

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.



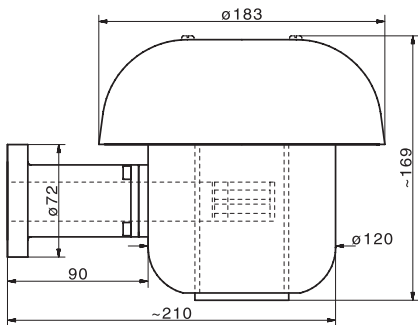
ACTIVELY VENTILATED SHIELDS

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

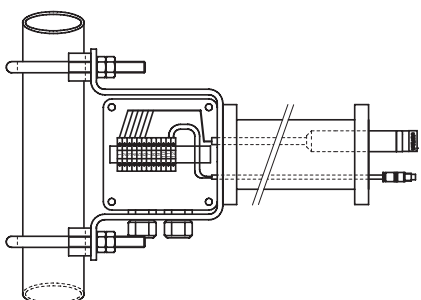


| Order code | RS12T | RS24T |
|----------------------|--|--------|
| Range of application | -30...60 °C | |
| Material | Aluminium, POM, RAL 9010 | |
| Supply | 12 VDC, approx. 2 W | 24 VDC |
| Fan | Papst ventilator IP 54 | |
| Aspiration rate | 3.5 m/s / 900 l/min | |
| Longevity | At 40 °C ~70,000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

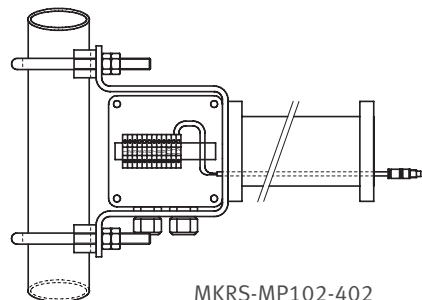
Assembly sets for RS weather-protection shields

| 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 |



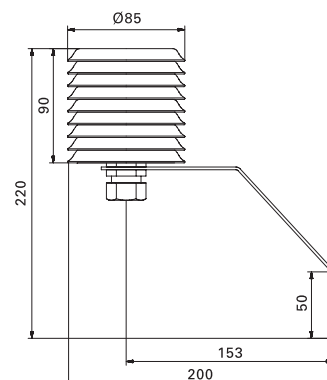
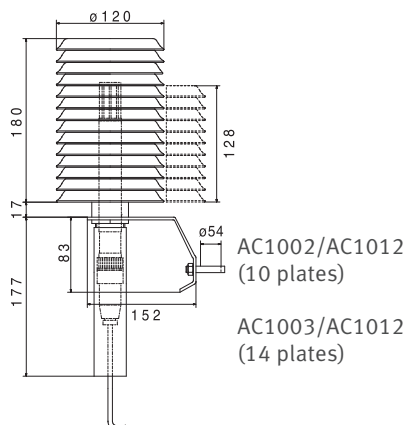
AC1002
AC1012



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.

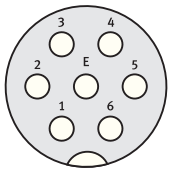
Applications

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

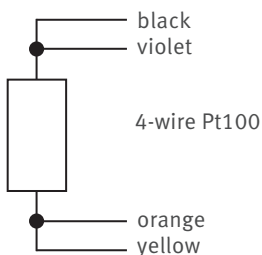
Tuchel 7-pin connector plug



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

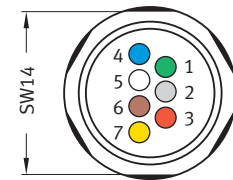
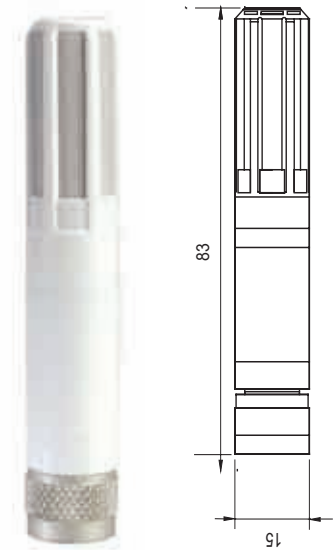
Highlights

- 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)

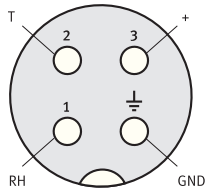
ANALOG METEOROLOGY PROBES

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

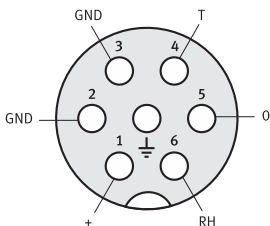
| Order code | MP100A-xx | MP400A-xx |
|----------------------|--|-----------------------|
| Output | Linear voltage output | Linear current output |
| Precision | Long term stability < 1 %rh / year | |
| Resistance | Condensation, thawing and dust particles | |
| Range of application | -40...60 °C | |
| 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 | |



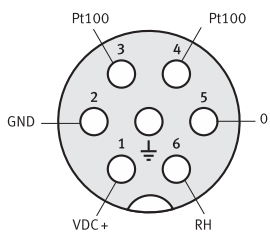
Pin configuration of the Tuchel connector plug for MP100 & MP400 series



Tuchel T4



Tuchel T7 MP100



Tuchel T7 with separate Pt100

| Order code | | Output signals: voltage | |
|-------------------|------|-------------------------|--|
| 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 |

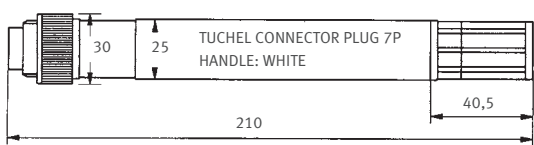
Order codes, standard probes:

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

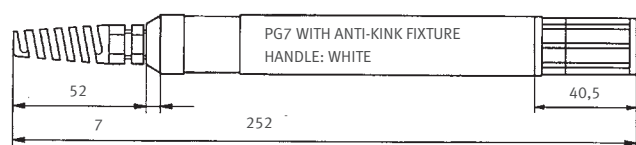
| Order code | Range (°C) | Connector | Cable compensation |
|-----------------|----------------------------|-----------------------------|--------------------|
| MP101A-T4-W4W | -0.4...0.6 V = -40...60 °C | Tuchel 4-pin connector plug | No |
| MP101A-T7-W4W | -0.4...0.6 V = -40...60 °C | Tuchel 7-pin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

XX = length in m

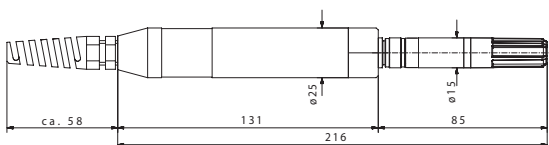
Dimensional drawings



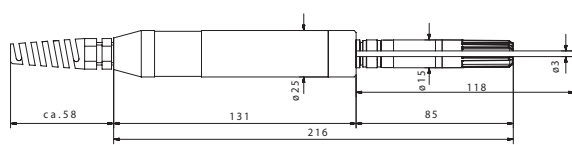
MP100A-T7



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

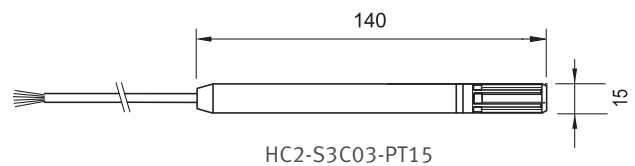
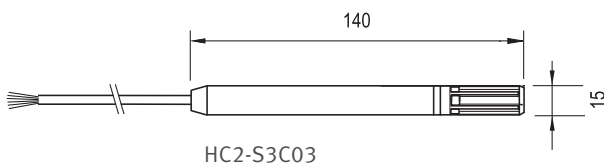
- Measures relative humidity, temperature and dew/frost point
- Hygromer® V-1 sensor
- Saves up to 2,000 readings measurement pairs *
- Range of application 0...100 %rh / -50...100 °C
- UART interface and freely scalable analog signals 0...1 V
- Standard scaling 0...1 V = 0...100 %rh / -40...60 °C
-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