7 VA
	Current draw	420 mA
	Output	420 mA
		$R_{Load} < \frac{Supply Voltage - 8 V}{\Omega} [\Omega]$
		0.02 A 2-wire technology (inherently short-circuit proof and reversed polarity protected)
Functional data	Measuring range	Refer to "Type summary"
	Sensing element	Piezo-resistive (silicone membrane, ceramic bar)
	Measuring accuracy at recommended mount- ing position and 20 °C ambient temperature	(FS = Full Scale)
	for QBM3x20-10, -10D, -25, -25D	
	 Zero point, end value 	<±0.7 % FS
	 Sum from linearity, reproducible and 	<±0.6 % FS
	hysteresis	
	- TC zero point	<±0.04 % FS/°C
	- IC sensitivity	<±0.02 % FS/°C
	Zero point and value	<+0.7 % ES
	 Sum from linearity reproducible and 	<+1 % FS
	hysteresis	
	– TC zero point	<±0.04 % FS/°C
	 TC sensitivity 	<±0.05 % FS/°C
	for QBM3x20-33D	
	 Zero point, end value 	<±0.7 % FS
	 Sum from linearity, reproducible and hysteresis 	<±1 % FS
	 TC zero point 	<±0.05 % FS/°C
	 TC sensitivity 	<±0.05 % FS/°C

	for QBM3x20-1U, -1, -1D			
	 Zero point, end value 	<±1 % FS		
	 Sum from linearity, reproducible and hysteresis 	<±1 % FS		
	– TC zero point	<+0.1 % FS/°C		
	 TC sensitivity 	<+0.06 % FS/°C		
	l ong-term stability	+1.0% ES as per DIN IEC 60770		
	Response time	<20 ms		
	Load change	<10 Hz		
	Tolerable overload on one side			
	At P1	5.000 Pa		
		(10.000 Pa for types QBM3x20-5, -10, -25)		
	At P2	400 Pa		
	Rupture pressure			
	070 °C	1.5 × overload		
	at room temperature	2 × overload		
	Display (on QBM3020D only)	LCD, 2-line, 8 position each, alphanumeric, not background lit		
	Display of	Differential pressure in Pa		
	Media	Air and non-aggressive gases		
	Admissible medium temperature	070 °C		
	Maintenance	Maintenance free		
Degree of protection	Protection degree of housing	IP54 according to EN 60529		
	Protection class	III according to EN 60730-1		
Connections	Electrical connection			
	Screw terminals for	Max. 1.5 mm ² (wire or stranded wire)		
	cable lead	Cable gland entry Pg 11		
	Pressure connection	PVC nipples \varnothing 6.2 mm		
Environmental conditions	Permissible ambient temperature			
	Operation	070 °C		
	Transport and storage	–25+70 °C		
	Permissible ambient humidity	<90 % r. F. (without condensation)		
Standards, directives and	Product standard	EN 61326-2-3:2013		
approvals		Electrical equipment for measurement, control		
		and laboratory use. EMC requirements. Gen-		
		eral requirements		
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial		
	FAC conformity	and industrial environments		
	c RL us	UL 60730-17 UL 60730-2-6		
	<u>http://ul.com/database</u>			
compatibility	product design and assessments (RoHS con ronmental benefit, disposal).	pliance, materials composition, packaging, envi-		
Dimensions (weight)	Weight (with packaging), without display	0.183 kg		
	Weight (with packaging), with display	0.196 kg		

*) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.

Connection terminals

QBM3020-xx



Operating voltage AC 24 V or DC 13.5...33 V

G (+) M (0) U (⊅) GND, measuring neutral

Measuring signal DC 0...10 V

QBM3120-xx



- G (+) I (⊅) Supply voltage DC 8...33 V
- Measuring signal DC 4...20 mA

Dimensions



Dimensions in mm

SIEMENS



Modbus air pressure Q sensor with I/O extension

QBM3700..

QBM3700.. air pressure sensor with I/O extension is designed for Modbus RTU communication networks. The QBM3700.. offers easy installation and less plant wiring with HVAC industry wide proven sensor technology.

- Modbus RTU communication interface
- Two analog inputs for 0...10 V or passive temperature elements
- One analog output for 0...10 V
- Available with a differential pressure sensor element
- Pressure sensor elements with high accuracy and long-term stability via ceramic strain-gauge technology at different pressure ranges from 0...500 – 2500 Pa
- Decentralized node provides simple installation and less wiring
- DIP switches for addressing and Modbus line termination
- Push button for automated on-event addressing together with Siemens Climatix controllers

QBM3700.. Modbus air pressure sensor with I/O extension

The QBM3700.. comes with one sensor element and with different pressure ranges for power and communication.

QBM3700..



Type / ASN	Order number / SSN	Pressure range	Inputs/ Outputs	MOQ
Types with 1 sensor				
QBM3700-5/MO	S55720-S487	1x 0…500 Pa	2 AI, 2 AO	1
QBM3700-13/MO	S55720-S485	1x 0…1250 Pa	2 AI, 2 AO	1
QBM3700-25/MO	S55720-S486	1x 0…2500 Pa	2 AI, 2 AO	1

Ordering

When ordering a QBM3700.. Modbus air pressure sensor with I/O extension, please specify the quantity and type.

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Please observe the minimum order quantity (MOQ). 1 $\,$ ASN order equals a box with one sensor.

Please contact your Siemens sales regional center for other QBM3700.. types or custom orders.

Accessories

Type / ASN	Order number / SSN	Description
FK-PZ1	BPZ:FK-PZ1	Air duct probe for differential pressure sensor, short, adjustable
FK-PZ2	BPZ:FK-PZ2	Air duct probe for differential pressure sensor, long, adjustable
FK-PZ3	BPZ·FK-PZ3	Air duct probe for differential pressure sensor, fixed length

Focus segment

- Air handling units (AHU), with communication between controller and field devices and connected to cloud enabling plant digitalization.
- Support of Ecodesign directive ErP 2016/2018 through the use of bus-compatible sensors for monitoring filters, including cloud visualization.

Field of application

The QBM3700.. Modbus air pressure sensor and I/O extension is used in ventilation systems and air handling units (AHU):

- To measure and monitor pressure in air ducts and over filters and fans
- On the supply and extract air side

The QBM3700.. is ideally suited for a multitude of tasks in the HVAC industry:

- Measures relative and differential pressure and flow of air and non-aggressive gases
- Available with a differential pressure sensor
- Allows monitoring of pressure or volume flow at two individual points in the system



Sensor technology

The built-in sensors of the QBM3700.. are based on the unique and in HVAC and automotive industry well-proven ceramic strain-gauge beam technology.

- The accurate sensors with long-term stability for all measured variables are completely maintenance free, providing cost savings over the life of the plant.
- The sensor elements are also suited for demanding applications in the food or pharmaceutical industry.
- The sensor elements are also suited for demanding applications in the food or pharmaceutical industry.

Decentralized node via Modbus (RTU) combined with inputs/outputs

The QBM3700.. with its Modbus communication interface is a decentralized node, when using the inputs and outputs for sensors and field devices:

- For example temperature sensors can be linked to the analog inputs and actuators linked to the analog outputs.
- Having these elements on Modbus reduces wiring and installation costs.

Innovative housing design with quick release fasteners

The housing of the QBM3700.. comes with quick release fasteners, which can be pushed in by hand, making screws and tools for opening and closing the sensor unnecessary. The innovative housing design is based on a patented sealing, injected directly during the plastic injection molding process. A high protection grade of IP54 is guaranteed, providing a wide range of application areas.

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Workflows and "How to instructions" are available in document A6V11841988. See Section Supplemental information [\triangleright 11].

DIP switches for addressing and Modbus line termination

For flexible use and wide range of application the QBM3700.. Modbus air pressure sensor with I/O extension can be addressed via its DIP switches with controllers other than Climatix controllers.

Push button for automated on-event addressing together with Climatix controllers

The QBM3700.. can be paired (addressed) easily and fast with Climatix controllers with the inbuilt push button for on-event addressing. On-event push button addressing is implemented in Siemens Modbus sensors and devices for digital air handling units (AHU), providing a consistent, easy and fast commissioning process for manufacturers and installers.

Zero point factory reset

Resetting to factory settings or zero point is easy.

Siemens as global technology partner

The QBM3700.. is distributed globally via the Siemens sales network. . The sensor is tested according to the major international standards such as EU and RCM conformity, UL approbation and EAC, making possible a worldwide field of application. Continuous innovations and development, as well as sustained quality, logistic processes, spare parts management and customer support make Siemens a valued technology partner.

PCB overview



Element	Description
А	Status LED
В	DIP switches
С	Button

Status LED indicator

Color	Flashing	Function
Red	Blinking, 1 sec. on, 5 sec. off	Internal error
Red	Blinking, 0.1 second on, 1 second off	 Invalid configuration
Orange	Modulating	• Waiting for on-event addressing
Orange	Blinking, 1 sec. on, 5 sec. off	• Bus communication failure
Orange	Blinking, 0.1 second on, 1 second off	• Device not configured (factory settings)
Green	Modulating	• Start-up
Green	Flashing	Normal operation
Green	Flickering	Bus communication
Blue	Modulating	• Zero point reset



Workflows and 'How to instructions' for the DIP switches and the push button can be found in A6V11841988. See Section Supplemental information [\triangleright 11].

DIP switches

- Use DIP switches for adjustment of the Modbus address (DIPs 1 to 8) and for Modbus line termination (DIP 9).
- The DIP switches have priority over register 'Modbus address'.Button

Duration of operation	Function
510 s	On-event addressing
1020 s	Zero point reset
2030 s	Reset to factory setting
Terminals



Terminal	Description
24 ∨≂ →	Power AC 24V / DC 24V
\perp	GND
24 ∨≂ →	Power for external device AC 24 V / DC 24 V
A+, REF, B-	Modbus, RS-485 NOTICE! Not galvanically separated
A01 ←	Analog output 1
\perp	GND
A02 ←	Analog output 2
AI1 →	Analog input 1
\perp	GND
AI2 →	Analog input 2

Technical data

Power data

Power supply	
Operating voltage	AC/DC 24 V ±15 %
Frequency	50/60 Hz
Protection class	III (SELV / PELV), UL class 2 NOTICE! Limited energy circuit 15 VA or less.
Power consumption	<2 VA
Current draw	AC max. 25 mA @ AC 24 V
Current draw DC	25 mA @ DC 24 V
24V external power supply for active sensors	Max current: 80 mA

Function data

Measuring			
ranges	See "Type overview / order data [▶ 2]".		
Variables	Pa, Psi, mmHG, mmH $_2$ O (configured via application)		
Sensing element	 Piezo resistive Ceramic bar: Al₂O₃ (96%) Diaphragm: Silicon 		
Accuracy	Accuracy Total measuring accuracy at required installation position and r.H. 45% • Device $0\cdots 500$ Pa, at 20° C: $\leq \pm 1\%$ FS • Device $0\cdots 1250$ Pa, at 20° C: $\leq \pm 0.5\%$ FS • Device $0\cdots 2500$ Pa, at 20° C: $\leq \pm 0.5\%$ FS • Device $0\cdots 500$ Pa, at $0\cdots 50^{\circ}$ C: $\leq \pm 2\%$ FS • Device $0\cdots 1250$ Pa, at $0\cdots 50^{\circ}$ C: $\leq \pm 1\%$ FS • Device $0\cdots 2500$ Pa, at $0\cdots 50^{\circ}$ C: $\leq \pm 1\%$ FS • Device $0\cdots 2500$ Pa, at $0\cdots 50^{\circ}$ C: $\leq \pm 1\%$ FS (Note: FS = Full scale) Long-term stability: $\pm 1.0\%$ FS per DIN EN 60770, resolution <0,1% FS		
Response time	<1 s		

Limits	
Tolerable overload on one side	 On Px +: 10000 Pa On Px -: 400 Pa
Rupture pressure	 At room temperature: 2x overload At 70 ° C: 1.5x overload
Media / Admissible temperature	Air and neutral gases / 070 °C

Data for volume flow calculation			
Permitted k factor range	01500		
Formula	$Q = k \times \sqrt{\Delta p}$		
Measured variables	l/s, m³/h, m³/s		

NOTICE
Accuracy of volume flow calculation The accuracy of the volume flow calculation is proportional to the root of the pressure measurement accuracy multiplied by the k-factor.

Additional data			
Pressure connections	Diameter 6.2 mm, (for pipe inside, diameter 5 mm)		
Maintenance	Maintenance free		

Communication Modbus RTU communication

Element	Specification
Address range	1247 (255 = Default)
Baud rate	960057600
Format	Modbus RTU
Line termination	Selectable via DIP switch 9
Hardware	RS485
Default configuration	9600E1 (9600 baud rate, 1 stop bit, even parity)

Cable types

Interface	Specification
Signal wiring (Inputs/ outputs)	 Screw terminals for wire and stranded conductors: Wire: 0.5····2.5 mm² NOTICE! Use only copper wiring
Cable bushings	 QBM3700 screwed connectors 2 x cable glands screwed for cable diameter 3…6 mm (wrench size 15 mm) 2 x cable glands screwed for cable diameter 5…10 mm (wrench size 20 mm)
Modbus	Modbus 2 or 3-wire, twisted, shielded, if >3 m

Wire lengths

Interface	Wire lengths
Signal wiring	Max. 50 m
Modbus	Max. 100 m

Inputs and outputs

Analog inputs Al1, Al2				
Туре	Range	Accuracy	Resolution	TK/B _{25/85}
Pt1000	-50+150 ° C	±0.5 K	0.1 K	3850 ppm/K
LG-Ni1000	-40+120 ° C	±0.5 K	0.1 K	5000 ppm/K
NTC10k	-4025 ° C	±1.0 K	0.2 K	3979
	-25+75 °C	±0.5 K	0.1 K	3979
	+75+100 ° C	±1.0 K	0.3 K	3979
	+100+125 ° C	±3.0 K	1.0 K	3979
	+125+150 ° C	±6.0 K	2.5 K	3979
Ni1000	-50+150 ° C	±0.5 K	0.1 K	6180 ppm/K
Input DC 010 V	0 V	±5 mV	<5mV	-
	5 V	±25 mV	<5mV	-
	10 V	±50 mV	<5mV	-
Input resistance	>100 kΩ			

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Configuration of Al1 and Al2 is done via application/HMI.

Analog outputs AO1, AO2				
Туре	Voltage	Resolution	Accuracy	
Output DC 0…10 V	0 V	<11mV	±66 mV	
	5° V	<11mV	±95 mV	
	10 V	<11mV	±124 mV	
	 Output current: Max. 1 mA (short-circuit proof) Min. load: 10 kΩ 			

Conformity

Ambient conditions and protection classification			
Classification as per EN 60730	-		
Degree of pollution	3		
Impulse voltage	330 V		
Degree of protection of housing to EN 60529	IP54		
Climatic ambient conditions as per EN 607213 Transport/storage	 Temperature: -30+70 ° C Air humidity: 5…90 % (non-condensing) 		
Operation	 Temperature: -25+50 ° C Air humidity: 590 % (non-condensing) 		

Standards, directives and approvals			
Product standard	EN 60730-1 Automatic electronic controls for household and similar use		
Electromagnetic compatibility	For residential, commercial, and industrial environments		
EU conformity (CE)	A5W00050769_en		
RCM Conformity	A5W00050770_en		
UL approbation	ANSI/UL 60730-1 http://database.ul.com		
EAC	Eurasian compliance		
Environmental compatibility	The product environmental declaration (A6V11616725_e) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		

Housing and weight

Housing	
Material, Color/look	Polycarbonate PC / Polyamide (PA)Transparent
Dimensions	See "Dimensions [▶ 14]"

Weight	
QBM3700	~250 g

Supplemental information

Document title	Торіс	Document no:
User's guide: Modbus air pressure sensor with I/O extension: QBM3700	Installation, commissioning, engineering, maintenance and Modbus registers	A6V11841988

The documents can be downloaded at http://siemens.com/bt/download.

Security National regulations



CAUTION

National safety regulations

Failure to comply with national safety regulations may result in personal injury and property damage.

• Observe national provisions and comply with the appropriate safety regulations.

Mounting

Mounting location

QBM3700.. air pressure sensor with I/O extension is suited for direct mounting on air ducts, walls, or in control panels. The following points must be observed.

Detailed information on mounting is available in document A6V11841988. See Supplemental information [\triangleright 11].

	NOTICE	
	Inaccurate measurements due to wrong mounting location.	
•	An environment subject to high pressure pulses and/ or significant thermal changes can lead to inaccurate measurements and/or zero shift.	
	• Avoid the these kinds of mounting locations.	
	• A zero shift can be corrected with the function zero point reset.	

Mounting location

	NOTICE
•	Condensation and damage to the device If the pressure connection nipples point upwards or are at a lower level than the air
	duct probes, condensation can collect inside the sensor, causing damage to the device.
	 Mount QBM3700 vertically with pressure nipples facing down. Mount QBM3700 higher than the duct probes.

Connecting tubes

	NOTICE
•	 Damage to the device when mounting or removing the device. The device can be damaged, if the system is not depressurized when mounting or removing it. Depressurize the system prior to mounting or removing the sensor.

The pressure tubing for the sensor nipples are connected as following to the differential pressure sensor:

On the air duct side	On the pressure sensor side
Tubing with higher pressure side (lower vacuum)	Connect to pressure nipple "+".
Tubing with lower pressure side (higher vacuum)	Connect to pressure nipple "-".

Wiring

NOTICE
Polarity reversal protection The device is short circuit proof and protected against polarity reversal. Each connection is protected against crossover up to maximum supply voltage.

Fused mode
analog outputsQBM37.. Are supplied with a fused mode. This prevents damage caused by an interrup-
tion in Modbus communications.

The analog outputs are switched to DC 0 V for interruptions to communications $>\!60$ seconds.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

• Dispose of the device through channels provided for this purpose.

• Comply with all local and currently applicable laws and regulations.



Front view QBM3700..



Bottom view QBM3700.. (opened cover)



Side view QBM3700..



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QBM4000-..., QBM4100-1U



QBM4100-1D

QBM4000...

QBM4100...

Differential pressure

sensor

For air and non-aggressive gases, with calibration certificate.

- Calibration certificate from the factory
- High degree of measuring accuracy
- Pressure-linear characteristic curve
- Operating voltage AC 24 V / DC 13.5...33 V or DC 11...33 V
- Output signal DC 0...10 V or 4...20 mA
- Simple and fast mounting thanks to integrated fixing angle bar in the housing
- Calibrated and temperature-compensated measuring signal
- Excellent long-term response
- Supplied with connection set
- Very short reaction time
- Display* indicates the present differential pressure

* Depending on type

Use

The differential pressure sensor acquires differential, over and under pressure of air and nonaggressive gases if a high degree of measuring accuracy and quality is required as well as a requirement for a calibration certificate.

Fields of application:

- Measuring slightest differential pressures in ventilation and air conditioning ducts
- Check air flows
- Monitor filters and control fans
- Pressure supervision in labs, production, storage and clean rooms
- For acquiring variable air flow in VAV plants on the supply and extract air side

Type summary

	1			1
Type (ASN)	Product number (SSN)	Measuring range	Output signal	LCD
QBM4000-1	S55720-S247	0100 Pa	DC 010 V	No
QBM4000-3	S55720-S248	0300 Pa	DC 010 V	No
QBM4000-10	S55720-S249	01000 Pa	DC 010 V	No
QBM4000-25	S55720-S250	02500 Pa	DC 010 V	No
QBM4100-1U	S55720-S251	-50+ 50 Pa	420 mA	No
QBM4100-1D ¹	S55720-S252	0100 Pa	420 mA	Yes

¹ Type with digital display.

Conversion

100 Pa = 1 hPa = 1 mbar

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Ordering and delivery

When ordering a differential pressure sensor, please specify the quantity, type, and product name.

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Example

Type (ASN)	Product number (SSN)	Product designation
QBM4000-1	S55720-S247	Differential pressure sensor with calibra- tion certificate.

A round plug connector (Lumberg RKC 30/11) and a 2-meter PVC tube is included with the differential pressure sensor.

Additional accessories may be ordered separately.

Accessories

Additional sets of air duct probes are available depending on measuring requirements. Various mounting brackets are also available depending on installation location.

Туре	Name	Data sheet
AQB2000	Mounting bracket, for mounting sensors in isolated air ducts.	N1590
AQB21.2	Top hat rail adapters (5 pieces) for DIN top hat rails, HT 35-7.5	N1590
FK-PZ1	Air duct probe, short, stainless steel, with elastic lead-through for simple, quick, and airtight mount-ing.	N1589
FK-PZ2	Air duct probe, long, aluminum, with orifice plates for precise measuring requirements.	N1589

Mode of operation

The sensor acquires the differential pressure using a silicon rubber membrane and ceramic bar. The sensor generates as per the deflection, a linear and temperature-compensated output signal DC 0...10 V or 4...20 mA.

The differential pressure sensors consist of:

- Sensor housing with fixing angle bar, 3-pin plug and hinged lid with sealed safety screw
- Pressure chamber with membrane and ceramic lever
- Circuit board
- LCD display for the digital display of the sensor signal in Pa (for QBM41...D only)

Display, setting, and connection elements



Key

1 3-pin plug

1

2

2 Display window (on **QBM4100-1D** only) for the digital display of the sensor signal

019Z01

4

- 3 Connection nipples (see "Mounting notes")
- 4 Sealed safety screw for hinged cover

Ŀ

3

Mounting and installation notes

The differential pressure sensor is suited for direct mounting on air ducts, walls, ceilings, or in control panels.

The sensor must be installed vertically.

The supplied 2 meter plastic tubing can be modified to the duct connection on the plant.

To achieve the housing protective class indicated under "Technical data", the differential pressure sensors must be mounted with the pressure nipple facing down. In addition, they should be higher than the air duct probes.

▲ Caution If the pressure connection nipples point upward or are at a lower level than the air duct probes, condensation can collect inside the sensor, causing damage to the device.

Note

The pressure tubing for the sensor nipples are connected as following to the differential pressure sensors:

On the air duct side	On the pressure sensor side
Tubing with higher pressure side (lower vacuum)	Connect to pressure nipple "P1" or "+".
Tubing with lower pressure side (higher vacuum)	Connect to pressure nipple "P2" or "-".

The sensor is supplied with mounting instructions.

Refer to the <u>Manual sensor installation</u> from the BT download center for additional information.

▲ Caution

- Power supply by SELV or class 2 power supply with limited output of 15 W or less. (UL requirement)
- Use only copper wiring

Commissioning notes

[▲] Caution	The values indicated under "Technical data" apply only to <u>vertically mounted</u> differ- ential pressure sensors (connection nipples pointing down).
Sensor calibration	The sensor is calibrated at the factor in the vertical position. As a consequence, the sensor must be installed in the vertical position . For <u>horizontal installation</u> (housing cover top or bottom), deviations occur to measured values that negate the measured values on the certificate.

Disposal

X	 The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage. Dispose of the device via the channels provided for this purpose. Comply with all local and currently applicable laws and regulations. 		
Technical data			
Power supply		Safety extra low voltage (SELV/PELV) or class 2 (UL)	
QBM4000	Operating voltage	AC 24 V ±15 %, 50/60 Hz or DC 13.533	
3-wire connection	Power consumption	< 0.5 VA	
	Current draw	< 10 mA	
	External supply line protection	Fuse slow max. 10 A	
		or	
		Circuit breaker max. 13 A	
		Characteristic B, C, D according to EN 60898	
		or	
		Power source with current limitation of max. 10 A	
	Output signal	DC 010 V, R _{Last} > 10 k Ω (not galvanically	
		separated, 3-wire connection, short-circuit proof,	
		protected against reverse polarity)	
QBM4000	Operating voltage	DC 833 V	
2-wire connection	for ohm loads up to 500 Ω.	DC 1833 V	
	Power consumption	<0.7 VA	
	Current draw	420 mA	
	Output signal	420 mA	
		$R_{load} < \frac{\text{supply voltage} - 8 \text{ V}}{0.02 \text{ A}} [\Omega]$	
		2-wire technology, short-circuit proof, protected against reverse polarity).	
Product data	Measuring range	Refer to "Type summary"	
	Sensing element	Piezo-resistive (silicone membrane, ceramic bar)	
	Degree of measuring accuracy at required	(FS = Full Scale)	
	installation position and room temperature 25 °C.		
QBM4100-1U	Sum from zero point, linearity, reproducible		
	and hysteresis.	<±1 % FS (<±1 Pa)	
	TC zero point	<±0,1 % FS/°C	
	TC sensitivity	<±0,06 % FS/°C	

QBM4000-1	Zero point	<±1.0 % FS
QBM4100-1D	Sum from linearity, reproducible and hysteresis.	<±1 % FS
	TC zero point	<±0.1 % FS/°C
	TC sensitivity	<±0.06 % FS/°C
QBM4000-3	Zero point	<±0.7 % FS
	Sum from linearity, reproducible and hysteresis.	<±1 % FS
	TC zero point	<±0.05 % FS/°C
	TC sensitivity	<±0.05 % FS/°C
QBM4000-10	Zero point	<±0.7 % FS
QBM4000-25	Sum from linearity, reproducible and hysteresis.	<±1 % FS
	TC zero point	<±0.04 % FS/°C
	TC sensitivity	<±0.02 % FS/°C
	Long-term stability	±1.0% FS as per DIN IEC 60 770
	Response time	<20 ms
	Load change	<10 Hz
	Tolerable overload on one side	
	on P1.	5,000 Pa
		(10,000 Pa for types QBM4000 -10, -25)
	At P2	400 Pa
	Rupture pressure	
	at room temperature	2 × overload
	at 70 °C	1.5 × overload
	Display (OBM4100-1D only)	I CD. 2-line 8 position each alphanumeric not
	, (background lit
	Display of	Differential pressure in Pa
	Media	Air and slightly aggressive gases
	Admissible medium temperature	
	Maintenance	Maintenance free
Degree of protection	Protection degree of housing at recommended	IP54 according to EN 60529
Degree of protection	installation	I Stacolding to EN 00523
	Protection class	III according to EN 60730-1
Connections	Electrical connections	3-pin round plug with screw terminals 1.5 mm ²
		(Lumberg RKC 30/11)
	Pressure connections	PVC nipples \varnothing 6.2 mm, under pressure side is
		designated as 'P2' or ' – '.
Environmental conditions	Permissible ambient temperature	
	Operation	070 °C
	Transport and storage.	-25+70 °C
	Permissible ambient humidity	<90 % r.h. (without condensation).
Directives, standards	Product standard	EN 61326-1
		Electrical equipment for measurement,
		control and laboratory use. EMC require-
		ments. General requirements
	EU Conformity (CE)	CE1T1910xx_01 *)
	RCM Conformity	CE1T1910en_C1 *)
	c RU [°] us	UL 60730-1 / UL 60730-2-6,
		http://ul.com/database
Environmental compatibility	The product environmental declaration CE1E1916*) contains data on environmentally compat- ible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
Dimensions (weight)	Weight (with packaging)	0.250 kg (with round plug connector).
	Weight (with packaging), with display	0.263 kg (with round plug connector).
	*) The desuments are be devialed from title	

*) The documents can be downloaded from http://siemens.com/bt/download.

Connectors

QBM4000-..



Front view of the plug on the sensor housing (internally wired at the factory) or the view of the connection side of the cable plug.

Terminal assignment Operating voltage AC 24 V (SELV) or DC 13.5...33 V. Output signal DC 0...10 V (reference point M) GND





Front view of the plug on the sensor housing (internally wired at the factory) or the view of the connection side of the cable plug.

Terminal assignment



Supply voltage DC 8...33 V. Output signal DC 4...20 mA.

Dimensions



Dimensions in mm

SIEMENS



Differential Pressure Switch QBM81-...

for air and nonaggressive gases

- For ventilation and air conditioning plants
- To monitor air filters, air flow, fan belts
- To monitor pressure in clean rooms, kitchens etc.
- Easy to mount
- >1 mio switching cycles
- Highly precise setting
- Long-term stability

Use

In ventilation and air conditioning plants to:

- · Monitor differential pressure, underpressure and overpressure
- Monitor air filters and air flows
- Recognize torn fan belts

Differential pressure switches can be used in clean rooms, kitchens, etc.

Type summary

Туре		Pressure range	
QBM81-3	0,23 mbar	20300 Pa	0.081.2 inH₂O
QBM81-5	0,55 mbar	50500 Pa	0.2…2 inH₂O
QBM81-10	110 mbar	1001000 Pa	0.44 inH ₂ O
QBM81-20	520 mbar	5002000 Pa	28 inH ₂ O
QBM81-50	1050 mbar	10005000 Pa	420 inH₂O

When ordering, please indicate quantity, name and product number. *Example:* **1 differential pressure switch QBM81-5** The accessory duct probe FK-PZ3 are included in the delivery. Additional accessories must be ordered separately.

Mechanical design

The differential pressure switch QBM81-... consists of:

- Housing and cover
- Diaphragm
- 1 sheet-steel mounting bracket

Accessory duct probe connection kit (FK-PZ3):

- 2 duct adaptors
- 4 fixing screws
- 2 m tubing, 5/8 mm dia.

Accessories

For precise measurements, two additional duct probe sets must be delivered; see also data sheet CA1N1589E:

FK-PZ1 Set containing two stainless steel duct adaptors with rubber grommetFK-PZ2 Set containing two duct adaptors with aluminum fixing rosettes, 4 screws

Technical design

The differential pressure between the two pressure connections deflects a springloaded diaphragm. This special diaphragm ensures the long-term stability of switching points.

Each type is engraved with individual scales for very precise adjustment. The adjustment options are illustrated in the 5 diagrams in Section "Functions" below.

Functions

Function diagram



Switching points



Application examples



Mounting notes

Mounting instructions are enclosed with the differential pressure switch. The pressure switch is suitable for mounting on air ducts or walls. Vertical orientation is recommended, but any orientation is acceptable in principle. Mounting positions other than vertical affects the switching point of the differential pressure switch; see "Commissioning notes" below. The pressure connection tubes can be any length, but the response time increases if longer than 2 meters.

Mount the pressure switch above the pressure connection points. To prevent accumulation of condensation, route the tubing to ensure gradual incline from the pressure connection points to the differential pressure switch (no looping).

Commissioning notes

Select the required setpoint using the setpoint knob [5] located under the cover (see "Dimensions").

The differential pressure switch is factory-calibrated in vertical position. Horizontal installation affects the switching point as follows:

- With cover facing upward: Switching point is 11 Pa higher than scale
- With cover facing downward: Switching point is 11 Pa lower than scale.

Disposal



The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Electrical interface	Type of switch	Single-pole change-over, multi-layer contact
	Contact rating	AC/DC 24 V, ≥ 0.01 A
		AC 250 V, max. 5 A res.
		max. 3 A ind., $\cos \varphi > 0.6$
		(0.8 A starting current sixfold, $\cos \omega > 0.6$)
	Voltage against earth	Max. AC 250 V
A Warning	No internal fuse	
Ũ	External preliminary protection required i	n all cases
	External supply line protection (EU)	Fuse slow max. 10 A
		or
		Circuit breaker max. 13 A
		Characteristic B, C, D according to EN 60898
	Switching differential	Factory set
	Reset	Automatic
	Service life	>1 000 000 switching cycles
Functional data	Measuring range	See "Type summary"
	Max. unilateral overload	
	-30…75 °C	7500 Pa
	-30…85 °C	5000 Pa
	Permitted media	Air, non-corrosive gases
	Reproducibility for range	· · · · · · · · · · · · · · · · · · ·
	20300 Pa	<±2.5 Pa
	502000 Pa	<±5 Pa
	10005000 Pa	<±15 Pa
Degree of protection	Protection class	III according to EN 60730-1
	Protection degree of housing	IP54 according to EN 60529
Materials	Housing	Fiber-glass reinforced polycarbonate
	Cover	Polycarbonate
	Diaphragm	Silicone. low-swell rubber, emission-free
	Mounting bracket	Sheet-steel (galvanized)
	Duct adaptors	ABS
	Tubing	PVC, soft
Mounting	Orientation	Anv:
		See "Commissioning notes"
Connections	Electrical connection	3 screw terminals
	Cable entry	PG11 cable gland
	Pressure connections	Male, dia. 6.2 mm

Ambient conditions	Ambient temperature:			
	Operation	−30 +85 °C		
	Storage	−40 + 85 °C		
	Ambient humidity	<90 % r.h. (non-condensing)		
Directives and Standards	Product standard	EN 61326-x		
		Electrical equipment involved in measurement, control, and laboratory use; EMV requirements; general requirements		
	Electromagnetic compatibility (application)	For residential, commercial, and industrial environments.		
	EU Conformity (CE)	CA1T1552xx *)		
	EAC Conformity	Eurasia Conformity		
	DVGW approval	to DIN 1854		
Combustion class		According to UL94		
	Pressure casing and housing	V-0		
	Cover	HB		
	Plastic tubing	V-2		
	Duct adaptors	HB		
Environmental compatibility	The product environmental declaration CA1 product design and assessments (RoHS con benefit, disposal).	E1552 ^{°)} contains data on environmentally compatible mpliance, materials composition, packaging, environmental		
Weight	Weight (including packaging)	0.19 kg with mounting bracket		
	*) The documents can be downloaded from htt	p://siemens.com/bt/download.		

Connection terminals



Phase
Switch position 1–2: lower pressure
Switch position 1–3: higher pressure



Key:

- 1 Mounting bracket
- 2 P1 connection, higher pressure
- 3 P2 connection, lower pressure
- 4 Pressure differential scale (factory-sealed with paint)
- 5 Setpoint knob

Duct adaptor



2 duct adaptors and 2 m tubing are supplied with the pressure switch.

SIEMENS



Pressure Sensors

QBE2003-P... QBE2103-P...

for neutral and slightly aggressive liquids and gases

- High-precision measuring
- Measuring range 0 to 60 bar relative
- Supply voltage AC 24 V / DC 12...33 V or DC 7...33 V
- DC 0 ...10 V or DC 4...20 mA output signal
- Measurement unaffected by changes in temperature
- High temperature stability
- Connection: external thread G 1/2", inside thread M5
- Maintenance free thanks to outstanding long-term stability
- High overload resistance
- Robust and compact construction

The pressure sensors are suitable for the measurement of relative pressure in HVAC plant, particularly in hydraulic and pneumatic systems using liquid or gaseous media (steam applications).

Type summary

Type reference	Order number	Pressur	e range	Output signal
QBE2003-P1	S55720-S290	01 bar	0100 kPa	010 V
QBE2003-P1.6	S55720-S291	01.6 bar	0160 kPa	010 V
QBE2003-P2.5	S55720-S292	02.5 bar	0250 kPa	010 V
QBE2003-P4	S55720-S293	04 bar	0400 kPa	010 V
QBE2003-P6	S55720-S294	06 bar	0600 kPa	010 V
QBE2003-P10*)	S55720-S295	010 bar	01.0 MPa	010 V
QBE2003-P16*)	S55720-S296	016 bar	01.6 MPa	010 V
QBE2003-P25*)	S55720-S297	025 bar	02.5 MPa	010 V
QBE2003-P40	S55720-S298	040 bar	04.0 MPa	010 V
QBE2003-P60	S55720-S299	060 bar	06.0 MPa	010 V
QBE2103-P1	S55720-S300	01 bar	0100 kPa	420 mA
QBE2103-P1.6	S55720-S301	01.6 bar	0160 kPa	420 mA
QBE2103-P2.5	S55720-S302	02.5 bar	0250 kPa	420 mA
QBE2103-P4	S55720-S303	04 bar	0400 kPa	420 mA
QBE2103-P6	S55720-S304	06 bar	0600 kPa	420 mA
QBE2103-P10*)	S55720-S305	010 bar	01.0 MPa	420 mA
QBE2103-P16*)	S55720-S306	016 bar	01.6 MPa	420 mA
QBE2103-P25*)	S55720-S307	025 bar	02.5 MPa	420 mA
QBE2103-P40	S55720-S308	040 bar	04.0 MPa	420 mA
QBE2103-P60	S55720-S309	060 bar	06.0 MPa	420 mA

*) These types do not have M5 inside threads.

Ordering and delivery

When ordering a pressure sensor, please provide quantity, type reference, order number and product name.

Example	Quantity	Type ref. (ASN)	Order number (SSN)	Product Name
	1	QBE2003-P1	S55720-S290	Pressure
				sensor

Any accessories required must be ordered separately.

Accessories

Туре	Order No.(SSN)	Name	Data Sheet
AQB2004**)	S55720-S318	Mounting bracket to attach the pressure sensor for remote mounting.	A6V10434028
AQB2001**)	S55720-S116	Connection set for remote mounting with 1 m copper capillary line. Pressure connection external thread	A6V10434028

**) Cannot be used with types QBE2003-P10, QBE2003-P16, QBE2003-P25, QBE2103-P10, $\ensuremath{\mathsf{A}}$

QBE2103-P16, and QBE2103-P25. These types do not have M5 inside threads.

	The pressure sensors operate on the piezo-resistive measuring principle. The ceramic or stainless steel diaphram*) (thick-film hybrid technology) acquires the pressure through direct contact with the medium. The measurement is converted electronically into a linear output signal of DC 010 V or DC 420 mA. *) Applies to QBE2003-P10, QBE2003-P16, QBE2003-P25, QBE2103-P10, QBE2103-P16, and QBE2103-P25
Mechanical design	
	 The pressure sensor consists of: Sensor hood with DIN EN 175301-803-A plug-in connection Piezo-resistive measuring element integrated in the stainless steel case Pressure connection external thread G ½" and inside thread M5*) for use with accessory AQB2001**) Plug DIN EN 175301-803-A (plugged in) No changes or adjustments are possible.
	 *) The following types do not have M5 inside threads: QBE2003-P10, QBE2003-P16, QBE2003-P25, QBE2103-P10, QBE2103-P16, and QBE2103-P25 **) Cannot be used on types QBE2003-P10, QBE2003-P16, QBE2003-P25, QBE2103-P10, QBE2103-P16, and QBE2103-P25. A solution on the construction side using the ½" threaded connection is possible.
Mounting notes	
	Mounting Instructions are enclosed with the sensor. For further information about mounting location and mounting position refer to the sensor mounting user's manual at the BT download center: <u>http://siemens.com/bt/download</u> . Appropriate measures must be taken to ensure a leak-proof fitting. To provide for test measurements without leakage of the medium, it is strongly recommended that an appropriate test adapter and shutoff device be fitted.
Pressure measurement with liquids	The tapping point should be at the side, near the bottom of the pipe. Do not measure the pressure from the top of the pipe (where it may be affected by airlocks) or the bottom (where it may be affected by dirt).
	Always purge the system.
Pressure measurement with condensing gases	The tapping point should be at the top so that no condensate reaches the sensor.
Important note	Ensure suitable constructions measures are undertaken to avoid pressure shocks in the plant; pressure shocks may damage the pressure sensor's diaphragm. In the event that pressure shocks are unavoidable, a panel screw (M5) may be able to weaken the effect. Contact in this case your nearest Siemens branch office.
Disposal	
	 The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage. Dispose of the device via the channels provided for this purpose. Comply with all local and currently applicable laws and regulations.

Technical data

Electrical interface	Power supply	Protection by extra low voltage (SELV, PELV)			
	Supply voltage (QBE2003) Current consumption	AC 24 V ±15%, 5060 Hz or DC 1233 V <7 mA, < 0.5 VA			
	Supply voltage (QBE2103) Current consumption	DC 733 V <23 mA, < 0.7 VA			
	External supply line protection	Fuse slow max. 10 A or			
		Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or			
		Power source with current limitation of max. 10 A			
	Output signal QBE2003…	DC 010 V, load >10 kΩ, < 100 nF, 3-wire			
	Output signal QBE2103	DC 420 mA, $R_{Load} \leq \frac{Operating \ voltage - 7 \ V}{0.02 \ A}$ Ohm 2-wire			
	Insulation voltage	500V			
	Short circuit proof, protected against reverse polarity	Any connection			
Functional data	Application range	Refer to "Type summary"			
Measuring accuracy FS = Full scale	Characteristic curve ¹⁾ Resolution Temperature response Long-term stability (as per IEC EN60770-1)	±0.3 % FS 0.1 % FS <±0.2 % FS/10 °C <i>(-1585°C)</i>) <±0.25 % FS			
	'' typical; max. 0.5 % FS (including zero point, end value, linearity, hysteresis, and reproducibility)				
	Dynamic response	Response time: <2 ms, typical 1 ms Load change: <100 Hz			
	Nominal pressure	Relative pressure as in "Type summary" (measurement of difference from ambient pressure)			
	Max. admissible pressure/ Rupture pressure	3 x scale end value of measuring range 01 to 04 bar 2.5 x scale end value of measuring range 06 to 060 bar			
	Media	Neutral and slightly corrosive liquids and gases (suited for use with oil-contacting media)			
	Admissible temperature of medium	–15+125 °C			
	Maintenance	Maintenance-free			
	Mounting position	Optional			
Protection	Protection standard	IP 65 to EN 60529			
	Protection class	III according to EN 60730			
Connections	Electric connection	Plug DIN EN 175301-803-A, Cable diameter 6-8 mm			
	Screwed fitting	External thread G ½", inside thread M5*)			
Environmental conditions	Temperature Humidity	OperationStorage-30+85 °C-50+100 °CInsensitive to CondensationInsensitive to Condensation			

Directives and standards	Product standard		EN 61326-1	
			Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements	
Materials	Pressure connection		Stainless steel 1.4404 / AISI 316L	
	Plug housing		Polyarylamide 50 % GF VO	
	Materials and media contact	Press. connection	Stainless steel 1.4404 / AISI 316L	
		Meas.elem.**)	Ceramics Al2O3 (96 %)	
		Sealant	FPM	
Conformity	EU Conformity (CE)		8000078214 ***)	
	RCM Conformity		CE1T1909en_C1 ***)	
Weight	Including packaging		0,171 kg	
	*) The following types do not have M5 inside threads.			
	QBE2003-P10, QBE2003-P16, QBE2003-P25, QBE2103-P10, QBE2103-P16, and QBE2103-P25			
	**) Stainless steel for types QBE2003-P10, QBE2003-P16, QBE2003-P25, QBE2103-P10, QBE2103-P16, and QBE2103-P25			

***) The documents can be downloaded from <u>http://siemens.com/bt/download</u>.

Internal diagram

QBE2003...



BT-Terminal marking	Terminal nr.	Meaning
∪ (↗)	2	Output signal DC 010 V (signal ground GND)
M (0)	3	GND
G (+)	1	Supply voltage AC 24 V or DC 1233 V

—₿ I(↗)	
— 🗘 G (+)	

BT-Terminal marking	Terminal nr.	Meaning
I (*)	2	Output signal DC 420 mA
G (+)	1	Supply voltage DC 733 V

QBE2103...

QBE2003-P... QBE2103-P...



SIEMENS



Differential Pressure Sensor

QBE3000-D.. QBE3100-D..

for neutral and mildly corrosive liquids and gases

Differential pressure sensor, suitable for gases or liquids, for the measurement of pressure differentials in HVAC systems.

- Ceramic measuring system
- Robust construction for highly reliable operation
- For neutral and mildly corrosive liquids and gases
- Supply voltage AC 24 V / DC 18...33 V or DC 11...33 V
- DC 0...10 V output signal or DC 4...20 mA
- Male-threaded G1/8" connection
- Delivery includes 2 screwed fittings for copper pipes, 6 mm diameter

Use

The differential pressure sensor is particularly suitable for use in HVAC systems for continuous monitoring of the level or flow rate of neutral or mildly corrosive gases or liquids.

The sensor can be used as:

- Control sensor
- · Measured value transmitter for building automation and control systems

Type summary

Туре	Article number	Pressure range		Output signal
		[bar]	[MPa]	
QBE3000-D1	S55720-S173	01	00.10	DC 010 V
QBE3000-D1.6	S55720-S174	01.6	00.16	DC 010 V
QBE3000-D2.5	S55720-S175	02.5	00.25	DC 010 V
QBE3000-D4	S55720-S176	04	00.40	DC 010 V
QBE3000-D6	S55720-S186	06	00.60	DC 010 V
QBE3000-D10	S55720-S177	010	01	DC 010 V
QBE3000-D16	S55720-S178	016	01.6	DC 010 V
QBE3100-D1	S55720-S179	01	00.10	DC 420 mA
QBE3100-D1.6	S55720-S180	01.6	00.16	DC 420 mA
QBE3100-D2.5	S55720-S181	02.5	00.25	DC 420 mA
QBE3100-D4	S55720-S182	04	00.40	DC 420 mA
QBE3100-D6	S55720-S187	06	00.60	DC 420 mA
QBE3100-D10	S55720-S183	010	01	DC 420 mA
QBE3100-D16	S55720-S184	016	01.6	DC 420 mA

Ordering and delivery

When ordering, please specify the quantity, product name and type code. *Example:* **1** differential pressure sensor QBE3000-D1 A suitable fixing bracket is supplied with the sensor. Any accessories required must be ordered separately.

Compatibility

Differential pressure sensors can be used in conjunction with all devices or systems capable of processing the DC 0...10 V or DC 4...20 mA output signal.

Technology

The pressure to be monitored acts on a ceramic sensor element. The ceramic element has the following significant advantages

- Very low susceptibility to temperature
- Resistance to high temperature
- No mechanical ageing or creepage

The sensor signal is linearised, temperature-compensated and amplified by the sensor electronics.

Mechanical design

The differential pressure sensor comprises the following:

- Sensor cover with DIN 175301-803-A connecting cable and gland
- Pressure sensor casing with ceramic element, screw connections and burglarproof screw
- Printed circuit board
- Pressure connections G¹/₈^e, external threaded with unscrewed fittings for copper pipe, 6 mm diameter
- Fixing bracket, enclosed loose, with sensor
- Plug DIN 175301-803-A unattached

AQB2002Mounting kit for remote mounting with 1 m
copper capillary line, both ends prefabri-
cated ready for connection.Thread adapters and terminal nuts made
of brass. Pressure connection with G1/8"
or G1/2" outer threading.



Instructions			
Mounting	Mounting instructions are enclosed with the differential pressure sensor. It can be connected directly with G ¹ /8" screwed fittings. Special precautions must be taken on site when mounting the sensors to ensure airtight screw connections.		
Recommended measures	Use standard T-fittings or drill and de-bur measuring holes, each 5 mm diameter, for the pressure tapping points (A). An isolating bypass (5) can be fitted, to avoid overloading the pressure sensor on one side while making adjustments. For inspection purposes, measuring circuits can be fitted with a measuring-T at the sensor head.		
Important note	<text></text>		
Remote mounting	For remote mounting, the sensor can be operated together with the AQB pressure mounting kit in ambient temperatures of up to 70 °C for medium temperatures of up to 180 °C. Care must be taken in this case to ensure that the cooling efficiency of the copper pipe is not reduced by additional heat sources or by restrictions to the air circu-		

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

	Power supply	Low voltage (SELV)	
	Operating voltage QBE3000-D	AC 24 V ±15 %, 50/60 Hz or DC 1833 V	
	Power consumpt. (at nom. pressure)	<5 mA at AC 24 V	
	Operating voltage QBE3100-D	DC 1133 V	
	Power consumpt. (at nom. pressure)	<20 mA	
	Frequency	50/60 Hz at AC 24 V	
	External supply line protection	Fuse slow max. 10 A	
		or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or	
	<u></u>	Power source with current limitation of max. 10 A	
	Output signal	Short-circuit proof and proof polarity reversal	
	QBE3000-D	DC 010 V	
	Working resistance	>10 kΩ	
	QBE3100-D	DC 420 mA Power supply – 11 V	
	Working resistance	$\leq \frac{1}{0.02 \text{ A}}$ [Ohm]	
Product data	Differential pressure range	Refer to "Type summary"	
	Measuring element	Ceramic	
	Measuring accuracy	Factory calibrated	
	Sum of linearity, hysteresis		
	and repeatability	<±0.5 % FS (FS = Full Scale)	
	Zero point, Full scale	<±0.4 % FS	
	TC zero point	<±0.04 % FS/K	
	TC sensitivity	<±0.015 % FS/K	
	Long-term stability DIN EN 60770	±0.5 % FS	
	Resolution	0.1 % FS	
	Overload on one side P1 / P2	≤ 2 × nominal pressure	
	System pressure at nom. pressure range	(simultaneous P1 and P2)	
	≤ 6 bar	25 bar	
	≥ 10 bar	50 bar	
	Bursting pressure	1.5 × system pressure	
	Dynamic response:		
	Response time	<5 ms	
	Load alternation	<50 Hz	
	Suitable media	Air, mildly corrosive gases, liquids	
	Admissible temperature of medium	-1585 °C	
	Maintenance	No maintenance required	
Degree of protection	Protection degree of housing	IP65 according to EN 60529, mounted and tightened	
	Protection class	III according to EN 60730-1	
Connections	Connecting cable	Plug DIN EN 175301-803-A, plug with seals and PG9	
		cable glands included	
	Pressure connections	Male-threaded G ¹ /8", With screwded fittings for	
		copper pipes, 6 mm diameter	

Mountings	Mounting bracket	For mounting in ducts, on walls or ceilings, in contr.pa	
	Orientation	Any (factory-calibrated with pressure connections at	
		bottom)	
Environmental conditions	Perm. ambient temperature		
	Operation	-1585 °C	
	Storage/Transport	-4085 °C	
	Perm. ambient humidity	<90 % r. h. (non-condensing)	
Directives and Standards	Product standard	EN-61326-1	
		Electrical equipment for measurement, control and la-	
		boratory use.	
	EU Conformity (CE)	CA1T1923xx ^{*)}	
	RCM Conformity	8000078879 ^{*)}	
Environmental compatibility	The product environmental declaration CE1E1922*) contains data on environmentally compatible		
	product design and assessments (RoHS co	ompliance, materials composition, packaging, environmental	
	benefit, disposal).		
Materials	Pressure casing, cover	Aluminium (AlMgSi1)	
	Parts in contact with medium	Stainless steel 1.4305 / AISI 303, ceramic element,	
		CuZn nickel plated	
	Sealant	FPM (fluoroelastomer)	
	Mounting bracket	Stainless steel (1.4305)	
	Mounting kit AQB2002	See "Accessories"	
Weight	Differential Pressure Sensor	545 g	
	Including accessories and packaging	660 g	

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals



Operating voltage AC 24 V or DC 18...33 V or DC 11...33 V Output signal DC 0...10 V (reference point GND) Output signal DC 4...20 mA IN G

OUT U

L

GND G0 Ground

Dimensions



SIEMENS



Differential pressure sensors

QBE61.3-DP..

for neutral or slightly aggressive gases and liquids

- Operating voltage AC 24 V or DC 18...33 V
- Output signal DC 0...10 V
- Connecting male thread G¹/₂"
- 3 Versions covering a total differential pressure range of 0...10 bar
- Ceramics measurement system
- High level of safety against overpressures

For acquiring the differential pressures in HVAC plant.

Suited for use with the following types of media:

- Neutral or slightly aggressive gases
- Neutral or slightly aggressive heating water and cold water (with or without additives, such as hydrazine or glycol)

Type summary

	Type reference	Measurement range	Max. overload on one s	ide Nominal pressure
	QBE61.3-DP2	02 bar	\pm 12 bar	PN 40 bar
	QBE61.3-DP5	05 bar	± 20 bar	PN 40 bar
	QBE61.3-DP10	010 bar	± 20 bar	PN 40 bar
Accessories	Description			Part no.
	Water trap pipe, for below –15 °C	medium temperatures	above 85 °C (steam) or	4 286 1652 0
Ordering and delivery				
	When ordering, please give name and type reference of the unit, for example: 1 differential pressure sensor QBE61.3-DP2 . The sensor is supplied without the water trap pipe.			
Equipment combinations				
	The differential pressure sensor can be used with all devices or systems capable of handling the sensor's output signal of DC 010 V.			
Mode of operation				
	The differential pressure sensor uses a ceramics measurement system. The pressure is measured by making direct contact with the medium. The pressure signal is electronically converted to a linear DC 010 V signal (3-wire connection) and made available at output "U". The output signal is proportional to the measurement range.			
Mechanical design				
	The differential pres plastic housing w mounting brocket 	sure sensor consists c ith removable cover	of:	

- mounting bracket
- 2 threaded connections G¹/₂
- · measurement system consisting of casing with an embedded ceramics element and a printed circuit board with electronics
- strip with the connection terminals
- The cable enters through a Pg 9 cable gland.

The QBE61.3-DP.. and all interconnected devices must be wired to the same G0/G– (measuring neutral). Also refer to the Data Sheets of the devices to which the sensor is connected.

The differential pressure at the sensor may never exceed the permissible overload on one side (refer to "Type summary").

High static pressure can destroy the sensor if it acts on only one side of the measurement system. This can be prevented by using the following layout:



Mounting and installation notes

Mounting position: optional.

Medium temperatures above 85 °C (steam) or below -15 °C make it necessary to install a water trap pipe between piping and sensor.

Connection "+" : higher pressure/smaller vacuum.

Connection "-" : lower pressure/higher vacuum.

When used for acquiring the differential pressure in liquids, the following must be noted:

- · Mount the sensor below the level of pressure measurement
- · Mount the sensor on a vibration-free surface
- System venting is mandatory

The differential pressure sensor is supplied with Mounting Instructions.

Disposal



The devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.
Technical data

Electrical interface	Operating voltage (SELV) Power consumption	AC 24 V ±15 %, 50/60 Hz or DC 1833 V <150 mVA		
	External supply line protection	or		
		Circuit breaker max 13 A		
		Characteristic B. C. D according to FN 60898		
		or		
		Power source with current limitation of max. 10 A		
	Output signal	DC 010 V (short-circuit-proof and reversed		
	Voltage burden	polarity protection)> 10 k Ω		
Product data	Measurement range	refer to "Type summary"		
	Sensing element	ceramics		
	Measurement accuracy at 20 °C	(FS = Full Scale)		
	Sum of linearity, hysteresis, and			
	QBE01.3-DP2, QBE01.3-DP5	<±1 % FS		
	Zero point	<±0.5 % FS		
	Zero politi Response time	<1 % FS <5 mg		
	Response une Max, overlead en ene side	<pre><5 ms refer to "Type summary""</pre>		
	Nominal pressure (system pressure	Telef to Type Summary		
	connected to both "+" and "-"	PN 40		
	Bursting pressure	1.5 times the nominal pressure		
	Media	not oleiferous, neutral or slightly aggressive		
		gases and liquids		
	Perm. temperature	-1585 °C (steam with water trap pipe)		
Degree of protection	Protection degree of housing	IP54 according to EN 60529		
	Protection class	III according to EN 60730-1		
Connections	Electrical connections			
	Connection terminals	no screws (WAGO), for max. 1.5 mm2		
	Cable gland	Pg 9		
	Pressure connections (externally	G½"		
	threaded)	4.04 hz		
	weight (Incl. packing)	1.64 Kg		
Environmental conditions	Perm. ambient temperature	15 95 °C (modium)		
	Operation	-1505 C (medium) -1570 °C (electronics terminals)		
	Transport and storage	-40 80 °C		
	Perm ambient humidity	<90 % r h (non-condensing)		
Materials and colours	Components getting in contact with the			
	medium	stainless steel (1.4305), ceramics, copper, brass		
	Sealing material	EPDM		
	Housing and cover	plastic ABS, light-grey (RAL 7035)		
	Cable entry	PA glassfibre re-inforced, NBR (seal)		
	Mounting bracket	stainless steel		
	Pressure connection	brass		
	Sensor	silicon-free		
Directives and Standards	Product standard	EN 61326-1		
		Electrical equipment for measurement, control		
		and laboratory use. EINC requirements. General		
	ELL Conformity (CE)	CE1T1923yy *)		
	RCM Conformity	8000078879 *)		
Environmental compatibility	The product environmental declaration (CF1F1923 ^{°)} contains data on environmentally		
	compatible product design and assessments (RoHS compliance, materials composition,			
	packaging, environmental benefit, disposal)			

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection diagram

(+)	(≠)	(0)	923G01
G	U	M	
	•	1	

Legend

G (+) Power supply AC 24 V or DC 18...33 V

U (7) Measured signal output DC 0...10 V

M (0) G0/G-, measuring neutral

Note: the symbols in parenthesis correspond to the terminal marking on the terminal block

Dimensions (in mm)

QBE61.3-DP..







SIEMENS

1⁹²⁰



Differential Pressure Sensors



for neutral and mildly corrosive liquids and gases

Differential pressure sensor, suitable for gases and liquids, for the measurement of positive and negative pressures and pressure differentials in HVAC systems.

- Hall-effect transducer technology
- · Highly resistant to positive pressure
- Simple, robust construction for highly reliable operation
- · For neutral and mildly corrosive liquids and gases
- Supply voltage AC 24 V or DC 20...30 V
- DC 0...10 V output signal
- Female-threaded G¹/8" connection

Use

The QBE63-DP... differential pressure sensors are particularly suitable for use in HVAC systems for continuous monitoring of the level or flow rate of neutral or mildly corrosive gases or liquids.

The pressure being monitored acts on a measuring system comprising a diaphragm, permanent magnet and Hall-effect transducer. The measured pressure is converted electronically into a linear DC 0 ...10 V output signal.

Types

Туре	Pressure range		
QBE63-DP01	0 100 mbar	0 10 kPa	
QBE63-DP02	0 200 mbar	0 20 kPa	
QBE63-DP05	0 500 mbar	0 50 kPa	
QBE63-DP1	0 1 bar	0 100 kPa	

When ordering, please specify the quantity, product name and type code.

Example: 1 differential pressure sensor, type QBE63-DP05

A suitable fixing bracket is supplied with the sensor.

Any accessories required must be ordered separately.

Compatibility

The QBE63-DP... differential pressure sensors can be used in conjunction with all devices or systems capable of processing the DC 0...10 V output signal.

Technology

The pressure to be monitored acts on an EPDM diaphragm which deflects a spring. As a result of the pressure and consequent movement of the diaphragm, a permanent magnet attached to the diaphragm changes its position in relation to the Hall-effect transducer on the outside of the pressure housing. The transducer delivers an electrical signal proportional to the magnetic field. This signal is linearised, temperaturecompensated and amplified by the built-in electronics.

Cross-section



Key:

- 1) Pressure housing (measuring chamber)
- 2) Diaphragm and spring
- 3) Permanent magnet
- 4) Hall-effect transducer with measuring electronics
- 5) Cover
- 6) Cable entry with PG9 gland
- 7) Purging points
- p1 $G^{1/8}$ " threaded connection for higher pressure or lower vacuum
- p2 G¹/8" threaded connection for lower pressure or higher vacuum

Mechanical design

- The QBE63.DP... differential pressure sensors comprise:
- Plastic housing with Pg 9 cable gland
- Pressure casing with diaphragm and spring
- · Printed circuit board with Hall-effect transducer
- Fixing bracket

AQB2002 Mounting kit for remote mounting with 1 m copper capillary line, both ends prefabricated ready for connection. Thread adapters and terminal nuts made of brass. Pressure connection with G1/8" or G1/2" outer threading.



Mounting instructions

Mounting instructions are enclosed with the differential pressure sensor. The QBE63-DP... sensors can be connected directly with G¹/8" or R¹/8" screwed fittings. Special precautions must be taken on site when mounting the sensors, to ensure airtight screw connections.

- Recommended measures:
- Use standard T-fittings or drill and de-bur measuring holes, each 5 mm diameter, for the pressure tapping points (A).
- An isolating bypass (5) can be fitted to avoid overloading the pressure sensor on one side while making adjustments.
- For inspection purposes, measuring circuits can be fitted with a measuring-T at the sensor head.

Important note

- Mounting for use with liquids:
- Always mount the sensor lower than the pressure measuring points
- Mount on a vibration-free surface
- Always evacuate the system



- Key:
- A Measuring holes1 Isolating valves
- 2 T-joints
- 3 Connection pieces (from mounting kit AQB2002)
- 4 Copper pipes (from mounting kit AQB2002)
- 5 Isolating bypass

Remote mounting

For remote mounting, the sensor can be operated together with the AQB pressure mounting kit in ambient temperatures of up to 70 °C for medium temperatures of up to 180 °C. Care must be taken in this case to ensure that the cooling efficiency of the copper pipe is not reduced by additional heat sources or by restrictions to the air circulation.

Disposal



The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Electrical interface	Power supply Supply voltageCurrent consumption	Low voltage (SELV, PELV) AC 24 V +15 / –10 %, 50/60 Hz or DC 2030 V <35 mA
	External supply line protection	Fuse slow max. 10 A or Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or
		Power source with current limitation of max. 10 A
	Output signal	DC 010 V, short-circuit-proof and proof against polarity reversal
	Working resistance	≥10 kΩ
Product data	Differential pressure range	Operating range, see "Types"
	Measuring element	Hall-effect transducer
	Measuring accuracy	
	Sum of linearity, hysteresis, and repeatability	<±1.5 % FS (FS = Full Scale)
	Zero point, Full scale	<±1.0 % FS
	Temperature drift	0.08 % FS / K (20 °C in relation to zero point)
	Overload capacity	10 bar (sensor range up to 200 mbar)
		20 bar (sensor range from 500 mbar)
	Burst pressure	30 bar
	Dynamic response:	
	Response time	<10 ms
	Load alternation	<10 Hz
	Suitable media	Air or mildly corrosive gases and liquids
	Admissible temperature of medium	-10+80 °C
	Maintenance	No maintenance required
Degree of protection	Protection degree of housing	IP65 according to EN 60529 (with cover fitted)
	Protection class	III according to EN 60730-1
	Combustion class	UL 94
	Cover	HB
Connections	Connection terminals	3 screw-terminals, 1.5 mm ²
	Cable entry	Pg 9 cable gland
	Pressure connections	Female-threaded G1/8"
Mounting	Mounting bracket	For mounting in ducts, on walls or ceilings and in
-		control panels
	Orientation	Any (factory-calibrated with pressure
		connections at bottom)
		When used with liquids: purging points at top
Environmental conditions	Perm. ambient temperature	
	Operation	–10 +80 °C
	Storage/Transport	-40 +80 °C
	Perm. ambient humidity	<90 % r. h. (non-condensing)

Directives and Standards	Product standard	EN 61326-1	
		Electrical equipment for measurement, control and	
		laboratory use. EMC requirements. General re-	
		quirements.	
	EU Conformity (CE)	CA1Ta920xx ^{*)}	
	RCM Conformity	8000078879 *)	
Environmental compatibility	The product environmental declaration CE1E1920*) contains data on environmentally compatible		
	product design and assessments (RoHS compliance, materials composition, packaging, environmental		
	benefit, disposal).		
Materials	Pressure casing	Nickel-plated brass	
	Cover	Plastic (ABS without fibre-glass)	
	Cable gland	Polystyrol	
	Diaphragm	EPDM (ethylene propylene rubber)	
	Mounting bracket	Galvanised steel	
	Mounting kit AQB2002	See "Accessories"	
Weight	Including packaging	0.86 kg	

*) The documents can be downloaded from http://siemens.com/bt/download.



Supply voltage AC 24 V or DC 20 ... 30 V DC 0 ...10 V output signal (reference point GND) GND

Dimensions





Dimensions in mm

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Flow switch

QVE1900

for liquids for piping DN $32 \dots 200$

Use

In HVAC plants to monitor the flow of fluids in hydraulic systems, especially in refrigeration, heat pump and heating plants, e.g. for use with condensers, boilers, heat exchangers, etc.

Ordering

When ordering, please provide the name and product number: flow switch **QVE1900**

Mechanical design

The unit comprises a base with attached screw-in body R1 (refer to "Dimensions") and cover.

The base houses the microswitch, transfer lever with adjusting screw (for switchon/switch-off point), a paddle holder and an opening for the cable entry. Four paddles of various lengths and attaching screws for mounting the paddles are enclosed.

The cover is secured to the base with two screws.

Setting element and connection terminals



Legend:

- a Adjusting screw for switch-on/off values
- b Connection terminals

The unit is supplied with the switch-on/off values set to the minimum (See the next section "Notes")

Notes	
Engineering	 On site, a T-junction R1" per EN DIN 10241 required (steel fittings with threads) and EN DIN 10242 (threaded fitting from malleable casting) required. All dimensions and data provided in the table of switching values are based on water at 20 °C, the use of T-junctions and horizontal piping. Before and after the mounting location of the flow switch, a smoothing path of at least 10 times or 5 times the nominal pipe diameter required.
Fitting	 Mount the enclosed cable gland and fit the T-junction R1" on-site prior to mounting the device. Insert vertically in the horizontal piping. Note the flow direction during installation (the screw-in body R1 has an arrow). For reasons of stability, the short paddles may not be removed with the larger pipe diameters.
Installation	 Observe all local regulations from the electrical utilities or waterworks as applicable. Allow for an extra loop of the connecting cable to ensure the switching value can be adjusted.
Commissioning	 A higher switch-off value can be set by turning the adjusting screw for the switch-on/off value clockwise. When mounting the flow switch in vertical piping, you must compensate for the weight of the paddles on the adjusting screw for the switch-on/off values (Orientation not recommended, see fitting instructions).

29	4 3 2 1 DN 32 DN 50 DN 80 DN 100	2200 0200 200 200	R 4 100 100					
DN	(mm)	Nr.	143 (DN 150) 167 (DN 200)	Qmax.(m³/h)	$\overline{\bigcirc} m^3$	/h 🖉		/h 🔗
32	29 x 34	1		3.6	≤0,8	≤2.8	≥1.3	≥3.0
40	29 x 34	1		4.8	≤1,1	≤3.7	≥1.7	≥4.0
50	29 x 60	1+2		7.3	≤2,2	≤5.7	≥3.1	≥6.1
65	29 x 60	1+2		8.4	≤2,7	≤6.5	≥4.0	≥7.0
80	29 x 89	1+2+3		13.7	≤4,3	≤10.7	≥6.2	≥11.4
100	29 x 92	1+2+3+4	4 / 92 mm	22.1	≤6,1	≤17.3	≥8.0	≥18.4
125	29 x 117	1+2+3+4	4 / 117 mm	32.2	≤9,3	≤25.2	≥12.9	≥26.8
150	29 x 143	1+2+3+4	4 / 143 mm	39.2	≤12,3	≤30.6	≥16.8	≥32.7
200	29 x 167	1+2+3+4		113	≤38,6	≤90.8	≥46.1	≥94.2

Disposal

X	

The device is considered an electronics device for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations..

Technical data

Functional data

Field of use Suitable media

Piping diameter Type of switch

Contact rating Adjustment of switching point

Setting range Perm. medium temperature

Protective data

Perm. operating pressure Degree of protection Safety class All liquids (not suitable for ammonia) DN 32...200 Microswitch with single-pole changeover, potential free AC 250 V, 15 (8) A manual, supplied with minimum switch-on/off values Refer to switching value table -20...+120 °C (medium must be antifreeze) PN 10 IP 65 per EN 60529 I per EN 60335-1

Environmental condi-	General environmental conditions			
tions	Operation and storage	−20…+85 °C		
Standards, directives,	Product standard	EN 60730-1.		
and approvals		Automatic electronic controls for household and similar use.		
	EU conformity (CE)	CM1E1592xx*)		
	Electromagnetic compatibility	For residential, commercial, and industrial environments.		
	*) Related documents can be downloaded	at the following Internet address:		
	http://siemens.com/bt/download			
Materials / colors	Housing base	Bayblend T85 / color RAL 7015		
	Cover	ABS / color RAL 5007		
	Screw-in body R1"	Brass		
	Paddle	High-grade steel (V2A)		
	Flow switch, overall	Silicon free		
Dimensions (weight)	Without packaging	0.570 kg		

Internal diagram



Dimensions



Dimensions in mm

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Flow switch

QVE1901

for liquids in piping DN 20...200.

- Contact load / switching capacity: max. AC 230 V, 1 A, 26 VA
 - max. DC 48 V, 1 A, 20 W
- Nominal pressure PN25
- Manual setting of contact type (NO / NC)
- Housing IP65 / Protection class II
- Maintenance free

Mode of operation

Flow monitor of liquid medium in HVAC plants in hydraulic systems, in particular, refrigeration, heat pump and heating plants, e.g. for evaporators, boilers, heat exchangers, etc.

Ordering

When ordering, please provide the name and product number: Flow switch **QVE1901**

The device records the flow of monitored medium via a paddle system (1), which has a permanent magnet (2) attached at its upper end. A reed contact (3) is positioned outside the flow above this magnet. A second magnet (4) with opposite polarity is used to create a reset force. The paddle system moves once it comes into contact with the monitored flow. The magnet (2) changes its position to the reed contact (3). The contact opens/closes depending on the contact type. As soon as the flow is interrupted, the paddle returns to its original position and the reed contact opens/closes depending on the contact type. (See "Adjusting the switching unit" on page 5)



Engineering notes

- On site, a T-junction 1/2" thread per EN DIN 10241 required (steel fittings with threads) and EN DIN 10242 (threaded fitting from malleable casting) required
- All dimensions and data provided in the table of switching values are based on water at 20 °C, the use of T-junctions and horizontal piping
- Before and after the mounting location of the flow switch, a smoothing path of at least 10 times or 5 times respectively the nominal pipe diameter required

You can shorten the paddles to adapt the nominal size, maximum flow, and switching point adjustment. Refer to table on page 9.

Flow switch installation

Mechanical installation General installation
When choosing the installation site, ensure that the specified limit values (see "Technical Data" are not exceeded.
Select suitable measures to prevent the medium from freezing. If the flow switch is to be used in ambient temperatures of <4°C, do not carry out any operation beforehand using pure water. Residual water in the flow switch can result in frost damage.

- First, clean the pipe system where the flow switch is installed and remove any magnetic particles, e.g. wielding residue.
- The smoothing section in front of and behind the flow switch must be at least 10 times or 5 times respectively.

- The nominal installation position of the flow switch is "upright standing position" in horizontal pipework.
- The switches should only be installed in a vertical position; deviation max. of 45°.
- Please make sure that there are no external magnetic fields in the immediate vicinity of the flow switch, since these can impair device operation.
- There is an arrow on the flow switch. Ensure during installation that the arrow is parallel with the pipe shaft and is facing in the flow direction.



• The brass connecting nut G³/₄ has a tightening torque of 25...30 Nm.



DN20...200

- Observe all local regulations from the electrical utilities or waterworks as applicable
- Allow for an extra loop of the connecting cable to ensure the switching value can be adjusted

Electrical connections

14

Warning

Danger of death due to electrical voltage!

Work on electrical installations may only be carried out by qualified electricians or by instructed persons working under the guidance and supervision of a qualified electrician, in accordance with the electrical regulations.

Always de-energize the system before connecting the wires of the mains cable.

• **CAUTION:** Ensure that the maximum electrical contact load specified on the type plate is never exceeded; otherwise the reed contact integrated in the switching unit will be damaged.

Inductive loads impair switching capacity. Please ask the manufacturer for information on protective circuits.

Elbow plug connector EN 175301-803-A



- Loosen the central screw (pos. 6) M3x35 and disconnect the junction box EN 175301-803-A (pos. 2) from the connector (pos. 1, Fig. 1).
- Use a screwdriver or similar tool to press out the core (pos. 8) of the junction box (Fig. 2).
- Loosen the screw connection PG 9 (pos. 5, Fig. 3).
- Feed the connecting cable into the junction box via the screw connection (pos. 5), the clamping ring (pos. 10) and the rubber insert (pos. 9) and subsequently connect the wires as displayed in the connection diagram (see Fig. 4).



- Press the core (pos. 8) until it locks into position in the junction box (pos. 2).
- Tighten the cable gland PG 9 (pos. 5).
- Place the junction box (pos. 2) on the connector (pos. 1) and retighten the central screw (pos. 6).
- To guarantee the protection class IP 65 per EN 60529, the applied connecting cable has to have a sheathing diameter of between 4.5 and 7 mm.
- Furthermore, ensure that all the connector seals (pos. 3, 4 and 9) have been correctly inserted.

Adjust switching unit

Standard contact

The flow switch can be operated as NO (normally open) or NC (normally close). The following table explains the two contact types:

Contact type	Setting	Flow rate	Electric contact
Make contact (NO)	RFD arrow	increasing	closing
Make contact (NO)		decreasing	opening
Brook contact (NC)	WHITE or BLUE arrow	increasing	opening
Dieak contact (NC)		decreasing	closing

Open switching head

• Open the plug cover.



Loosen the locking screw

• Loosen the locking screw (1) (hexagon socket SW2.5 in brass and stainless steel versions and philips head on plastic versions).

Set NO contact

• Position the switching unit until the red arrow (4) is visible at the entry of the switching unit guide.

Note

The switching contact is supplied with a factory setting of NO.



Set NC contact

• Position the switching unit until the white/blue arrow (5) is visible on the entry of the switching unit guide.



Set the switching unit for low flow

• Position the switching unit in the direction of the arrow head (3).

Set swtching point for higher flow

• Position the switching unit in the direction of the end of the arrow (2).

Tighten the locking screw

- Carefully tighten the locking screw (1).
- We recommand using lacquer/thread locker to secure the locking screw after individually setting the switching point.

Close the switching head

• Close the cover until it locks in place.

Maintenance and repair

The flow switch is maintenance-free and cannot be repaired by the user. In the unlikely event of a defect, return the device to the manufacturer for repair.

Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Functional data	Field of use			
	Suitable media	All liquids		
		(not suitable for ammonia)		
	Piping diameter	DN 20200		
	Type of switch	Reed contact		
	Max. contact rating	AC 230 V, 1 A / DC 48 V, 1 A		
	Max. switching capacity	AC 26 VA / DC 20 W		
	External supply line protection (EU)	Fuse slow max. 4 A		
		Circuit breaker max. 6 A Characteristic B, C, D according to or		
		Power source with current limitation of max. 6 A		
	Switching point adjustment	manual, supplied with minimum switch-off value		
	Tolerance of switching			
	point ranges in the table	±15 %		
	Setting range	See switching value table		
	Medium temp.			
	(medium cannot freeze)	-20110 °C		
D	Nominal pressure	PN 25		
Degree of protection	Protection class	II according to EN 60/30-1		
	Housing	IP65 according to EN 60529		
Environmental	General environmental conditions			
conditions	Operation and storage	-2080 °C		
e i i i i	Ambient humidity	<95 % r.h.		
Standards, directives,	Product standard	EN 60204-1		
and approvals		Safety of machinery -		
		Electrical equipment of machines		
	EU Conformity (CE)	CM1T1594xx ⁽)		
	EAC Conformity	Eurasia Conformity		
Environmental	The product environmental declaration CM1E1594 ^{*)} contains data on environmentally			
compatibility	compatible product design and assessr composition, packaging, environmental	nents (RoHS compliance, materials benefit, disposal).		
Materials / Color	Housing	Polyamide, black		
	Screw-in body G ¹ / ₂ "	Brass		
Weight	excl. packaging	0.31 kg		

*) The documents can be downloaded from http://siemens.com/bt/download.

Flow switch for direct mounting

Туре	QVE1901
Body	Brass CW614N
Paddle / sleeve	PPE+PS Noryl [™] 30 % reinforced fiberglass /
	stainless steel
Process connection	Brass CW614N
Axel	Stainless steel 1.4571
Magnet	Hard ferrite
Seal	NBR

Max.

230

200

175

160

Mounting in T-piece per EN 10242

Nom	ninal size		Switching points ON/OFF [m ³ /h] * 1) max. flow [m ³ /h]													
Paddle I	ength		DN 20			DN 25	;		DN 32			DN 40			DN 50	1
Marking	L1 [mm]	ON	OFF	Max.	ON	OFF	Max.	ON	OFF	Max.	ON	OFF	Max.	ON	OFF	Max.
9	40	1.1	0.9	4	1.7	1.5	8.5	2.9	2.6	15	4.2	3.8	25	6.5	6.0	41
15	46		-/-		1.3	1.1	5	2.2	1.9	10	3.2	2.8	18	4.9	4.5	29
20	51		-/-			-/-		1.9	1.6	8	2.8	2.4	14	4.4	4.0	24
30	61		-/-			-/-			-/-		2.1	1.8	10	3.3	3.0	17
40	71		-/-			-/-			-/-			-/-		2.7	2.4	13

*) Water. 20 °C. horizontal piping, tolerance ±15 %.

ON = Rising flow; OFF = Descreasing flow

Installation with wolded sloove per EN 10241

			With $G\frac{1}{2}$ Internal threading, 15 mm in length.													
Non	imal size				Swit	ching	points	ON/O	FF [m ⁱ	³/h] * 1	max.	flow [r	n³/h]			
Paddle I	ength		DN 65			DN 80		1	DN 100)		DN 150	0		DN 200)
Marking	L1 [mm]	ON	OFF	Max.	ON	OFF	Max.	ON	OFF	Max.	ON	OFF	Max.	ON	OFF	İ.
15	46	8.8	8.5	50	13.8	11.3	80		-/-			-/-			-/-	
20	51	7.4	7.0	45	11.7	9.6	65	18.8	16.3	110		-/-			-/-	
30	61	5.6	5.2	34	9.2	7.7	50	14.6	12.0	80		-/-			-/-	
40	71	4.5	4.2	27	7.5	6.3	40	12.3	10.0	65	27.0	25.0	150		-/-	
50	81		-/-	•	6.5	5.3	33	10.2	8.0	55	22.8	19.8	130	45.0	43.5	
60	91		-/-		5.1	4.7	28	8.0	7.1	50	19.5	17.8	110	38.0	36.0	
70	101		-/-			-/-	•	6.9	6.3	40	18.0	16.0	100	33.5	32.0	Γ

-/-

*1) Water, 20 °C, horizontal piping, tolerance ± 15 %. ON = Rising flow; OFF = Decreasing flow.

5.9

6.2

36

15.7

14.3

90

33.5 32.0

29.0

30.0

80

111

-/-

Dimensions



Dimensions in mm

311

SIEMENS



Flow switch

For liquids in piping DN 10...25

QVE1902.010 QVE1902.015 QVE1902.020 QVE1902.025

- Contact load: max. AC 230 V, 1 A, 26 VA DC 48 V, 1 A, 20 W
- Nominal pressure PN10
- Manual contact setting (NO/NC contact)
- Housing protection type IP65 / Protection class II
- Maintenance free

Use

In HVAC plants to monitor the flow of liquid medium in hydraulic systems, in particular, refrigeration, heat pump and heating plants, e.g. for evaporators, boilers, heat exchangers, etc.

Type summary

Type / ASN	Order number (SSN)	Name
QVE1902.010	S55720-S199	Flow switch
QVE1902.015	S55720-S200	Flow switch
QVE1902.020	S55720-S201	Flow switch
QVE1902.025	S55720-S202	Flow switch

Ordering

When ordering, please specify the quantity, type, and product name.

Sizing

Switching value table for water at 20 °C

		Threading	Q _{max}	Facto	ory setting (range)	[l/min]
Type (ASN)	DN	[inch]	[l/min]	→	↑	↓ ↓
QVE1902.010	DN 10	G3⁄8	20	3.2 (2.83.7)	2.7 (2.03.4	3.6 (3.14.1)
QVE1902.015	DN 15	G1⁄2	30	4.2 (3.64.9)	3.4 (2.84.0)	4.4 (3.75.1)
QVE1902.020	DN 20	G¾	80	7.6 (6.98.4)	7.1 (6.18.2)	8.7 (8.09.5)
QVE1902.025	DN 25	G1	130	12.0 (10.813.3)	10.5 (8.912.1)	13.1 (12.014.3)

Engineering notes

Warning

- The flow switch QVE1902.0xx is not a safety component in terms of Directive 2006-42-EC.
- Operational safety of the supplied device is only guaranteed when used properly (monitoring the flow of liquids). Under no circumstances may the indicated limit values (see "Technical data") be exceeded.
- You must ensure that the materials used in the flow switch are sufficiently chemically and mechanically durable against the medium to be monitored as well as external influences.

🛕 Caution

- Comply with maximum contact load for the reed contact. The maximum contact load indicated on the type label applies to Ohm loads only and may not be exceeded under any circumstances.
 High voltage or current spikes may occur when switching, in particular, inductive or capacitive loads (e.g. relay coils, capacitors). Even a short overload may destroy (fusing of contacts) or damage (reduced life cycle) reed contacts. Use appropriate and tested safety measures.
- Select suitable measures to prevent the medium from freezing. Do not operate, e.g. testing, the flow switch using pure water if operated in ambient temperatures of <4°C. Residual water in the flow switch may result in frost damage.

Mounting instructions

- A smoothing section of at least 10 x or 5 x the pipe diameter respectively must be planned prior to and after intended location.
- First, clean the pipe system where the flow switch is installed and remove any magnetic particles, e.g. wielding residue.
- Do not use grease or oils to seal the flow switch or its piping.

Orientation

- horizontal, at a maximum angle of 45°, as well as
- vertical

See illustration below



- Ensure when mounting that the arrow points parallel to the pipe axis and indicates the direction of flow.
- Install the section of piping for the flow switch the same as a valve in the existing piping.

Installation notes

Warning

- · Comply with all local regulations on electrical systems.
- Only qualified personnel may do the electrical installation.
- Always de-energize the system before connecting the wires of the mains cable.
- The connecting cable to relieve tension has a reserve loop so that there is sufficient "play (cable)" when making fine adjustments to the switching unit.

Commissioning notes

Contact type factory setting

NO or NC contact

The switching unit is factory set as a make contact, i.e. the reed contact opens if the set switching point is breached.

Type of contact Setting		Flow rate	Electric contact		
NO	RFD arrow	increasing	closing		
(closer)		decreasing	opening		
NC		increasing	opening		
(opener)		decreasing	closing		

Setting the switching unit

The setting can be changed as needed by the customer:

- Loosen the locking screw (Phillips-head screw) and position the switching unit until the red or white arrow are visible at the entry of the switching contact guide for a desired normally open (NO) or normally closed (NC) contact respectively.
- You can use the arrow length to make fine adjustments to the switching point: Adjust to the arrowhead means: Switching point is at a lower flow rate. Adjust to the arrow end: Switching point is at a higher flow rate.
- Carefully retighten the locking screw.
- We recommend using thread locker to secure the locking screw on the switching unit after carrying out individual adjustments.

NO contact (red arrow)

NC (white arrow)



Operating notes

- Please make sure that there are no external magnetic fields in the immediate vicinity of the flow switch, since these can impair device operation.
- Ensure that the maximum operating pressure is not exceeded.

Service notes

• Never remove a flow switch or its body from a system under pressure.



• The flow switch is maintenance-free and cannot be repaired by the user.

Disposal



Technical data

Functional data	Field of use	
general	Permissible media	All liquids
-		(not suitable for ammonia)
	Medium temperature	-20100 °C (Medium may not freeze)
	Piping diameter	DN 1025
	Nominal pressure	PN 10
		(piping approved for PN 25)
Switching function	Contact	Closes as flow increases *)
-		Opens as flow decreases *)
	Type of switch	Reed contact
	Max. contact rating	AC 230 V, 1 A / DC 48 V, 1 A
	Max. switching capacity	26 VA or 20 W
	Length of connecting cable/cross section	1.5 m / 0.5 mm²
	External supply line protection (EU)	Fuse slow max. 4 A
		Circuit breaker max 6 A
		Characteristic B, C, D according to
		Power source with current limitation of max. 6 A
	Switching point adjustment	Manual, set at the factory to the middle of the setting range
	Setting range	See Sizing on page 2
Degree of protection	Protection class	II according to EN 60730-1
5	Housing	IP65 according to EN 60529
Environmental conditions	Storage, transportation, operation	
	Temperature	070 °C
	Humidity	<95 % r.h.
Standards and Directives	Product standard	EN 60204-1
		Safety of machinery - Electrical
		equipment of machines
	EU Conformity (CE)	CM1T1596xx **)
Dimensions / Weight	Excl. packaging	See under "Dimensions and weight"
Material	Switching unit/connecting cable	Polyamide / PVC
	Housing and paddle system/piping	PPE+PS Noryl FE1630PW / brass
Housing color		Black

 $^{\ast})$ Applies to delivery state (switching function can be inverted as needed).

**) The documents can be downloaded from http://siemens.com/bt/download.

Dimensions and weight

Dimensions in mm



Type (ASN)	Nominal width dia	Qmax [l/min]	G [inch]	L [mm]	h [mm]	H [mm]	Weight [g]
QVE1902.010	DN 10	20	G¾	11	41.5	101.5	255
QVE1902.015	DN 15	30	G1⁄2	11	41.5	101.5	220
QVE1902.020	DN 20	80	G¾	15	46.0	105.5	239
QVE1902.025	DN 25	130	G1	15	55.5	115.5	315

SIEMENS



Flow sensor

QVE2000.0xx QVE2100.0xx

for liquids in DN 10...25 pipes

- Vortex flow sensor made from fiber-glass-reinforced plastic
- Output signal: DC 0...10 V or 4...20 mA
- Flow range: 1.8 ... 150 l/min
- Used for temperature ranges: -15...+125 °C
- Operating voltage: DC 18...33 V (QVE2100...) or 11.5...33 V (QVE2000...)
- Temperature-insensitive measuring principle
- No moving parts
- Low pressure loss
- Insensitive to soiling

The flow sensor is suited to continuously measure flow or monitor liquids such as hot water, heating water, or standard water-glycol mixes in HVAC plants and applications. The sensors can be used in automation and control systems as control sensor or measured value sensor.

Type summary

Type / ASN Product number		Nominal	Measuri	Output signal	
	(SSN)	width dia [mm]	[l/min]	[m ³ /h]	DC
QVE2000.010	S55720-S189	DN 10	1.832	0.11.92	010 V
QVE2000.015	S55720-S190	DN 15	3.550	0.23.0	010 V
QVE2000.020	S55720-S191	DN 20	5.085	0.35.1	010 V
QVE2000.025	S55720-S192	DN 25	9.0150	0.59.0	010 V
QVE2100.010	S55720-S193	DN 10	1.832	0.11.92	420 mA
QVE2100.015	S55720-S194	DN 15	3.550	0.23.0	420 mA
QVE2100.020	S55720-S195	DN 20	5.085	0.35.1	420 mA
QVE2100.025	S55720-S196	DN 25	9.0150	0.59.0	420 mA

Ordering

When ordering, please specify the quantity, type, and product name.

Туре	Stock number	Designation
ASN	SSN	Product designation
QVE2000.01 0	S55720-S189	Flow sensor

Example: 1 flow sensor QVE2000.010

Delivery

Scope of delivery:

- Flow sensor with external thread connection
- 2 x inserted O-ring
- Straight, 3-pin plug M12x1 with cable, 2 m
- Mounting instructions



Engineering notes

Warning Operational safety of the supplied device is only guaranteed when used properly (flow measurement of liquids). Do not exceed under no circumstances the indicated limit values (see "Technical data").

Mounting notes

Smooth operation of the flow sensor is guaranteed only if the mounting instructions delivered with the product are adhered to completely. See also the following notes.

Important Strictly observe the following notes to prevent sensor material damages when mounting:

- Mount the sensor only when **deenergized.** Thus, the connecting pipes must be supported by tube clamps as close to the sensor inlet and outlet as possible.
- When mounting the sensor, use suitable connection fittings. Do not exceed a **12 Nm** torque when tightening the union nut. To tighten, hold the union nut with a wrench against the tightening torque.



Avoid air bubbles in the medium

Install the flow sensor where the pipes are completely filled with the medium to be measured, and where gas bubbles and cavitation in the medium are avoided.

Note mounting position and flow direction Mount the flow sensor only in the intended position or proper flow direction (note the arrow on the connecting pipe). The measured flow values will be wrong if the sensor is mounted in the wrong position or direction.



Further Important notes	 The entire measuring path must be free of foreign bodies. Plan for sufficient settlement distance before the sensor inlet or outlet area to avoid eddying effects e.g. by curvatures, steps, changes to diameter, valves, pumps, etc
	 For this reason, strictly adhere to the recommended minimum distances as recommended in the mounting instructions.
Installation notes	

- Comply with all local regulations on electrical systems.
- Use only qualified personnel for electrical installation.
- Always de-energize the system before connecting the wires of the mains cable.

Operating notes

Do not exceed maximum operating pressure as well as maximum medium temperature (see "Technical data").

Service notes

- Do not remove a flow switch or its body from a system under pressure.
- The flow sensor is maintenance-free and cannot be repaired by the user.

Disposal



The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Product data	Nominal width and measuring range	See "Type summary					
General function data	Measuring principle	Vortex					
	Sensing element	Piezo-ceramic sensor element					
	Measuring accuracy at < 50 % FS (water) at > 50 % FS (water)	< 1 % FS (Full Scale) < 2 % measured value					
	Dynamic response:	< 500 mg					
	Switch-on delay	< 2 s					
	Flow media	Heating water with standard additives					
		Potable water (bot / cold)					
	Admissible medium temperature	Non-freezing ± 100 °C					
		(short-term to $\pm 125 ^{\circ}\text{C} < 4 \text{bar}$)					
	Max. pressure at medium temperature	12 bar at +40 $^{\circ}$ C					
	during life	6 bar at +100 °C					
Electrical data	Types with voltage output	Supply: DC 11.533 V, <6 mA (SELV) Output: DC 010 V (loads up <1 mA)					
	Types with current output	Supply: DC 1833 V (SELV) (for loads up to 500 Ω) Output: DC 420 mA (loads up to 500 Ω)					
Connections	Electrical connection	Straight, 3-pin plug M12x1 with 2 m cable					
	External thread on measuring pipe	See Dimensions					
Degree of protection	Protection degree of housing	IP65 according to EN 60529, mounted and screwed					
	Protection class	III according to EN 60730-1					
Environmental conditions	Permitted ambient temperature Transport and storage Operation	–1585 °C –3085 °C					
Environmental compatibility	The product environmental declaration C compatible product design and assessme packaging, environmental benefit, dispos	E1E1597 ^{*)} contains data on environmentally ents (RoHS compliance, materials composition, al).					
Directives and Standards	Product standard	EN 61326-1					
		Electrical equipment for measurement, control and laboratory use. EMC requirements. Gen- eral requirements.					
	EU Conformity (CE)	CE1T1597xx ^{*)}					
Materials	Housing under pressure	Plastic PA6T / 6I					
	Sealing material	EPDM ethylene-propylene-rubber (peroxide linked)					
	Sensor	ETFE					
Dimensions (weight)	Including packaging	See Dimensions					
	*) The documents can be downloaded from http://siemens.com/bt/download.						



Α

30

Pin assignment

Plug pin	Wire color
1	brown
3	blue
4	black

Dimensions

Dimensions in mm





1597M01

Type (ASN)	Nom. width dia.	A [mm]	B [mm]	C [mm]	D [mm] Ø	E [mm]	Thread G [inch]	Weight [g]
QVE2x00.010	DN 10	35	41	81	12	√19	G1⁄2	57
QVE2x00.015	DN 15	36.6	43	87	16	જે 22	G¾	68
QVE2x00.020	DN 20	36.6	45	105	20	ร์ 27	G1	92
QVE2x00.025	DN 25	50	47	120	26	ন্থ 34	G1¼	100

SIEMENS



Flow sensor

QVE3000.0xx QVE3100.0xx

for liquids in DN10...25 pipes

- Vortex flow sensor made from robust red brass
- Output signal: DC 0...10 V or 4...20 mA
- Flow range: 1.8...150 l/min
- Used for temperature ranges: -15...125 °C
- Operating voltage: DC 18...33 V (QVE3100..) or 11.5...33 V (QVE3000..)
- Temperature-insensitive measuring principle
- No moving parts
- Low pressure loss
- Insensitive to soiling

Use

The flow sensor is suited to continuously measure flow or monitor liquids such as hot water, heating water, or standard water-glycol mixes in HVAC plants and applications. The sensors can be used in automation and control systems as control sensor or measured value sensor.
Type summary

Type / ASN	Product num-	Nominal	Measuring range		Output signal
	ber	width dia.	[l/min]	[m ³ / h]	DC
	(SSN)	[mm]			
QVE3000.010	S55720-S211	DN 10	1.832	0.11.92	DC 010 V
QVE3000.015	S55720-S212	DN 15	3.550	0.23.0	DC 010 V
QVE3000.020	S55720-S213	DN 20	5.085	0.35.1	DC 010 V
QVE3000.025	S55720-S214	DN 25	9.0150	0.59.0	DC 010 V
QVE3100.010	S55720-S215	DN 10	1.832	0.11.92	DC 420 mA
QVE3100.015	S55720-S216	DN 15	3.550	0.23.0	DC 420 mA
QVE3100.020	S55720-S217	DN 20	5.085	0.35.1	DC 420 mA
QVE3100.025	S55720-S218	DN 25	9.0150	0.59.0	DC 420 mA

Ordering

When ordering, please specify the quantity, type, and product name.

Туре	Stock number	Designation
ASN	SSN	Product designation
QVE3000.010	S55720-S211	Flow sensor

Example:

1 flow sensor QVE3000.010

Delivery

Scope of delivery:

- Flow sensor with external thread connection
- Straight, 3-pin plug M12x1 with cable, 2 m
- Mounting instructions

Service life

10 year curve as related to flow and media temperature



Engineering notes

A Warning	Operational safety of the supplied device is only guaranteed when used properly (flow measurement of liquids). Do not exceed under no circumstances the indicated limit values (see "Technical data").		
Mounting notes			
	Smooth operation of the flow sensor is guaranteed only if the mounting instructions delivered with the product are adhered to completely. See also the following notes.		
Avoid air bubbles in the medium	Install the flow sensor where the pipes are completely filled with the medium to be measured, and where gas bubbles and cavitation in the medium are avoided.		
Note mounting position and flow direction	Mount the flow sensor only in the intended position or proper flow direction (note the arrow on the connecting pipe). The measured flow values will be wrong if the sensor is mounted in the wrong position or direction.		
Further important notes	 The entire measuring path must be free of foreign bodies. Plan for sufficient settlement distance before the sensor inlet or outlet area to avoid eddying effects e.g. by curvatures, steps, changes to diameter, valves, pumps, etc For this reason, strictly adhere to the recommended minimum distances as recommended in the mounting instructions. When mounting red brass-type flow sensors, use flat seals at the inlet and outlet of the red brass pipe. 		
Installation notes			
	 Comply with all local regulations on electrical systems. Use only qualified personnel for electrical installation. Always de-energize the system before connecting the wires of the mains cable. 		
Operating notes			
	Do not exceed maximum operating pressure as well as maximum medium temper- ature (see "Technical data").		

- Do not remove a flow sensor or its body from a piping system under pressure.
- The flow sensor is maintenance-free and cannot be repaired by the user.

Disposal

The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Product data	Nominal width and measuring range	See "Type summary"	
General function data	Measuring principle	Vortex	
	Sensing element	Piezo-ceramic sensor element	
	Measuring accuracy		
	at <50% FS (water)	<1% FS (Full Scale)	
	at >50% FS (water)	<2% measured value	
	Dynamic response:		
	Response time	<500 ms	
	Switch-on delay	<2 s	
	Flow media	Heating water with standard additives	
		Potable water (hot / cold)	
	Admissible medium temperature	Non-freezing100 °C	
		(short-term to 125 °C, <4 bar)	
	Max. pressure at medium temperature	12 bar at 40 °C	
	during life	6 bar at 100 °C	
Electrical data	Types with voltage output	Supply: DC 11.533 V, <6 mA (SELV)	
		Output: DC 010 V (loads up <1 mA)	
	Types with current output	Supply: DC 1833 V (SELV)	
		Output: DC 420 mA (loads up to 500 Ω)	
Connections	Electrical connection	Straight, 3-pin plug M12x1 with 2 m cable	
	External supply line protection	Stromversorgung mit Strombegrenzung	
		von max. 10 A	
	External thread on measuring pipe	See 'Dimensions'	
Degree of protection	Protection class	III according to EN 60730-1	
	Protection degree of housing	IP65 according to EN 60529,	
		mounted and screwed	
Environmental conditions	Permitted ambient temperature		
	Transport and storage	–30…85 °C	
	Operation	–1585 °C	
Environmental compatibility	The product environmental declaration CE1E1598 ^{*)} contains data on environmen-		
	tally compatible product design and assessments (RoHS compliance, materials		
	composition, packaging, environmental benefit, disposal).		

Standards, directives, and	Product standard	EN 61010-1	
approvals		Safety requirements for electrical equip-	
		ment for measurement, control and la-	
		boratory use.	
	Electromagnetic compatibility	For use in residential, commerce, light-	
	(Applications)	industrial and industrial environments	
	EU Conformity (CE)	CE1T1597xx ^{*)}	
	EAC Conformity	Eurasia Conformity	
Materials	Housing under pressure	Red brass	
	Sealing material	EPDM ethylene-propylene-rubber	
		(peroxide linked)	
	Sensor	ETFE	
Dimensions (weight)	Including packaging	See Dimensions	
	*) The documents can be downloaded from http://siemens.com/bt/download.		

Device connection



Pin assignment

Plug pin	Wire color
1	brown
3	blue
4	black

Dimensions

Dimensions in mm



Type (ASN)	Nominal width dia	A	B	C	G	Weight
	wiutii ula.	լուուլ	լուուլ	լուոյ	linen	[9]
QVE3x00.010	DN 10	32	57	65	G¾	230
QVE3x00.015	DN 15	40	59	75	G¾	240
QVE3x00.020	DN 20	49	65	86	G1	340
QVE3x00.025	DN 25	70	71	109	G1¼	510

SIEMENS



Air velocity sensor

QVM62.1

Use

This sensor is used to control the air velocity to a constant value, or to balance out pressure fluctuations (supply or extract air control), or to monitor the flow in air ducts. It primarily is used for modulating fan control in primary plants to set the basic volume flow.

Action

The QVM62.1 records the air velocity as a measured value and converts it to an active DC 0...10 V or 4...20 mA output signal.

Three measuring ranges are available:

0...5 m/s, 0...10 m/s, and 0...15 m/s.

The sensor measures a point, i.e., it measures the values at a specific location in the flow profile. For recording the mean air velocity in the duct, the sensor's immersion depth is the key measure. The immersion depth depends on the flow profile. The measurement principle is based on the anemometric measurement principle. The specially developed thin film sensing element of the QVM62.1 is to a big extend independent form the flow direction and is nearly insensitive to any kind of dirt in the airflow.

Ordering

When ordering, indicate the name and type designation : Air velocity sensor $\ensuremath{\text{QVM62.1}}$

The air velocity sensor consists of:

- Immersion stem with sensor head and sensing element
- Extension pipe with fitting
- Immersion stem end with flow direction arrow
- Adjustable connecting flange
- Transducer
- Connection cable, screened, four-core, 1 m long

A scale with 0.5 cm grating on the immersion stem and the extension pipe indicates the immersion depth.

The connecting flange is used to attach and seal the immersion stem on the duct wall.

A plastic housing with removable cover accommodates the transducer. It can be screwed to a flat surface.

The sensor cable is connected; the sensor and the transducer together represent a unit. The measuring ranges are selected by inserting or removing a plug-in jumper.

- Protection against false wiring is provided related to own voltages, i.e., measuring output X1 is short-circuit proof.
- 1. The sensor head connections are not protected against AC/DC 24 V operating voltage.



Disposal

Wiring and setting

elements



The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Power supply	Operating voltage Frequency Power consumption	AC/DC 24 V ±20 %(SELV) 50/60 Hz <5 VA (max_200 mA)
	External supply line protection	
	External supply line protection	ruse slow max. To A
		Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898
		OI Device course with current limitation
		of may 10.4
Managering data	Macauring ranges, editatelle	or max. TO A
measuring data	Measuring ranges, adjustable	05 III/S
		010 m/s (lactory setting)
		015 m/s
	Measuring accuracy at 20°C, 45 % r.n., 1013 hPa	
	05 m/s	\pm (0.2 m/s + 3 % of measured value)
	010 m/s	\pm (0.2 m/s + 3 % of measured value)
	015 m/s	\pm (0.2 m/s + 3 % of measured value)
	Permissible air velocity	20 m/s
	Direction dependence	<3% of measured value at
	Time and the state of the	<±10°
	Time constant t ₉₀ at 10 m/s	ca. 4 s
Signal output X1	Voltage output	DC 010 V, ±1 mA
	Current output	DC 420 mA, 0500 Ω
Line length	Perm. line length to controller at	
	0.6 mm dia copper cable	50 m
	1 mm ² copper cable	150 m
	1.5 mm ² copper cable	300 m
	Line length to the sensor head	1 m (prewired)
Connections	Mechanical:	screw connection
	Electric:	screw terminal, max. 2×1.5 mm ²
Degree of protection	Protection class Protection degree of housing	III according to EN 60730-11
	Transducer	IP42 according to EN 60529
	Sensor head	IP20 according to EN 60529
Environmental	Operation (transducer and immersion stem)	IEC 721-3-3
conditions		
	Temperature Humidity (non condensing)	-10+45 C
	Mechanical conditions	Class 3M2
	Chemical conditions	class 3C2
	Storage (transducer and immersion stem)	IFC 721-3-1
	Climatic conditions	class 1K3
	Temperature	−30+60 °C
	Humidity (non-condensing)	<95 % r.h.
	Mechanical conditions	class 1M2
	Transport (transducer and immersion stem)	IEC 721-3-2
	Climatic conditions	class 2K3
	Temperature	-25+60 °C
	Humidity (non-condensing)	<95 % r.h.
	iviecnanical conditions	CIASS ZIMZ

Materials and colours	Housing bottom Housing cover Sensor pipes Sensor head, extension, end Connecting flange Sensor, total	polycarbonat, RAL 7001 (silver-grey) polycarbonat, RAL 7035 (light-grey) polycarbonat, RAL 7001 (silver-grey) polycarbonat, RAL 7035 (light-grey) polycarbonat, RAL 7001 (silver-grey) silicon-free	
Standards, directives and approvals	Product standard	EN 60730-1 Automatic electrical controls for household and similar use	
	Electromagnetic compatibility (Applications)	For use in residential, commerce, light-industrial and industrial environments	
	EU Conformity (CE)	CM2T1932xx *)	
	EAC Conformity	Eurasia conformity)	
Environmental compatibility	The product environmental declaration CM1E1932 ^{*)} contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		
Weight	With packaging	0.352 kg	
	*) The documents can be downloaded from <u>http://siemens.com/bt/download</u> .		

Engineering notes

Place the sensor on the measuring path in a location where the air flow is quiet. Thus: do not place it close to dampers, registers, and duct direction changes.





Use a transformer with safety extra-low voltage (SELV) with separate winding for 100% ON-time. Observe all local safety rules and regulations pertaining to sizing and protecting transformers.

Note the permissible line length to the controller.

Mounting and installation notes

Mount the immersion stem so that the air flows through the opening at the sensor head. The immersion stem is premounted and wired to the transducer on delivery. The sensor pipes and the end with the direction arrow are prearranged on the connecting cable-fit them together (use the direction-oriented snap-on connections). If the extension pipe is not required, remove it from the cable. The connecting flange is not attached on delivery.

The sensor is supplied with mounting instructions.

Commissioning notes

Check the wiring and the air velocity range settings prior to commissioning. Check the immersion stem position in the air duct (mounting instructions!).

Diagrams



G Operating voltage AC/DC 24 V

- M Measuring neutral/operating voltage ground
- X1 Output signal DC 0...10 V or 4...20 mA

Dimensions (All dimensions in mm)



SIEMENS



Solar Impact Sensor

QLS60

- Sensor for acquiring the impact of solar radiation
- Output signal DC 0...10 V
- 2-wire current output 4...20 mA

Use

The solar impact sensor is used as a reference sensor in heating, ventilation and air conditioning plants where compensation of solar radiation is required. Solar compensation is necessary where buildings or building sections with large window areas are subjected to strong solar radiation, especially in plants where thermostatic radiator valves cannot be used.

Ordering

When ordering, please give name and type reference: Solar impact sensor QLS60

Equipment combinations

The sensor can be used in connection with all types of systems and devices capable of acquiring and handling the sensor's 4...20 mA or DC 0...10 V output signal.

Technical design

To determine the impact of solar radiation, the sensor uses a solar cell which acquires the level of radiation. That cell generates an electrical current depending on the extent of radiation, which is then evaluated by the sensor. As a result, the sensor delivers an output signal of 4...20 mA or DC 0...10 V, which is proportional to the solar radiation range.

The solar impact sensor is designed for wall mounting. The cable must be introduced from the bottom.

The sensor consists of plastic housing with a transparent cover and a Pg 9 cable entry gland.

The solar cell is located in the cover, the sensor electronics with the connection terminals inside the housing. The cover is secured to the housing with 2 screws and can be removed. A rubber seal is used between housing and cover to ensure degree of protection IP 65. The measured values from the photocell to the sensor electronics are transmitted via a 2-wire connection.



Legend

1 Solar cell

2 Connection terminals

3 Rubber seal

4 Sealing gland (conduit adapter supplied for US / Asia Pacific)

Engineering notes

The correct mounting location of the sensor is decisive for achieving the desired effect. It must be determined by the planning engineer. The information given in section "Mounting and installation notes" must be observed.

Power supply line and measuring line must be run together.

The voltage output can be used only if the current output is not required. Mixed operation is not possible. The measuring voltage is calculated as follows:

$$U = E \bullet \frac{10 V}{1000 W / m^2}$$

where E = solar radiation in W/m^2

When using the current output, the voltage output cannot be used. The electronic circuit receives its power from the current supply. For that, the current measuring voltage must lie in the range of DC 15...30 V. The measuring current is calculated as follows:

$$I = 4 mA + E \bullet \frac{16 mA}{1000 W / m^2}$$

where E = solar radiation in W/m^2

When deciding on the mounting location, it should first be determined for which part of the building (heating zone) the sensor shall acquire the solar radiation. It must be located on the wall having the windows of the rooms that are affected by solar radiation.

This is, in general:

- The wall of the heating zone with the window area which receives the largest part of solar radiation for the longest period of time
- As high as possible, but at least 3 m above the ground
- Easily accessible (to facilitate checking), approximately 30 cm beside a window

Not in the shade of trees, houses, telephone poles, etc. The sensor must not be painted over.



The solar impact sensor is supplied complete with Mounting Instructions.

Commissioning notes

When commissioning the plant, the wiring must be checked. No settings can be made on the sensor itself.

Disposal



The devices are considered electronics devices for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic waste.

- Dispose of the device via the channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Note:

Technical data

Power supply (G+, M)	Rated voltage range	AC 24 V ±20 % (SELV) or
	Rated frequency at AC 24 V	50/60 Hz
	Rated power consumption	max. 2.5 VA (1 W)
	External supply line protection	Fuse slow max. 10 A
Range of use	Measuring range	Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 or Power source with current limitation of max. 10 A 01000 W/m ²
Functional data	Time constant t ₆₃	≤2 s
Measured value outputs (U. I)	Voltage signal output (U)	DC 010 V
	Current signal output (I)	$420 \text{ mA} \cong 01000 \text{ W/m}^2$
	Perm. cable lengths with copper cable	
	1.0 mm ²	50 m
	1.5 mm ²	150 m
	2.5 mm ²	300 m
Electrical connections	Screw terminals for	2 x 1.5 mm ² or 1 x 2.5 mm ²
Degree of protection	Protection degree of housing	IP65 according to EN 60529
	Protection class	III according to EN 60730
Environmental conditions	Operation to Climatic conditions Temperature Humidity (noncondensing) Mechanical conditions	IEC 60721-3-3 Class 3K5 – 25+55 °C 595 % r. h. Class 3M2
	Transportation to	IEC 60721-3-2
	Climatic conditions	Class 2K3
	Temperature	−25+70 °C
	Humidity Mechanical conditions	<95 % r. h.
Directives and Standards	Product standard	EN 61326-1 Electrical equipment for measurement, control and laboratory use.
	EU Conformity (CE)	CE1T1943xx ^{*)}
Environmental compatibility	The product environmental declaration CE1E1943 ^{*)} contains data on environmentally compatible product design and assessment (RoHS compliance, materials composition, packaging, environ-mental benefit, disposal).	
Materials and colors	Housing	Polycarbonate / RAL 9002 (gray-white)
	Housing cover	Polycarbonate (transparent), solar panel moulded in silicone / RAL9010
	Packaging	cardboard
Weight	Without packaging	approx. 0.124 kg

*) The documents can be downloaded from http://siemens.com/bt/download.

Connection diagrams

Internal diagrams



G+

Operating voltage AC 24 V or DC 24 V (DC 18...30 V) Measuring neutral (power supply and signal), Solar radiation measuring signal 4...20 mA Solar radiation measuring signal DC 0...10 V Operating voltage DC 24 V (DC 18...30 V)

DC supply:

_Г

(1) (2)

DC 0...10 V

U G+

٦+

l (3) M (4)

- M U
- L

Connection diagrams

Voltage measurement with



Current measurement:



Dimensions



+

DC 18...30 V

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