

Meteorology

In meteorology, the accuracy of the measurements is essential for accurate forecasting and decision-making. ROTRONIC humidity probes have an excellent reputation for providing reliable results even in the most demanding conditions where high humidity and low temperatures pervade. Our current product range offers high performance, a wide range of configurations and price levels compatible with any application's demands.

Especially with respect to humidity measurement, it is essential to carefully consider correct temperature. Relative humidity is very temperature dependent. In recognition of this fact, ROTRONIC has developed a range of enhancements to improve temperature effects and measurement accuracy. These include ventilated weather and radiation protection shields that provide very good shelter from rain, snow and radiation, and most importantly, improve the performance of temperature measurement.

Why is correct temperature essential?

In the past, temperature and humidity probes have been built into weather stations, or screens (Stevenson) usually made of wood and painted white. Despite of the white colour, the screens tended to heat up by suns radiation, and the deviation from actual temperature could be quite high. Such a deviation obviously must lead to incorrect measurement of the humidity, because relative humidity is so dependent of temperature.

Example:

Assuming an absolute humidity Q of 5 g/kg, the relative humidity at 20 °C is 34.74 %rh; at 21 °C 32.66 %rh and at 19 °C 36.97 %rh. Hence, it becomes obvious that a wrong temperature must lead to a wrong humidity value.

ROTRONIC ventilated weather stations minimise thermal effects and provide for better temperature accuracy, as the probe is not heating up in the sun. The airflow constantly cools the shield, whilst air temperature is measured at the air inlet.

Key features

- High accuracy and stability
- Probe exchange without tools
- Digital probes
- Ventilated shields
- Compact mounting system for various probes
- Easy mounting

Your benefits

- Reliable measurement data and low maintenance costs
- Saves installation and on-site costs
- No on-site calibration required
- Optimum temperature performance
- One shield for all probe types
- Saves installation and on-site costs



Section contents

Page

Ventilated Weather Protection Shields VHTS2 70

Non-Ventilated Weather Protection Shields

Probe adaptors for VHTS2

Analogue Meteorological Probes 71 to 75

Digital HygroClip Probes

MOK Adaptors for HygroClip S

Meteorology Applications

ROTRONIC Weather Station for Temperature and relative Humidity



Snowguns



Agronomical applications



Alpine observation applications



Ice warning systems



Weatherstations



BMS/HVAC applications

Weather and Radiation Protection



Ventilated weather/radiation protection

Designed to minimise the influence of thermal radiation on humidity and temperature measurements. Provides optimum protection even in horizontally driving wind and rain.

Key features

- Easy-to-install protection shield with built-in ventilator to prevent heating-up of probe and shield
- Special white paint against radiation
- Probe mounting without tools
- Various adaptors for different probes
- 12 V or 24 V fan supply

Order code:	Suitable for	Fan supply
VHTS2-W-T7/12	MP100 / MP400 probes	12 VDC
VHTS2-W-T7/24		24 VDC
VHTS2-W-C/12	MPH probes	12 VDC
VHTS2-W-C/24		24 VDC
VHTS2-W-M/12	HygroClip with MOK adaptors	12 VDC
VHTS2-W-M/24		24 VDC
VHTS2-W-I/12	HygroClip industrial probe IC3	12 VDC
VHTS2-W-I/24		24 VDC

Adaptors for retrofitting older shields with a thread in the lower end of the tube are available.

Order code:	Used for probe type:
VHTS-X-MP1	MP100-series
VHTS-X-MP4	MP400-series
VHTS-X-MPH	MP100H /MP400H series
VHTS-X-MOK	HygroClip probes with MOK adaptors
VHTS-X-IC3	HygroClip IC3 probes
VHTS-X-SCREW	Screw for all types; must always be ordered separately
VHTS2-SP	Option Snow protection



Weather and radiation protection shield with natural ventilation

The naturally ventilated shield is recommended for applications where the accuracy is less important than in meteorology applications. Fairly good protection against radiation and precipitation with natural ventilation.

Suitable for humidity and temperature probes series MP100A, MP400A, MP100H, MP400H

Protects even against horizontally driving wind and rain up to 68 km/h Including probe protection tube

Order code:	Suitable for:
AC1002/AC1012	MP100A series
AC1003/AC1012	MP400A, MP100H, MP400H
AC1002/AC1012/AC1015	HygroClip S
AC1004	For HygroClip S3C03 probes, HygroClip S+MOK

MP100A with linear voltage output MP400A with linear current output

Key features:

- Accuracy and long term stability
- Resistant to condensation and air-borne pollutants
- Temperature operating range: -40...60 °C
- Temperature measurement by direct Pt100 resistance or linear analogue output
- Cable length compensation circuit; no signal errors for cables up to 100 m
- Universal power supply 4.8...30 VDC



Order codes of standard types:

Humidity Range: 0...100 %rh = 0...1 V / 4...20 mA

Order code	Temperature range	Tuchel plug	Cable compensation (see page 75)
MP101A-T4-W4W	-0.4...0.6 V = -40...60 °C	Tuchel 4 pin	Yes
MP101A-T7-W4W		Tuchel 7 pin	
MP102A-T4-W4W	0...1 VDC = -30...70 °C	Tuchel 4 pin	Yes
MP102A-T7-W4W		Tuchel 7 pin	
MP103A-T4-W4W	0...1 VDC = -40...60 °C	Tuchel 4 pin	Yes
MP103A-T7-W4W		Tuchel 7 pin	
MP106A-T7-W4W	Direct Pt100	Tuchel 7 pin	
MP408A-T4-W4W	4...20 mA = -40...60 °C	Tuchel 4 pin	N/A
MP408A-CGXX-W4W	4...20 mA = -40...60 °C	N/A	Cable type XX = cable length in m

Order codes of non-standard types MP100 & MP400

Specification	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Example:	M	P	1	0	1	A	-	T7				-	W	4	W
Output signals: Voltage	M	P	1	0											
Specification:															
Humidity: 0...1 VDC = 0...100 %rh															
Temperature: -0.4...0.6 V=-40...60 °C					1										
0...1 VDC=-30...70 °C					2										
0...1 VDC=-40...60 °C					3										
Auxiliary Pt100 for 4/4 wire connection					6										
Output signals: Current	M	P	4	0			-								
0...20 mA = 0...100 %rh /Pt100, 4 wire					0										
4...20 mA = 0...100 %rh /Pt100, 4 wire					1										
4...20 mA = 0...100 %rh /2 wire, % rh only					2										
4...20 mA= 0...100 %rh/2 wire,/Pt100 4 wire					3										
0...20 mA = 0...100 %rh 0...100 °C					4										
0...20 mA = 0...100 %rh -40...60 °C					5										
0...20 mA = 0...100 %rh -30...70 °C					6										
4...20 mA = 0...100 %rh 0...100 °C					7										
4...20 mA = 0...100 %rh -40...60 °C					8										
4...20 mA = 0...100 %rh -30...70 °C					9										
Common terms for MP100 & MP400															
Version:						A									
Integrated plug: Tuchel 4 pin connector								T4							
Tuchel 7 pin connector								T7							
Connection cable: PUR cable, grey								CG							
Cable length: 2m (for example)									02						
Cable plug: Cannon 4 pin connector										C4					
Without plug, stripped wires											00				

Sensor protection: Wire filter
Operating range: -40...60 °C
Humidity sensor: IN-1

MP100H / MP400H



MP100H/MP400H with interchangeable HygroClip probe

Key features:

- Humidity and temperature measurement using interchangeable HygroClip sensor module (see chapter on HygroClip products)
- Temperature measurement option: accurate measurement by additional direct Pt100 sensor
- Temperature operating range: -40...60 °C
- Current or voltage output signal

Order codes standard types:

Humidity Range: 0...100 %rh = 0...1 V / 0(4)...20 mA, 3 m cable length

Order code	Temperature range	Remarks
MP100H-010300	-0.4...0.6 V = 40...60 °C	
MP100H-030300	0...1 V = -40...60 °C	
MP100H-130300	0...1 V = -40...60 °C	Auxiliary Pt100, active signal
MP400H-050300	0...20 mA = -40...60 °C	
MP400H-080300	4...20 mA = -40...60 °C	
MP400H-180300	4...20 mA = -40...60 °C	Auxiliary Pt100, active signal

Order codes for non-standard probe MP100H & MP400H

Specification	Column No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Basic model voltage output		MP100H-												
Basic model current output		MP400H-												
Without auxiliary Pt100		0												
With auxiliary Pt100, active signal		1												
With auxiliary Pt100, passive signal 2 wire		2												
With auxiliary Pt100, passive signal 3 wire		3												
With auxiliary Pt100, passive signal 4 wire		4												
Output signal for MP100H														
0...1 V = 0...100 %rh, -40...60 °C = -0.4...0.6 V				1										
0...1 V = 0...100 %rh, -30...70 °C				2										
0...1 V = 0...100 %rh, -40...60 °C				3										
Output signal for MP400H														
0...20 mA = 0...100 %rh, 0...100 °C (max. 60 °C)				4										
0...20 mA = 0...100 %rh, -40...60 °C				5										
0...20 mA = 0...100 %rh, -30...70 °C				6										
4...20 mA = 0...100 %rh, 0...100 °C (max. 60 °C)				7										
4...20 mA = 0...100 %rh, -40...60 °C				8										
4...20 mA = 0...100 %rh, -30...70 °C				9										
PUR connection cable (3m standard)					0	3								
Maximum 99m					9	9								
7 pin Tuchel plug (not for 3/4 wire auxiliary Pt100)					T	7								
Stripped wires							0	0						
Auxiliary temperature sensor Pt100 1/3 DIN									-	0	3	D	I	N
Pt100 1/5 DIN										0	5	D	I	N
Pt100 1/10 DIN										1	0	D	I	N

HygroClip S3C03 for agricultural applications

Typical applications include weather stations and data acquisition systems. Available with 3 m cable, stripped wires

- Precise and stable measurement of temperature and humidity
- Economical price
- Configured for outdoor measurements
- Compact dimensions
- Weather protection shield available
- Technical data equal to HygroClip S3, except cable

Measurement range:

HygroClip S3: -40...60 °C, 0...100 %rh = 0...1 V

Accuracy: ±1.5 %rh, ±0.3 K (at 23 °C)

Order code:

HygroClip S3C03



HygroClip S3

Standard sensor module for humidity and temperature. A wire mesh filter provides sensor protection against dust and high air velocity.

Dimensions: Ø 15 x 100 mm

IP rating: IP65

HygroClip S3 is designed for meteo applications.

Measurement range:

HygroClip S3: -40...60 °C, 0...100 %rh = 0...1 V

Accuracy: ±1.5 %rh, ±0.3 K (at 23 °C)

Order code:

HygroClip S3



MOK Adaptors for Meteo Applications with HygroClip Probes

The MOK adaptors provide a simple and low cost means of connecting a HygroClip probe to a 5 V signal processing device. They are used in conjunction with the weather protection shields.

Output signal: 0...5 V = 0...100 %rh/-40...60 °C

Cable length: 5 m

Supply: min. 5.5 V, max. 26.5 V

Order code:

MOK3-05-XX-005V-3

Other types available on request. (See page 65)

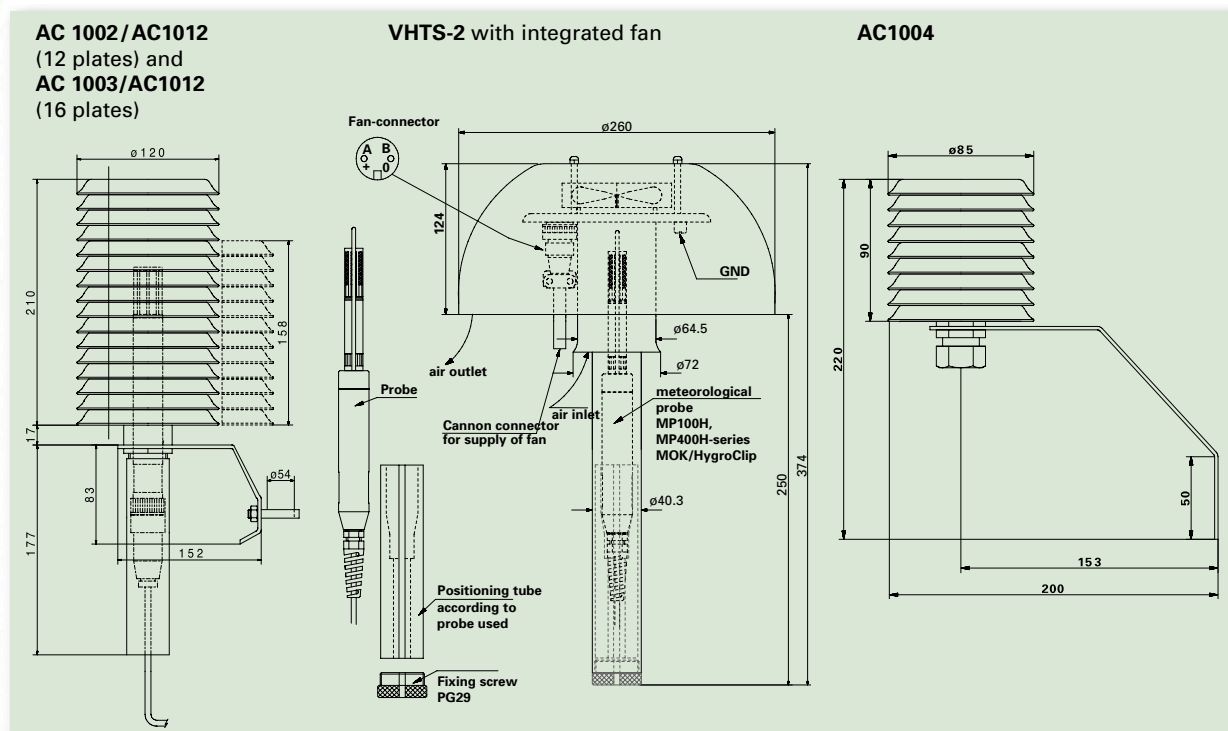


Technical Data

Technical data, MP100A, MP400A, MP100H, MP400H

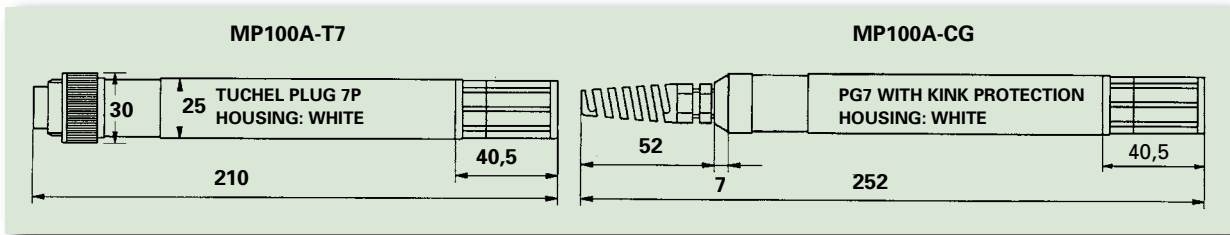
Series	MP100A	MP100H	MP400A	MP400H
Protection (IP-rating)	IP65			
Option: humidity only (2 wire, 3 wire)	Yes	N/A	Yes	N/A
Output signal	Voltage		Current	
Supply voltage	4.8...30 VDC		Min. 8 VDC +0.02 x load	
Power consumption:				
4 wire with current output	N/A		50 mA	45 mA
2 wire with current output	N/A		20 mA	
4/5 wire with voltage output	6 mA	10 mA	N/A	
3/4 wire with voltage output	3.5 mA	10 mA	N/A	
Load	>1000 Ω		<500 Ω	
Cable length compensation	up to 99 m		N/A	
Measuring range				
Temperature	Various temps. in °C, see ordering information			
Humidity	0...100 %rh			
Operating range sensor & electronics	-40...60°C / 0...100 %rh			
Temperature sensor type	Pt100 1/3 DIN			
Pt100 1/5 DIN / 1/10 DIN	N/A	Option	N/A	Option
Sensor type humidity	Hygromer® IN-1	HygroClip S	Hygromer® IN-1	HygroClip S
Accuracy at 23°C				
Temperature	±0.3 K			
Humidity 10...95 %rh	±1.5 %rh	See HygroClip S	±1.5 %rh	See HygroClip S
<10, >95 %rh	±2.5 %rh	See HygroClip S	±2.5 %rh	See HygroClip S
0...100 %rh	±1.5 %rh		±1.5 %rh	
Reproducibility	H=<0.5%, T=0.1 K			
Long-term stability humidity	< 1 %rh / year			
Time constant at 1m / air movement	<15s			
Adjustment points (potentiometers)				
Humidity	35, 80, Hmin.	See HygroClip S	35, 80, Hmin.	See HygroClip S
Temperature	Tmin., Tmax.	See HygroClip S	Tmin., Tmax.	See HygroClip S
Housing material	Delrin (POM)			
Weight	approx. 170g			

Technical drawings

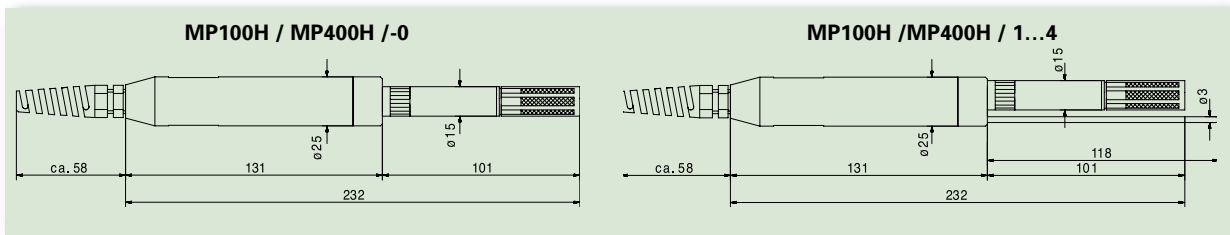


Dimensional Diagrams

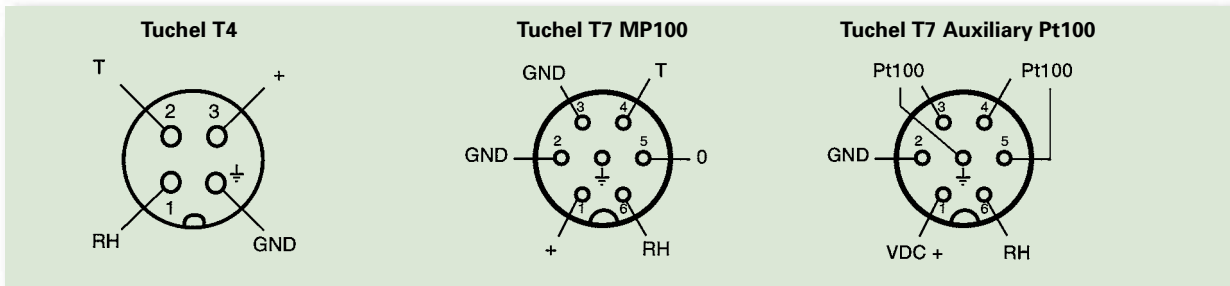
Dimensional Diagrams MP100A / MP400A



Dimensional Diagrams MP100H / MP400H



Pinning of Tichel Plugs for MP100 & MP400 Series



Cable Length Compensation

The integrated cable length compensation allows the use of a connection cable up to 99 m long, without an adverse affect on measurements. The additional "0" cable wire is connected according to the diagrams shown.

The combination of ROTRONIC instruments with ROTRONIC cables includes the cable length compensation facility as standard.

The connection from probe to display instrument consists of a 5 core cable, where the shielding may also be used for the common earth. The "0" cable compensation is connected to the common earth "GND" at the display instrument. It is possible to use the probe with a non-ROTRONIC instrument, such as a data-logger, chart recorder or controller and retain the compensation, by connecting the cable compensation "0" to the common earth "GND" of the termination point (the load).

The cable compensation "0" can be connected with the common earth "GND" at the plug, if a 5core cable is extended by a 5core cable. If this is terminated by a 4pin plug, in this case the cable compensation is effective in the 5 core cable up to the 4pin plug.

Probes with integrated 4 pin connector:

The cable compensation is effective up to the connector.

