



Symaro™

## Room sensors

## QFA31..

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
- Capacitive humidity measurement
- Function test
- Range of use  $-40...+70\text{ °C}$  /  $0...100\text{ % r. h.}$   
with LCD display  $-25...+70\text{ °C}$  /  $0...100\text{ % r. h.}$

### Use

The QFA31.. 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:

- Storage and production facilities in the paper, textile, pharmaceutical, food, chemical and electronics industry, etc.
- Laboratories
- Hospitals
- Indoor swimming-pools
- Computer and EDP centers
- Greenhouses
- With the AQF3100 accessory for outdoor use

## Type summary

Type reference	Temperature measuring range	Temperature signal output	Humidity measuring range	Humidity signal output	Operating voltage	Measured value display
<b>QFA3100</b>	None	None	0...100 %	active, DC 0...10 V	AC 24 V or DC 13,5...35 V	No
<b>QFA3101</b>	None	None	0...100 %	active, 4...20 mA	DC 13,5...35 V	No
<b>QFA3160</b>	0...50 °C / -40...+70 °C / -35...+35 °C	active, DC 0...10 V	0...100 %	active, DC 0...10 V	AC 24 V or DC 13,5...35 V	No
<b>QFA3160D</b>	0...50 °C / -40...+70 °C / -35...+35 °C	active, DC 0...10 V	0...100 %	active, DC 0...10 V	AC 24 V or DC 13,5...35 V	Yes
<b>QFA3171</b>	0...50 °C / -40...+70 °C / -35...+35 °C	active, 4...20 mA	0...100 %	active, 4...20 mA	DC 13,5...35 V	No
<b>QFA3171D</b>	0...50 °C / -40...+70 °C / -35...+35 °C	active, 4...20 mA	0...100 %	active, 4...20 mA	DC 13,5...35 V	Yes

## Ordering and delivery

When ordering, please give name and type reference, e.g.: Room sensor **QFA3160**  
The outdoor mounting kit **AQF3100**, and the service set **AQF3153** listed under "Accessories" must be ordered as a separate item.

## 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 room or in the outer air, respectively, via its capacitive sensing element whose capacitance varies as a function of the relative humidity of the ambient air.

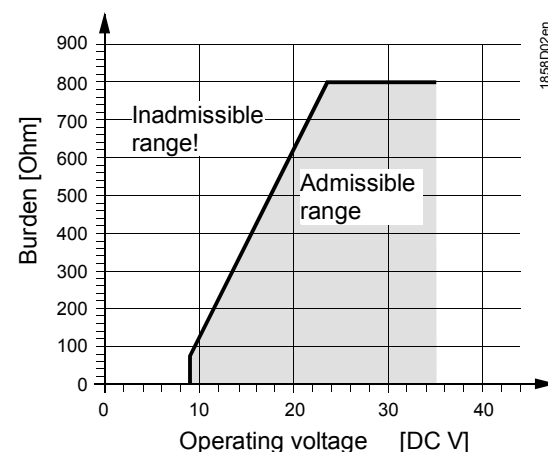
An electronic circuit converts the sensor's signal to a continuous DC 0...10 V or 4...20 mA signal, corresponding to a relative humidity of 0...100 %.

### Temperature

The sensor acquires the temperature in the room or in the outer air, respectively, 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



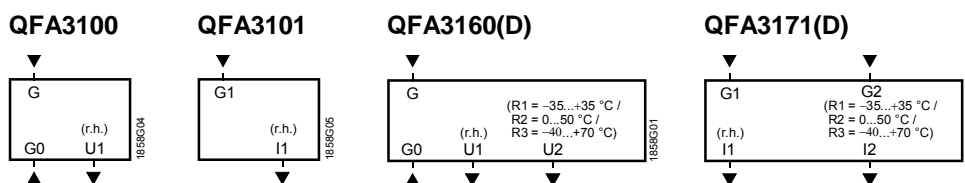
## Technical data

Power supply	Operating voltage	AC 24 V $\pm$ 20 % or DC 13,5...35 V (SELV) or AC/DC 24 V class 2 (US)
	Frequency	50/60 Hz at AC 24 V
Cable lengths for the measuring signal	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	$\leq$ 1 VA
Functional data "Humidity sensor"	Max. perm. cable lengths	refer to Data Sheet of the device handling the signal
	Measuring range	0...100 % r. h.
Functional data "Temperature sensor"	Measuring accuracy at 23 °C and AC/DC 24 V in 0...100 % r.h.	$\pm$ 2 % r. h.
	Temperature dependency	$\leq$ 0.05 % r.h./°C
	Time constant	< 20 s
	Output signal, linear (terminal U1)	DC 0...10 V $\hat{=}$ 0...100 % r.h. max. 1 mA
	Output signal, linear (terminal I1) Burden	4...20 mA $\hat{=}$ 0...100 % r.h. refer to "Function"
	Measuring range	0...50 °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 15...35 °C -35...+70 °C	$\pm$ 0.3 K $\pm$ 0.6 K $\pm$ 0.8 K
	Time constant	8.5 min. (according to airflow and wall coupling)
	Output signal, linear (terminal U2)	DC 0...10 V $\hat{=}$ 0...50/-35...+35/-40...+70 °C max. 1 mA
Output signal, linear (terminal I2) Burden	4...20 mA $\hat{=}$ 0...50/-35...+35/-40...+70 °C refer to "Function"	
Degree of protection	Protection degree of housing	EN 60529
	Base unit	IP65
	Measuring tip	IP40
	Unit with outdoor mounting kit	IP65
Electrical connections	Protection class	III according to EN 60730-1
	Screw terminals	1 $\times$ 2.5 mm <sup>2</sup> or 2 $\times$ 1.5 mm <sup>2</sup>
	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) LCD-display readable	-40...+70 °C -25...+70 °C
	Humidity	0...100 % 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	-40...+70 °C	
Humidity	<95 % r.h.	
Mechanical conditions	class 2M2	

Materials and color	Base	polycarbonate, RAL 7001 (silver-grey)
	Housing cover	polycarbonate, RAL 7035 (light-grey)
	Measuring tip	polycarbonate, RAL 7001 (silver-grey)
	Filter cap	polycarbonate, RAL 7001 (silver-grey)
	Mounting bracket	PA, RAL 7035 (light-grey)
	Sensor (entirely)	silicon-free
	Packaging	corrugated cardboard
Standards and Directives	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)	CE1T1858xx *)
	RCM Konformität	8000078879 *)
	UL	UL 873, <a href="http://ul.com/database">http://ul.com/database</a>
	Environmental compatibility	The product environmental declaration CE1E1858*) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal)
Weight	Incl. packaging	
	Without LCD-display	0.152 kg
	With LCD-display	0.175 kg
	AQF3150	0.050 kg
AQF3153	0.066 kg	

\*) 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 QFA3171(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!

Clean Rooms | Pharma | Hospital | HVAC | BulkDrugs | Chemicals | Heavy Machinery | Hydraulics | Vacuum Industry  
Green House | Server Room | Confined Space | Cold Storage

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