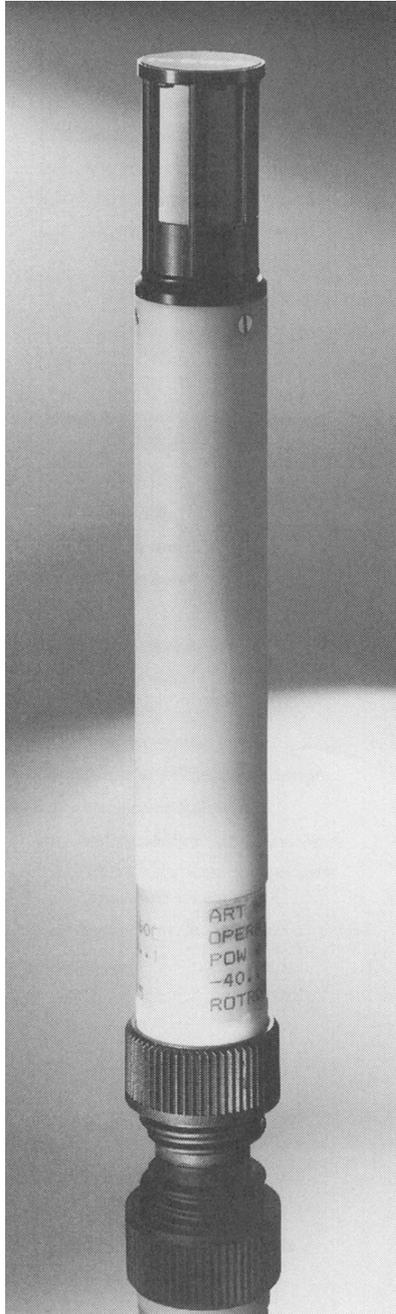


HYGROMER[®] - MP 400 A

Meteorology probe



Operating Instructions

rotronic

1. Introduction

With the HYGROMER[®] meteorology probe **MP 400A** for measuring humidity and temperature, you have purchased a precision measuring instrument which incorporates more than 25 years experience of the company ROTRONIC AG in this special field.

Special resistance to air pollutants is achieved by the HYGROMER[®] sensor IN-1 which, in combination with the sophisticated electronics, guarantees outstanding measuring accuracy. When the following instructions are observed, many years of perfect operation and long-term stability of the probe and thus reliable measurement are assured.

The HYGROMER[®] meteorology probe is a combined humidity and temperature probe for use in meteorology and similar demanding applications, for example in tunnels, on motorways, airports etc.

Except for the sensor element, the HYGROMER[®] meteorology probe is protected against unintentional penetration of humidity. Its linear voltage output has been matched to the requirements of data collection and transmission systems.

We accept no liability for damage and disturbances which result from non-observation of these operating instructions.

You can obtain further copies of these operating instructions either from ROTRONIC AG or one of our representatives.

2. Start-up

The HYGROMER[®] meteorology probes can be connected to external power supplies and signal processing circuits with the 4-pin Tuchel connector installed as standard.

(Connection diagram see chapter 8).

The probe must be protected against water splashes and rain. A weather and radiation protector is available from ROTRONIC AG as an accessory. Additional sensor protection is necessary for air velocities greater than approx. 20 m/s, otherwise the sensors can be damaged.

Important!

Incorrect voltage supplies and overloading of the outputs can destroy the probe!

3. Performance of measurements

The HYGROMER[®] meteorology probes (relative humidity and temperature) are factory adjusted before delivery, for which reason checking upon reception of the instrument is not necessary as a rule.

The probe is ready for use half a second after being switched on.

Important!

Before a reliable measurement can be made, the measuring probe and medium to be measured must be in temperature and humidity equilibrium.

Example: At 50 %RH and 23 °C, a temperature difference of 1 K (between sensor and the medium to be measured) causes a humidity error of about 3 %RH!

The necessary adjustment time, which can last up to 30 minutes, depends upon several factors:

- Size of the humidity and temperature deviation of probe and medium before start of measurement
- Change of the measured values during the adjustment time.

The humidity measurement delivers a better picture of the progress of acclimatization since it reacts much more quickly and more sensitively than the temperature measurement. The 1/10 percent display is therefore very suitable as a trend display. If the display oscillates about a mean value, then adjustment is completed.

Due to the HYGROMER[®] IN-1 sensor, specially developed for the HYGROMER[®] meteorology probe, insensitivity to chemical influences far beyond the MAK value range is largely guaranteed (MAK = Maximum workplace exposure)

4. Sources of errors

Humidity measurements are very sensitive to various influences:

- Temperature errors

Due to too short adjustment time, sunshine during the measurement, heating, cold outer wall, air draft (e.g. fans), radiating hand and/or body heat etc.

- Humidity errors due to steam, water splashes, dripping water or condensation on the sensor etc.

Repeatability and long-term stability in operation are not impaired by this even if the probe has been exposed to high humidity or saturation with water vapour over a lengthy period.

- Contamination

of the humidity sensor can be largely avoided by using a corresponding filter. The filters must be cleaned or replaced periodically depending upon the degree of contamination of the measuring site.

Important!

The sensor is insensitive to chemicals, when they occur in normal concentrations (MAK values). At higher concentrations or possibilities of contact with liquid chemicals, the manufacturer must always be consulted!

5. Warranty

For verifiable material and manufacturing errors, the factory warranty is 12 months from the date of delivery. Please refer to the "General conditions of sales and delivery" for details.

We accept no liability if this instrument is used in applications for which it is not intended.

6. Maintenance and service

6.1 Temperature

The probes are adjusted before delivery. A temperature readjustment is normally not required. When in doubt about the correct calibration, please ask ROTRONIC AG.

6.2 Humidity

The probes are adjusted before delivery at 35 %, 80 % and 10 %RH. This results in optimum accuracy over the full measuring range. To maintain this accuracy, we recommend you to subject the probe to a check at least once a year. Please use only the ROTRONIC AG humidity standards for this!

These humidity standards consist of unsaturated salt solutions which can be kept indefinitely.

Important!

The ROTRONIC AG humidity standards (CH poisonous category 3) are normally not dangerous to humans, but can irritate sensitive skin. In the case of contact with the skin or the eyes, the solution must be washed out immediately and thoroughly with plenty of water. The ROTRONIC AG humidity standards must not be consumed!

The calibration device for calibration and adjustment suitable for your type of probe and the required humidity standards are obtainable as an accessory from ROTRONIC AG or one of our representatives.

Definitions:

Calibration = Control measurement with a ROTRONIC AG humidity standard

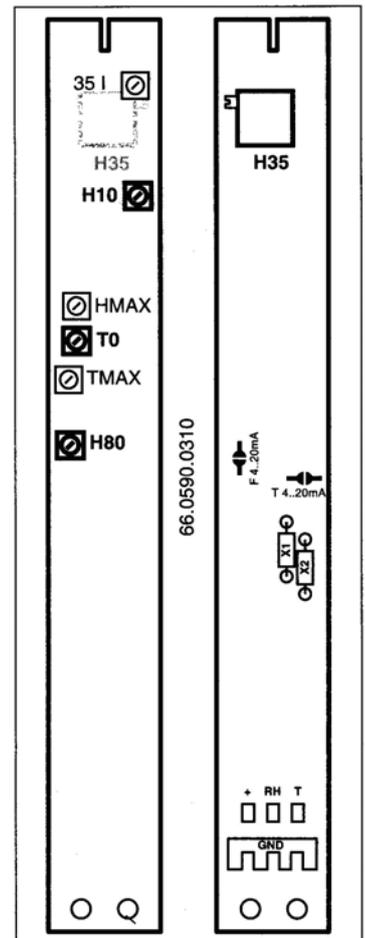
Adjustment = Calibration + additional readjustment of the probe to the set point value.

It is necessary to observe the following rules during calibration:

- Calibrate in a room with constant temperature (if possible $23\text{ °C} \pm 2\text{ °C}$) and avoid any thermal influence which could influence the measurement: (air) draft, sunshine, heating, fans etc.!
- Place the probe and especially its calibration device on an insulating surface (e.g. the lid of the calibration set) so that there can be optimum temperature adjustment.
- Start with the calibration point of 35 %RH (potentiometer H35) and then adjust the points of 80 %RH (potentiometer H80) and 10% RH (potentiometer Hmin) with a second and third calibration.

Calibration steps:

1. Unscrew the lower part (cup) of the calibration device.
2. Unscrew the probe's sensor protector and screw the calibration device onto the probe. Proceed carefully so as not to damage the sensors!
3. Remove the 3 small screws on the probe housing and take out the print.
4. Insert a textile pad in the cup.
5. Shake the ampoule until the entire fluid is in the thick part of the ampoule.
6. Break off the neck of the ampoule at the fracture point (white line) and empty the entire contents into the centre of the textile pad (you may have to knock it a little).
7. Screw the cup immediately into the calibration device from below.
8. Place the calibration device on the insulating surface and leave it for at least 1 hour.
9. Check the display; if necessary readjust on the associated potentiometer with a small screwdriver (see diagram).
10. Remove cup from the calibration device.
11. Remove the textile pad and dispose of with the household rubbish. (The textile pads are designed for single use only and must not be reused under any circumstances.)
12. Wash the cup out thoroughly under running water and dry it carefully.
13. According to which calibration method you have chosen, repeat the process from item 4 to 12 with the corresponding humidity standards.
14. Push the print back into the housing and screw tight.
15. Remove the calibration device carefully and reattach the sensor protector.



Component side

Soldering side

6.3 Contamination

Contaminated filters can cause measuring errors and prolong the adjustment time. Depending upon the degree of contamination of the filter, it must be cleaned or if necessary replaced periodically. In order not to damage the sensors, unscrew the filter for cleaning. Clean the filter with soapy water, alcohol or a cleaning agent suitable for removing contamination and rinse thoroughly with water. Do not screw the filter back onto the probe until it is completely dry. Replace filters which can no longer be cleaned with new ones. Should the sensors be severely contaminated despite of the protective filter, we recommend having these replaced by our service department.

7. Accessories and spare parts

Please be sure to use only ROTRONIC original accessories and spare parts from our current sales catalogue "HUMIDITY AND TEMPERATURE MEASUREMENT".

8. Technical data MP 400A series

Humidity sensor	ROTRONIC-HYGROMER® IN-1
Temperature sensor	RTD Pt 100 1/3 DIN
Operating ranges:	Humidity 0...100 %RH Temperature -40...+60 °C
Accuracy at 23 °C: Humidity: Temperature:	±1 %RH (5...95 %RH) ± 2% RH < 5 %, > 95 % RH) ±0.3 °C
Reproducibility: Humidity Temperature	< 0.5% RH < 0.1 °C
Long term stability for humidity typical under normal conditions	< 1 % RH/year
Time constants at 23 °C and 1 m/s air movement:	Humidity < 10 s Temperature < 15 s
Adjustment points (potentiometers) Humidity 100% limit Temperature	35%,80%, 10% Hmax Tmin, Tmax
Output signals humidity : -MP404A, MP405A, MP406A -MP407A, MP408A, MP409A	0...20 mA = 0...100 %RH 4...20 mA = 0...100 %RH
Output signals temperature: MP404A MP405A MP406A MP407A MP408A MP409A	0...20 mA = 0...100 °C 0...20 mA = -40...60 °C 0...20 mA = -30...70 °C 4...20 mA = 0...100 °C 4...20 mA = -40...60 °C 4...20 mA = -30...70 °C
Load per output	<500 Ω
Supply voltage: Example: Load 100 Ω:	MP402A & MP403A Other types 8 +(0.02*load) VDC; max 26.5 VDC Min. 5 +(0.02*load) VDC; max. 26.5 VDC 5+(0.02*100) VCC = 7 VDC
Max. current consumption	50 mA
Probe connection	(Standard) 7-pin Tuchel plug
Sensor protection:	Wire mesh filter
Weight	70 g

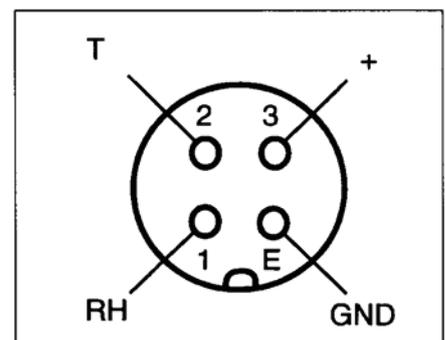
8.1 Connector wiring

Connection designations	
+	Supply voltage + VDC
GND	Common ground (-),- VDC
RH	Humidity (+)
T	Temperature (+)
0	Cable compensation

View of the connection side of the opposite connector

Version with 4-pin Tuchel connector

Example: MP404A-T4-W4W



8.2 Connection cables without connectors

Code CP PVC cable
 Code CG PUR cable grey
 Example: MP404A-CG-02...

		Colour of wire
Supply voltage	+ VDC	green
Relative humidity	% RH (+)	white
Temperature	T (+)	brown
Compensation	0	yellow
Common ground	(-), -VDC /GND	shield

8.3 Explanation of the article numbers (order no)

Example 1

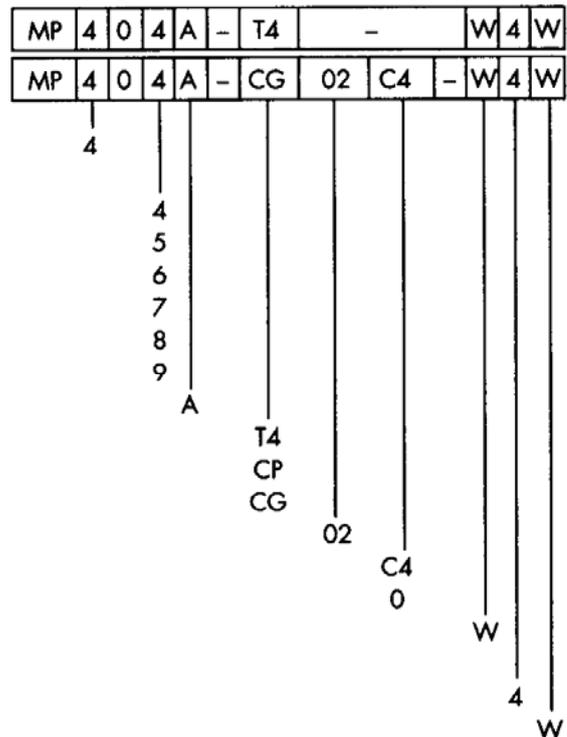
Example 2

Output signals: Current

Output signals:

- 0...20 mA = 0...100% RH/0...100 °C
- 0...20 mA = 0...100% RH/-40...+60 °C
- 0...20 mA = 0...100% RH/-30...+70 °C
- 4...20 mA = 0...100% RH/0...100 °C
- 4...20 mA = 0...100% RH/-40...+60 °C
- 4...20 mA = 0...100% RH/-30...+70 °C

Type: A
 Integrated connector: Tuchel 4-pin
 Connecting cable: PVC cable
 PUR cable grey
 Cable length: 2 m (for example)
 Cable connector: Cannon 4-pin
 without connector
 Sensor protection: Wire filter
 Temperature operating range: -40...+60 °C
 Humidity sensor: HYGROMER IN-1



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