SIEMENS

Room sensors

QFA2068, QFA2068D, QFA2079



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 temperature and relative humidity
- Capacitive humidity measurement
- Accuracy of ±3 % r.h. within comfort range
- Range of use -15…+50 °C / 0…95 % r.h. (non-condensing)

Use

QFA2068, QFA2068D and QFA2079 are used in ventilating and air conditioning plants to acquire room

- relative humidity and
- temperature

In various places, the sensor is used as a

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

Example:

- Offices, hospitals, storage rooms, and so on

Type summary

Type reference	SSN NO.	Temperature measuring range	Temperature signal output	Humidity measuring range	Humidity signal output	Operating voltage
QFA2068	S55720-S462	0...50 °C / -35...+35 °C / -40…+70 °C	active, DC 0...10 V	0...100 %	active, DC 0...10 V	AC 24 V or DC 13.5…35 V
QFA2068D	S55720-S463					
QFA2079	S55720-S464	0...50 °C / -35...+35 °C / -40…+70 °C	active, 4…20 mA	0...100 %	active, 4…20 mA	DC 13.5…35 V

Ordering and delivery

When ordering, please give name and type reference, e.g.:Room sensor QFA2068D.

Equipment combinations

All systems or devices capable of acquiring and handling the sensor's DC 0...10 V, 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 datasheet N5146).

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 need to be introduced from the rear (concealed wiring).

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 QFA2068D 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.

Setting element

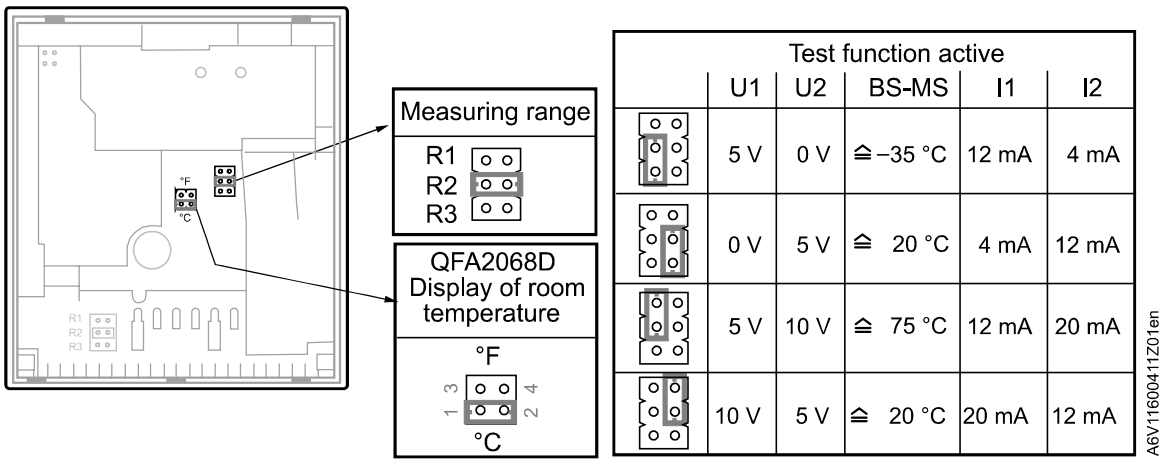


Fig. 1: Graphic 1

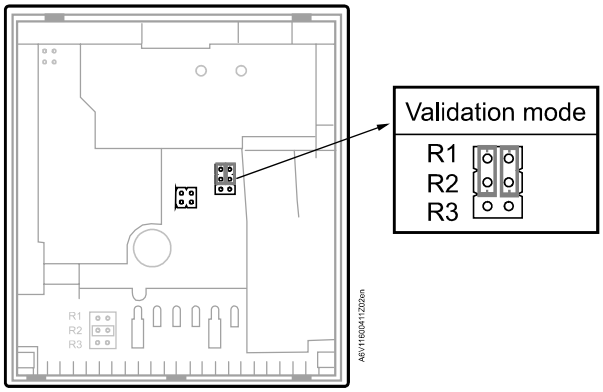


Fig. 2: Graphic 2

The setting elements are located in the casing. A setting element consists of 6 pins and 2 jumpers. 1 jumper is used for selecting the required temperature measuring range and for activating the test function (see graphic 1). Two jumpers are used for selecting validation mode (see graphic 2). Types with LCD display have a second setting element with 4 pins and a jumper.

NOTICE! Two jumper caps are provided as accessory. Make sure to keep both of them during basic range setting!

The different jumper positions have the following meaning:

- 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
- For activating the test function:
  Jumper in the vertical position: The values according to the table "Test function active" will be made available at the signal output.
- For the measured value display (QFA2068D)
  - Jumper horizontal, in the upper position= °F
  - Jumper horizontal, in the lower position = °C (factory setting)

Validation mode

Validation mode is used for accuracy validation in lab high-speed air flow chamber.

Detailed operating guide for validation mode, see A6V13355925.

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.

Notes

Engineering

Room sensors with active outputs have a high power loss, which can influence temperature measurement. The degree of influence depends on the operating voltage and is compensated for an operating voltage of AC 24 V or DC 24 V. Over- or under compensation 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.

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 electrical interference. Use shielded cables in EMC-prone environments.

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

Note to QFA2079

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

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.

Install the sensor in the occupied space about 1.5 m above the floor and at least 50 cm 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.

NOTICE	
!	Avoid direct contact with chemicals in any form. Do not touch sensitive components with bare hands or tools this will negatively impact measurement accuracy.

Commissioning

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 [▶ 2]).



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

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.

Disposal



This symbol or any other national label indicate that the product, its packaging, and, where applicable, any batteries may not be disposed of as domestic waste. Delete all personal data and dispose of the item(s) at separate collection and recycling facilities in accordance with local and national legislation.
For additional details, refer to Siemens information on disposal.

Technical data

Power supply	
Operating voltage	AC 24 V ±20 % or DC13.5…35 V (SELV)
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 QFA2068 QFA2068D QFA2079	 ≤ 0.4VA ≤0.4VA ≤ 1.4W

Functional data of sensor	
Humidity sensor	
Range of use	0…95 % r.h. (non-condensing)
Measuring range	0…100 % r.h.
Measuring accuracy (*) at 23 °C and AC/DC 24 V and at 0...95 % r.h. 30...70 % 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	 ±5 % r.h. ±3 % r.h.
Temperature dependency	≤ 0.2 % r.h./℃
Time constant	< 20 s
Output signal, linear (terminal U1)	DC 0...10 V/0...100 % r.h., max. 1 mA
Output signal, linear (terminal I1) Burden	4…20 mA/0...100 % r.h. refer to Mode of operation [▶ 5]
Temperature sensor	
Range of use	-15...+50 °C
Measuring range	0...50 °C (R2 = factory setting), -35...+35 °C (R1) or -40…+70 °C (R3)
Sensing element	NTC 10k

Functional data of sensor	
Measuring accuracy at AC/DC 24 V and at 23 °C 15...35 °C -35...+50 °C	 ±0.3 K ±0.7 K ±1 K
Time constant	8.5 min (depending on air movement and thermal coupling to the wall)
Output signal, linear (terminal U1)	DC 0...10 V ≙ 0...50 °C / -35...+35 °C / -40…+70 °C max. 1 mA
Output signal, linear (terminal I1) Burden	4…20 mA ≙ 0...50 °C / -35...+35 °C / -40...+70 °C refer to Mode of operation [▶ 5]

Ambient conditions and protection classification	
Protection degree of housing	IP30 according to EN 60529
Protection class	III according to EN 60730
Environmental conditions Operation to ● Climatic conditions – Temperature (housing with electronics) – Humidity ● Mechanical conditions Transport to ● Climatic conditions – Temperature – Humidity ● Mechanical conditions	 IEC 60721-3-3 ● Class 3K5 – -15...+50 °C – 0…95 % r. h. (non-condensing) ● Class 3M2 IEC 60721-3-2 ● Class 2K3 – -25...+70 °C – <95 % r.h. ● Class 2M2

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)	CE1T1857xx *)
RCM conformity	CE1T1961en_C1 *)

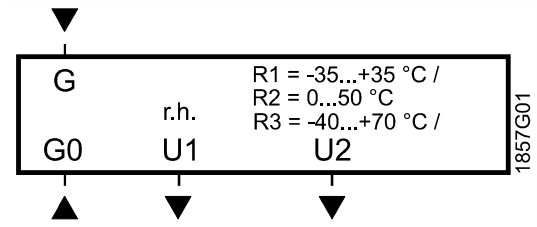
Standards, directives and approvals	
EAC conformity	Eurasia Conformity
UL	UL 873, http://ul.com/database
Environmental compatibility	The product environmental declaration (A5W90011819 *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

General	
Cable lengths for measuring signal Perm. cable lengths	 See data sheet for the device handling the signal
Electrical connections Screw terminals for	 1 × 2.5 mm^2 or 2 × 1.5 mm^2
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
Weight including package Without LCD display With LCD display	 Approx. 0.130 kg Approx. 0.150 kg

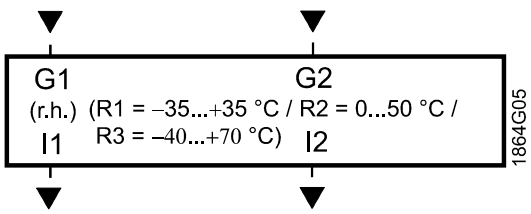
*) The documents can be downloaded from http://siemens.com/bt/download.

Internal Diagrams

QFA2068 QFA2068D



QFA2079



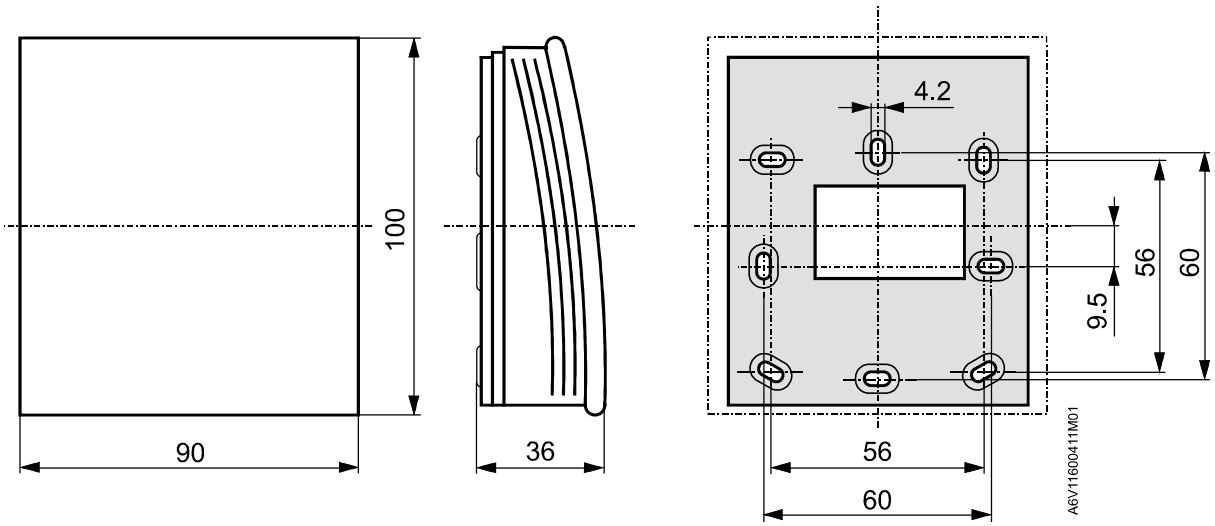
G, G0	Operating voltage AC 24 V (SELV) or DC 13.5...35 V
G1, G2	Operating voltage DC 13.5...35 V
U1	Signal output DC 0...10 V for relative humidity 0...100 %
U2	Signal output DC 0...10 V for temperature range 0...50 °C (R2 = factory setting) -35...+35 °C (R1) or -40…+70 °C (R3)
I1	Signal output 4…20 mA for 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)

Note on connection terminals of the QFA2079:

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



Dimensions in mm

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Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
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