

RVT80, RVT81

Relative humidity and air temperature sensors



- The mechanical dimensions of the sensor are adapted to the RK5 radiation cover
- Typ. measurement accuracy $\pm 1.5\%$ RH in the range of 0 to 80% RH
- Increased temperature measurement accuracy with RVT81 sensor (type $\pm 0.1^\circ\text{C}$)
- Reading of measured values via RS485 at a distance of up to 500 m
- FINET or Modbus RTU communication protocols
- Compatible with all FIEDLER telemetry stations

Basic description

Sensors RVT80, RVT81 are designed for measuring relative humidity and air temperature. Both sensors use a combined compact SHT85 sensor made in Switzerland, which, in addition to the value of relative humidity, also measures the air temperature. In addition, the RVT81 sensor contains a Pt100 temperature sensor, including measuring electronics, to increase the accuracy of temperature measurement.

The RK5 or RK7 radiation cover can also be part of the sensor delivery, which prevents the measured temperature from being affected by radiant heat and at the same time protects the sensor from direct exposure to rain and sunlight.

Converter connection via RS485

The measured value of relative humidity and air temperature is transmitted to the connected recording unit via the RS485 serial bus under the FINET protocol (Modbus RTU). The converters are also powered from the connected unit via the same communication cable.

The communication address, baud rates and some other parameters of the converter are user-adjustable, which allows you to connect more sensors to existing and newly built RS485 networks.

Examples of use

Relative humidity and air temperature sensors RVT80 and RVT81 have a wide application:

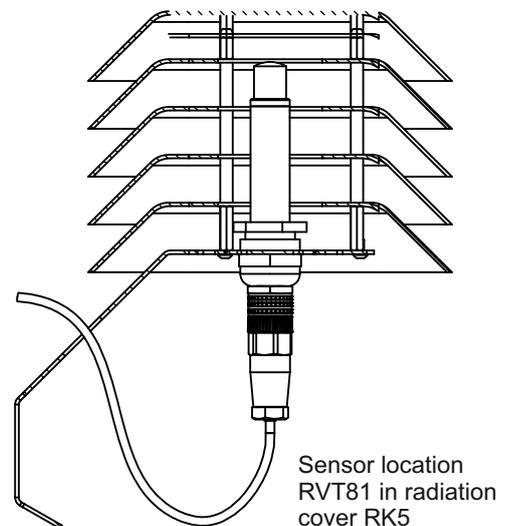
- Meteorological stations, monitoring of biosystems
- Process monitoring in laboratories
- Warehouse monitoring
- Climatic chambers and drying plants
- Universities, development and research
- Intelligent building management
- Museums, depositories and monuments

Mechanical design

The body of the RVT80 and RVT81 sensors consists of a plastic housing with a diameter of 16 mm and a length of 72 mm, in which all measuring, evaluation and communication electronics of the sensor are located. The sensor is equipped on one side with a circular connector of the M12 standard with a power and communication pair of pins. The other side of the sensor body carries a combined relative humidity sensor SHT85 and possibly a Pt100-A temperature resistor (RVT81 only).

The sensors are covered with a simple breathable plastic cover with very low temperature inertia, which prevents mechanical damage to the sensors and at the same time does not affect the accuracy of measurement.

Usually, the sensors are placed in the radiation cover RK5 or RK7, which can be ordered together with the probe from the sensor supplier. A universal stainless steel holder is also part of the delivery of the radiation cover.



Measuring channels and connections

The RVT80 sensor contains two, the RVT81 sensor three, measuring channels. The first channel is always occupied by the measured value of relative humidity and the second measuring channel is occupied by the air temperature obtained from the compact sensor SHT85.

The third measuring channel (only for RVT81 sensor) contains the air temperature value measured by the Pt100-A temperature sensor.

The sensors are connected to the RS485 bus via a standard industrial 4-pin M12 connector, which is not included in the delivery of the sensor. On request, PUR or PVC cable of the required length (2 m, 5 m or 10 m) with M12 connector can be supplied.

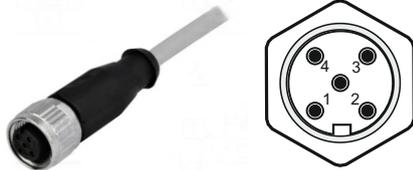
Both RVT80 and RVT81 sensors are connected to the recording unit via the RS485 bus under the Modbus RTU or FINET protocol.

Air temperature measurement

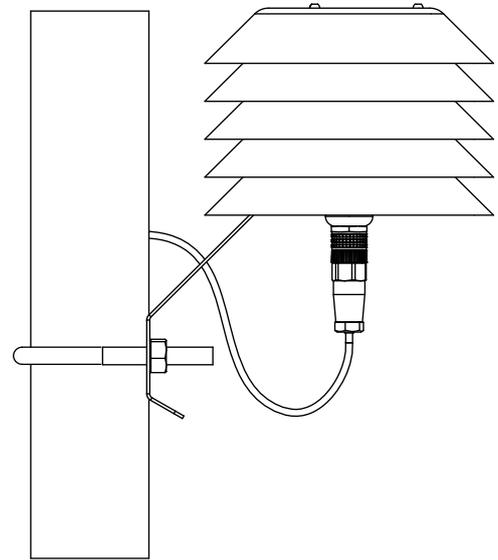
The RVT80 sensor uses a combined semiconductor SHT85 sensor for air temperature measurement, for which the manufacturer declares a measurement accuracy of $\pm 0.3\text{ }^{\circ}\text{C}$ for $25\text{ }^{\circ}\text{C}$ with an additional possible error of $\pm 0.1\text{ }^{\circ}\text{C}$ every $10\text{ }^{\circ}\text{C}$ from the declared reference value of $25\text{ }^{\circ}\text{C}$. For a large group of applications, this accuracy of air temperature measurement is sufficient.

The RVT81 sensor is supplemented by a Pt100 temperature sensor of accuracy class A. The evaluation electronics of the sensor work with a typical error not exceeding $\pm 0.1\text{ }^{\circ}\text{C}$ in the range from $-30\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$. In the entire operating range from $-40\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$, the typical temperature measurement error is less than $\pm 0.3\text{ }^{\circ}\text{C}$. High accuracy and stability of measurement allows the use of high resolution of the measured temperature, which can be set by the user in the connected recording unit. The converter works with minimal noise without fluctuations and with a resolution of $0.01\text{ }^{\circ}\text{C}$.

Connecting connector / cable



Connector	1	2	3	4	5
Signal	+Unap	GND	485-A	485-B	SV
Cable PUR - black	brown	green	yellow	white	gray
Cable PVC - gray	brown	white	blue	black	gr/yel



Technical parameters:

	RVT80	RVT81
Sensor:	SHT85	SHT85 + Pt100 class A
Number of measuring channels:	2	3
Humidity measuring range:	0...100% RH	
Temperature measuring range:	-40 60 °C	
RV measurement accuracy:	$\pm 1.8\%$ RH (0..80% RH), $\pm 3\%$ RH (100% RH)	
Air temperature measurement accuracy:	$\pm 0.3 + 0.01 * (t-25)\text{ }^{\circ}\text{C}$	$\pm 0.25 + 0.002 * t\text{ }^{\circ}\text{C}$
Measurement reproducibility:	$\pm 0.1\%$ RH / $\pm 0.1\text{ }^{\circ}\text{C}$	
Long-term temperature stability:	better than 0.4% RH; 0.04 °C / year	
Response time:	<20 sec	
Working temperature:	-40... 60 °C, 0...100% RH	
Sensor dimensions:	diameter 16 mm, length 72 mm	
Output signal:	RS485 (FINET, Modbus RTU)	
Measurement time of one channel:	<0.5 sec	
Cable connection:	M12/4 connector, 5m cable	
Sensor supply:	6 ... 14 VDC / 8 mA	