

METEOROLOGY

INTRODUCTION

In meteorology, the precision of measurement data parameters is critical for accurate weather forecasting and environmental research. ROTRONIC meteorological probes have an excellent reputation for providing precise results even in the most demanding of environments, especially where high humidity and low temperatures dominate. Our current product range offers high performance and a wide range of configurations to suit every application and budget.

Even the best probes measure inaccurately if the surrounding conditions are not representative of the actual climatic conditions. Without appropriate weather protection shields, the probe temperature will not be correct, and since relative humidity is temperature dependent, significant measurement errors will be the result. Poorly ventilated weather protection shields can result in a micro-climate around the probes causing consequential errors of measurement.

Therefore, in applications which require a high level of accuracy, ventilated protection shields are used. High accuracy measurements are even more important when energy optimization is concerned. The more accurate the measurement, the smaller the control errors and the greater the energy savings.

ROTRONIC's meteorology probes in combination with ventilated weather and radiation protection shields provide the best possible measurement results. At a significantly lower price level, they can offer practically the same performance as that achieved by a dew point mirror meteorological system, but without the need for regular maintenance.

Weather protection shields were developed in close co-operation with Meteo Suisse and are utilized world-wide. Tests conducted clearly demonstrated the unmatched accuracy obtained by the combination of ROTRONIC probes and ventilated weather protection!

Applications

Weather stations, snow guns, agricultural meteorology, high-Alpine meteorology, building management systems, climate modelling, ice warning systems, fog detection and wind turbines.



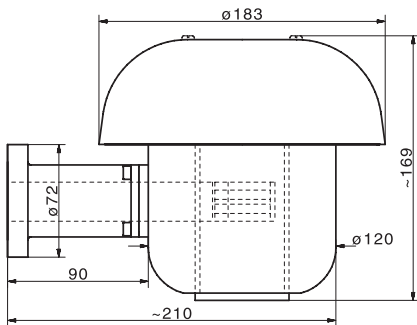
ACTIVELY VENTILATED SHIELDS

Applications

Snow guns, weather stations, agricultural meteorology, building management systems

Highlights

- Simple-to-install protective shield with integrated fan
- Special white coating minimises solar heating (RAL 9010)
- Easy probe mounting
- 12 VDC or 24 VDC supply for fan
- Compatible with various probe types

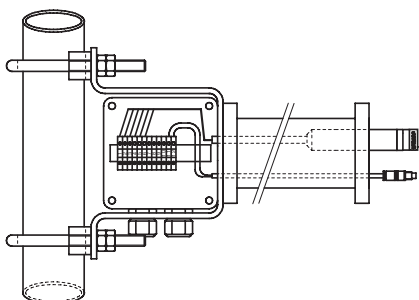


Order code	RS12T	RS24T
Range of application	-30...60 °C	
Material	Aluminium, POM, RAL 9010	
Supply	12 VDC, approx. 2 W	24 VDC
Fan	Papst ventilator IP 54	
Aspiration rate	3.5 m/s / 900 l/min	
Longevity	At 40 °C ~70,000 h, at 70 °C ~35,000 h	

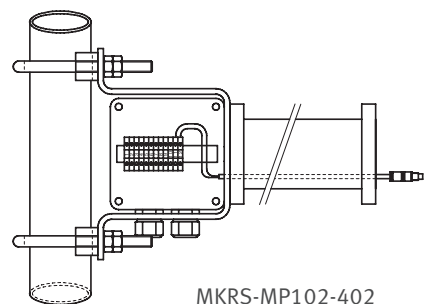
Assembly sets for RS weather-protection shields

Order code	To be used with	Probe connector	Connection: clamp box
MKRS-HC2	HygroClip2 (HC2-S3)	E2	Clamps / 2 cable screw connections
MKRS-MP102-402	MP102H / MP402H	N/A	Clamps / 2 cable screw connections

Mounting connections



54 MKRS-HC2



MKRS-MP102-402

NATURALLY VENTILATED SHIELDS

Naturally ventilated shields are used in applications where the conditions aren't so harsh and where demand for precision is not so high.

Applications

Snow guns, weather stations, building management systems

Highlights

- Easy-to-install protective screen
- Multi-plate system for natural ventilation
- Simple probe mounting
- Compatible with various probe types
- Mounting hardware included
- Suitable for 25...50 mm mast diameters
- Protection against wind speeds up to 68 km/h and horizontal precipitation

Order code	AC1002-AC1012	AC1003-AC1012
Number of plates	10	14
Supplied with	Mounting bracket and screws	
Protection	Probe protection tube	
Use	With probes from the MP100A series	With probes from the MP400A, MP102H, MP402H series

Order code	AC1015	AC1004
Type	HC2-S3 probe/cable protection tube	Weather and radiation protection
Number of plates		9
Supplied with		Mounting bracket and screws
Use	Along with AC1002-AC1012 / AC1003-AC1012	With HC2-S3 and connection cable

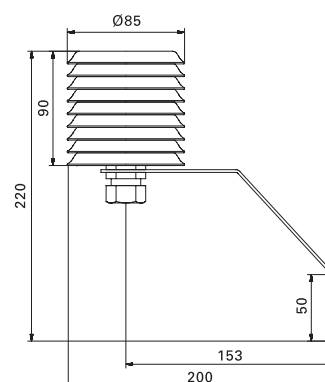
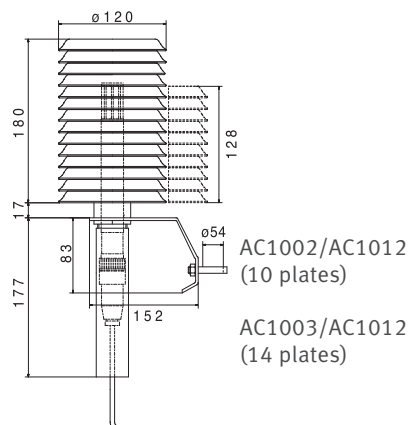
AC1002
AC1012



AC1004



AC1015



HYGROMET METEOROLOGICAL PROBES

MP102H/402H for interchangeable probes* HC2-S3

MP102H and MP402H series probes provide truly class leading accuracy and stability . Based on the HygroClip HC2-S3 probe, they provide linear voltage or current outputs for secure transmission over extended cable lengths. An RS485 interface is available on request.

With direct 4 -wire Pt100 temperature measurement available in the same probe assembly as the new AirChip3000 technology, this ultimate meteo probe combination offers outstanding performance within a single shield installation.

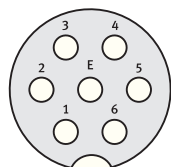
Applications

Weather stations, snow guns, building management systems

Highlights

- Range of application (temperature): -40...85 °C
- Current or voltage output signal
- Optional: directly connected Pt100 sensor
- UART & service interface to PCB

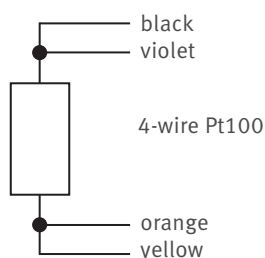
Tuchel 7-pin connector plug



Pin configuration / Wire colors

Term	Colour	Pin
+VDC	Green	1
Ground	Grey	2
Humidity	White	3
Temperature	Brown	4
RS485 +	Red	5
RS485 -	Blue	6
Protection		E

Separate Pt100 (for both types):



Order code				
MP102H-				Meteorology transmitter with voltage output
MP402H-				Meteorology transmitter with current output
	0			Without additional Pt100
	3			Separate Pt100 1/3 Class B, passive, 4-wire
	5			Separate Pt100 1/5 Class B, passive, 4-wire
	A			Separate Pt100 1/10 Class B, passive, 4-wire
Output signals MP102H				
	2			0...1 V = 0...100 %rh / -30...70 °C
	3			0...1 V = 0...100 %rh / -40...60 °C
Output signals MP402H				
	4			0...20 mA = 0...100 %rh / 0...100 °C
	5			0...20 mA = 0...100 %rh / -40...60 °C
	6			0...20 mA = 0...100 %rh / -30...70 °C
	7			4...20 mA = 0...100 %rh / 0...100 °C
	8			4...20 mA = 0...100 %rh / -40...60 °C
	9			4...20 mA = 0...100 %rh / -30...70 °C
(03-99)		03		PUR connection cable (03 m standard, max. 99 m)
		T7		7-pin Tuchel connector (not for passive 4-wire Pt100)
		00		Open ends

*Order HygroClip probe HC2-S3 separately
(Meteo probe with direct dew point output available on request)

HYGROCLIP HC2-S3 (AIRCHIP3000)

Applications

Meteorology stations, building automation systems, agricultural meteorology

Use

Meteorology probe MP102H & MP402H series, OEM applications

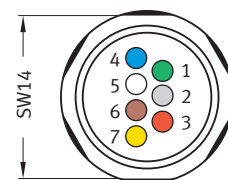
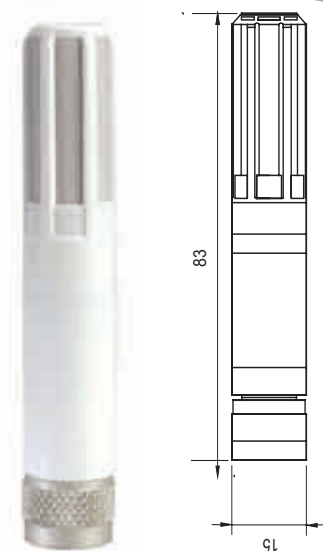
Highlights

- Measures relative humidity, temperature and dew/frost point
- Hygromer® V-1 sensor
- Saves up to 2,000 measurement pairs *
- Range of application 0...100 %rh / -50...100 °C
- UART interface and freely scalable analog signals 0...1 V
- Standard scaling 0...1 V = 0...100 %rh / -40...60 °C
- Probe with adjustment profile «Standard», factory certificate

Order code	HC2-S3	HC2-S3H
Adjustment	At 23 °C and 10, 35, 80 %rh	
Accuracy	±0.8 %rh / ±0.1 K	±0.5 %rh / ±0.1 K
Probe	Ø15 x 85 mm	
Color	White	
Housing	Polycarbonate	
Filter	Polyethylene, white ~ 40 µm pore size	

Order code	HC2-R3
Probe	Interchangeable probe with new humidity sensor

* Requires HW4 software



Electrical connections:
(all HygroClip2 probes with connector)

- 1 ● V+ (3.2 VDC to max. 5 VDC, ±0%; recommended: 3.3 VDC)
- 2 ● GND (ground, digital and power)
- 3 ● RXD (UART)
- 4 ● TXD (UART)
- 5 ○ Analog signal %rh (0...100 %rh=0...1 V)
- 6 ● Analog signal °C (-40...60 °C = 0...1 V)
- 7 ● AGND (analog ground)

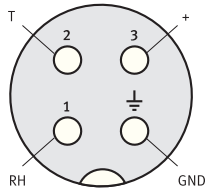
ANALOG METEOROLOGY PROBES

Standard meteorology probes with fixed sensors; analog technology
Hygromer® V-1 sensor

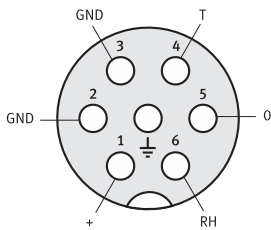
Order code	MP100A-xx	MP400A-xx
Output	Linear voltage output	Linear current output
Precision	Long term stability < 1 %rh / year	
Resistance	Condensation, thawing and dust particles	
Range of application	-40...60 °C	
Measurement	Temperature with Pt100 – direct or linear output signal	
Cable length	Cable-length compensation – no measurement deviations at a distance of up to 100 m	
Filter	Wire filter ~ 20 µm pore size	



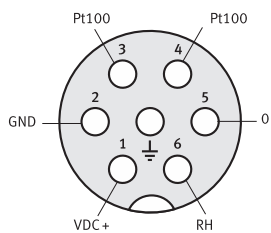
Pin configuration of the Tuche
connector plug for MP100 & MP400
series



Tuche T4



Tuche T7 MP100



Tuche T7 with separate Pt100

Order code

MP100A-					Output signals: voltage	
MP101A-					0...1 VDC = 0...100 %rh	-0.4...0.6 V = -40...60 °C
MP102A-					0...1 VDC = 0...100 %rh	0...1 V = -30...70 °C
MP103A-					0...1 VDC = 0...100 %rh	0...1 V = -40...60 °C
MP106A-					0...1 VDC = 0...100 %rh	Separate Pt100 in 4-wire circuit
MP400A-					Output signals: current	
MP400A-					0...20 mA = 0...100 %rh	Pt100, 4-wire passive
MP401A-					4...20 mA = 0...100 %rh	Pt100, 4-wire passive
MP402A-					4...20 mA = 0...100 %rh	2-wire, only %rh
MP403A-					4...20 mA = 0...100 %rh	2-wire / Pt100 4-wire passive
MP404A-					0...20 mA = 0...100 %rh	0...20 mA = 0...100 °C
MP405A-					0...20 mA = 0...100 %rh	0...20 mA = -40...60 °C
MP406A-					0...20 mA = 0...100 %rh	0...20 mA = -30...70 °C
MP407A-					4...20 mA = 0...100 %rh	4...20 mA = 0...100 °C
MP408A-					4...20 mA = 0...100 %rh	4...20 mA = -40...60 °C
MP409A-					4...20 mA = 0...100 %rh	4...20 mA = -30...70 °C
Common parameters						
	T4				Signals & supply to Tuchel 4-pin connector plug on the probe	
	T7				Signals & supply to Tuchel 7-pin connector plug on the probe	
	CG				PUR cable, grey	
	02				Cable length (02 -99) in m	
		C4			Cannon 4-pin connector plug at the end of the cable	
		00			Open ends, tin-plated	
				- W4W	Sensor protection: wire filter	

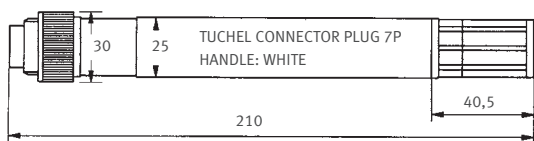
Order codes, standard probes:

Humidity range: 0...100 %rh = 0...1 V (MP100A) or 4...20 mA (MP400A)

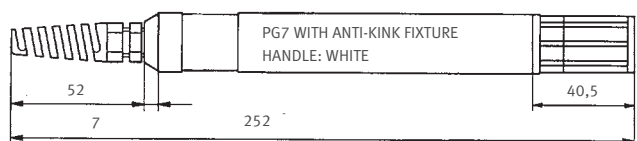
Order code	Range (°C)	Connector	Cable compensation
MP101A-T4-W4W	-0.4...0.6 V = -40...60 °C	Tuche 4-pin connector plug	No
MP101A-T7-W4W	-0.4...0.6 V = -40...60 °C	Tuche 7-pin connector plug	Yes
MP408A-T4-W4W	4...20 mA = -40...60 °C	Tuche 4-pin connector plug	No
MP408A-CGXX-W4W	4...20 mA = -40...60 °C	Open ends	No

XX = length in m

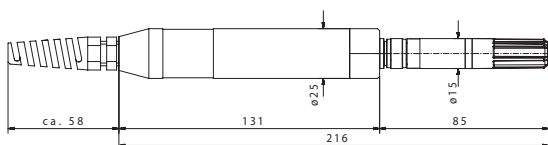
Dimensional drawings



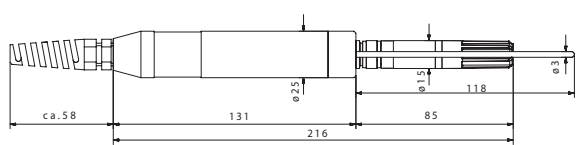
MP100A-T7



MP100A-CG



MP102H / MP402H /-0



MP102H / MP402H /-3/-5/-A

HYGROCLIP PROBES for agricultural and other outdoor applications

New cable probes for agricultural and outside applications are equipped with a fast sensor and new filter technology which offers significantly improved protection against the growth of biofilm. Typical applications: weather stations and data recording systems.

Applications

Agriculture, OEM and meteorology

Use

Handheld devices, data loggers, transmitters, OEM products

Highlights

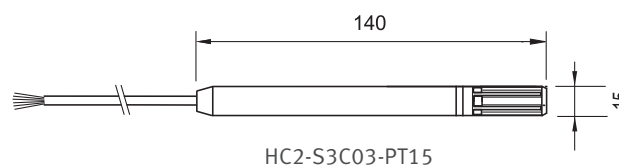
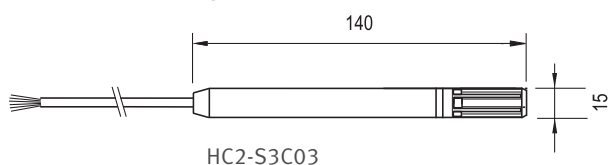
- Measures relative humidity, temperature and dew/frost point
- Hygromer® V-1 sensor
- Saves up to 2,000 readings measurement pairs *
- Range of application 0...100 %rh / -50...100 °C
- UART interface and freely scalable analog signals 0...1 V
- Standard scaling 0...1 V = 0...100 %rh / -40...60 °C
- Probe with adjustment profile «Standard», factory certificate

Order code	HC2-S3C03	HC2-S3C03-PT15
Adjustment	At 23 °C and 10, 35, 80 %rh	
Accuracy	±1 %rh / ±0.2 K	±1 %rh / ±0.1 K (passive Pt100)
Filter	Polyethylene, white ~ 40 µm pore size	
Color	White	
Probe	3 m TPU open-ended cable probe	PT100 1/5 Class B
Voltage	5...24 VDC / 5...16 VAC	
Dimensions	Ø15 x 140 mm	On request

* Optional, requires HW4 software



Dimensional drawings



METEOROLOGY

Adapter with voltage regulator for meteorological applications (permissible voltages 5...24 VDC / 5...16 VAC)

Order code	Adapter
E3-01XX-ACT	Adapter with voltage regulator for HC2-S3 probe, 1 m cable, open-ended
E3-02XX-ACT	Adapter with voltage regulator for HC2-S3 probe, 2 m cable, open-ended
E3-05XX-ACT	Adapter with voltage regulator for HC2-S3 probe, 5 m cable, open-ended

Specifications MP-100/400 series

Series	MP102H	MP402H	MP100A (analog)	MP400A (analog)
Output signal type	Voltage	Current	Voltage	Current
Supply voltage	5...24 VDC	15...24 VDC V min = 10 V + (0.02 x load*)	4.8...30 VDC	MP402/403: 8 V+ (0.02 x load) Others: 5 V+ (0.02 x load) max. 26 VDC
Current consumption	<6 mA	<50 mA	6 mA	20 mA / 2x20 mA
* Load (in Ω)	>1 k Ω	<500 Ω	>1 k Ω	<500 Ω
Cable-length compensation	Yes	N/A	Up to 99 m	N/A
Range of application electronics	-40...85 °C	-40...85 °C	-40...60 °C 0...100 %rh	-40...60 °C 0...100 %rh
Humidity measurement range	0...100 %rh	0...100 %rh	0...100 %rh	0...100 %rh
Temperature measurement range	Freely scalable	Freely scalable	According to order number	According to order number
Humidity sensor	N/A, HC2-S3 probe	N/A, HC2-S3 probe	Hygromer® V-1	Hygromer® V-1
Temperature sensor	N/A, HC2-S3 probe	N/A, HC2-S3 probe	Pt100 1/3 Class B	Pt100 1/3 Class B
Separate Pt100 DIN (optional)	According to order number	According to order number	N/A	N/A
Accuracy (humidity)	Same as HC2-S3 probe	Same as HC2-S3 probe	10...95 %rh: ± 1.5 %rh, <10, >95 %rh: ± 2.5 %rh	
Accuracy (temperature)	Same as HC2-S3 probe	Same as HC2-S3 probe	± 0.3 K	± 0.3 K
Reproducibility	Same as HC2-S3 probe	Same as HC2-S3 probe	<0,5 %rh/ ± 0.1 K	<0,5 %rh/ ± 0.1 K
Long term stability (humidity sensor)	< ± 1 %rh/year	< ± 1 %rh/year	< ± 1 %rh/year	< ± 1 %rh/year
Response time	<12 s	<12 s	<12 s	<12 s
Adjustment points				
Humidity (analog)	N/A	N/A	35, 80, H(min.)	35, 80, H(min.)
Temperature (analog)	N/A	N/A	Tmin, Tmax	Tmin, Tmax
Humidity & temperature (digital)	Adjustment of the probe	Adjustment of the probe	N/A	N/A
Housing material	POM	POM	POM	POM
Protection	IP 65	IP 65	IP 65	IP 65
Weight	Approx. 200 g	Approx. 200 g	Approx. 200 g	Approx. 200 g