

ATM10, ATM11

Atmospheric pressure and air temperature sensors



- *Wide working range 300..1100 mbar*
- *Resolution 0.025 mbar (height 20 cm)*
- *Max. measurement error $<\pm 1.5$ mbar*
- *Long-term stability type ± 1 mbar*
- *High temperature measurement accuracy ± 0.25 °C*
- *Temperature resolution up to 0.002 °C*
- *Mechanical dimensions adapted to the RK5 radiation cover*
- *Reading of measured temperatures via RS485 at a distance of up to 500 m*
- *FINET communication protocols (Modbus RTU)*
- *Compatible with all FIEDLER telemetry stations*

Basic description

The ATM10 and ATM11 sensors convert atmospheric air pressure and air temperature into a digital signal transmitted to the connected system via the RS485 bus. In addition, the ATM11 sensor contains a precise Pt100-A temperature sensor.

Both sensors contain a temperature-compensated sensor that allows the measurement of atmospheric air pressure in the range of 300 to 1100 mbar with a resolution of 0.01 mbar. The use of a precise sensor with very low temperature drift, excellent linearity and long-term stability, together with microprocessor control of the measuring cycle, ensures the sensing of atmospheric pressure with a very small error (typically <0.5 mbar).

Connection of sensors via RS485 bus

Both ATM10 and ATM11 sensors communicate with the connected recording unit via the RS485 bus under the FINET protocol (Modbus RTU). The communication interface is fully compatible with all telemetry stations of FIEDLER AMS s.r.o. (hydro loggers H1, H3, H7, H40,..).

Communication address, baud rates and some other parameters of ATM10, 11 converters are user-adjustable, which allows to connect several different devices and sensors to existing and newly built RS485 networks.

Examples of use

- Pressure and temperature sensor for weather stations
- Measurement of air pressure in industrial plants
- Pressure measurement in research projects
- Highly sensitive altimeter (resolution 20 cm)

Mechanical design

All electronic circuits of the sensor, including the strain gauge pressure sensor itself, are housed in a cylindrical plastic housing with a diameter of only 16 mm and a length of 80 mm. The lower end of the housing is equipped with an industrial 4-pin M12 connector, through which the sensor converter is powered and through which it transmits the measured data to the connected device.

The mechanical design of the sensor allows its placement in the radiation cover RK5 or in the cable gland of the telemetry station. The RK5 radiation shield is especially suitable for the ATM11 sensor, which is supplemented by accurate air temperature measurement using a platinum Pt100 sensor of the accuracy class A.



Location of the ATM11 sensor in radiation cover RK5

Air pressure measurement

Both the ATM10 and ATM11 sensors use a high-precision sensor from MEAS Switzerland for measuring atmospheric air pressure, which is characterized by very low temperature drift, excellent linearity and excellent long-term stability. The analog signal of the strain gauge bridge inside the sensor is measured by an integrated 24-bit AD converter, which is supplemented by internal calibration coefficients during production. The result is excellent sensitivity and accuracy of measurement, at which a resolution of up to 0.025 mbar can be obtained (this corresponds to a pressure difference of only 20 cm).

The software of the ATM10 and ATM11 sensors performs measurements and subsequent calculations for up to 6 internal measuring channels, which can be transmitted to the connected unit:

Channel K1: Air pressure, range 300 to 1100 mbar, resolution 0.1 mbar

Channel K2: Air temperature measured by a precision Pt100 sensor, accuracy class A (only for ATM11, range -30 to +50 °C, resolution 0.01 °C)

Channel K3: Air temperature measured by ATM sensor (range -30 to +50 °C, resolution 0.1 °C)

Channel K4: Reserve

Channel K5: Air pressure reduced by 500.00 mbar, range 500 to 1150 mbar, resolution 0.025 mbar (the shift was caused by the requirement to archive the high resolution of the sensor and the limited archiving capacity of the connected recording unit, which is max 16 bits per value, ie max. range 0 to 650.00 mbar)

Channel K6: Air pressure converted to altitude, range 300 to 1100 mbar, resolution 0.1 mbar (channel setting requires entering the altitude of the final location in the parameters of the sensor during its production or during its installation in the field)

Technical parameters

Number of measuring channels: 5 + 1 spare

Air pressure measuring range: 300 to 1100 mbar, permissible overload: 10 to 2000 mbar

Pressure measurement error: ± 1.5 mbar (for 25 °C, 750..1100 mbar), ± 2.5 mbar (for -20..70 °C, 300..1100 mbar)

Long-term stability: type ± 1 mbar / year

Temperature sensor type (ATM11 only): Pt100 accuracy class A, four-wire connection

Measuring temperature range: -40 °C to +70 °C

Measured temperature resolution: 0.002 °C

Temperature measurement error

ATM11: type $0.15 + 0.001 * t$ [°C], max $0.25 + 0.002 * t$ [°C]

ATM10: <math>< 0.8</math> °C for 25 °C, max 2.0 °C in the range -20 .. + 70 °C

Measurement time of one channel: <math>< 0.1</math> sec

Output: RS485, connecting cable length up to 500 m

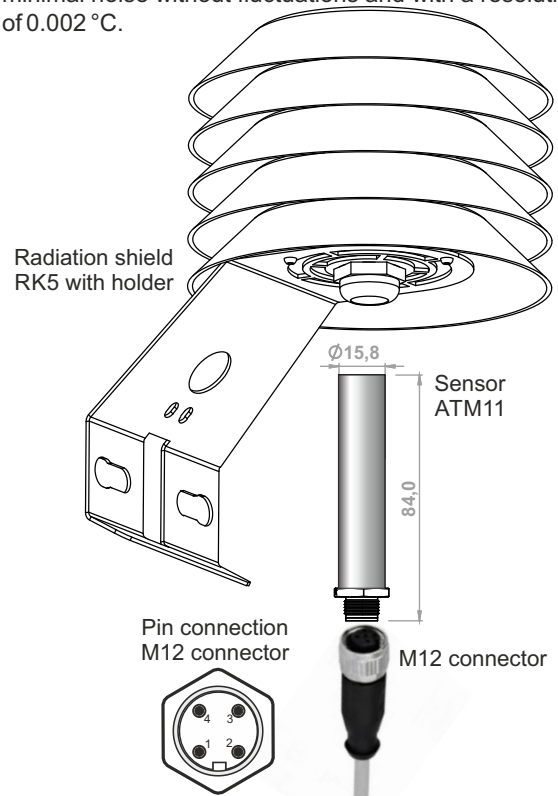
Communication protocols: FINET (Modbus RTU), range of adjustable addresses: 1 to 240

Supply voltage: Un: 6 to 16 V DC, current consumption: <math>< 5</math> mA

Mechanical dimensions: diameter 15.8 mm, length 84 mm

Air temperature measurement

The RVT11 sensor measures the air temperature with a typical error not exceeding 0.25 °C in the range from -30 °C to +50 °C. In the entire operating range from -50 °C to + 70 °C, the typical temperature measurement error is less than 0.4 °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 0.002 °C.



Connector	1	2	3	4
Signál	+Unap	GND	485-A	485-B
Kabel	PUR - black	brown	green	yellow
	PVC - gray	brown	white	blue