

These sensors are intended for general-purpose application in control and regulation systems type 1-wire for the temperature and humidity measurement in airflows.

The information about measured values is transmitted using the DS2438 circuit on a 1-wire communication bus.

Each sensor has its own unique address, which must be found via the bus using a Master device - e.g. a 1-wire extension from Loxone.

The temperature and humidity sensor is located in a plastic ABS stem, which ends with a dust filter. Inside the plastic head made of gray polycarbonate, there is a terminal block for connecting the device to the bus.

Mounting on the wall - type PH1W111

Air conditioning version - type PH1W12

Basic technical parameters:

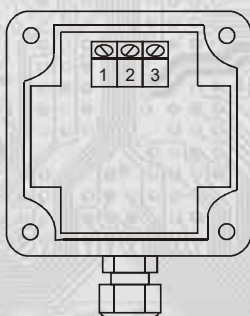
| | |
|--|--|
| Supply voltage ¹ | 5 VDC |
| Current consumption | max. 2 mA |
| Type of used temperature sensor | DS2438 / SHT31-ARP |
| Accuracy of temperature measurement ¹ | DS2438 $\pm 2^{\circ}\text{C}$ / SHT31-ARP $\pm 0,5^{\circ}\text{C}$ |
| Type of used humidity sensor | SHT31-ARP |
| Range of relative humidity measurement | 0 ÷ 100% |
| Humidity resolution | 0,25% |
| Accuracy of RH (+25°C) ¹ | $\pm 3\%$ (20 ÷ 80 %RH) |
| Communication | 1-wire |
| HW Communication interface | DS2438 |
| Galvanic separation input - output - 1wire | no |
| Range of working temperature and humidity ² | -10 ÷ 40°C / 0 ÷ 100 %RH without condensation |
| Range of recommended storage temp. / RH | 10 ÷ 50 °C / 20 ÷ 60 %RH |
| Protection type - head | IP65 |
| Protection type - sensor | IP40, filter 100µm |
| Terminal board | COB (wires max. 1,5 mm ²) |
| Cable gland | PG9 / 8 mm |

1 The accuracy of temperature and RH measurement depends on the stability of the supply voltage U_{cc} (+5V = terminal 1), since the SHT31-ARP sensor is directly powered from it, see: Formulas for calculating the value of measured quantities.

2 The devices are intended for use in residential interiors.

The sensor operates stably within the recommended measuring range, which is 5 ÷ 60 °C and 20 ÷ 80 %RH. Long-term exposure to high humidity, especially >80%RH, results in a gradually increasing deviation of the RH reading (+3%RH after 60 hours >80%RH). After returning to the normal range, the RH measurement slowly returns to the calibrated values. Long-term exposure to extreme conditions can accelerate the aging of the sensor. More detailed information on the conditions of long-term use of the sensor in conditions outside the normal range, especially at rel. humidity >80%RH, is provided directly on the manufacturer's website <http://www.sensirion.com>.

Wiring diagram (fig. 1)



Terminal 1..... + 5V (U_{cc})
Terminal 2..... common terminal (GND)
Terminal 3..... 1-wire

Description of measured quantities:

T (temperature):

There is a temperature sensor included in the DS2438 circuit + SHT31 temperature sensor.

RH (relative humidity):

To measure RH, an SHT31 sensor is used, the output of which is processed by one of the A/D converters of the DS2438 circuit.

Formulas for calculating the value of measured quantities:

1. Calculation from bit values of registers:

rVDD = register value VDD (supply voltage to DS2438) [b]

rVAD = register value VAD [b]

rVsens = register value Vsens [b]

$$T(\text{SHT31}) [^{\circ}\text{C}] = -66,875 + 218,75 * ((0,00390625 * rVsens) / (rVDD * 0,01))$$

$$\text{RH} [\%] = -12,5 + 125 * ((rVAD * 0,01) / (rVDD * 0,01))$$

2. Calculation from voltage values:

VDD = voltage value (supply voltage to DS2438) [V]

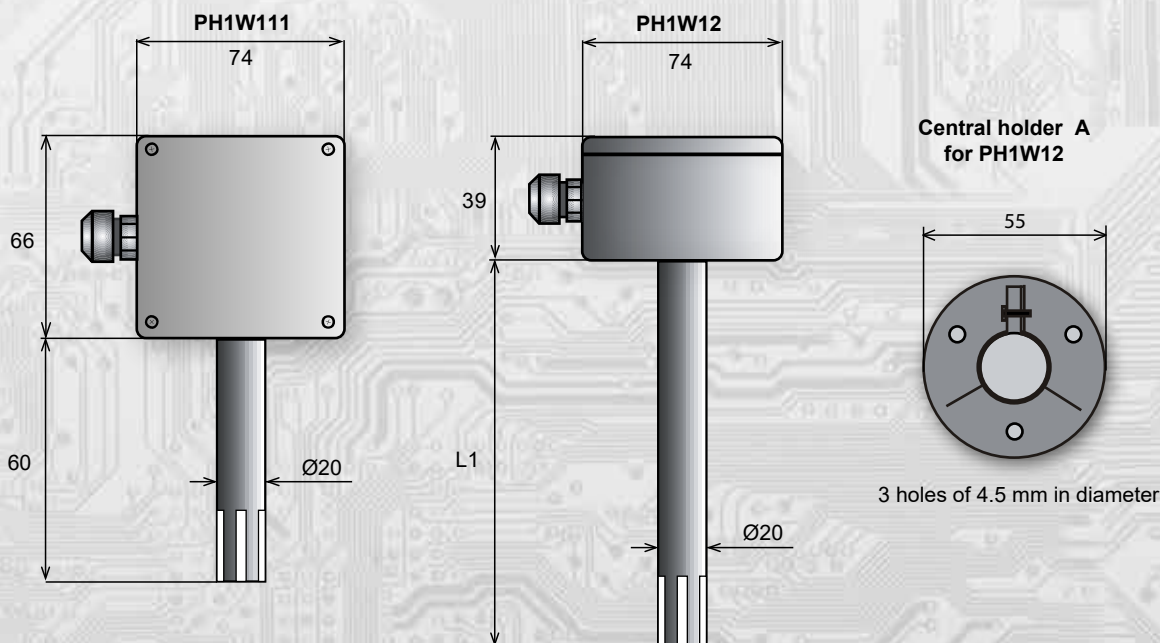
VAD = voltage value [V]

Vsens = voltage value [V]

$$T(\text{SHT31}) [^{\circ}\text{C}] = -66,875 + 218,75 * (16 * Vsens / VDD)$$

$$\text{RH} [\%] = -12,5 + 125 * (VAD / VDD)$$

Dimensions and accessories



Standard length L1

| Type | L1[mm] |
|------------|--------|
| PH1W12-180 | 180 |
| PH1W12-240 | 240 |