Measuring & Monitoring Solutions for Various Parameters

rotronic
MEASUREMENT SOLUTIONS

A PST Brand

2020-V2

Rotronic measuring instruments: precision at the highest level

Based in Switzerland and established in 1965, Rotronic offers a wide range of handheld instruments, transmitters, (industrial) probes, data loggers, OEM products and monitoring systems. A world leader in relative humidity and temperature measurement, our portfolio also includes solutions for water activity, CO_2 and differential pressure. We thus cover a wide range of applications from the pharmaceutical and food industries to HVAC and meteorology.

Rotronic Monitoring System: modular, flexible and reliable

The Rotronic Monitoring System is a modular system of interconnected hardware elements and cloud software. It enables maximum flexibility in installation and guarantees excellent availability of the data during operation. The data loggers record all measurements by Rotronic and third-party sensors and transmit them to the database, which stores all the information reliably. Authorized users can access the database at any time via the Internet via PC, Mac, tablet or smartphone and set alarms according to defined events.

RMS

Rotronic – a PST company

Within the Process Sensing Technologies (PST) Group, Rotronic is the competence center for relative humidity and cloud-based monitoring systems. PST unites leading manufacturers who together offer a comprehensive and complementary suite of instruments, analyzers and sensors unmatched by other suppliers. PST opens up new areas of application for Rotronic and our customers benefit from a broader product range and sales network.

PST
PROCESS SENSING
TECHNOLOGIES

Rotronic guarantee and services

Rotronic products guarantee reliability: we offer validated software and products that comply with international regulations such as GAMP and FDA.

- Highest accuracy at ± 0.5 %RH
- ISO 9001 quality with factory adjustment certificate
- ISO 17025 accredited calibration laboratories in CH, DE (SCS0065)
- ISO 17025 accredited laboratories in UK, USA
- Validated software
- Products compliant to current industry standards
- 24 months product warranty (12 months for HG2 calibration system and AwTherm water activity measuring instrument)
- More than 50 years of experience in humidity measurement
- Eco-friendly, professional and free disposal of old devices and accessories

SWISS ACCREDITATION
sas.admin.ch
SCS 0065

QUALITY
ISO 9001
rotronic
MANAGEMENT

Humidity and Temperature

Temperature

Differential pressure

CO_2

Applications

Rotronic Monitoring System – RMS

Software

Services

Theory

Humidity and Temperature

Video Humidity

Interested? Then scan the QR code!

Standard and high precision probes

HC2A-S / HC2A-S-HH / HC2A-S3 and HC2A-SH/HC2A-S3H

The HC2A-S / HC2A-S-HH / HC2A-S3 is the most versatile probe from Rotronic and forms the basis of the product portfolio. It measures humidity and temperature and calculates the dew/frost point. The HC2A-SH/HC2A-S3H fulfills the highest demands for measuring accuracy.

APPLICATIONS
HVAC, food industry, building services equipment, paper, textile and pharmaceutical industries.

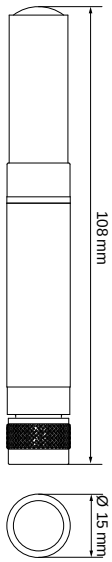
FEATURES
- Accuracy: standard probe (HC2A-S / HC2A-S-HH): ±0.8 %RH, ±0.1 K, at 10...30 °C
- Accuracy: high precision probe (HC2A-SH): ±0.5 %RH, ±0.1 K, at 10...30 °C
- Range of application: -50...100 °C / 0...100 %RH
- Digital interface (UART) and scalable analog outputs, 0...1 V or Default analog scaling/ outputStandard: adjusted at 23 °C and 10, 35, 80 %RH
- High precision: adjusted at 23 °C and 10, 20, 30, 40, 50, 60, 70, 80, 90 %RH, then calibrated at 20, 50, 80 %RH
- Standard analog output scaling: 0...1 V = -40...60 °C / 0...100 %RH

Order code	HC2A-S / HC2A-S-HH / HC2A-S3	HC2A-SH / HC2A-S3H
Probe type	S: black, S3: white	SH: black, S3H: white
Dimensions	Ø 15 x 108 mm	
Range of application	-50...100 °C, 0...100 %RH	
Accuracy	±0.8 %RH, ±0.1 K at 10...30 °C	±0.5 %RH, ±0.1 K at 10...30 °C (10...90 %RH)
Power supply	3.3...5 VDC, adjusted at 3.3 VDC	
Current consumption	~4.5 mA	
Long-term stability	<1 %RH / year	
Sensor type	ROTRONIC HYGROMER® HT-1 (HC2A-S-HH: HH-1), PT100 1/3 Class B	
Filter type	S: polyethylene white, 40 µm S3: polyethylene white, 40 µm	SH: polyethylene white, 40 µm S3H: polyethylene white, 40 µm
Response time	<15 s, without filter	
Max. wind velocity	3 m/s, without filter 20 m/s with polyethylene filter	
Housing material	Polycarbonate	
Weight / IP protection	10 g / IP65	

The HC2A-S-HH is especially suitable for environments with hydrogen peroxide (H_2O_2) using the HH-1 sensor.

HC2A-S
HC2A-SH
HC2A-HH

HC2A-S3
HC2A-S3H



Compatible

• Handheld instruments	HP32, HP23-A
• Data loggers	HL-NT3-D
• Transmitters	HF5, HF8, PF4, PF5
• Meteorology transmitters	MP102H, MP402H

Delivery package

- Factory adjustment certificate
- Short instruction manual
- Polyethylene filter

Recommended accessories

• Mounting flange	AC5005
• Filters	
• Extension cable 2 m, black	E2-02A
• Adapter cable, open ends, 2 m	E2-02XX-ACT/01
• Calibration device	ER-15
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

Industrial probes, steel

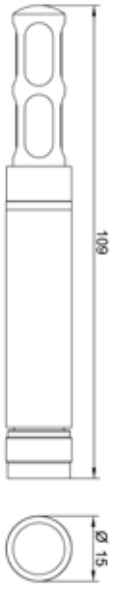
The HC2A-SM is the robust probe from Rotronic for harsh environments and adds to the wide product portfolio. It measures humidity and temperature and calculates the dew/frost point.

APPLICATIONS
Food, paper, textile, pharmaceutical and cosmetic industries.

FEATURES
- Accuracy: ±0.8 %RH, ±0.1 K, at 10...30 °C
- Range of application: -50...100 °C / 0...100 %RH
- Digital interface (UART) and scalable analog outputs, 0...1 V
- Standard analog output scaling: 0...1 V = -40...60 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH

Order code	HC2A-SM
Probe type	Chrome steel standard
Dimensions	Ø 15 x 109 mm
Range of application	-50...100 °C, 0...100 %RH
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C
Power supply	3.3...5 VDC, adjusted at 3.3 VDC
Current consumption	~4.5 mA
Long-term stability	<1 %RH / year
Sensor type	ROTRONIC HYGROMER® HT-1, PT100 1/3 Class B
Filter type	Wire mesh filter
Response time	<15 s, without filter
Max. wind velocity	3 m/s, without filter 25 m/s with wire mesh filter
Housing material	Stainless steel 1.4301
Weight / IP protection	47 g / IP65

HC2A-SM



Available with ATEX certificate

Compatible

• Handheld instruments	HP32, HP23-A
• Data loggers	HL-NT3-D
• Transmitters	HF5, HF8, PF4, PF5

Delivery package

- Factory adjustment certificate
- Short instruction manual
- Wire mesh filter

Recommended accessories

• Mounting gland	AC1303-M
• Filters	
• Extension cable 2 m, metal connector	E2-02A-M
• Calibration device	ER-15
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

Industrial cable probes

The Rotronic industrial probe is especially suitable for high temperatures and demanding industrial environments. It measures humidity and temperature and calculates the dew/frost point.

APPLICATIONS
Production environments, high temperatures, industrial manufacturing, drying processes, climate chambers.

FEATURES
- Accuracy: ±0.8 %RH, ±0.1 K, at 10...30 °C
- Range of application: -100...200 °C[1] (HC2-HK40)/ 0...100 %RH
- Digital interface (UART) and scalable analog outputs, 0...1 V
- Standard analog output scaling: 0...1 V = -40...60 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH

Industrial probes

Ø 15 mm

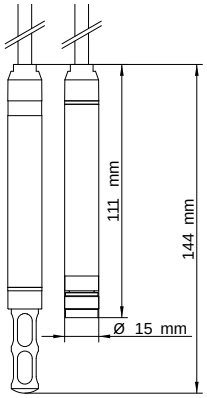
Order code	HC2A-IC1xx*	HC2A-IC3xx*
Dimensions	Ø 15 x 100 mm	Ø 15 x 250 mm
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C	
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA	
Sensor type	ROTRONIC HYGROMER® HT-1, HH-1 ,PT100 1/3 Class B	
Response time	<15 s, without filter	
Material	PPS, stainless steel 1.4301	
Weight	230 g	260 g
* xx = cable length in meters (02, 05), 80 g per meter cable		

Industrial probes

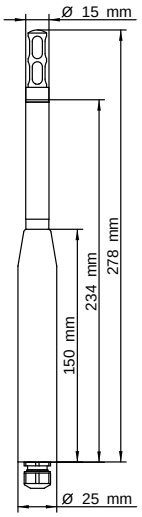
Ø 15/25 mm

Order code	HC2A-IC4xx*-A	HC2A-IC7xx*-A
Dimensions	Ø 15/25 x 400 mm	Ø 15/25 x 700 mm
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C	
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA	
Sensor type	ROTRONIC HYGROMER® HT-1, PT100 1/3 Class B	
Response time	<15 s, without filter	
Material	PPS, stainless steel 1.4301	
Weight	320 g	380 g
* xx = cable length in meters (02, 05), 80 g per meter cable		

The HC2A-ICxx-HH is especially suitable for environments with hydrogen peroxide (H_2O_2) using the HH-1 sensor.



HC2A-ICxxx
HC2A-ICxxx-HH



HC2A-ICxxx-A

Compatible

• Handheld instruments	HP32, HP23-A
• Data loggers	HL-NT3-D
• Transmitters	HF5, HF8, PF4, PF5

Delivery package

- Factory adjustment certificate

Recommended accessories

• Filters	
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

[1] Peak load: 100 h
Permissible continuous load: 190 °C

Industrial cable probes, steel

The metal industrial probe is especially suitable for high temperatures, demanding industrial environments and applications where hygiene plays an important role. The probe measures humidity and temperature and calculates the dew/frost point.

APPLICATIONS
Food and pharmaceutical production, drying processes, industrial manufacturing.

FEATURES
- Accuracy: ±0.8 %RH, ±0.1 K, at 10...30 °C
- Range of application: -100...200 °C[1], (screw-in probe; -100...200 °C[1]) / 0...100 %RH
- Digital interface (UART) and scalable analog outputs, 0...1 V
- Standard output scaling: 0...1 V = -40...60 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH

Steel industrial probes

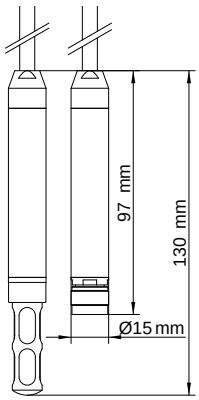
Ø 15/25 mm

Order code	HC2A-IM1xx*	HC2A-IM3xx*
Dimensions	Ø 15 x 130 mm	Ø 15 x 280 mm
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C	
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA	
Sensor type	ROTRONIC HYGROMER® HT-1, PT100 1/3 Class B	
Response time	<15 s, without filter	
Housing material	Stainless steel, DIN 1.4301	
Weight	260 g	400 g
* xx = cable length in meters (02, 05), 80 g per meter cable		

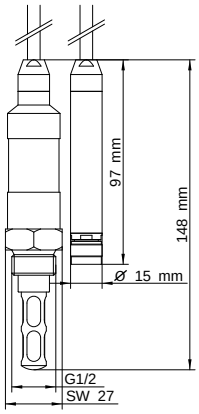
Screw-in probes

Ø 15 mm

Order code	HC2A-IE1xx*	HC2A-IE3xx*
Probe type	½" G with Rotronic connector	½" NPT with Rotronic connector
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C	
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA	
Sensor type	ROTRONIC HYGROMER ® HT-1, PT100 1/3 Class B	
Pressure	Pressure resistant to 100 bar / 1450 PSI	
Response time	<15 s, without filter	
Housing material	Stainless steel, DIN 1.4301	
Weight	290 g	
* xx = cable length in meters (02, 05), 80 g per meter cable		



HC2A-IMxxx



HC2A-IExxx

Compatible

• Handheld instruments	HP32, HP23-A
• Data loggers	HL-NT3-D
• Transmitters	HF5, HF8, PF4, PF5

Delivery package

- Factory adjustment certificate

Recommended accessories

• Filters	
• Calibration device (HC2A-IM)	ER-15
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

[1] Peak load: 100 h
Permissible continuous load: 190 °C

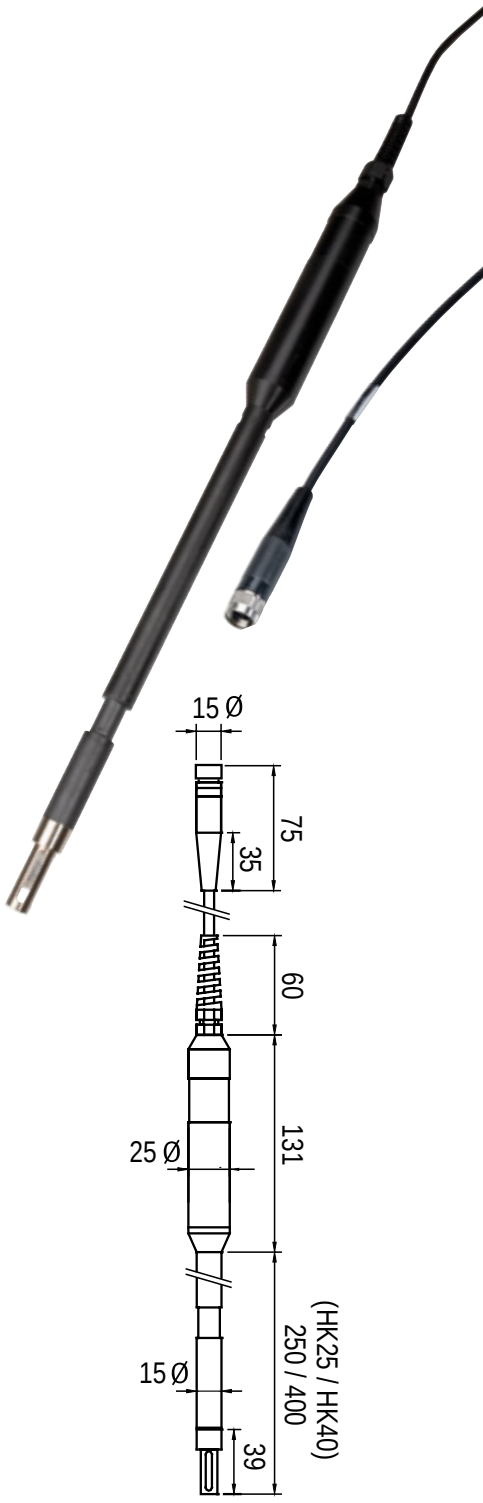
High temperature handheld probes

The handheld probe is especially suitable for portable measurements of high temperatures.
It measures humidity and temperature and calculates the dew/frost point.

APPLICATIONS
Climate and temperature chambers, dryers, air ducts.

FEATURES
- Accuracy: ±0.8 %RH, ±0.1 K, at 10...30 °C
- Range of application: -100...170 °C/200 °C[1] / 0...100 %RH
- Digital interface (UART) and scalable analog outputs, 0...1 V
- Standard output scaling: 0...1 V = -40...60 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH

Order code	HC2-HK25	HC2-HK40
Probe type	Handheld probe	
Dimensions	Ø 15 x 250 mm	Ø 15 x 400 mm
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C	
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA	
Sensor type	ROTRONIC HYGROMER® IN-1, PT100 1/3 Class B	
Response time	<15 s, without filter	
Housing material	PEEK, brass, chemically nickel-plated	
Weight	210 g	240 g
Filter	Wire mesh filter	
Cable length	2 m	



Compatible

• Handheld instruments	HP32
• Data loggers	HL-NT3-D
• Transmitters	HF5, HF8, PF4, PF5

Delivery package

- Factory adjustment certificate
- Wire mesh filter

Recommended accessories

• Filters	
• Calibration device	ER-15
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

[1] Short-term peak load (3 x 5 min)

HygroWin USB probe

The USB probe measures humidity and temperature. It is ideal for basic monitoring applications. The HW4 Software PC software is included.

APPLICATIONS
Residential and office.

FEATURES
- Connects directly to a PC on a USB port
- Range of application: -50...100 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH

Order code	HC2A-WIN-USB
Probe type	HC2A probe with direct USB connection
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C
Power supply	Via USB cable
Sensor type	ROTRONIC HYGROMER® HT-1, PT100 1/3 Class B
Filter type	Polyethylene standard filter, 20 µm, gray
Response time	‹15 s, without filter
Weight	110 g
Housing material	Polycarbonate
Cable length	3 m

Delivery package

- Factory adjustment certificate
- HW4 software HW4-E-V3-Code
- Service and adapter cable AC3001

Recommended accessories

• Calibration device	ER-15
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

Miniature probes

The miniature probe is used for humidity and temperature measurement in confined spaces. It also calculates the dew/frost point and can be installed discretely. The 4 mm probe has a spike tip for insertion in walls.

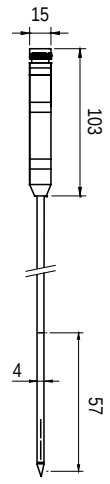
APPLICATIONS

Museums, glass cabinets, building material tests, automotive and aviation industries, testing laboratories, paper, textile and pharmaceutical industries.

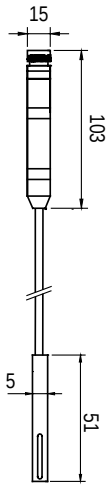
FEATURES

- Accuracy: ±1.5 %RH, ±0.3 K, at 10...30 °C
- Range of application: -40...85 °C / 0...100 %RH
- Digital interface (UART) and scalable analog outputs, 0...1 V
- Standard output scaling: 0...1 V = -40...60 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH

Order code	HC2-C04	HC2-C05
Probe type	Cable probe, Ø 4 mm	Cable probe, Ø 5 mm
Accuracy	±1.5 %RH, ±0.3 K, at 10...30 °C	
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA	
Sensor type	ROTRONIC HYGROMER® IN-1, PT100 1/3 Class B	
Response time	‹15 s, without filter	
Housing material	Stainless steel, DIN 1.4305	Brass, nickel-plated
Weight	85 g	85 g
Cable length	2 m	



HC2-C04



HC2-C05

Compatible

• Handheld instruments	HP32, HP23-A
• Data loggers	HL-NT3-D
• Transmitters	HF5, HF8, PF4, PF5

Delivery package

- Factory adjustment certificate

Recommended accessories

• Extension cable 2 m, black	E2-02A
• Teflon filter for HC2-C05	SP-T05
• Calibration device	ER-05
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

Insertion probes

Ø 5 mm / 10 mm

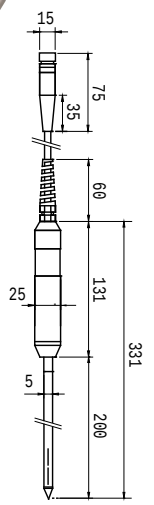
The insertion probe is suitable for measurement in dust-free (P05) or dusty (HP28/50) bulk materials, bricks, concrete, etc. It measures humidity and temperature and calculates the dew/frost point.

APPLICATIONS
Water activity measurement
Portable measuring units with handheld instruments and data loggers.

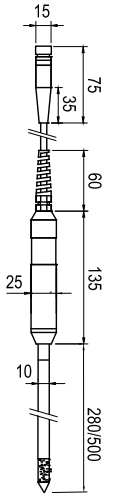
FEATURES
- Accuracy: ±0.8/1.5 %RH, ±0.1/0.3 K, at 10...30 °C
- Range of application: -40...85 °C / 0...100 %RH
- Digital interface (UART)
- Standard output scaling: 0...1 V = -40...60 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH

Order code	HC2-P05
Probe type	Ø 5 x 200 mm, insertion probe with laser cut slots
Accuracy	±1.5 %RH, ±0.3 K, at 10...30 °C
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA
Filter type	No filter available
Sensor type	ROTRONIC HYGROMER® IN-1, PT100 1/3 Class B
Response time	‹15 s
Material	Stainless steel DIN 1.4305 (probe), POM (handle)
Weight	160 g
Cable length	2 m

Order code	HC2-HP28
Probe length	Ø 10 x 280 mm
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA
Filter type	Sintered steel
Sensor type	ROTRONIC HYGROMER® IN-1, PT100 1/3 Class B
Response time	‹20 s, with filter
Material	Stainless steel DIN 1.4305 (probe), POM (handle)
Weight	200 g
Cable length	2 m



HC2-P05



HC2-HPxx

Compatible

• Handheld instruments	HP32
• Water activity measuring instrument	HP23-AW-A
• Data loggers	HL-NT3-D
• Transmitters	HF5, HF8, PF4, PF5
• Laboratory analyzer	HygroLab C1

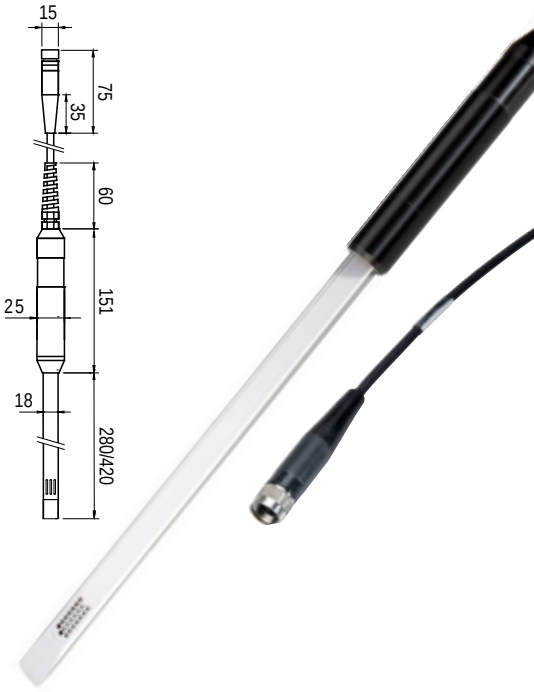
Recommended accessories

• Replacement filter (HC2-HP28 / 50 sintered steel)	ET-Z10
• Calibration device HC2-P05	ER-05
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

Delivery package

- Factory adjustment certificate

Sword probes



APPLICATIONS
Paper, printing and textile industries with handheld instruments and data loggers.

FEATURES
- Accuracy: ±0.8 %RH, ±0.1 K, at 10...30 °C
- Range of application: -40...85 °C / 0...100 %RH
- Digital interface (UART) and scalable analog outputs, 0...1 V
- Standard output scaling: 0...1 V = -40...60 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH

Order code	**HC2-HS28**
Probe length	280 mm
Accuracy	±0.8 %RH, ±0.1 K, at 10...30 °C
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA
Filter type	No filter
Sensor type	ROTRONIC HYGROMER® IN-1, PT100 1/3 Class B
Response time	‹15 s
Material	Aluminum (probe), POM (handle)
Weight	220 g
Cable length	2 m

Compatible

• Handheld instruments	HP32
• Data loggers	HL-NT3-D
• Transmitters	HF5, HF8, PF4, PF5

Delivery package

- Factory adjustment certificate

Recommended accessories

• Calibration device (sword probe)	EGS
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

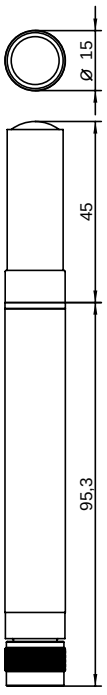
XD probes

Thanks to its wide power supply range and freely selectable output signals, the XD probe is suitable for a wide variety of applications.

APPLICATIONS
HVAC, climate chambers, snow guns and meteorology.

FEATURES
- Accuracy: ±0.8 %RH, ±0.2 K, at 10...30 °C
- Housing colors: black and white
- Range of application: -40...85 °C / 0...100 %RH
- UART digital interface
- Various voltage outputs available
- Adjusted at 23 °C and 10, 35, 80 %RH
- Freely scalable output signals: 0...1/5/10 VDC*

Order code	**XD33A-S3X**
Housing color	Black
Range of application	-40...85 °C
Accuracy	±0.8 %RH, ±0.2 K, at 10...30 °C
Power supply	5...24 VDC / 5...16 VAC (0...1 V) 16...24 VDC / 12...16 VAC (all output versions)
Current consumption	‹12 mA
Long-term stability	‹1 %RH / year
Sensor type	ROTRONIC HYGROMER® HT-1, PT100 1/3 Class B
Filter type	Polyethylene standard filter, 20 µm, gray
Response time	‹15 s, without filter
Housing material	Polycarbonate
Weight	20 g



Note: Not compatible with Rotronic data loggers, transmitters or handheld instruments.

Delivery package

- Factory adjustment certificate
- Polyethylene filter
- Short instruction manual

* Requires optional HW4 software and service cable

Recommended accessories

• Mounting flange	AC5005
• Filters	
• Extension cable 2 m, with open ends, black	E2-02XX
• Extension cable 2 m, with open ends, white	E3-02XX
• Calibration device	ER-15
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS
• Service cable to PC	XD-AC3001

Filter / Carrier HC2A advanced probes

DESCRIPTION

Filter carriers protect the humidity and temperature sensors against mechanical damage. Filters act as a protective barrier against contaminants/ pollutants that can influence the sensor. When choosing the correct combination of filter carrier and filter there are many factors to consider. Specific conditions such as high air velocities, pollutants in the air, disinfection and cleaning routines, mechanical impacts, high bioactivity, condensation, airborne chemical contaminants and required response time are some of the many considerations.

Plastic filter carrier

- Maximum temperature 100 °C
- Mechanical protection

Metal filter carrier

- Maximum temperature 200 °C
- Mechanical protection

Overview filters

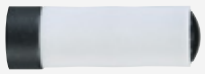
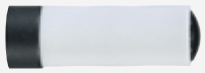
	Teflon filters	Polyethylene filters	Sintered steel filters (stainless steel)	Wire mesh filters (metal)
Maximum temperature (consider range of application of filter carrier)	200 °C	100 °C	200 °C	200 °C
Protection against particulates	✔✔	✔✔	✔	✔
Protection against abrasives in the air			✔✔✔	✔
Pore size	10 µm	40 µm	25 µm	10 µm
Max. air velocity [m/s] (continuous load)	50	50	70	50

✔ = low ✔✔ = medium ✔✔✔ = high

Overview probes

Filters & carriers	Range of application (temp.)		-50...100 °C									-40...85°C		-100...200°C				-50...120°C
	Probe		HC2A-S	HC2A-S3	HC2A-S-I	HC2A-S3-I	HC2A-SH	HC2A-S3H	HC2A-S-HH	HC2A-S3-HH	HC2A-SM	HC2A-SM-HH	XD33A-S3X	XD33A-S3X-I	HC2A-ICxxx	HC2A-ICxxx-I	HC2A-IMxxx	HC2A-IExxx	HC2A-ICxxx-HH
	-50...100 °C	SPA-PCB				✔							✔						
		SPA-PCW				✔							✔						
	-100...200°C	SPA-SS				✔					✔		✔			✔			✔
	-50...100 °C	SPA-PCB-PE				✔							✔						
		SPA-PCB-PTFE				✔							✔						
		SPA-PCB-WM				✔							✔						
		SPA-PCW-PE				✔							✔						
		SPA-PCW-PTFE				✔							✔						
		SPA-PCW-WM				✔							✔						
		SPA-SS-PE				✔					✔		✔						
		SPA-PE				✔					✔		✔						
	-100...200°C	SPA-SS-PTFE				✔					✔		✔			✔			✔
		SPA-SS-WM				✔					✔		✔			✔			✔
		SPA-SSS				✔					✔		✔			✔			✔
		SPA-WM				✔					✔		✔			✔			✔
		SPA-PTFE				✔					✔		✔			✔			✔

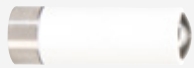
HC2A-S / HC2A-S3 / HC2A-S-I / HC2A-S3-I / HC2A-SH / HC2A-S3H / HC2A-S-HH / HC2A-S3-HH / HC2A-SM / HC2A-SM-HH

Order code	Filter carrier	Filter element	Pore size	Range of application	
SPA-PCB	Polycarbonate, black	No filter, only filter carrier		-50...100 °C	
SPA-PCB-PE		Polyethylene, white	40-50 µm		
SPA-PCB-PTFE		PTFE, white	10 µm		
SPA-PCB-WM		Wire mesh 1.4401	10 µm		
SPA-PCW	Polycarbonate, white	No filter, only filter carrier		-50...100 °C	
SPA-PCW-PE		Polyethylene, white	40-50 µm		
SPA-PCW-PTFE		PTFE, white	10 µm		
SPA-PCW-WM		Wire mesh 1.4401	10 µm		
SPA-PE	No filter carrier, only filter	Polyethylene, white	40-50 µm		
SPA-PTFE	No filter carrier, only filter	PTFE, white	10 µm	-100...200 °C	

HC2A-IC / HC2A-IM / HC2A-IE

Order code	Filter carrier	Filter element	Pore size	Range of application	
SPA-SS	1.4301	No filter, only filter carrier		-100...200 °C	
SPA-SS-PTFE		PTFE, white	10 µm		
SPA-SS-WM		Wire mesh 1.4401	10 µm		
SPA-SSS	Filter carrier incl. filter	Sintered steel 1.4404	25 µm		
SPA-WM	No filter carrier, only filter	Wire mesh 1.4401	10 µm		

HC2A-SM / HC2A-SM-HH

Order code	Filter carrier	Filter element	Pore size	Range of application	
SPA-SS	1.4301	No filter, only filter carrier		-50...100 °C	
SPA-SS-PTFE		PTFE, white	10 µm		
SPA-SS-WM		Wire mesh 1.4401	10 µm		
SPA-SSS	Filter carrier incl. filter	Sintered steel 1.4404	25 µm	-100...200 °C	
SPA-WM	No filter carrier, only filter	Wire mesh 1.4401	10 µm		

Note
The range of application depends on the component with the smallest temperature range.

Filter / Carrier HC2 probes

DESCRIPTION

Filter carriers protect the humidity and temperature sensors against mechanical damage. Filters act as a protective barrier against contaminants/ pollutants that can influence the sensor. When choosing the correct combination of filter carrier and filter there are many factors to consider. Specific conditions such as high air velocities, pollutants in the air, disinfection and cleaning routines, mechanical impacts, high bioactivity, condensation, airborne chemical contaminants and required response time are some of the many considerations.

Plastic filter carrier

- Maximum temperature 120 °C
- Mechanical protection

Metal filter carrier

- Maximum temperature 200 °C
- Mechanical protection

Overview filters

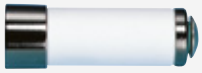
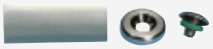
	Teflon filters	Polyethylene filters	MFD filters (membrane)	Polypropylene filters (screen)	Sintered steel filters (stainless steel)	Wire mesh filters (metal)
Maximum temperature (consider range of application of filter carrier)	200 °C	100 °C	120 °C	120 °C	200 °C	200 °C
Protection against particulates	✔✔	✔✔	✔		✔	✔
Protection against abrasives in the air					✔✔✔	✔
Fast response time (low damping)			✔	✔✔		
Pore size	10 µm	40 µm	-	150 µm	25 µm	10 µm
Max. air velocity [m/s] (continuous load)	50	50	15	10	70	50

✔ = low ✔✔ = medium ✔✔✔ = high

Suitable for standard probes HC2-S / HC2-S3 / Thread: Rotronic round thread

Order code	Filter carrier	Filter element	Pore size	Range of application	
NSP-PCB-PE	Polycarbonate, black	Polyethylene, gray	20 µm	-50...100 °C	
NSP-PCB-PE40		Polyethylene, white	40 µm		
NSP-PCB-WM		Wire mesh	20...25 µm		
NSP-PCB-TF		Teflon	10 µm		
NSP-PCB-MFD		MFD	–		
NSP-PCB-PP100		Polypropylene	150 µm		
NSP-PCB		No filter element, only carrier			
NSP-PCW-PE	Polycarbonate, white	Polyethylene, gray	20 µm	-50...100 °C	
NSP-PCW-PE40		Polyethylene, white	40 µm		
NSP-PCW-WM		Wire mesh	20...25 µm		
NSP-PCW-TF		Teflon	10 µm		
NSP-PCW		No filter element, only carrier			
NSP-PE	No carrier, only filter		20 µm	-50...100 °C	
Particulate filter / Waterproof					
NSP-POM-FD2	POM, white	Teflon	2 µm	-50...100 °C	

Suitable for industrial probes HC2-IC / HC2-HK
Thread: Rotronic round thread

Order code	Filter carrier	Filter element	Pore size	Range of application	
NSP-ME-WM	Brass, nickel-plated	Wire mesh DIN 1.4401	20...25 µm	-100...200 °C	
NSP-ME-SS		Sintered steel DIN 1.4401	5 µm	-100...200 °C	
NSP-ME-TF		Teflon	10 µm	-80...200 °C	
Spare parts					
SP-M15	No filter carrier, only filter	Wire mesh DIN 1.4401	20...25 µm	-100...200 °C	
SP-S15	No filter carrier, only filter	Sintered steel DIN 1.4401	5 µm	-100...200 °C	
SP-T15	No filter carrier, only filter	Teflon	10 µm	-80...200 °C	

Suitable for industrial probes HC2-IM / HC2-IE
Thread: M12 x 1.5

Order code	Filter carrier	Filter element	Pore size	Range of application	
SP-MC15	Brass, nickel-plated	Wire mesh DIN 1.4401	20...25 µm	-100...200 °C	
SP-SC15		Sintered steel DIN 1.4401	5 µm	-100...200 °C	
SP-TC15		Teflon	10 µm	-80...200 °C	
Spare parts					
SP-MSB15	Brass, nickel-plated	No filter element, only carrier		-100...200 °C	
SP-M15	No filter carrier, only filter	Wire mesh DIN 1.4401	20...25 µm	-100...200 °C	
SP-S15	No filter carrier, only filter	Sintered steel DIN 1.4401	5 µm	-100...200 °C	
SP-T15	No filter carrier, only filter	Teflon	10 µm	-80...200 °C	

Suitable for handheld probes HC2-HP28/HP50

Order code	Filter carrier	Filter element	Pore size	Range of application	
ET-Z10	No filter carrier, only filter	Sintered steel DIN 1.4401	5 µm	-40...85 °C	

Suitable for HF3

Order code	Filter carrier	Filter element	Pore size	Range of application	
NSP-PCG-PE	Polycarbonate, gray	Polyethylene, gray	20 µm	-40...85 °C	

Suitable for MP100A/400A

Order code	Filter carrier	Filter element	Pore size	Range of application	
SP-W3-25	Polycarbonate, white	Wire mesh	20 µm	-40...85 °C	

Suitable for web and water activity probes HC2-AW-USB, HC2-AW, BFC-UART

Order code	Description	
ET-W24-Set	Flat wire mesh filter with circlip, Ø 24 mm for HC2-AW (-USB) Pore size: 20...25 µm	

Suitable for HF1, CP11, CL11

Order code	Description	
NSP-PCB-PE-AZ	Polycarbonate filter for HF1, CP11, CL11, CF1	

The HygroFlex series

			
Transmitters	**HF1**	**HF3**	**HF4**
Range of application electronics with display option	-20...50 °C -20...50 °C	-40...60 °C -10...60 °C	-40...60 °C -10...60 °C
Temperature limits at probe	-20...50 °C	-40...60 °C	-50...100 °C
Accuracy at 23 °C	**Type W & D:** ‹± 2 %RH (10...90 %RH) at ±5 K **Type S:** ‹± 3 %RH (10...90 %RH) at ±5 K	±2 %RH ±0.3 K	±1 %RH ±0.2 K
FDA / GAMP conformity		✓	✓
Probes			
Probe connection	Not interchangeable	Not interchangeable	Not interchangeable
Housing			
Space mount version	✓	✓	
Wall version	✓	✓	✓
Duct version, 15 mm probe	✓	✓	✓
Duct version, 25/15 mm probe			
Cable version			
Display	✓	✓	✓
Keypad			✓
IP protection	IP65 (space mount version IP20)	IP65 (space mount version IP20)	IP65
Power supply			
15...40 VDC / 12...28 VAC	✓	✓	✓
15...40 VDC / 12...28 VAC galvanically isolated			
85...240 VAC galvanically isolated			
Power over Ethernet (POE)			
Output			
2 or 2 x 2-wire: current output	2x	2x	2x
3/4-wire: current or voltage output	2x	2x	2x
RS-485			✓
Ethernet			✓
Wireless			✓
Analog and digital signals			
Functions			
Data logging			
Relay			
Hygrostat / Thermostat			
Beep tone			
Analog input			
Psychrometric parameters		Dew/Frost point	Dew/Frost point

The HygroFlex series

			
Transmitters	**HF5 / HS5**	**HF7**	**HF8**
Range of application electronics with display option	-40…60 °C -10…60 °C	-40…85 °C -10…60 °C	-40…85 °C -10…60 °C
Temperature limits at probe	Probe dependent	-50…100 °C (type W) -100…150 °C (type D) -100…200 °C (type C)	Probe dependent
Accuracy at 23 °C	Probe dependent	±1 %RH ±0.2 K	Probe dependent
FDA / GAMP conformity	✓	✓	✓
Probes			
Probe connection	1x interchangeable HC2 probe	Not interchangeable	2x interchangeable HC2 probes
Housing			
Space mount version			
Wall version	✓	✓	✓
Duct version, 15 mm probe	✓	✓	
Duct version, 25/15 mm probe		✓	
Cable version		✓	
Display	✓	✓	✓
Keypad	✓		✓
IP protection	IP65	IP67	IP65
Power supply			
15…40 VDC / 12…28 VAC	✓	✓	✓
15…40 VDC / 12…28 VAC galvanically isolated	✓		✓
85…240 VAC galvanically isolated	✓		✓
Power over Ethernet (POE)	✓		
Output			
2 or 2 x 2-wire: current output	2x	2x	
3/4-wire: current or voltage output	2x	2x	4x
RS-485	✓		✓
Ethernet	✓		✓
Wireless	✓		
Analog and digital signals	✓		✓
Functions			
Data logging			✓
Relay	HS5		4 (2 relays with Ethernet option)
Hygrostat / Thermostat	HS5		✓
Beep tone			✓
Analog input			✓
Psychrometric parameters	All	Dew/Frost point	All

HF1 series

HygroFlex1 is the low-cost series of HVAC transmitters for relative humidity and temperature. The devices are equipped with the tried-and-tested Hygromer® IN-1 sensor and boast unbeatable value for money. The freely available Rotronic SW21 software enables you to change the output scaling, calibrate the transmitter and adjust the humidity sensor.

FEATURES

- Accuracy: ±2 %RH, ±0.3 K, at 23 °C ±5 K
- Range of application: -20…50 °C / 0…100 %RH
- Small size
- Easy mechanical installation
- USB service interface
- Adjusted at 35 %RH / 80 %RH

Power supply

- Low voltage: 2 x 2- or 3-wire

Signal outputs

- Current output
- Voltage output

Versions

- Space mount version with integrated probe
- Duct version (D)
- Wall version (W)

Output parameters

- Humidity & temperature

Output scaling

- Relative humidity: range selectable, standard 0…100 %RH
- Temperature: range selectable, standard: 0…50 °C

Display

- Display with or without backlight
- Without display

HF1 wall and duct versions

APPLICATIONS

Measures relative humidity and temperature in HVAC applications.

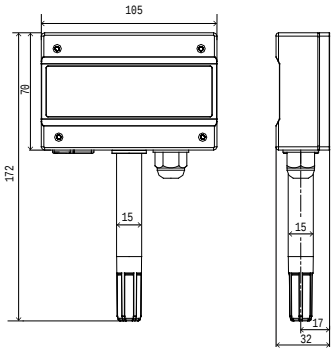
2 or 2x2-wire

Order code	HF120
Output signal	4...20 mA
Supply voltage	10...28 VDC
Display	Optional (without backlight)
Temperature range	Scalable
Probes	Not interchangeable Standard, duct probe 100 mm (optional, duct probe 300 mm)
Filter type	Polyethylene

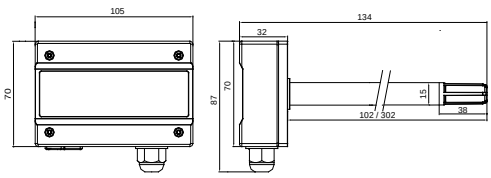
3-wire

Order code	HF13x
Output signal	0...10 V 4...20 mA Only voltage output can be changed
Supply voltage	15...40 VDC / 12...28 VAC
Display	Optional (without backlight)
Temperature range	Scalable
Probes	Not interchangeable Standard, duct probe 100 mm (optional, duct probe 300 mm)
Filter type	Polyethylene

Wall version



Duct version



Compatible

- SW21 PC software

Delivery package

- Factory adjustment certificate
- Short instruction manual

Recommended accessories

• USB service cable	AC0003
• Calibration device	ER-15
• Mounting flange	AC5005

HF1 space mount version

APPLICATIONS

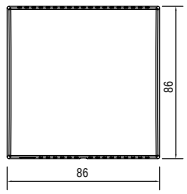
Offices or rooms where good looks are important.

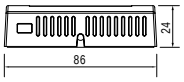
2 or 2x2-wire

Order code	HF120
Output signal	4...20 mA
Supply voltage	10...28 VDC
Display	Optional (without backlight)

3-wire

Order code	HF13x
Output signal	0...1 V / 0...5 V / 0...10 V / 4...20 mA Only voltage output can be changed
Supply voltage	15...40 VDC / 12...28 VAC
Display	Optional (with backlight)





Technical data	HF1 Analog 2-wire	HF1 Analog 3-wire
General		
Parameters	Humidity and temperature	
Housing material / IP protection	ABS / IP65, except type S IP20	
Dimensions	105 x 172 x 32 mm (type W), 105 x 87 x 134(334) mm (type D), 86 x 86 x 24 mm (type S)	
Weight	140 g	
Probe connection	Fixed	
Filter material	Polyethylene	
Display	LCD, 1 or 2 decimals, without backlight	LCD, 1 or 2 decimals, with backlight
Electrical connections	Connections: screw terminals inside (type D/W) Cable gland: M12	
Power supply	10...28 VDC	15...40 VDC / 12...28 VAC
Current consumption	2x20 mA max.	‹55 mA (current output) ‹15 mA (voltage output)
Range of application	-20...50 °C / 0...100 %RH (non-condensing)	
Service interface	USB-Mini	
CE / EMC compatibility	EMC Directive 2014/30/EU	
Humidity measurement		
Sensor	ROTRONIC HYGROMER® IN-1	
Measurement range	0...100 %RH	
Accuracy at 23°C ±5 K	±3.0 %RH (10...90 %RH)	
Long-term stability	‹1.5 %RH/year	
Response time	‹30 s τ63 (63 % increase 35...80 %RH) without filter	
Maximum wind velocity	20 m/s with filter	
Temperature measurement		
Sensor	NTC	
Measurement range	-20...50 °C / 0...100 °F	
Accuracy at 23°C ±5 K	±0.3 K (type W, type D), ±1 K (type S)	
Response time	4 s	
Analog output		
Number	2	
Current	4...20 mA	4...20 mA
Voltage	N/A	0...1/5/10 V

HF3 series

The HygroFlex3 series is ideal for rooms where exact measurement of humidity and temperature is important. The transmitters can be used in a wide range of industries for HVAC applications, greenhouses, museums, storage rooms, libraries, swimming pools or for climate control in office buildings.

FEATURES

- Accuracy: ±2 %RH, ±0.3 K at 23 °C ±5 K
- Temperature limit at probe: -40...60 °C / 0...100 %RH
- Range of application electronics: -40...60 °C / 0...100 %RH
- -10...60 °C with display
- Service interface
- Adjusted at 23 °C and 35, 80 %RH

Power supply

- Low voltage: 2 x 2- or 3-wire

Signal outputs

- Current output
- Voltage output

Versions

- Space mount version with integrated probe
- Space mount version with fixed probe, retractable
- Wall mount (W)
- Duct mount (D)

Output parameters

- Humidity & temperature
- Humidity only or temperature only
- Temperature
- Temperature & dew point

Output scaling

- Relative humidity: range selectable, standard 0...100 %RH
- Temperature: range selectable, standard: 0...50 °C
- Dew point: range selectable

Display

- Display with or without backlight
- Without display

HF3 space mount version

APPLICATIONS

Offices or rooms where good looks are important.

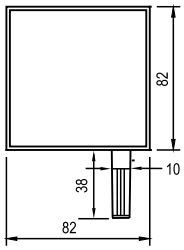
2 or 2x2-wire

Order code	HF320 Type S	HF320 Type R
Output signal	4...20 mA	
Supply voltage	10...28 VDC	
Display	Optional (without backlight)	
Temperature range	Scalable*	
Probes	Fixed internal	Retractable

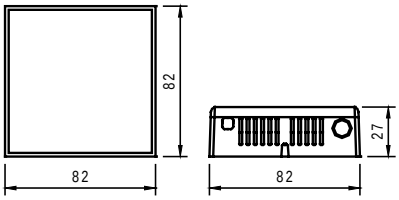
3-wire

Order code	HF33x Type S	HF33x Type R
Output signal	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*	
Supply voltage	18...40 VDC / 13...28 VAC	
Display	Optional (with backlight)	
Temperature range	Scalable*	
Probes	Fixed internal	Retractable

Type R



Type S



Compatible

- HW4 software

Recommended accessories

- Service cable AC3006 / AC3009*

Delivery package

- Factory adjustment certificate
- Short instruction manual

* Requires optional HW4 software and service cable

HF3 wall and duct versions

APPLICATIONS
Heating, ventilation, air-conditioning.

2 or 2x2-wire

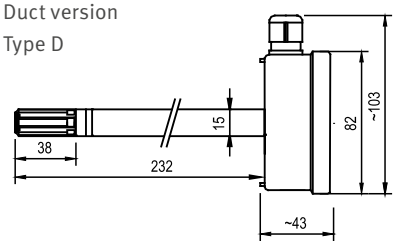
Order code	HF320 Type S
Output signal	4...20 mA
Supply voltage	10...28 VDC

3/4-wire

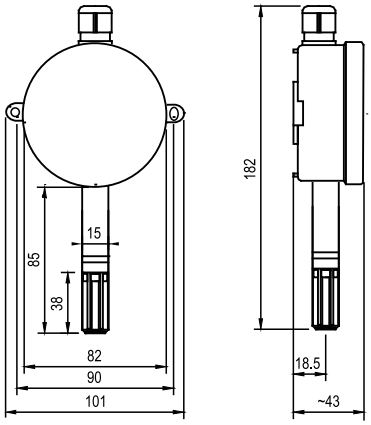
Order code	HF33x Type W/D
Output signal	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*
Supply voltage	18...40 VDC / 13...28 VAC

Temperature range	Scalable*
Probes	Fixed
Filter type	Polyethylene

Duct version
Type D



Wall version
Type W



Compatible

- HW4 software

Delivery package

- Factory adjustment certificate
- Short instruction manual

Recommended accessories

• Service cable	AC3006 / AC3009*
• Replacement filter, PE, gray	NSP-PCG-PE
• Calibration device	ER-15
• Mounting flange	AC5005

* Requires optional HW4 software and service cable

Technical data	HF320 Analog 2-wire	HF33x Analog 3-wire
General		
Parameters	Humidity and temperature	
Calculated parameters	Dew/Frost point	
Housing material / IP protection	ABS / IP65, except type R/S IP20	
Dimensions	101 x 182 x 43 mm (type W), 103 x 82 x 278 mm (type D), 82 x 82 x 27 mm (type S), 120 x 82 x 27 mm (type R)	
Weight	140 g	
Probe material	Polycarbonate	
Probe connection	Fixed, type R retractable	
Filter material	Polyethylene	
Display (only type R/S)	LCD, 1 or 2 decimals, without backlight	LCD, 1 or 2 decimals, with backlight
Electrical connections	Type D/W: screw terminals inside, M16 cable gland	
Power supply	10...28 VDC	18...40 VDC / 13...28 VAC
Current consumption	2x20 mA max.	‹60 mA DC / ‹150 mA AC (type W/D) ‹100 mA DC / ‹250 mA AC (type R/S)
Application temperature / Storage conditions	-40...60 °C / 0...100 %RH, -10...60 °C (with display)	
Measurement range	-40...60 °C	
Firmware upgrade	Via HW4 software	
Service interface	UART service interface (Universal Asynchronous Receiver Transmitter)	
CE / EMC compatibility	EMC Directive 2014/30/EU	
Fire protection class	Corresponds to UL94-HB	
FDA / GMP compatibility	Conforms to 21 CFR Part 11 and GAMP5	
Humidity measurement		
Sensor	ROTRONIC HYGROMER® IN-1	
Measurement range	0...100 %RH	
Accuracy at 23°C ±5 K	±2.0 %RH / ±1.0 %RH (type R)	
Adjustment at 23 °C	35, 80 %RH	
Long-term stability	‹1 %RH/year	
Response time	‹15 s t63 (63 % increase 35...80 %RH) without filter	
Maximum wind velocity	20 m/s with filter	
Temperature measurement		
Sensor	PT100 Class A	
Measurement range	-40...60 °C / -40...140 °F	
Accuracy at 23°C ±5 K	±0.3 K / ±0.2 K (type R)	
Adjustment points	1	
Long-term stability	‹0.1 °C / year	
Response time	‹15 s t63 (63 % increase 35...80 %RH) without filter	
Scale limits	-999...+9999 units	
Analog output		
Number	2	
Current	4...20 mA	0/4...20 mA
Voltage	N/A	0...1/5/10 V
Maximum load	≤2x500 Ω (current output)	≤2x500 Ω (current output) ≥1 kΩ/V (voltage output)
Accuracy at 23 °C	0.03 mA	0.02 mA 2 mV (0...1 V), 5 mV (0...10 V)

HF4 series

The HygroFlex4 series is ideal for all applications where exact measurement of humidity and temperature is critical.

FEATURES

- Accuracy: ±1 %RH, ±0.2 K, at 23 °C ±5 K
- Temperature limit at probe: -50...100 °C / 0...100 %RH
- Range of application electronics: -40...60 °C / 0...100 %RH; -10...60 °C with display
- Service interface
- Adjusted at 23 °C and 10, 35, 80 %RH

Power supply

- Low voltage: 2x2 or 3-wire

Signal outputs

- Current output
- Voltage output

Versions

- Wall version (W)
- Duct version (D)

Output parameters

- Humidity & temperature
- Humidity
- Temperature
- Humidity & dew point

Output scaling

- Relative humidity: range selectable, standard 0...100 %RH
- Temperature: range selectable, standard: 0...50 °C
- Dew point: range selectable

Display

- Display with backlight (excl. 2-wire), trend indicators and keypad
- Without display

HF4 wall and duct versions

APPLICATIONS

HVAC applications, greenhouses, museums, storage rooms, libraries, swimming pools, climate control in office buildings

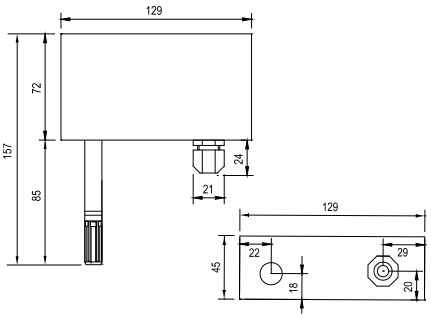
2 or 2x2-wire

Order code	HF420 Type W/D
Output signal	4...20 mA
Supply voltage	10...28 VDC
Display	Optional (without backlight, keypad) Type D only horizontal version possible with display (see pictures)
Temperature range	Scalable*
Probes	Fixed
Filter type	Polyethylene

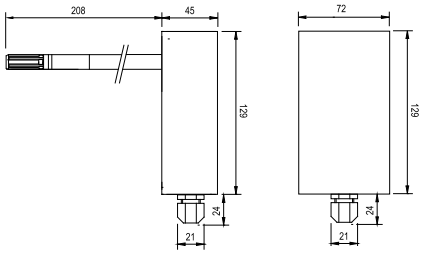
3-wire

Order code	HF43x Type W/D
Output signal	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*
Supply voltage	18...40 VDC 13...28 VAC
Display	Optional (with backlight, keypad) Type D only horizontal version possible with display (see pictures)
Temperature range	Scalable*
Probes	Fixed
Filter type	Polyethylene

Wall version, type W



Duct version, type D



Compatible

- HW4 software

Delivery package

- Factory adjustment certificate
- Short instruction manual
- Mounting flange (type D)

Recommended accessories

• Service cable	AC3006 / AC3009*
• Replacement filter, PE, black	NSP-PCB-PE
• Calibration device	ER-15
• Mounting kit DIN top-hat rail (type W)	AC5002

* Requires optional HW4 software and service cable

Technical data	HF420 Analog 2-wire	HF43x Analog 3-wire
General		
Parameters	Humidity and temperature	
Calculated parameters	Dew/Frost point	
Housing material / IP protection	ABS / IP65	
Dimensions	129 x 157 x 45 mm (type W), 129 x 253 x 72 mm (type D)	
Weight	220 g	
Probe material	Polycarbonate	
Probe connection	Fixed	
Filter material	Polyethylene	
Display	LCD, 1 or 2 decimals without backlight, menu navigation, 4 keys	LCD, 1 or 2 decimals with backlight, menu navigation, 4 keys
Electrical connections	Screw terminals inside, M16 cable gland	
Power supply	10...28 VDC	18...40 VDC / 13...28 VAC
Current consumption	2 x 20 mA max.	‹270 mA
Application temp. housing / electronics	-40...60 °C / -10...60 °C (with LCD), 0...100 %RH	
Measurement range	-50...100 °C	
Firmware upgrade	Via HW4 software	
Service interface	UART service interface (Universal Asynchronous Receiver Transmitter)	
CE / EMC compatibility	EMC Directive 2014/30/EU	
Fire protection class	Corresponds to UL94-HB	
FDA / GMP compatibility	Conforms to 21 CFR Part 11 and GAMP5	
Humidity measurement		
Sensor	ROTRONIC HYGROMER® IN-1	
Measurement range	0...100 %RH	
Accuracy at 23 °C ±5 K	±1.0 %RH	
Adjustment at 23 °C	10, 35, 80 %RH	
Long-term stability	‹1 %RH/year	
Response time	‹15 s τ63 (63 % increase 35...80 %RH) without filter	
Maximum wind velocity	20 m/s with polyethylene filter	
Temperature measurement		
Sensor	PT100 1/3 Class B	
Measurement range	-50...100 °C / -58...212 °F	
Accuracy at 23 °C ±5 K	±0.2 K	
Adjustment points	1	
Long-term stability	‹0.1 °C / year	
Response time	‹15 s τ63 (63 % increase 35...80 %RH) without filter	
Analog output		
Number	2	
Current	4...20 mA	0/4...20 mA
Voltage	N/A	0...1/5/10 V
Maximum load	≤2x500 Ω (current output)	≤2x500 Ω (current output) ≥1 kΩ/V (voltage output)
Accuracy at 23 °C	0.03 mA	0.02 mA 2 mV (0...1 V), 5 mV (0...10 V)

HF5 series

The HF5 series is compatible with HygroClip2 probes with integrated AirChip technology – which achieve excellent accuracy thanks to their precision. This generation of instruments includes unique calibration and adjustment functions.

FEATURES

- Interchangeable HC2 probes
- Housing material: ABS / Aluminum
- Accuracy: See chapter «Probes»
- Temperature limit at probe: See chapter «Probes»
- Range of application electronics: -40…60 °C / 0…100 %RH; -10…60 °C with display
- Digital outputs, also combinable with analog outputs
- Use as %RH / °C simulator for system validation *
- Service interface

Power supply

- Low voltage: 2x2 or 3-wire
- Low voltage, galvanically isolated; 4-wire
- Mains voltage, galvanically isolated; 4-wire

Signal outputs

- Current outputs, voltage outputs
- RS-485, USB, Ethernet

Versions

- Wall mount (W), duct mount (D), cable version (C) with a selected probe

Output parameters

- Humidity & temperature
- Humidity & a psychrometric parameter
- Temperature & psychrometric parameters

Output scaling

- Relative humidity: range selectable, standard scale 0…100 %RH
- Temperature: range selectable, standard scale 0…50 °C
- Psychrometric parameters: range selectable

Available with ATEX certificate

Display

- Display with backlight (excl. 2-wire), trend indicators and keypad
- Without display

* Requires optional HW4 software and service cable

HF5 wall and duct versions

APPLICATIONS

HVAC applications, food and pharmaceutical industries, printing and paper industries, meteorology, agriculture, archaeology.

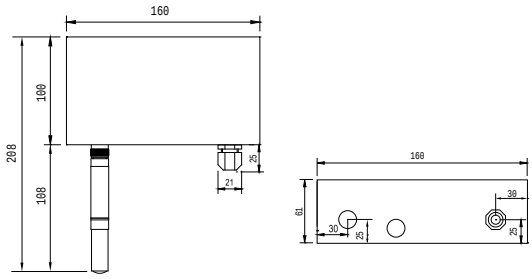
2x2-wire

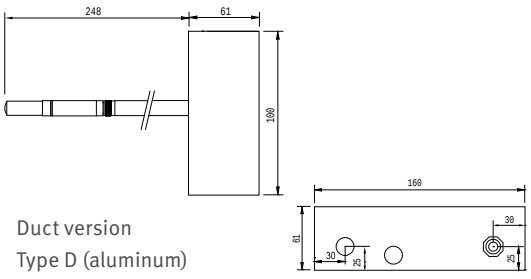
Order code	HF520 Type W/D
Output signal	4...20 mA
Supply voltage	10...28 VDC

3/4-wire

Order code	HF5xx Type W/D	
Output signal	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*	RS-485 Ethernet (not for aluminum version)
Supply voltage	Low voltage: 15...40 VDC / 12...28 VAC Galvanically isolated: 9...36 VDC / 7...24 VAC (not for aluminum version)	
Housing	ABS or aluminum	
Display	Optional (with backlight, keypad) Type D only horizontal version possible with display (see pictures)	
Output ranges	Scalable*	
Probes	1 interchangeable HC2 probe input	

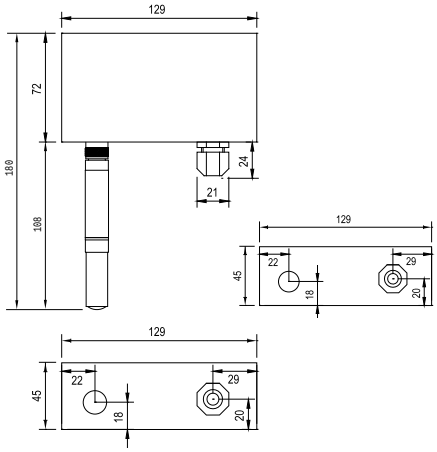
Wall version
Type W (aluminum)

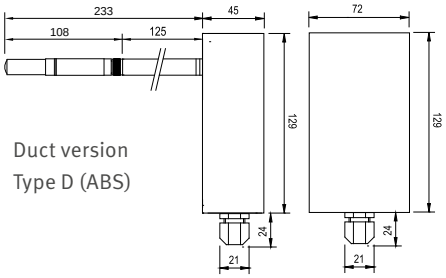




Duct version
Type D (aluminum)

Wall version
Type W (ABS)





Duct version
Type D (ABS)

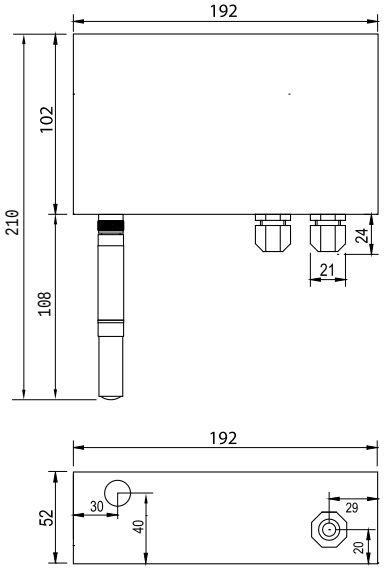
* Requires optional HW4 software and service cable

HF5 wall versions

4-wire mains voltage

Order code	**HF5xx Type W/D**	
Output signal	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*	RS-485 Ethernet
Supply voltage	Mains voltage: 100...240 VAC	
Versions	Type W	
Display	Optional (with backlight, keypad)	
Probes	1 interchangeable HC2 probe input	
Output ranges	Scalable*	
Housing	ABS	

Wall version type W



Compatible

- All HC2 probes (order separately)
- HW4 software

Delivery package

- Product qualification
- Short instruction manual
- Mounting flange (type D)

Recommended accessories

• Standard climate probe	HC2A-S
• Probe extension cable 2 m	E2-02A
• Service cable:	AC3006*
• Mounting kit DIN top-hat rail (type W)	AC5002
• Calibration cable with HP23	AC2001

* Requires optional HW4 software and service cable

Technical data	HF520 2-wire	HF53/4/x 3-wire	HF56x, mains voltage 4-wire
General			
Parameters	Humidity and temperature		
Calculated parameters	All psychrometric parameters		
Housing material / IP protection	ABS / IP65 (models with USB or Ethernet interface, IP40), Al/IP65 (also with Ethernet interface)		
Dimensions	ABS: 129 x 72 x 45 mm (type D/W) Al: 160 x 100 x 61 mm		192 x 102 x 52 mm (type D/W)
Weight	ABS: 220 g	ABS: 220 g, Al: 750 g	ABS: 500 g
Probe connection / Interface	E2 (threaded coupling) / UART		
Display	LCD, 1 or 2 decimals, without backlight, menu navigation, 4 keys	LCD, 1 or 2 decimals, with backlight, Menu navigation, 4 keys	
Electrical connections	Screw terminals inside M16 cable gland Socket (USB/Ethernet)		2xM16 Cable gland
Power supply	10...28 VDC min 10 + 0.02 x load	15...40 VDC/12...28 VDC galvanically. isolated 9...36 VDC / 7...24 VAC	100...240 VAC
Current consumption	2 x 20 mA max.	270 mA max. (without Ethernet) 420 mA max. (with Ethernet)	30 mA max. (without Ethernet) 45 mA max. (with Ethernet)
Start-up time	1 min		
Application temp. housing / electronics	-40...60 °C / -10...60 °C (with display), 0...100 %RH		
Firmware upgrade	Via HW4 software		
Service interface	UART service interface (Universal Asynchronous Receiver Transmitter)		
CE / EMC compatibility	EMC Directive 2014/30/EU		
Fire protection class	Corresponds to UL94-HB		
FDA / GMP compatibility	Conforms to 21 CFR Part 11 and GAMP5		
Humidity measurement			
Humidity measurement	Probe dependent)		
Temperature measurement			
Temperature measurement	Probe dependent		
Analog output			
Number	2		
Current	4...20 mA	0/4...20 mA	
Voltage	N/A	0...1/5/10 V	
Galvanic isolation	N/A	HF54 and HF56	
Maximum load	2x500 Ω	≤2x500 Ω (current output) ≥1 kΩ/V (voltage output)	
Accuracy at 23 °C	0.02 mA	0.02 mA 10 mV	
Digital output			
RS-485	No digital outputs	RS-485 & analog	
USB		USB & RS-485 & analog	
Ethernet		Ethernet RJ45 & RS-485 & analog	

HF7 series

The HygroFlex HF7 transmitters are used wherever harsh environments demand an optimal solution. There is hardly an industrial process in which humidity, temperature or dew point / frost point does not need to be considered.

FEATURES

- Accuracy: ±1.0 %RH, ±0.2 K, at 10...30 °C
- Temperature limit at probe: max. -100...200 °C[1]
  0...100 %RH
- Range of application electronics: -40...85 °C / 0...100 %RH
  -10...60 °C with display
- Aluminum diecast housing and probe of stainless steel or PEEK
- Various probe lengths available
- Use as a %rh/°C simulator for system validation *
- Service interface
- Adjusted at 23 °C and 10, 35, 80 %RH

Power supply

- Low voltage: 2x2 or 3-wire

Signal outputs

- Current outputs, voltage outputs

Versions

- Wall version (W), duct version (D), cable version (C)

Output parameters

- Humidity & temperature
- Humidity
- Temperature
- Humidity & dew point
- Temperature & dew point

Output scaling

- Relative humidity: range selectable, standard scale 0...100 %RH
- Temperature: range selectable, standard: -50...100 °C
- Dew/Frost point: range selectable

Display

- Display with backlight (excl. 2-wire), trend indicators
- Without display

* Requires optional HW4 software and service cable

[1] Short-term peak load (3 x 5 min)

HF7 wall and duct versions

APPLICATIONS

Measures relative humidity, temperature and dew/frost point in industrial environments and outdoors. For use in harsh conditions.

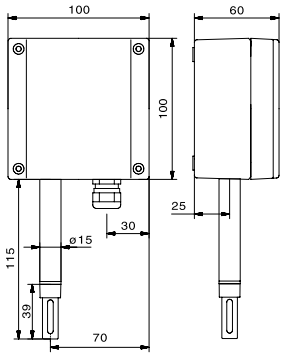
2 or 2x2-wire

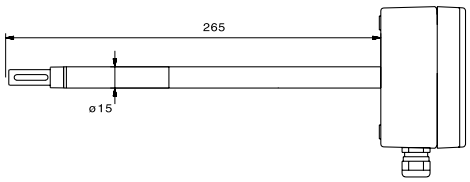
Order code	HF720
Output signal	4...20 mA
Supply voltage	10...28 VDC
Probes	Fixed, PEEK
Display	Optional (without backlight)
Output ranges	Scalable*
Temperature limit at probe	-50...100 °C (type W) -100...150 °C (type D)
Filter carrier	Slotted sleeve (order filter separately)

3-wire

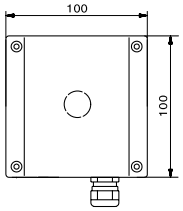
Order code	HF73x
Output signal	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*
Supply voltage	18...40 VDC / 13...28 VAC
Probes	Fixed, PEEK / stainless steel
Display	Optional (with backlight)
Output ranges	Scalable*
Temperature limit at probe	-50...100 °C (type W) -100...150 °C (type D)
Filter carrier	Slotted sleeve (order filter separately)

Wall version type W





Duct version
Type D



* Requires optional HW4 software and service cable

HF7 cable version

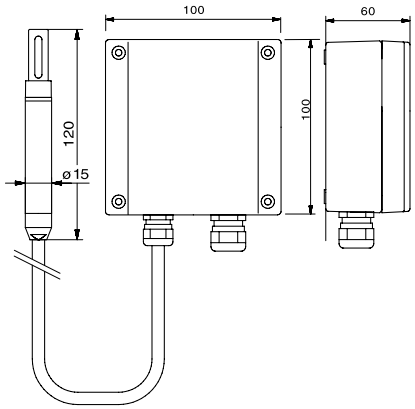
2 or 2x2-wire

Order code	HF720
Output signal	4...20 mA
Supply voltage	10...28 VDC
Probes	Fixed, PEEK with 2 meter cable
Display	Optional (without backlight)
Output ranges	Scalable*
Temperature limit at probe	-100...200 °C [1]
Filter carrier	Slotted sleeve (order filter separately)

3-wire

Order code	HF73x
Output signal	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*
Supply voltage	18...40 VDC / 13...28 VAC
Probes	Fixed, PEEK with 2 meter cable Fixed, stainless steel with 2 meter cable
Display	Optional (with backlight)
Output ranges	Scalable*
Temperature limit at probe	-100...200 °C [1]
Filter carrier	Slotted sleeve (order filter separately)

Cable version
Type C



Compatible

- HW4 software

Delivery package

- Factory adjustment certificate
- Product qualification
- Short instruction manual
- Note: filter must be ordered separately

Recommended accessories

• Teflon filter	SP-T15
• Sintered steel filter	SP-S15
• Wire mesh filter	SP-M15
• Service cable	AC3006 / AC 3009*
• Mounting gland	AC1303-M

* Requires optional HW4 software and service cable

[1] Short-term peak load (3 x 5 min)

Technical data	HF720, analog 2-wire	HF73x, analog 3-wire
General		
Parameters	Humidity and temperature	
Calculated parameters	Dew/Frost point	
Housing material / IP protection	Aluminum / IP67 (without display) IP65 (with display)	
Dimensions	215 x 100 x 60 mm (type W), 325 x 100 x 100 (type D), 100 x 100 x 60 (type C)	
Weight	600 g + 140 g per probe extension unit (150 mm)	
Probe material	PEEK	PEEK or stainless steel 1.4305
Probe connection	Fixed, possible with 2/5 meter cable (type C)	
Filter carrier	Slotted sleeve	
Filter material	Filter is not supplied with transmitter (must be ordered separately)	
Display	LCD, 1 or 2 decimals, without backlight	LCD, 1 or 2 decimals, with backlight
Electrical connections	Screw terminals inside, M16 cable gland	
Power supply	10...28 VDC, min 10 + 0.02 x load	18...40 VDC / 13...28 VAC
Current consumption	2 x 20 mA max.	150 mA max.
Application temp. housing / electronics	-40...85 °C / -10...60 °C (with LCD), 0...100 %RH	
Measurement range	-100...100 °C (type W) -100...150 °C (type D) -100...200 °C[1] (type C)	
Firmware upgrade	Via HW4 software	
Service interface	UART service interface (Universal Asynchronous Receiver Transmitter)	
CE / EMC compatibility	EMC Directive 2014/30/EU	
Fire protection class	Non flammable	
FDA / GMP compatibility	Conforms to 21 CFR Part 11 and GAMP5	
Humidity measurement		
Sensor	ROTRONIC HYGROMER® IN-1	
Measurement range	0...100 %RH	
Accuracy at 10...30 °C	±1.0 %RH	
Adjustment at 23 °C	10, 35, 80 %RH	
Long-term stability	<1 %RH/year	
Response time	<15 s τ63 (63 % increase 35...80 %RH) without filter	
Temperature measurement		
Sensor	PT100 Class A	
Measurement range	Dependent on probe type, see application temperature for probe	
Accuracy at 10...30 °C	±0.2 K	
Adjustment points	1	
Long-term stability	<0.1 °C / year	
Response time	<15 s τ63 (63 % increase 35...80 %RH) without filter	
Analog output		
Number	2	
Current	4...20 mA	0/4...20 mA
Voltage	N/A	0...1/5/10 V
Maximum load	2x500 Ω	≤2x500 Ω (current output) ≥1 kΩ/V (voltage output)
Accuracy at 23 °C	0.03 mA	0.02 mA 2 mV (0...1 V), 5 mV (0...10 V)

[1] Short-term peak load (3 x 5 min)

HF8 series

The HF8 is ideal for all applications where high accuracy measurement of humidity and temperature is critical. Thanks to its multifunctional design, it can be used in practically all industrial applications.

FEATURES

- 2 interchangeable HC2 or analog probes
- Range of application electronics: -40...60 °C / 0...100 %RH, -10...60 °C with display
- Digital outputs, also combinable with analog outputs
- Analog inputs
- Data logging, up to 10,000 measured values
- Relay outputs
- Use as a %rh / °C simulator for system validation *
- Service interface

Power supply

- Low voltage: 3-wire
- Low voltage, galvanically isolated; 4-wire
- Mains voltage, galvanically isolated; 4-wire

Signal outputs

- Current outputs, voltage outputs
- RS-485, Ethernet, switch outputs (relays)

Versions

- Wall mount (W), cable mount (C)

Output parameters

- Humidity & temperature
- Humidity & a psychrometric parameter
- Temperature & a psychrometric parameter

Output scaling

- Relative humidity: range selectable, standard scale 0...100 %RH
- Temperature: range selectable, standard scale 0...50 °C
- Psychrometric parameters: range selectable

Display

- Display with backlight, trend indicators and keypad
- Without display

* Requires optional HW4 software and service cable

HF8 wall version

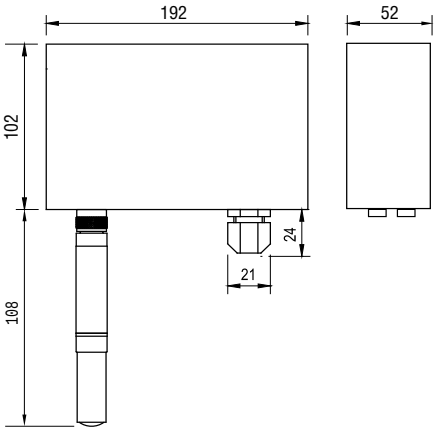
APPLICATIONS

HVAC, industry, pharmaceutical industry.

3/4-wire

Order code	HF5xx Type W/D	
Output signal	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*	RS-485 Ethernet Relays
	Analog and digital combinable	
Supply voltage	Low voltage: 15...40 VDC / 12...28 VAC Galvanically isolated: 9...36 VDC / 7...24 VAC Mains voltage: 85...265 VAC	
Versions	Type W, type D (only horizontal possible)	
Display	Optional (with backlight, keypad)	
Output ranges	Scalable*	
Probes	2 interchangeable HC2 probes	

Wall version
Type W



Compatible

- All HC2 probes (order separately)
- HW4 software

Delivery package

- Product qualification
- Short instruction manual

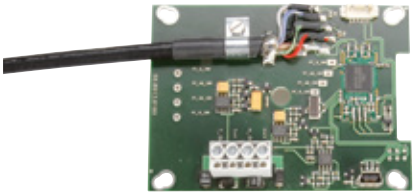
Recommended accessories

• Standard climate probe	HC2A-S
• Industrial probe	HC2A-IC102
• Probe extension cable 2 m	E2-02A
• Service cable	AC3006 / AC 3009*
• Mounting kit DIN top-hat rail	AC5002

* Requires optional HW4 software and service cable

Technical data	HF832 Low voltage	HF842 Low voltage, galvanically isolated	HF862 Mains voltage, galvanically isolated
General			
Parameters	Humidity and temperature		
Calculated parameters	All psychrometric parameters		
Housing material / IP protection	ABS / IP65 (models with Ethernet interface, IP40)		
Dimensions /Weight	192 x 102 x 52 mm / 550 g		
Probe connection / Interface	E2 (threaded coupling) / UART		
Display	LCD, 1 or 2 decimals, with backlight, menu navigation, 4 keys		
Electrical connections	Screw terminals inside M16 cable gland Socket (Ethernet)		2xM16 cable gland
Power supply	15...40 VDC 14...28 VAC	9...36 VDC 7...24 VAC	85...265 VAC
Current consumption	380 mA max.		20 mA max. (without Ethernet) 60 mA max. (with Ethernet)
Application temp. housing / electronics	-40...85 °C (-10...60 °C with display), 0...100 %RH		
Firmware upgrade	Via HW4 software		
Service interface	UART service interface (Universal Asynchronous Receiver Transmitter)		
CE / EMC compatibility	EMC Directive 2014/30/EU		
Fire protection class	Corresponds to UL94-HB		
FDA / GMP compatibility	Conforms to 21 CFR Part 11 and GAMP5		
Humidity measurement			
Humidity measurement	Probe dependent		
Temperature measurement			
Temperature measurement	Probe dependent		
Analog output			
Number	4		
Current	0/4...20 mA		
Voltage	0...1/5/10 V		
Galvanic isolation	N/A	Yes	
Maximum load	≤4x500 Ω (current output) ≥1 kΩ/V (voltage output)		
Accuracy at 23 °C	0.02 mA 10 mV		
Digital output			
RS-485	RS-485 & analog		
Ethernet	Ethernet RJ45 & RS-485 & analog		
Switch output			
Type	Relay (change-over switch, switch, pulse)		
Number	4 (except models with Ethernet 2)		
Switch parameters	Every probe and parameter		
Breaking capacity	250 VAC / 2 A at ohmic load		
Analog input			
Supply	Max. 5V / 10mA		
Pull-up load	1 MΩ / 5 V		
Pull-down load	130 Ω		

XB



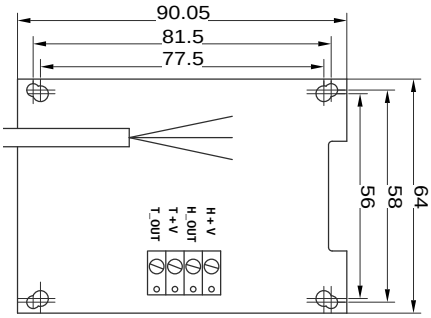
The XB OEM transmitter consists of a cable probe, a printed circuit board and an optional housing. Thanks to its compact size, high accuracy and choice of analog outputs, the transmitter can be adapted to meet customer requirements and used practically everywhere.

APPLICATIONS

Climate chambers, incubators, monitoring of industrial processes, etc.

FEATURES

- Accuracy: ±1.0 %RH, ±0.2 K, at 10...30 °C
- Range of application: probe dependent up to 0...100 %RH / -100 to 200 °C[1]
- Range of application: electronics -40...85 °C
- Large choice of probes
- Freely scalable analog outputs
- Simulator mode*



Power supply

- 2-wire (XB20), low voltage 3/4 wire (XB3X)

Signal outputs

- Current outputs, voltage outputs

Versions

- Printed circuit board with cable probe (C)

Probes

- PEEK and chrome steel probes
- Probe diameter: 15 mm or 25/15 mm
- Probe length up to 720 mm
- Cable lengths 2 and 5 m

Output parameters

- Humidity & temperature
- Dew or frost point & temperature or humidity

PEEK probe Ø15 mm

PEEK probe Ø15/25 mm

Chrome steel probe Ø 15mm

Compatible

- HW4 software

Delivery package

- Factory adjustment certificate
- Short instruction manual
- Note: a filter must be ordered separately

Recommended accessories

- Wire mesh (SP-M15), sinter steel (SP-S15) and Teflon (SP-T15) filters
- Service cable AC3006 / AC 3009*

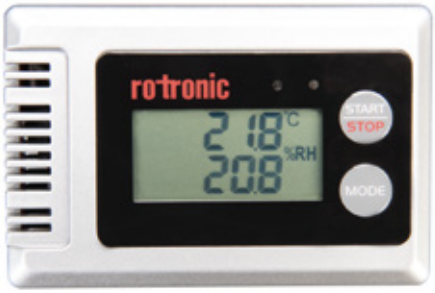
* Requires optional HW4 software and service cable

[1] Short-term peak load (3 x 5 min)

Overview

	Basic		Compact	High-end
				
	HL-1D	**BL-1D**	**HL-20**	**HL-NT series**
Memory capacity	32,000 lines (each line contains %RH + °C)	64'000 lines	20,000 lines	47,000 measured values per MB on memory card
Sensor	HYGROMER IN-1 / NTC	BOSCH BMP280 / HYGROMER IN-1 / NTC	HYGROMER IN-1 / Pt100 Class A	Probe dependent
Range of application	-30...70 °C 0...100 %RH	-30...70 °C 0...100 %RH	-10...60 °C 0...100 %RH	-30...70 °C 0...100 %RH (-10...60 °C, with display)
Calculations	–	–	Dew/Frost point	All psychrometric parameters
Power supply	1x CR2 battery	1 x CR2 battery	3x AA batteries	9 V battery/Rechargeable battery/Mains
Configurable logging interval	Yes			
Programmable alarms	Yes			
Interface	USB	USB	UART, requires AC3006 service cable	Docking station
FDA / GMP compatibility	21 CFR Part 11 / GAMP5-compliant HW4 software	21 CFR Part 11 / GAMP5-compliant HW4 software	Yes	Yes
IP protection	IP67	IP67	IP40	IP40
Standards	EN 12830	EN12830	–	–
CE / EMC compatibility	Yes			

HygroLog HL-1D



Basic logger

The HL-1D is the smallest humidity logger available from Rotronic. It offers the most important logging functions and is fully compatible with HW4-LITE software.

FEATURES

- Accuracy: ±3.0 %RH, ±0.3 K
- Compact with very high level of IP protection
- High storage capacity: 32,000 lines
- Free evaluation and configuration software HW4-LITE
- Very long battery life: up to 3 years
- Conforms to EN12830. Version V3.0 and later
- Programmable logging mode

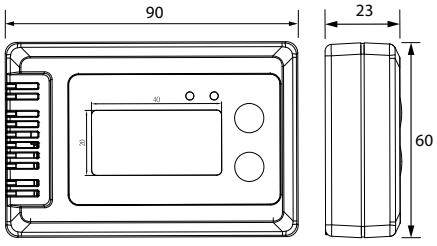
Technical data	HL-1D
General	
Parameters	Humidity & temperature
Sensor type	HYGROMER® IN-1 / NTC
Accuracy at 23 °C ±5 K	±3.0 %RH, ±0.3 K
Range of application / Storage conditions	-30...70 °C / 0...100 %RH
IP protection	IP67
Weight	85 g
Dimensions	90 x 60 x 23 mm
Logging interval	30 s...24 h
Battery	1 x CR2
Battery life	Up to 3 years (logging interval 1 h)
Battery charge indicator	Yes (HW4 software, display and LED indicator)
Storage capacity	32,000 lines (each line contain %RH & °C)
Function	MIN/MAX/AVG
Display	LCD
Resolution	0.1 %RH, 0.1 °C
Display refresh rate	5 s (standard) or same as logging interval
LED indicators	2 LEDs
	Right LED flashes green during data logging
	Left LED flashes red when limits exceeded or low battery state
Communication	USB-Mini port (cable optional)
FDA/GMP compatibility	FDA 21 CFR Part 11 / GAMP 5-compliant HW4 software
Standards	EN12830 (V3.0 and later)

USB-Mini port (settings and data download)

Battery compartment

Configuration & evaluation

The values stored in the HL-1D can be downloaded with the HW4 software and displayed graphically. The user determines the logging interval, the alarm limits, the recording mode and much more.



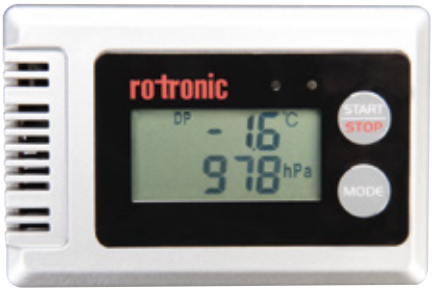
Delivery package

- Battery, CR2
- Short instruction manual
- Function and calibration certificate

Recommended accessories

• USB-Mini cable	AC0003

BL-1D



In addition to humidity and temperature, the BL-1D also logs ambient pressure and dew point. Thanks to its full HW4 functionality, its compact size and easy handling, the BL-1D is ideal for numerous applications.

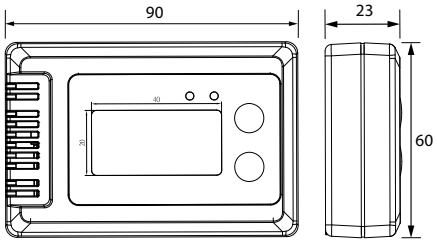
FEATURES

- Accuracy: ±3.0 hPa, ±3.0 %RH, ±0.3 K
- Compact with very high level of IP protection
- High storage capacity: 32,000 lines
- Free evaluation and configuration software HW4-LITE
- Very long battery life: up to 3 years
- Conforms to EN12830

Technical data	BL-1D
General	
Parameters	Pressure / Humidity / Temperature
Sensor type	BOSCH BMP280 / HYGROMER® IN-1 / NTC
Accuracy at 23 °C ±5 K	±3.0 hPa, ±3.0 %RH, ±0.3 K
Range of application / Storage conditions	-30..70 °C / 0..100 %RH
IP protection	IP67
Weight	85 g
Dimensions	90 x 60 x 23 mm
Logging interval	30 s...24 h
Battery	1 x CR2
Battery life	Up to 3 years (logging interval 1 h)
Battery charge indicator	Yes (HW4 software, display and LED indicator)
Storage capacity	32,000 lines (each line contains °C/%RH/Pa/DP)
Function	MIN/MAX/AVG
Display	LCD
Resolution	1 hPa, 0.1 %RH, 0.1 °C
Display refresh rate	5 s (standard) or same as logging interval
Communication	USB-Mini port (cable optional)
FDA/GMP compatibility	FDA 21 CFR Part 11 / GAMP 5-compliant HW4 software
Standards	EN 12830

Configuration & evaluation

The values stored in the BL-1D can be downloaded with the HW4 software and displayed graphically. The user determines the logging interval, the alarm limits, the recording mode and much more.



Delivery package

- Battery, CR2
- Short instruction manual
- Function and calibration certificate

Recommended accessories

• USB-Mini cable	AC0003

HygroLog HL-20

Precision compact logger

The compact data logger for humidity and temperature measurement offers high precision and reliability at a reasonable price. The HL-20 series is easy to use and suitable for a wide range of applications. Thanks to its integrated batteries, the HL-20 provides hours of operation and offers its users maximum flexibility.

APPLICATIONS

Warehouses, factories, museums, office buildings, cleanrooms, transportation, libraries and test facilities.

FEATURES

- Range of application: -10...60 °C / 0...100 %RH
- 20,000 data point memory
- Accuracy at 10...30 °C: ±1.3 %RH (0...10 %RH) / ±0.8 %RH (10...60 %RH) / ±1.3 %RH (60...100 %RH) ±0.3 K
- Freely selectable logging interval, 5 s...1 h
- Integrated clock with time stamp for every measurement
- Adjusted at 10, 35, 80 %RH and 23 °C
- Programmable visual alarms
- Free HW4-LITE software for device configuration and analysing recorded data

HL-20-D

HL-20D-SET

Order code	Display	Incl. AC3006 service cable
HL-20D	Yes	No
HL-20D-SET1	Yes	Yes

Delivery package

- Factory adjustment certificate, short instruction manual, 3 AA batteries
- Screw with plug for wall mounting

Recommended accessories

• Service cable	AC3006
• Calibration device	HL-20-CAL
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

High-end loggers – HygroLog HL-NT series

The HL-NT is a first-class modular data logger that can be adapted to meet customer requirements with a wide range of docking stations.

APPLICATIONS

Cleanrooms, storerooms, server rooms, production areas, residential and office rooms, transportation.

FEATURES

- Up to 7 interchangeable probe inputs
- Range of application: logger -30…70 °C (-10…60 °C, with display) 0…100 %RH
- Range of application: probes up to -100…200 °C (peak load), 0…100 %RH
- Calculation of all psychrometric parameters
- Integrated clock with time stamp for every measured value
- Freely selectable logging interval, 5 s…24 h
- Power supply: 9 V (battery, rechargeable battery or docking station)
- Networkable with PC, via docking station (USB, RS-485, Ethernet)
- Audible and visual alarms
- IP40

Order code	Display	Incl. interchangeable HC2 probe	2 additional HC2 probe inputs
HL-NT3-D	Yes	No	Yes

Delivery package

- 128 MB flash card, battery
- Short instruction manual
- Factory adjustment certificate (for models supplied with a probe)

Recommended accessories

• PC access set, USB Hygrodata-HL-E-USB	
• Ethernet docking station with 4 probe inputs	HL-DS-U4
• Probe extension cable, 30 cm	E2-F3A

Docking stations for HygroLog-NT

Depending on the model, the docking stations serve purely as a wall mounting bracket or offer additional functions such as external power supply, interface module to a PC or network or extension module with digital or analog probe inputs.

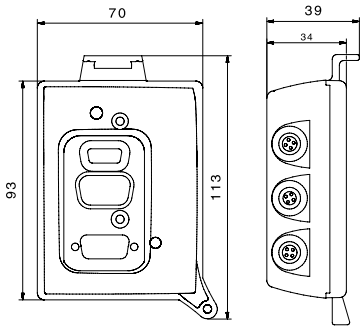
HL-DS-U4-420

FEATURES

- IP protection: IP40
- Range of application: -30...70 °C / 0...100 %RH

Overview docking stations

Order code	Inputs						Interfaces						
	External power supply (12-24 VDC)	HygroClip2 or analog inputs	Analog input 0...2.5 V	Analog input 0(4)...20 mA	Digital inputs (switch contact)	Pt100 inputs	RS-232 & RS-485	USB & RS-485	Ethernet TCP/IP RJ45 & RS-485	Ethernet TCP/IP RJ45	WLAN & RS-485	WLAN	Relay outputs
HL-DS-NT3	✓							✓					
HL-DS-NT4	✓				2				✓				
HL-DS-PT4	✓				2	2			✓				
HL-DS-U4	✓	4	✓		2				✓				
HL-DS-U4-420	✓	4		✓	2				✓				



Delivery package

- Screws for mounting
- Short instruction manual
- Configuration data sheet (LAN / WLAN docking stations)

Recommended accessories

• Probe extension cable, 2 m, black	E2-02A
• AC adapter, 85...264 VAC to 12 VDC	AC1211-V1

Order code	Description
AC adapter	
AC1211-V1	AC adapter for HygroLog NT docking stations, 240 VAC / 12 VDC
Connection sets	
Hygrodata-HL-E-USB	PC connection set, consisting of: HW4-E standard software, docking station HL-DS-NT3 and USB data cable
Hygrodata-HL-P-USB	PC connection set, consisting of: HW4-P professional software, docking station HL-DS-NT3 and USB data cable
HW4 software	
HW4-E-V3-Code	Standard software for programming and data management. Licensed for a single PC.
HW4-P-V3-Code	Professional software with network and access control options and additional graphic functions. Licensed for multiple PC use on the same site
HW4-OPC-V3-Code	HW4-P with OPC server functionality
HW4-VAL	HW4-OPC with comprehensive validation documentation
Probe cables	
E2-F3A	Probe extension cable 30 cm, to prevent possible self-heating of the internal probe in loggers with connected Ethernet docking station
E2-01A	Probe extension cable for HC2 probes, 1 m, black
E3-01A	Probe extension cable for HC2 probes, 1 m, white
E2-02A	Probe extension cable for HC2 probes, 2 m, black
E3-02A	Probe extension cable for HC2 probes, 2 m, white
E2-05A	Probe extension cable for HC2 probes, 5 m, black
E3-05A	Probe extension cable for HC2 probes, 5 m, white
E2-02A-S	Probe extension cable for HC2 probes, 2 m, black, with short connector
Signal amplifier	
AC3003	Signal amplifier set for cable lengths up to 100 m. The set consists of: - 2 connection cables with electronic amplifier - open cable ends for connection via terminal box
Memory card	
AC-NT512MB	512 MB flash card, industrial type -40...85 °C
Other accessories	
ET-409	4-pin Binder connector, to connect Pt100 probes to selected docking station

HygroPalm31

The HygroPalm HP31 is a handheld instrument with a fix Rotronic probe, it is able to perform spot measurements and logging of relative humidity, temperature and psychrometric parameters.

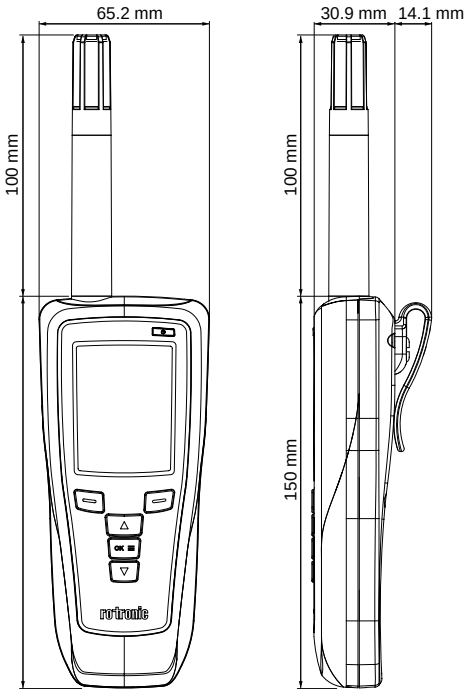
APPLICATIONS

Field inspection and spot checks in HVAC, pharmaceutical industry, agriculture and food industry and building management systems.

FEATURES

- Measures relative humidity and temperature and perform psychometric calculations
- Visual and audible alarms
- Graphic display for saved data
- 64'000 data points memory with programmable logging interval
- Long-life rechargeable battery (up to 48 hours at a logging interval of 30 seconds)

General specifications	
Order code	HP31
Device type	Handheld device (%RH / °C)
Application range	-10...60 °C | 0...100 %RH (non-cond.)
Storage range	-10...45 °C | 10...90 %RH
Probe application range	-10...60 °C | 0...100 %RH (non-cond.)
Functions	Spot measurements Programmable logging interval MIN / MAX / AVG
Accuracy @ 23°C	±2 %rH / ±0.3 °C
Logging interval	1 s...24 h
Memory capacity	8 x 8000 data points
Psychrometric calculations	Dew / Frost point (Dp / Fp) Wet bulb temperature (Tw) Enthalpy (H) Vapor concentration (Dv) Specific humidity (Q) Mixing ratio by weight (R) Vapor pressure (E) Saturation vapor pressure (Ew) Saturation vapor density (SVD)
Calculation method	WMO Standard
Display refresh rate	1 s (typical)
Integrated battery	Lithium polymer, 3.7 V, 1000 mAh 48 h – Logging every 30 s, screen off 10 h – Screen always on
PC interface	Micro-USB port, HW4 compatible › V3.9
Housing / Mechanics	
Enclosure material	ABS, TPR
IP protection class	IP65
Dimensions	160 x 63 x 30 mm
Weight	185 g



Compatible

- HW4 software › V3.9

Delivery package

- HygroPalm HP31
- Soft case
- Micro-USB service cable AC0006
- HW4 LITE (max. 3 instruments connected)

Recommended accessories

• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

HygroPalm32

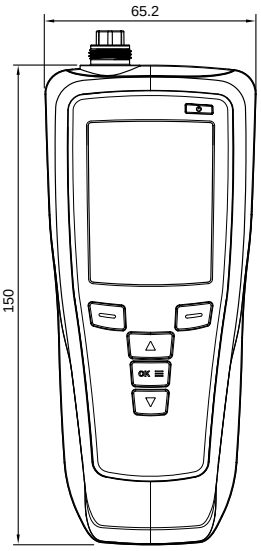
The HygroPalm32 can be combined without adjustment with all all HC2 and HC2A probes (except HC2-LDP). It measures relative humidity and temperature, can perform all psychrometric calculations and has trend indicators as well as a hold function to freeze measured values.

APPLICATIONS

Field inspection and spot checks in HVAC, pharmaceutical industry, agriculture and food industry and building management systems.

FEATURES

- Measures relative humidity and temperature and perform psychometric calculations
- Visual and audible alarms
- Graphic display for saved data
- 64'000 data points memory with programmable logging interval
- Long-life rechargeable battery (up to 48 hours at a logging interval of 30 seconds)



General specifications	
Order code	HP32
Device type	Handheld device (%RH / °C)
Application range	-10...60 °C | 0...100 %RH (non-cond.)
Storage range	-10...45 °C | 10...90 %RH
Probe application range	Depends on probe
Functions	Spot measurements Programmable logging interval MIN / MAX / AVG
Accuracy @ 23°C	Depends on probe
Logging interval	1 s...24 h
Memory capacity	8 x 8000 data points
Psychrometric calculations	Dew / Frost point (Dp / Fp) Wet bulb temperature (Tw) Enthalpy (H) Vapor concentration (Dv) Specific humidity (Q) Mixing ratio by weight (R) Vapor pressure (E) Saturation vapor pressure (Ew) Saturation vapor density (SVD)
Calculation method	WMO Standard
Display refresh rate	1 s (typical)
Integrated battery	Lithium polymer, 3.7 V, 1000 mAh 48 h – Logging every 30 s, screen off 10 h – Screen always on
PC interface	Micro-USB port, HW4 compatible › V3.9
Housing / Mechanics	
Enclosure material	ABS, TPR
IP protection class	IP65
Dimensions	160 x 63 x 30 mm
Weight	185 g

Compatible

- All HC2 and HC2A probes (except HC2-LDP)

Delivery package

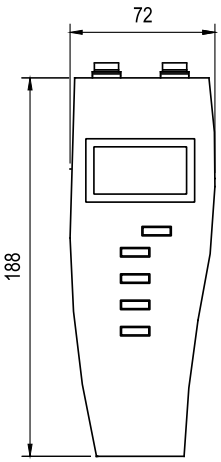
- HygroPalm HP32
- Short instruction manual
- Soft case
- USB-Micro service cable AC0006

Recommended accessories

• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

HygroPalm23-A

The HygroPalm23-A is the high-end product in our range of handheld instruments. In addition to measuring humidity and temperature, it also calculates all psychrometric parameters and provides a variety of additional functions. The HP23-A is a full-function data logger and has the capability to record measurements with a simple push of a button. In addition, all Rotronic transmitters in the AirChip3000 series can be adjusted with the HP23-A via a service cable.



APPLICATIONS

Portable applications in HVAC, the pharmaceutical industry, building management systems, etc.

FEATURES

- Two probe connections for all Rotronic HC2 probes or analog third-party probes (not included)
- Data recording function for up to 10,000 data records (with date, time, batch no.)
- Adjustment of transmitters via service cable
- All psychrometric calculations
- Battery charging function
- Service interface (USB)

Order code	HP23-A
Probe type	Compatible with all HC2 probes (not included)
Range of application	-10..60 °C / 0..100 %RH
Material	ABS
Power supply	9 V battery or rechargeable battery
Weight	200 g

Compatible

- All Rotronic HC2 probes
- HF3, HF4, HF53/4/6, HF7, HF8 for adjustment with service cable (AC2001)
- HW4 software

Delivery package

- Short instruction manual
- Battery

Recommended accessories

• Polyethylene filter, gray, 20 µm	NSP-PCB-PE
• Desktop stand	DESK-HP
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS
• 5 VDC AC adapter	AC1212

Specifications handheld instruments			
Features	**HP31**	**HP32**	**HP23-A**
Probe type	Fixed probe	HC2A-xx (not included)	HC2A-xx (not included) or analog third-party probe (with cable)
Probe interchangeable	No	Yes	Yes
Humidity / Temperature sensor	HYGROMER® IN-1 Pt100 1/3 Class B	Probe dependent	
Number of probe inputs	N/A	1	2
Measurement range (probe)	-10...60 °C 0...100 %RH	Probe dependent	
Accuracy at 10...30 °C	±2 %RH / ±0.3 K	Probe dependent	
Long-term stability	<1 %RH / year		
Response time humidity sensor	<15 s τ63	Probe dependent	
Initialization time	<2 s		
Range of application	-10...60 °C / 0...100 %RH		
Display resolution	2 decimals		
Illuminated display	Yes		
Alarm indicators	Yes		
Battery indicator	Yes		
Real time clock	Yes		
Functions			
Adjustment of transmitters	No		Yes
Adjustment via keypad	Single & multi-point %RH Single-point °C		
Probe adjustment with dew point reference	No		Yes
Calculations	All psychrometric parameters		
Data logging	8 x 8,000 measurement points		20,000 data records (2 x 10,000 pairs of measurement points)
Electrical specifications			
Power supply	Integrated rechargeable battery		9 V battery, rechargeable battery, USB cable, 5 VDC AC adapter
Rechargeable battery charge	No		Yes
Battery life (typical, without backlight)	4...7 h		80 h
Communication interfaces	Micro USB Service cable AC0006		Mini USB Service cable AC0003
Max. length probe cable	5 m		
Mechanical specifications			
Housing material	ABS, TPR (housing)		ABS (housing), polycarbonate (probe)
Dimensions	250 x 65 x 31 mm	150 x 65 x 31 mm (without probe)	188 x 72 x 35 mm (without probe)
Weight	200 g	185 g	200 g
CE / EMC directives	2014/30/EU		
FDA / GMP compatibility	FDA 21 CFR Part 11 / GAMP 5-compliant HW4 software		
IP protection class	IP65		IP40

HP-GTS – Measuring instrument for the paper industry

The HP-GTS from Rotronic is a tried-and-tested instrument for measurement of equilibrium relative humidity and temperature in stacks of paper and cardboard.

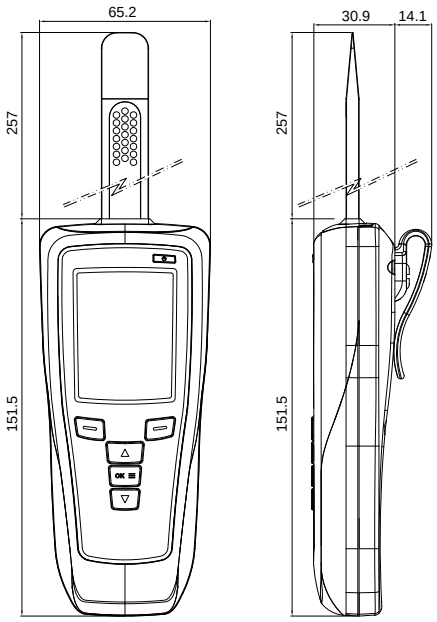
APPLICATIONS

Humidity measurements in stacks of paper, cardboard and textiles for paper and textile technicians and printers.

FEATURES

- Measures relative humidity and temperature in stacks of paper
- Graphical display of measured values
- Freely adjustable visual and audible alarm
- 64,000 data point memory with programmable logging interval

General specifications	
Order code	HP-GTS
Device type	Handheld device (%RH / °C)
Range of application of instrument and probe	-10...60 °C / 0...100 %RH (non-condensing)
Humidity sensor	ROTRONIC HYGROMER IN-1
Accuracy @ 23 °C	±2 %RH / ±0.3 °K
Functions	Spot measurements Programmable logging interval MIN / MAX / AVG
Logging interval	1 s...24 h
Memory capacity	8 x 8000 data points
Display refresh rate	1 s (typical)
PC interface	Micro-USB port, HW4 compatible V
Integrated battery	• Rechargeable lithium polymer battery • 3.7 V • 1000 mAh • 48 h with screen off, logging every 30 s • 10 h with screen always on
Housing / Mechanics	
Housing material	ABS, TPR
Probe material	Aluminum
IP protection class	IP65 (measuring instrument)
Dimensions	408 x 63 x 30 mm
Weight	225 g



The white paper contains detailed theory about humidity in the paper production and printing industries.
www.rotronic.com/en/hp-gts

Delivery package

- HygroPalm HP-GTS
- Soft case
- Micro-USB cable (computer connection and battery charging)

Recommended accessories

• Calibration device for sword probes	EGS
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

HygroGen2

Since its launch, the Rotronic HygroGen has defined the standard for portable humidity and temperature calibration. Hundreds of users worldwide have identified that this tool for the rapid generation of stable temperature and humidity conditions can save significant amounts of time in performing calibrations of all types of humidity instruments from all manufacturers.

The HygroGen2 further satisfies the stringent demands of quality and compliance regulations with its ability to calibrate instruments over their full working range, and is embraced throughout the pharmaceutical industry as the leading instrument in its class and is favored in ISO 17025 humidity calibration laboratories across the world.

Being portable and robust, it can be set up at the installation location allowing for complete system qualification. The rock-solid stability, minimal thermal gradients and quick set-point changes of HygroGen2-S are now replicated in a new family member: HygroGen2-XL, which boasts a chamber with 10 times the capacity.

HygroGen2 with external MBW473 dew point reference

APPLICATIONS

On-site calibration solution for all users of humidity and temperature measuring equipment.

FEATURES

- Generates stable humidity and temperature conditions (‹±0.1 %RH, ‹±0.01 °C)
- Calibration solution for the laboratory and on-site
- Humidity equilibrium typically in only 5 minutes for HG2-S, 15 minutes for HG2-XL
- Calibrates multiple probes simultaneously
- «AutoCal» automatic calibration (optional)
- «Remote API» logging and control with third-party software (optional)
- Integrated FDA 21 CFR part 11 compliant Rotronic HW4 software

HG2-S and HG2-XL in comparison

Video HygroGen2

Interested? Then scan the QR code!

Delivery package

- Instruction manual
- SCS certificate for reference probe

Recommended accessories

- See HygroGen2 accessories
- «AutoCal» automatic calibration
- Extended ranges of application «HumiExt» and «TempExt»
- «ExtRef» chilled mirror reference
- «RemoteSS» remote screen sharing
- «RemoteAPI» programming interface for remote control

HygroGen2 Specifications		HG2-S	HG2-XL
Chamber volume		2 liters	20 liters
Working volume		1.5 liters	17 liters
Humidity changes (‹±0.1 %RH stability)	5…95 %RH	‹5 minutes	‹15 minutes
Temperature changes (‹±0.01 °C stability)	23…50 °C	‹5 minutes	‹15 minutes
	23…0 °C	‹25 minutes	‹35 minutes
Temperature gradients	15…50 °C	‹±0.05 °C	‹±0.05 °C
	5…60 °C	‹±0.1 °C	‹±0.1 °C
	0…5 °C	‹±0.15 °C	‹±0.15 °C
Probe mounting		Up to 6 probes through door ports	8 probes through the door, plus internal shelf racks
Weight & dimensions		13 kg, 45 x 41x 21 cm	37 kg, 80 x 62 x 41 cm
Working principle	Mixed flow with desiccant dryer cell and piezoelectric humidifier; Peltier thermoelectric element with radial chamber mixing fan		
Control probe specification	± 0.8 %RH (10…30 °C), ± 2 %RH (0…60 °C) ± 0.1 K (10…30 °C), ± 0.3 K (0…60 °C)		
Typical calibration uncertainty	± 1.5 %RH (k=2) at 23 °C, ± 0.15°C (k=2) 15…50 °C		
Sensor	HygroClip2, capacitive RH sensor, Pt100 temperature sensor		
Control type	Embedded multiple PID controller, touch screen graphical user interface		
Programmer function	20 user programs can be saved, up to 200 set-points per program can be changed		
External sample loop for MBW reference	Temperature controlled outlet and inlet, 6 mm fittings		
USB ports	7 front, 2 rear		
Integrated software	Rotronic HW4 (FDA 21 CFR part 11 compliant)		
Water level	Low and high alarm, bar graph status indication		
Water quality	UV sterilization, auto time cycling		
Desiccant condition	Condition monitored during control operation		
Optional enhanced features	Temperature and humidity range extensions, AutoCal, External MBW/RHS Reference Integration, Remote Screen Share, Remote API		
Power supply	110…240 VAC 50/60 Hz, 3 A (240 VAC) 6A (110 VAC)		
Housing	Powder coated aluminum and steel, IP20		
Operating conditions	10-35 °C, ‹2000 m altitude		
CE	Safety:	EN 61010-1:2001	
	EMC:	EN 61326-1:2006	
		EN 61000-6-1:2007	

Order code	Description
HG2-S	HygroGen2 with touch screen, calibrated control/reference probe, set-point control & programmer function, heated sample loop, desiccant cell, fill syringe, embedded HW4-P software. Order chamber door separately
HG2-XL	HygroGen2-XL with touch screen, calibrated control/reference probe, set-point control & programmer function, heated sample loop, 2 x desiccant cell, fill syringe, embedded HW4-P software.
MBW473-RP2-SET	MBW473 dew point mirror, RP2 measurement head, SCS certification
MBW473 SH2-SET	MBW473 dew point mirror, SH measurement head, SCS certification Recommendation, SH placed inside the HG-XL on the top shelf, sampling directly from the inside
HG2-AutoCal-Code	Extension (activation key): automatic calibration function
HG2-ExtRef-Code	Extension (formerly Autocal+, requires AutoCal or RemoteAPI, activation key): MBW/RHS External Reference Integration - enables MBW chilled mirror as external reference
HG2-TempExt-Code	Extension (activation key): extended temperature range -5…60 °C
HG2-HumiExt-Code	Extension (activation key): extended humidity range 2…99 %RH
HG2-RemoteSS-Code	Extension (formerly Remote, activation key): Remote Screen Share
HG2-RemoteAPI-Code	Extension (activation key): programming interface for remote control

HygroGen2 / HygroGen2-XL accessories	
Consumables	
HG2-DES-3	Desiccant for molecular sieve (3 kg)
HG2-DC	Additional desiccant cell; pre-filled with molecular sieve
HG2-FILL	Fill tube and syringe
Chamber doors, plugs and probe sleeves	
HG2-D-888888	HG2-S door, 6 x 30 mm ports with 6 bungs; order specific B8 sleeves to suit smaller probe diameters
HG2-DP-00000	HG2-S clear acrylic door (no ports) for instruments with displays
HG2-B8	30 mm bung for HG2-D-888888
HG2-B8-xx	B8 probe sleeves for HG2-D-888888 (external: 30 mm; internal: probe diameter see xx diameter codes)
HG2-D-xxxxx	HG2-S custom door for › 30 mm ports, please ask your Rotronic dealer for the doors available
HG2-Bxx	Custom bung
HG2-Bxx-xx	Custom probe adaptor sleeves
Accessories	
HG2-TB	HG2-S transit bag, lightweight
HG2-TC	HG2-S heavy-duty transit case
HG2-AC3001-L/050	HygroClip2 calibration cable, 50 cm, USB connector
HG2-HW4-V3	Software for HygroGen2
HG2-CAM	Probe sleeve with high definition USB cam

HG2-D-888888 door with plugs and probe sleeves

Door cross section

HygroGen bag

HygroGen case

Humidity standards

Equipped with Rotronic humidity standards, a suitable calibration device and the HW4 software, it is easy to calibrate and adjust probes on-site at your premises. It is also possible to calibrate and adjust probes with the handheld instrument HP32-A (HW4 software then not necessary).

APPLICATIONS

Calibration and adjustment of Rotronic probes (third-party probes also possible).

FEATURES

- Traceable to national standard
- Ampoules contain unsaturated salt solutions
- Inexpensive calibration on site
- Simple and safe use
- Unlimited lifetime as long as the glass ampoules are kept sealed
- Practical packs of 5 ampoules of the same humidity value (approx. 0.8 ml per ampoule)

Order code	Nominal value	Measurement uncertainty at 23 °C
EA00-SCS	0.5 %RH	±0.3 %RH
EA05-SCS	5 %RH	
EA10-SCS	10 %RH	
EA11-SCS	11.3 %RH	
EA20-SCS	20 %RH	
EA35-SCS	35 %RH	±0.4 %RH
EA50-SCS	50 %RH	±0.6 %RH
EA60-SCS	60 %RH	
EA65-SCS	65 %RH	
EA75-SCS	75.3 %RH	±0.7 %RH
EA80-SCS	80 %RH	
EA95-SCS	95 %RH	±0.8 %RH

Compatible

- With all calibration devices

Delivery package

- SCS certificate
- Textile pads
- Calibration instructions

Recommended accessories

• Textile pads in tubes (50 pc.)	EA-PADS

Calibration devices

APPLICATIONS

Rotronic calibration devices are small, airtight chambers that fit Rotronic probes precisely. The lower part of the device consists of a screw-on lid into which the humidity standard is poured on to an absorbent textile pad. The specified humidity is generated in the calibration device after a stabilization period. High humidity values require a longer stabilization period. The probe can then be calibrated or adjusted by comparison with the reference value of the humidity standard.

Order code	Use	
Push-on calibration devices. Gasket with O-ring and thumb screw		
ER-15	For 1 probe Ø 14...15 mm Brass, nickel-plated	
EDM 15/15	For 2 probes Ø 14...15 mm Brass, nickel-plated	
ERV-15	For 1 probe Ø 14...15 mm Vertical calibration position Brass, nickel-plated	
ER-05	For 1 probe Ø 4...5 mm Brass, nickel-plated	
ER-12K	For 1 probe Ø 12 mm Brass, nickel-plated	
Calibration devices for special probes		
EGS	For all sword probes Brass, nickel-plated	

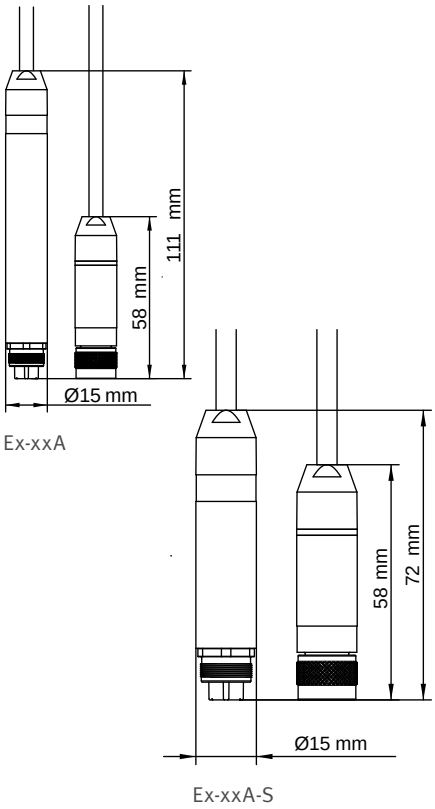
Order code	Use	
Screw-on calibration devices. Gasket with seal face on probe. Cannot be used for HC2A-S probes		
EMV-25	For 1 probe Ø 25 mm (PG11) Vertical calibration position Aluminum, Ematal-coated	
Calibration devices for special probes		
WP-14-S	For bell probes HC2-AW, HC2-AW-USB, AW-DIO POM, stainless steel 1.4305	
HL-20-CAL	For HL-20 POM Spring steel 1.4310	

Other calibration devices on request.

Extension cables

For HC2 probes

The HC2 extension cables extend the HC2 probes away from transmitters, The HC2 extension cables extend the HC2 probes away from transmitters, handheld instruments or data loggers.and data loggers. The HC2 extension cables can be used up to 5 meters. For longer cable runs, use the AC3003 signal amplifier for distances up to 100 meters.



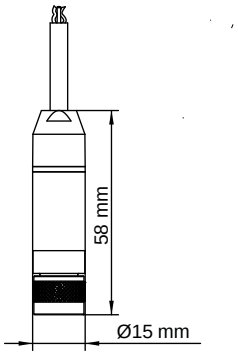
FEATURES

- Range of application -40...90 °C

Extension cables for HC2 probes			
Order code	**Cable length**	**Shaft**	**Color**
E2-F3A	30 cm	Normal	Black
E2-01A	1 m		
E2-02A	2 m		
E2-02A-S	2 m	Short [S]	
E2-05A	5 m	Normal	
E3-F3A	30 cm	Normal	White
E3-01A	1 m		
E3-05A	5 m	Normal	
E2-02A-M	2 m	Normal	Black, with metal connector

Extension cables

For use with HC2-S3C03(PT15) meteorological probe and analogue probes.

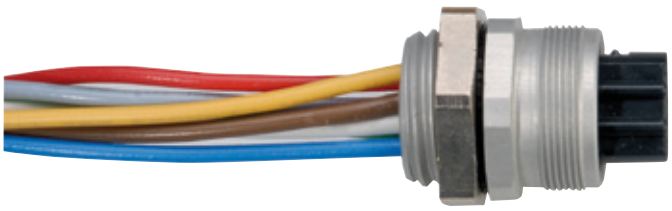


FEATURES

- Range of application -40...70 °C

Cables to connect an analog probe to a HP23-A, HF8, HL-NT		
Order code	**Cable length**	**Color**
A-01XX	1 m	Black

HC2 connector



FEATURES

- Maximum wall thickness: 4 mm
- Hole diameter: 12.5 mm
- 30 cm long, color-coded wires
- Ends tin-plated
- Range of application: -40...100 °C

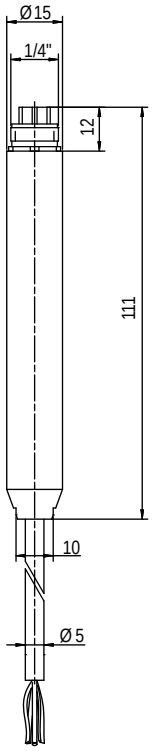
Order code: E2-XX

Extension cables

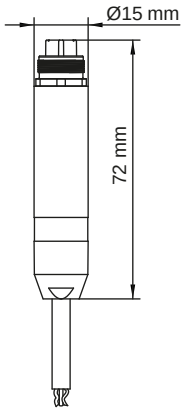
For HC2 probes with open ends

The HC2 probe extension cables with open ends can be used to integrate HC2 probes into users' analog or digital networks.

Extension cables for HC2 probes with open ends				
Order code	**Cable length**	**Shaft**	**Color**	**Range of application**
Supply voltage 3.3 VDC (without electronic control)				
E2-01XX	1 m	Normal	Black	-40..90 °C
E2-02XX	2 m			
E2-02XX-S	2 m	Short [S]		
E2-05XX	5 m	Normal		
E3-01XX	1 m	Normal	White	
E3-02XX	2 m			
E3-05XX	5 m			
Supply voltage 5...24 VDC / 5...16 VAC (with electronic control)				
E2-02XX-ACT/01	2 m	Normal	Black	-40..70 °C
E2-05XX-ACT/01	5 m			
E2-10XX-ACT/01	10 m			
E3-02XX-ACT/01	2 m	Normal	White	
E3-05XX-ACT/01	5 m			
E3-10XX-ACT/01	10 m			
Supply voltage 5...40 VDC / 6...28 VAC (with electronic control)				
E2-05XX-ACT-HV	5 m	Black	5 m	
Wire assignment				
Green	VDD (+)	3.3 VDC		
		5...24 VDC / 5...16 VAC		
		5...40 VDC / 6...28 VAC		
Gray	GND	Digital and power supply GND		
Red	RxD	UART		
Blue	TxD	UART		
White	Out1	Analog output 1, standard humidity 0...100 %RH = 0...1 V		
Brown	Out2	Analog output 2, standard temperature -40...60 °C = 0...1 V		
Yellow	AGND	Analog GND (connect to GND when using docking stations)		



E2-01xx



E2-02xx-S

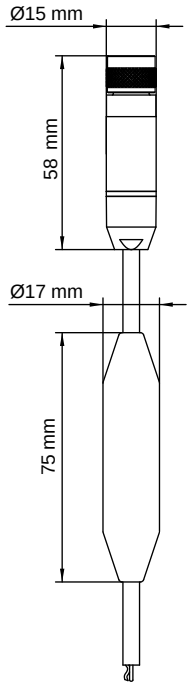
Digital signal amplifiers

Using a digital signal amplifier, it is possible to achieve probe line distances of up to 100 meters.

FEATURES

- Color: black
- Range of application: -40...70 °C
- Power supply: 3.3 V / 4.8 mA

Digital signal amplifiers		
Order code	**Description**	**Cable length / Shaft**
AC3003	UART signal amplifier, probe and instrument side with luster terminals	Normal shaft
AC3003/10	AC3003 with luster terminal and pre-assembled Cat. 5 cable, normal shaft	10 m
AC3003/20		20 m
AC3003/50		50 m



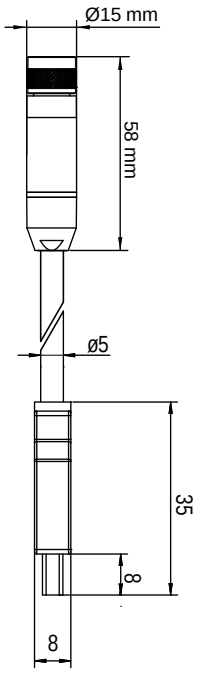
AC3003

Service cable HF transmitters

FEATURES

- Transfer of measured values from HF3/4/5/7/8 to HP32/23
- USB-Mini to 7-pin connector

Service cable for HF-series transmitters	
Order code	**Description**
AC2001	Service cable for HF-series transmitters



AC2001

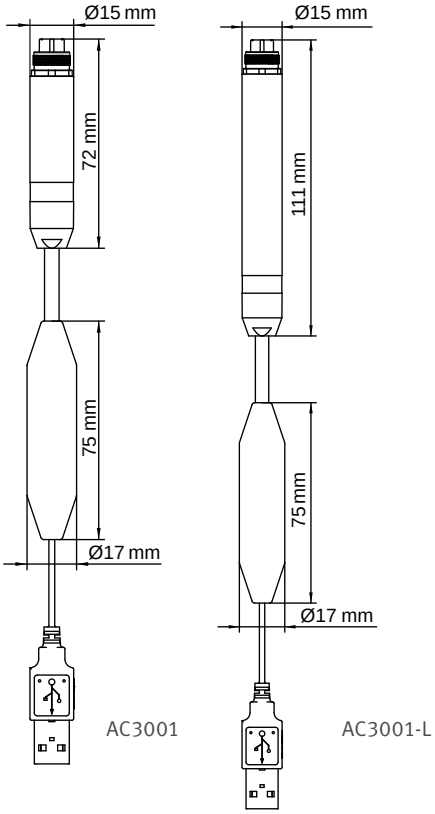
USB converters

For HC2 probes

FEATURES

- To connect HC2 probes to a PC via the USB interface
- Requires HW4 software on the PC
- Power supply via USB interface
- Range of application: -40...70 °C
- Cable length: 2.8 m

USB converters for HC2 probes		
Order code	**Description**	**Shaft**
AC3001	Active UART to USB converter cable	Short shaft
AC3001-L		Long shaft [L]
XD-AC3001	Active UART to USB converter cable for XD probes	Short shaft



RS-485 and Modbus converter

For HC2 probes

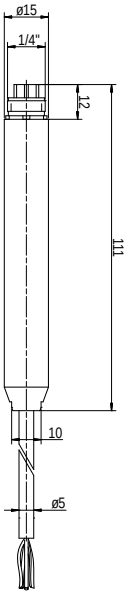
FEATURES

- To connect HC2 probes to a RS-485 or Modbus network
- It is possible to switch between Modbus and RS-485 protocol in the HW4 software
- Power supply: 5...28 VDC
- Range of application: -40...70 °C

Note

Self-heating of the converter can lead to errors in the measured values; it is therefore advisable to place the probe a short distance away using an extension cable (e.g. E2-F3A).

RS-485 / Modbus converters		
Order code	**Description**	**Cable length**
E2-05XX-MOD	Converter cable for HC2 RS-485 and MODBUS	5 m



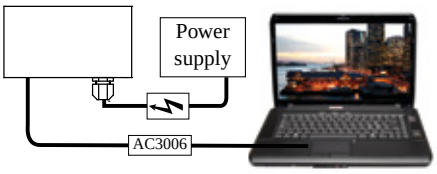
Service cables

For HF, HP21 / 22, HL-20

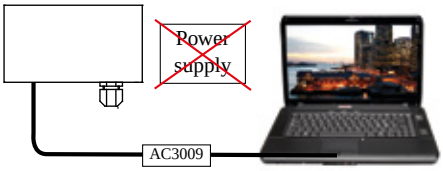
FEATURES

- Connects Rotronic instruments via their service interface (UART) to a USB interface
- Requires HW4 software
- For programming (settings, scaling, firmware update, etc.)
- Two different types:
  AC3006, the instrument must be supplied with power.
  AC3009, the instrument is supplied with power via the USB interface.

AC3006 in combination with a 2-wire type: with all 2-wire types (HF320, HF420, HF520, HF620, HF720) ensure that the computer or laptop is galvanically isolated from the main power supply.



AC3006



AC3009

AC3006 / AC3009

Service cables		
Order code	**Description**	**Length**
AC3006	Service cable without power supply	1.8 m
AC3009	Service cable with power supply via USB interface	3.6 m

	AC3006	AC3009	AC0006
HF1			
HF3	✓	✓	
HF4	✓	✓	
HF5	✓	✓	
HF7	✓	✓	
HF8	✓	✓	
TF5	✓	✓	
PF4	✓	✓	
PF5	✓	✓	
HL-20	✓	✓	
HL-NT			
BL-1D			
HL-1D			
TL-1D			
CL11			
HP21	✓	✓	
HP32			✓
HP23			
TP22	✓	✓	
CP11			
AwTherm			✓
HygroLab C1		✓	
CRP1	✓		
CRP5	✓		

HC2 simulators

FEATURES

- Humidity / Temperature simulators with fixed values and certificate
- For system validation
- Values cannot be changed with the HW4 software
- Range of application: -40...100 °C

Service cables		
Order code	**Humidity**	**Temperature**
HC2-SIMC-000/0023	0 %RH	23 °C
HC2-SIMC-035/0023	35 %RH	23 °C
HC2-SIMC-050/0023	50 %RH	23 °C
HC2-SIMC-080/0023	80 %RH	23 °C

Other types available on request.

Protective caps

FEATURES

- Protects probes/connectors during cleaning cycles against water and chemical substances, e.g. H_2O_2

Protective caps	
Order code	**Protection**
Protection E2/E3	Connectors
Protection filter	Sensor
Protection HC2	Complete HC2 probe

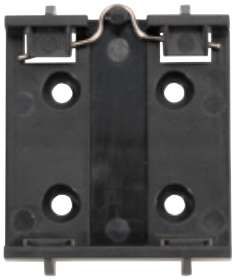
Protection filter

Protection HC2

Protection E2/E3

Mounting kits

Mounting kits	
Order code	**Description**
AC5002	DIN top-hat rail adapter for PF4, PF5, HF4, HF5, HF8



AC5002

Mounting gland with flange

Mounting gland with flange for temperatures <100 °C	
Order code	**Description**
AC5005	Mounting gland with flange for 15 mm probes M20 x 1.5 / to 100 °C

AC5005

Mounting glands without flange	
Order code	**Description**
AC1303-M	Mounting gland for 15 mm probe M20 x 1.5 / brass, nickel-plated / to 200 °C
AC1304-M	Mounting gland for 25 mm probe M32 x 1.5 / brass, nickel-plated / to 200 °C
AC1301-MEX	Mounting gland for 15 mm ATEX probes M25 x 1.5 / brass, nickel-plated / to 95 °C

AC1303-M
AC1304-M
AC1301-MEX

Mounting flange		
Order code	**Use with**	**Description**
AC1305	AC1303-M	Mounting flange for AC1303-M Ø 80 mm / steel, nickel-plated / to 200 °C
AC1306	AC1304-M	Mounting flange for AC1304-M Ø 80 mm / steel, nickel-plated / to 200 °C
AC1307	AC1301-MEX	Mounting set for AC1301-MEX Ø 80 mm / steel, nickel-plated / to 200 °C

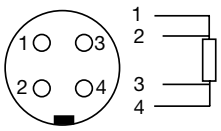
AC1305
AC1306

PT100 probes

Rotronic offers a wide range of its own PT100 probes, but other 4-wire temperature probes can also be used.

Accuracy: Class A
Wire technique: 4-wire
Connection: 4-pin Binder connector plug
τ90: Time needed to reach 90% of the new measured value after a temperature increase (air velocity = 2 m/s)

PT100 input



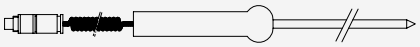
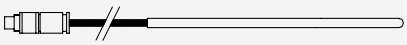
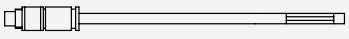
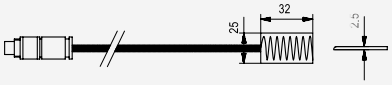
4-wire PT100

AC1900

AC1904

AC1902

AC1909

Order code	Probe type	Measurement range class A accuracy (IEC 60751)	Probe operating range	Cable operating range	
AC1900	Fixed probe 100 x 3 mm DIN 1.4404	-50...300 °C	-70...500 °C	Without cable	
AC1902	Insertion probe with handle 249 x 3 mm DIN 1.4404	-50...300 °C	-70...500 °C	1 m, PUR cable Max. 115 °C Min. -45 °C	
AC1903	Cable probe 200 x 6 mm Not waterproof DIN 1.4404	-50...300 °C	-70...500 °C	2 m, thermoplastic cable Max. 105 °C Min. -40 °C	
AC1904	Cable probe 50 x 6 mm Waterproof DIN 1.4301	-50...300 °C	-50...110 °C	2 m, thermoplastic cable Max. 105 °C Min. -40 °C	
AC1909	Fixed probe for measurements in air, 100 x 4 mm DIN 1.4401	-50...300 °C	-50...120 °C	Without cable	
AC1913-A	Kapton foil probe, 20 x 15 x 2 mm	-50...200 °C	-50...200 °C	1 m, four PFA wires Max. 200 °C Min. -50 °C	
AC1916-A-T	Cable probe 60 x 6 mm Waterproof DIN 1.4571	-30...200 °C	-100...250 °C	2 m PTFE cable Max. 250 °C Min. -100 °C	

Order code	Probe type	
HC2-PT100-B4	Adapter for PT100 probes to HP32, HP23-A, HF5, HF8, PF4 and HL-NT	
AC1607/02	Extension cable for PT100 probes, 4-pin Binder male/female connectors Max. 85 °C, min. -40 °C	2 m
AC1607/05	Extension cable for PT100 probes, 4-pin Binder male/female connectors Max. 85 °C, min. -40 °C	5 m
AC1607/10	Extension cable for PT100 probes, 4-pin Binder male/female connectors Max. 85 °C, min. -40 °C	10 m
AC1607/25	Extension cable for PT100 probes, 4-pin Binder male/female connectors Max. 85 °C, min. -40 °C	25 m

Compatible

- Handheld instrument — TP22
- Transmitters — TF5, PF4, PF5
- Docking station — HL-DS

Delivery package

- Temperature probe

TF5 series

The TF5 series is compatible with all PT100 probes in the Rotronic range. This device generation includes a unique calibration and adjustment function.

FEATURES

- Interchangeable PT100 probes
- Range of application electronics: -40...60 °C / 0...100 %RH -10...60 °C with display
- Temperature measurement with PT100 probe, 4-pin Binder connection
- Service interface

Power supply

- Low voltage: 2 or 3-wire

Signal outputs

- Current output
- Voltage output

Version

- Wall version

Output parameter

- Temperature

Output scaling

- Temperature: range selectable, standard: -40...60 °C

Display

- Display with backlight (excl. 2-wire, trend indicator and keypad)
- Without display

TF5 wall version

APPLICATIONS

Production processes, storage, transportation and drying processes.

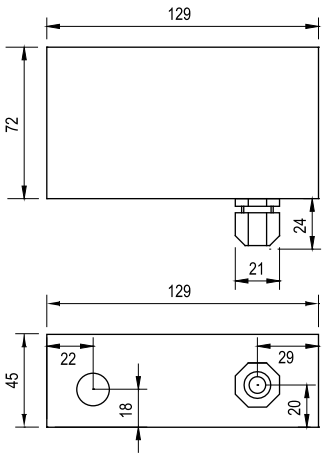
2-wire

Order code	TF520 Type W
Output signal	4...20 mA
Supply voltage	10...28 VDC
Display	Optional (without backlight)
Temperature range	Scalable*
Probes	Interchangeable (-100...600 °C)

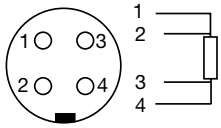
3-wire

Order code	TF53x Type W
Output signals	0...1 V 0...5 V 0...10 V 0...20 mA 4...20 mA Customer selection possible*
Supply voltage	15...40 VDC / 12...28 VAC
Display	Optional (with backlight)
Temperature range	Scalable*
Probes	Interchangeable (-100...600 °C)

Wall version, type W



PT100 input



4-wire PT100

Compatible

- PT100 probes
- All PT100 probes with 4-wire connection
- HW4 software

Delivery package

- Product qualification
- Short instruction manual
- Screws and plugs for mounting
- Connector for third-party probe

Recommended accessories

• Service cable	AC3006 / AC3009*
• Extension cable 2 m	AC1607/02
• Extension cable 5 m	AC1607/05
• Mounting kit DIN top-hat rail	AC5002

* Requires optional HW4 software and service cable.

Technical data	TF520 2-wire	TF53x 3-wire
General		
Parameter	Temperature	
Housing material	ABS	
Protection	IP65	
Dimensions	129 x 72 x 45 mm	
Weight	220 g	
Probe connection	4-pin Binder, threaded coupling	
Display/Operation optional	LCD, 1 or 2 decimals without backlight Menu navigation, 4 keys	LCD, 1 or 2 decimals with backlight Menu navigation, 4 keys
Electrical connections	Connections: screw terminals inside Cable gland: M16	
Power supply	10...28 VDC	15...40 VDC / 12...28 VAC
Current consumption	‹20 mA	‹20 mA
Range of application / Storage conditions	-40...60 °C / -10...60 °C (with LCD), 0...100 %RH	
Temperature scaling	Max. -100...200 °C	
Firmware update	Via HW4 software	
Service interface	UART service interface (Universal Asynchronous Receiver Transmitter)	
CE / EMC compatibility	EMC Directive 2014/30/EU	
Fire protection class	Corresponds to UL94-HB	
FDA / GMP compatibility	21 CFR Part 11 and GAMP5	
Analog output		
Number	1	
Current	4...20 mA	0(4)...20 mA
Voltage	N/A	0...1/5/10 V
Permissible load	≤500 Ω	≤500 Ω (current output) ≥1 kΩ/V (voltage output)

TL-CC1

The Rotronic cold-chain temperature logger TL-CC1 is easy to configure (without software), generates PDF reports automatically and comes at an unbeatable price.

APPLICATIONS

Monitoring of the cold chain during the transportation of sensitive freight such as pharmaceuticals, foods and technical products.

FEATURES

- PDF report generation without software installation
- Freely configurable
- Clear alarm indication
- All-in-one logger: configuration tool, PDF report, instruction manual and calibration certificate
- High storage capacity, single use, single journey
- Conforms to GxP, EN 12830 and FDA 21 Part 11 / GAMP 5

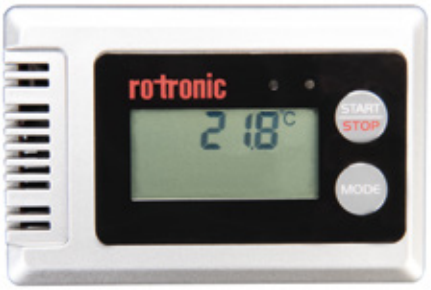
Technical data	TL-CC1
General	
Parameter	Temperature
Temperature sensor	NTC thermistor
Accuracy at -30...70 °C	±0.5 K
Resolution	0.1 °C
Range of application / Storage conditions	-30...70 °C / -22...158 °F, ‹ 80 %RH
IP protection	IP65 (in plastic bag)
Weight	Approx. 10 g
Battery	CR2032 (not replaceable)
Dimensions without bag	80 x 43 x 2.5 mm
Dimensions with bag	105 x 55 x 2.5 mm
Logging interval	0.5/5/10/30/60/90/120 min.
Start delay	0.5/5/10/30/60/90/120 min.
Alarm ranges	-20...-10 °C, -10...0 °C, 2...8 °C, 0...15 °C, 0...25 °C, 15...25 °C, freely selectable values
Alarm type	Deactivated, single or cumulative
Storage period	12 months
Storage capacity	8192 data points
Event marking	Up to 8 points
Use	START/STOP button, MARK button
Alarm indication	LED indicators PDF reports
Communication	USB 2.0 port, type A
Operating system	Windows
Conformity	GxP, EN 12830, FDA 21 CFR Part 11 and GAMP5

PDF report

Delivery package

- 10 pc. per box
- Short instruction manual

TL-1D



TL-1D temperature data logger: compact, accurate and inexpensive.

APPLICATIONS

Warehouses, factories, museums, office buildings, cleanrooms, transportation, libraries, test facilities, room monitoring in HVAC systems.

FEATURES

- Accuracy: ±0.3 K, at 23 °C ±5 K
- Compact with very high level of IP protection
- High storage capacity: 32,000 lines
- Free evaluation and configuration software HW4-LITE
- Very long battery life: up to 3 years
- Conforms to EN12830. Version 3.0 and later
- Programmable logging mode

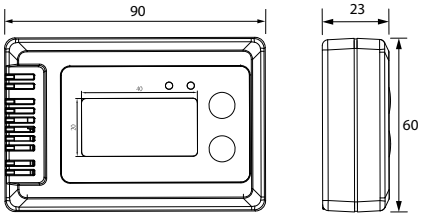
Technical data	TL-1D
General	
Parameter	Temperature
Sensor type	NTC thermistor
Accuracy at 23 °C ±5 K	±0.3 K
Range of application / Storage conditions	-30...70 °C / 0...100 %RH
IP protection	IP67
Weight	85 g
Dimensions	90 x 60 x 23 mm
Logging interval	30 s...24 h
Battery	1 x CR2
Battery life	Up to 3 years (logging interval 1 h)
Battery charge indicator	Yes (HW4 software, display and LED indicator)
Storage capacity	32,000 lines
Function	MIN/MAX/AVG
Display	LCD
Resolution	0.1 °C
Display refresh rate	5 s (standard) or same as logging interval
LED indicators	2 LEDs Right LED flashes green during data logging Left LED flashes red when limits broken or low battery
Communication	USB-Mini port (cable optional)
FDA/GMP compatibility	FDA 21 CFR Part 11 / GAMP 5-compliant HW4 software
Standards	EN12830 (V3.0 and later)

USB-Mini port (settings and data download)

Battery compartment

Configuration & evaluation

The values stored in the TL-1D can be downloaded with the HW4 software and displayed graphically. The user determines the logging interval, the alarm limits, the recording mode and much more.



Delivery package

- Short instruction manual
- Battery CR2
- HW4 software key
- Function and calibration certificate

Recommended accessories

• USB service cable	AC0003

Video differential pressure

Interested? Then scan the QR code!

PF1 series

Measurement by means of the PF1 transmitter's diaphragm enables exact measurements in small measurement ranges without risk of cross contamination. The PF1 is valued by planners, installers and end customers for its clever housing design, stable sensors and outstanding value for money.

APPLICATIONS

Filter and room pressure monitoring, HVAC, pneumatics, process measurement technology.

FEATURES

- Accuracy: ±1.5 %full scale
- MEMS-based diaphragm sensor
- Compact design
- Measurement range manually adjustable
- Excellent value for money

Power supply

- Low voltage: 3-wire or 2-wire

Signal outputs

- Current output 4...20 mA (2-wire)
- Voltage output 0...10 V (3-wire)

Version

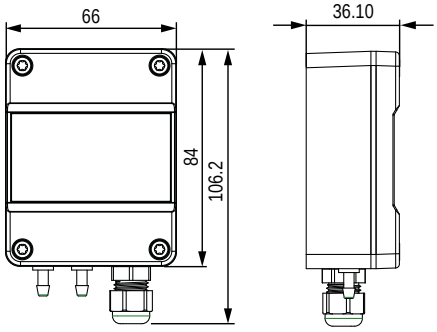
- Wall mount

Output parameter

- Differential pressure

Measurement ranges

- -25...+25 Pa / -50...+50 Pa / -100...+100 Pa / -250...+250 Pa / -500...+500 Pa



Delivery package

- Factory adjustment certificate
- Short instruction manual
- Mounting screws

Recommended accessories

- Mounting kit DIN top-hat rail AC5002

PF1 series

Technical data	PF120 Analog 2-wire	PF132 Analog 3-wire
General		
Parameter	Differential pressure	
Housing material	ABS	
IP protection	IP65	
Mounting position	Wall mounting, any mounting position	
Dimensions	84 x 66 x 36 mm Incl. steel conduit screw fitting: 105 x 66 x 36 mm	
Weight	100 g	
Display	LCD, 4 digits (optional)	
Electrical connections	Screw terminals inside, M12 cable gland	
Power supply	10...32 VDC	13...32 VDC
Current consumption	0...20 mA	› 10 mA (RL›4.7 kΩ)
Range of application / Storage conditions	-10..+50 °C / 0..90 %RH / -20..+70 °C / 0..90 %RH	
CE / EMC compatibility	EMC Directive 2014/30/EU	
Fire protection class	Corresponds to UL94-HB	
Differential pressure measurement		
Measurement principle	MEMS diaphragm sensor	
Measurement ranges	-25...+25 Pa / -50...+50 Pa / -100...+100 Pa / -250...+250 Pa / -500...+500 Pa	
Medium	Air and non-aggressive gases	
Accuracy at 23 °C ±3 K	±1.5 % full scale measurement range ≤ 50 Pa ±1.0 % full scale measurement range > 50 Pa	
Long-term stability	0.1 %FS/y	
Pressure resistance	≤ ±100 Pa => 1 kPa ≤ ±500 Pa => 15 kPa	
Burst pressure	≤ ±100 Pa => 15 kPa ≤ ±500 Pa => 20 kPa	
Zero adjustment	By button	
Pressure connections	Tubing connector Ø 4.0 mm x 10 mm	
Outputs		
Analog outputs	1	
Analog output type	4...20 mA	0...10 V
Permissible load	‹ 500 Ω	› 4.7 kΩ

PF4/PF5 series

The thermal measurement technique of the PF4 transmitter allows exact measurements in the smallest of ranges. The differential pressure transmitter enables Rotronic customers to measure a further important parameter in addition to humidity, temperature, low dew point and CO_2.

FEATURES

- Accuracy: ±1.0 % full scale
- Fast response time
- Freely configurable analog signals
- Integrated relay switch contact
- High resistance to pressure
- Thermal mass flow measurement at low flow rate
- High immunity to dust and humidity in the environment
- Integrated damping function for variable response times

Power supply

- Low voltage: 3-wire

Signal outputs

- Current output
- Voltage output
- Ethernet
- Relay switch contact

Version

- Wall mount

Output parameters

- Differential pressure
- Differential pressure & temperature
- Differential pressure, temperature & relative humidity

Measurement ranges

- -25...+25 Pa / -50...+50 Pa / -100...+100 Pa / -250...+250 Pa / -500...+500 Pa

Display

- Display with backlight, trend indicator and keypad
- Without display

PF4/PF5 series

PF4 with PT100

PF5 with HC2-A

APPLICATIONS

Clean rooms, operating theaters, HVAC, filter technology and applications where small pressure differences prevail.

BENEFITS

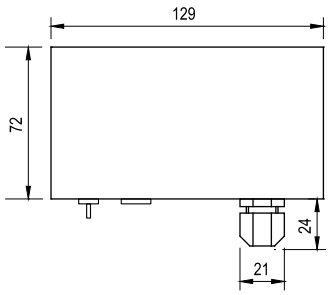
- Flow or diaphragm differential pressure sensors
- 1 to 3 analog outputs, 1 analog input
- Network integration (Ethernet)
- Modbus TCP or RTU over RS485
- Potential-free relay with switch contacts

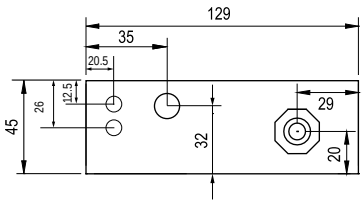
3-wire

Order code	PF44x-1	PF44x-L
Output signals	0...1/5/10 V 0/4...20 mA Relay switch contact	Ethernet Relay Switch contact
Supply voltage	15...48 VDC / 16...35 VAC	
Display	Optional	

3/4-wire

Order code	PF54x-1	PF54x-L
Output signals	0...1/5/10 V 0/4...20 mA Relay switch contact	Ethernet Relay Switch contact
Supply voltage	18...48 VDC / 16...35 VAC	
Display	Optional	





Compatible

- HW4 software

Delivery package

- Factory adjustment certificate
- Short instruction manual
- Screws and plugs for mounting

Recommended accessories

• Service cable	AC3006 / AC3009*
• Temperature probe	AC19xx
• Mounting kit DIN top-hat rail	AC5002
• HC2A-S probe	

* Requires optional HW4 software and service cable.

PF4/PF5 series

Technical data	PF44X-1 Analog 3-wire	PF44X-L Analog & digital 3-wire	PF54X-1 Analog 3/4-wire	PF54X-L Analog & digital 3/4- wire
General				
Parameters	Differential pressure, temperature and relative humidity			
Housing material	ABS			
IP protection	IP65	IP40	IP65	IP40
Mounting position	Wall mount			
Dimensions	129 x 72 x 45 mm			
Weight	243 g			
Display	Coloured TFT display			
Electrical connections	Screw terminals M16 cable gland	Screw terminals M16 cable gland, socket	Screw terminals M16 cable gland	Screw terminals M16 cable gland, socket
Power supply	15...48 VDC / 16...36 VAC (galvanically isolated)			
Current consumption	‹300 mA @ 24 VDC			
Range of application / Storage conditions	-5...60°C / 0...100%rH, non-condensing			
Firmware upgrade	Via HW4 software			
Service interface	UART service interface (inside device)			
CE / EMC compatibility	EMC-Directive 2014/30/EU			
Fire protection class	Corresponds to UL94-HB			
FDA / GMP compatibility	21 CFR Part 11 and GAMP5			
Differential pressure measurement				
Measurement principle	Thermal mass flow measurement		Membran sensor	
Measurement ranges	±10 Pa / ±25 Pa / ±50Pa / ±100 Pa / ±250 Pa / ±500 Pa		±25 Pa / ±50Pa / ±100 Pa / ±250 Pa / ±500 Pa	
Medium	Air and non-agressive gases			
Accuracy at 23°C ±3 K	±1.0 %FFS			
Long-term stability	±0.05 % FSS/year (typ.) ±0.1 % FSS/year (max.)		±0.25 % FSS (typ.) per year @ ±250 and ±500 Pa measurement range ±0.3125 % FSS (typ.) per year @ ±100 Pa measurement range ±0.625 % FSS (typ.) per year @ ±50 Pa measurement range ±1.25 % FSS (typ.) per year @ ±25 Pa measurement range	
Measurement interval	1 s			
Pressure resistance	5 bar		0.7 bar	
Leak rate	‹10.8 ml/h		0	
Pressure connections	Tubing connector Ø 4 mm x 10 mm			
Measurement of temperature and relative humidity (type-dependent)				
Probe connections	Temperature: 4 pin Binder for 4-wire PT100 Humidity: Rotronic E2 for Rotronic HC2A-S probe Accuracy: probe dependent			
Outputs				
Analog outputs	Min. 1, max. 3, freely configurable			
Analog output type	0 to 1 V 0 to 5 V 0 to 10 V 0 to 20 mA 4 to 20 mA			
Relais / Switch output	1 relay potential-free change-over switch (NC - COM - NO)			
Accuracy analog output @ 23°C	Voltage output: ±1 mV/V Current output: ±20 µA			
Permissible load	› 1 kΩ/V (voltage output) / ‹ 500 Ω (current output)			

Video CO_2

Interested? Then scan the QR code!

CF1 series

The CF1 measures the concentration of CO_2 in rooms and emits an alarm by relay when a threshold is exceeded. Fits directly on standard EU and US surface-mounted boxes.

FEATURES

- 3-in-1 transmitter: temperature, relative humidity and CO_2
- Compact design
- Accuracy: ±40 ppm ±3%, ±3 %RH, ±0.3 K
- Measurement ranges: 0…2000/5000 ppm, 0…100 %RH, 0…50 °C
- Analog output signals
- Relay output

Power supply

- Low-voltage: 3-wire

Signal outputs

- Current output
- Voltage output

Version

- Space mount (R)
- Space mount (S)
- Duct (D)

Output parameters

- Temperature, relative humidity and CO_2

Output scaling

- CO_2 range adjustable to 5000 ppm, standard: 0 … 2000 ppm
- Temperature range selectable, standard: 0…50 °C
- Relative humidity range selectable, standard: 0…100 %RH

Display

- Display with or without backlight
- Without display

CF1 space mount version

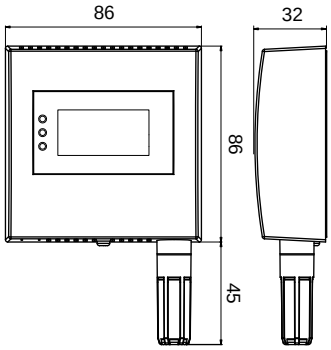
APPLICATIONS

Office rooms, conference rooms, residential rooms, classrooms, public buildings and other rooms where air quality is important.

EU version

Order code	CF13x-R
Output signals	4...20 mA 0...10 VDC
Supply voltage	12...28 VAC / 15...40 VDC
Display	Optional
LED indicators	LED scale for good/medium/bad air quality
Temperature measurement range	Standard 0...50 °C
Relative humidity measurement range	Standard 0...100 %RH
CO_2 measurement range	Standard 0...2000 ppm
Relay	Yes
Dimensions	131 x 86 x 32 mm

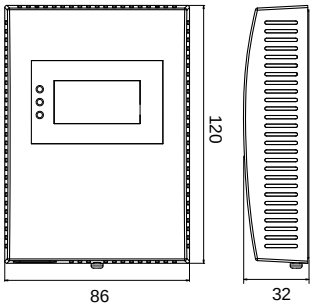
Type R



US version

Order code	CF13x-S
Output signals	4...20 mA 0..10 VDC
Supply voltage	12...28 VAC / 15...40 VDC
Display	Optional
LED indicators	LED scale for good/medium/bad air quality
Temperature measurement range	Standard 0...50 °C
Relative humidity measurement range	Standard 0...100 %RH
CO_2 measurement range	Standard 0...2000 ppm
Relay	Yes
Dimensions	120 x 86 x 32 mm

Type S



Compatible

- SW21 software

Recommended accessories

- USB-Mini cable AC0003

Delivery package

- Factory adjustment certificate
- Short instruction manual

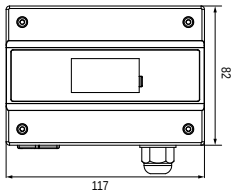
CF1 duct version

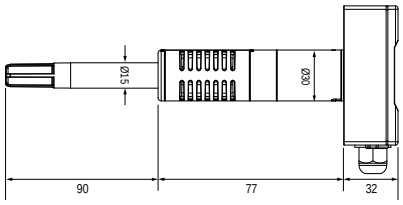
APPLICATIONS

Offices, conference rooms, residential premises, classrooms, public buildings and other rooms where air quality is important.

Duct version

Order code	CF13x-D
Output signals	4...20 mA 0...10 VDC
Supply voltage	12...28 VAC / 15...40 VDC
Display	Optional
Temperature measurement range	Standard 0...50 °C
Relative humidity measurement range	Standard 0...100 %RH
CO_2 measurement range	Standard 0...2000 ppm
Relay	Yes
Dimensions	82 x 117 x 32 mm





Compatible

- SW21 software

Recommended accessories

- USB-Mini cable AC0003

Delivery package

- Factory adjustment certificate
- Short instruction manual

CL11 benchtop display unit

Benchtop display unit for monitoring indoor air quality. Measures and records CO_2, relative humidity and temperature.

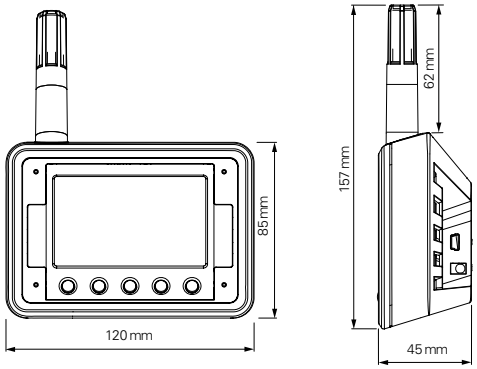
APPLICATIONS

Indoor air quality (IAQ) measurements in offices, conference rooms, schools, etc.

FEATURES

- Benchtop or wall mounting
- Measures and records CO_2, relative humidity and temperature
- Accuracy: ±30 ppm, ±3 %RH, ±0.3 K
- ROTRONIC HYGROMER® IN-1 humidity sensor
- 40,000 data point memory for CO_2, humidity and temperature values
- Maximum, minimum and average value display
- Adjustable audible and visual CO_2 alarm
- Real-time clock
- Includes free logging and configuration software SW21

Order code	CL11
Probe type	CO_2: infrared (NDIR) with automatic calibration (ABC) Humidity: ROTRONIC HYGROMER® IN-1 Temperature: NTC
CO_2 measurement range	0...5000 ppm
Range of application	0...50 °C / 0...95 %RH, non-condensing
Material	ABS
Power supply	Only with AC adapter
IP protection	IP30



Delivery package

- Short instruction manual
- AC adapter AC1214
- Rotronic software SW21
- USB cable
- Factory adjustment certificate

Recommended accessories

• Humidity calibration device	ER-15
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80%RH	EA80-SCS
• External temperature probe	AC1215

CO_2 DISPLAY

Room / Wall panel for monitoring indoor air quality. Measures and records CO_2, relative humidity and temperature.

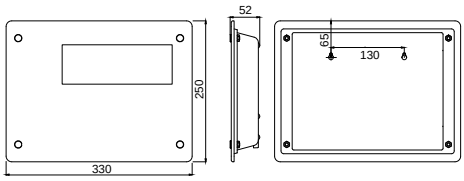
APPLICATIONS

Indoor air quality (IAQ) measurements in offices, conference rooms, schools, etc.

FEATURES

- Benchtop or wall mounting
- Measures and records CO_2, relative humidity and temperature
- Accuracy: ±30 ppm, ±2.5 %RH, ±0.3 K
- ROTRONIC HYGROMER® IN-1 humidity sensor
- 18,000 data point memory for CO_2, humidity and temperature values
- Adjustable, visual CO_2 alert indicator
- Data download via USB flash drive
- Display of date and time

Order code	CO_2 Display
Probe type	CO_2: infrared (NDIR) with automatic calibration (ABC) Humidity: ROTRONIC HYGROMER® IN-1 Temperature: NTC
CO_2 measurement range	0...5000 ppm
Range of application	0...50 °C / 0...95 %RH, non-condensing
Material	ABS
Power supply	AC adapter, 12 V
Dimensions	330 x 250 x 50 mm



Delivery package

- Short instruction manual
- Mounting hardware
- Factory adjustment certificate

Recommended accessories

• Humidity calibration device	ER-15
• Humidity standard for calibration 80%RH	EA80-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS

CP11

Portable monitoring of indoor air quality. Measures and records CO_2, relative humidity and temperature.

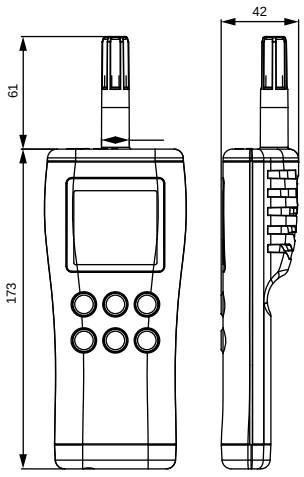
APPLICATIONS

Mobile inspections and random tests of indoor air quality in offices, conference rooms, schools, etc.

FEATURES

- Measures and records CO_2, relative humidity and temperature
- Accuracy: ±30 ppm, ±2.5 %RH, ±0.3 K
- ROTRONIC HYGROMER® IN-1 humidity sensor
- 18,000 data point memory for CO_2, humidity and temperature values
- Maximum, minimum and average value display
- Adjustable audible CO_2 alarm
- Adjustable automatic power off function
- Includes logging and configuration software, USB data cable and case

Order code	CP11
Probe type	CO_2: infrared (NDIR) with automatic calibration (ABC) Humidity: ROTRONIC HYGROMER® IN-1 Temperature: NTC
CO_2 measurement range	0...5000 ppm
Range of application	0...50 °C / 0...95 %RH, non-condensing
Material	ABS
Power supply	4 AA batteries / optional AC adapter
IP protection	IP30



Delivery package

- Short instruction manual
- 4 x AA batteries
- Rotronic software SW21
- USB cable
- Soft case
- Factory adjustment certificate

Recommended accessories

5 VDC AC adapter	AC1214
Humidity calibration device	ER-15
Humidity standard for calibration 35 %RH	EA35-SCS
Humidity standard for calibration 80%RH	EA80-SCS

Technical data	CL11	CP11	CO_2 Display
General			
Parameters	CO_2, relative humidity and temperature		
Memory capacity	40,000 values with time stamp, automatic recording (%RH / °C / ppm)	18,000 values with time stamp, automatic recording (%RH / °C / ppm) 99 single values with time stamp, manual recording (%RH / °C / DP / WBT / ppm)	18,000 values with time stamp, automatic recording (%RH / °C / ppm)
Housing material / IP protection	ABS / IP30		
Dimensions	157 x 120 x 45 mm	77 x 42 x 234 mm	330 x 250 x 50 mm
Weight	200 g	290 g	1400 g
Display	Two-line LCD with backlight		
Alarm	Audible and visual, adjustable for CO_2 measurement	Audible, adjustable for CO_2 measurement	Visual, adjustable for CO_2 measurement
Power supply	AC adapter AC1214	4 AA batteries / optional AC adapter AC1214	AC adapter
Current consumption	50 mA	40 mA	‹700 mA
Application temp. housing / electronics	0...50 °C / 0...95 %RH, non-condensing		
Service interface	USB-Mini port		
CE / EMC compatibility	CE conformity 2014/30/EU		
CO_2 measurement			
Measurement principle	Infrared (NDIR) with automatic calibration (ABC)		
Measurement range	0...5000 ppm		
Accuracy at 23 °C ±5 K	±30 ppm ±5 % of measured value		
Null drift	‹10 ppm/year		
Maintenance	No maintenance (standard indoor applications)		
Humidity measurement			
Sensor	ROTRONIC HYGROMER® IN-1		
Measurement range	0...100 %RH		
Accuracy at 23 °C ±5 K	‹2.5 %RH (10...90 %RH)		
Adjustment points	35, 80 %RH		
Long-term stability	‹1.5 %RH/year		
Response time	‹30 s τ63, without filter		
Temperature measurement			
Sensor	NTC		
Measurement range	-20..60 °C		
Accuracy at 23 °C ±5 K	±0.3 K		
Response time	4 s τ90		

Download the aw white paper from **www.rotronic.com/aw**

Video water activity

Interested? Then scan the QR code!

Video CRP5

Interested? Then scan the QR code!

Video differential pressure

Interested? Then scan the QR code!

Water activity probes

APPLICATIONS

Quality assurance in food manufacturing, coffee processing and the tobacco industry, grain storage and pharmaceutical industry.

HC2-AW-USB

FEATURES

- Range of application: 0…1 aw (0…100 %RH) / -40…85 °C
- On/Off switch
- USB interface for direct connection to a PC
- Power supply: via USB interface
- Adjusted at 23 °C and 10, 35, 80 %RH
- AW Quick function for fast measurement results (typically 4-5 minutes)

Order code	HC2-AW-USB	HC2-AW-USB-SW
Feature	Measurement probe	Probe + software HW4-P-Q-V3-Code
Connection	Via USB to PC, 3 m cable	
Accuracy	±0.008 aw, ±0.8 %RH, ±0.1 K, at 10…30 °C	
Power supply	Via USB interface	
Filter type	Wire mesh filter with 20…25 µm pore size	
Weight	550 g	

HC2-AW-USB

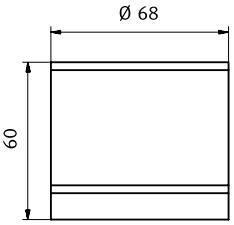
HC2-AW

FEATURES

- Same as HC2-AW-USB, but with UART interface

Order code	HC2-AW
Feature	Measurement probe
Connection	Via UART, 1 m cable
Accuracy	±0.008 aw, ±0.8 %RH, ±0.1 K, at 10…30 °C
Power supply	Via display unit
Filter type	Wire mesh filter with 20…25 µm pore size
Weight	550 g

HC2-AW



Compatible

- HC2-AW-USB: with PC
- HC2-AW: with laboratory analyzer HygroLab C1 and handheld instrument HP23-AW-A

Delivery package

- Factory adjustment certificate

Recommended accessories

- Sample holders WP-14-S, WP-40, WP-40TH
- Calibration device WP-14-S
- Calibration standards EAxx-SCS
- Disposable sample containers PS-14, PS-40

Insertion probes

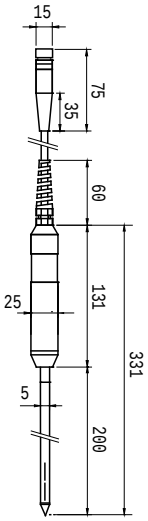
5 / 10 mm for measurements in bulk materials

APPLICATIONS

5 mm insertion probe: dust-free bulk materials such as tablets, grain, jelly capsules and granulates.
10 mm insertion probe: dusty bulk materials such as flour, sugar, etc.

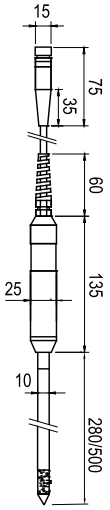
FEATURES

- Range of application: -40...85 °C / 0...100 %RH
- Digital interface (UART) and scalable analog outputs, 0...1 V
- Standard configuration: 0...1 V = -40...60 °C / 0...100 %RH
- Adjusted at 23 °C and 10, 35, 80 %RH



5 mm insertion probe

Order code	HC2-P05
Probe type	Ø 5 x 200 mm, insertion probe with 2 m cable
Accuracy	±0.015 aw, ±1.5 %RH, ±0.3 K, at 10...30 °C
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: approx. 4.5 mA
Filter type	No filter available (laser-cut slots)
Response time	‹15 s τ 63
Material	Stainless steel DIN 1.4305 (probe), POM (handle)
Weight	160 g



10 mm insertion probe

Order code	HC2-HP28
Probe length	Ø 10 x 280 mm
Accuracy	±0.008 aw, ±0.8 %RH, ±0.1 K, at 10...30 °C
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: approx. 4.5 mA
Filter type	Sintered steel
Response time	‹20 s, with filter τ 63
Material	Stainless steel DIN 1.4305 (probe), POM (handle)
Weight	200 g

Compatible

• Handheld instrument	HP23-AW-A
• Laboratory analyzer	HygroLab C1

Recommended accessories

• Replacement filter HC2-HP28	ET-Z10

Delivery package

- Factory adjustment certificate

Laboratory analyzer AwTherm

With AwTherm, Rotronic offers a professional, high-end laboratory unit for temperature-stabilized measurement of water activity. The wide control range permits measurements to be integrated directly in the tempered manufacturing or storage process.

APPLICATIONS

Food industry, pharmaceutical industry, cosmetics industry

FEATURES

- Highest precision through exact stabilization of temperature
- Wide temperature-control range
- Outstanding repeatability
- Excellent long-term stability
- Reference probe exchangeable for calibration or cleaning

General specifications	
Order code	AwTherm
Operating conditions	1...40 °C (34...107 °F)
Measurement range	0.005...1.000 aw
Accuracy	±0.005 aw (10...30 °C) / ±0.1 °C (±0.18 °F)
Power supply	110...230 V / 50...60 Hz
Display	8-line LCD with touch operation
Sample sizes	Variable (14 mm / 40 mm)
Current consumption	≤2 A
Temperature control range	0...60 °C (32...140 °F)
Temperature stability	±0.01 °C/min (±0.018 °F/min)
Chamber-temperature gradient	‹0.1 °C (‹0.18 °F)
Probe	
Sensor	HYGROMER® IN-1
Maintenance / Calibration	Annual calibration (recommended)
Long-term stability	‹0.01 aw/year
Temperature sensor	PT100, DIN 1/3 Class B
Functions	
HW4-compatible	Yes (v 3.6.0 and higher)
aw-Quick function	Yes
Interface	Micro USB
Calibration / Adjustment	**Aw & temperature:** HG2-S (probe removed with AwT-CAL) **Aw:** Rotronic humidity standards (via HW4)
Trend indicator	Yes
Approval / Conformity	
Standards	ISO 18787
CE / EMC	EMC 2004/108/EC / IEC EN 61010-1:2010
IP protection	IP21
Housing / Mechanics	
Enclosure material	PC / ABS
Housing dimensions	400 x 180 x 180 mm
Sample container dimensions	AwT-PS14: Ø46 x 14 mm / AwT-PS40: Ø46 x 40 mm
Weight	4200 g

Delivery package

- AwTherm incl. AwT-MHS
- AwT-PS14 or AwT-PS40
- AC adapter
- USB cable
- Instruction manual
- HW4-P-Q-V3-Code

Recommended accessories

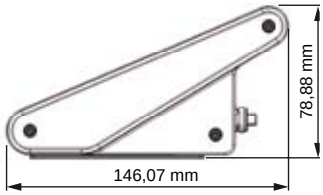
• AwTherm measurement probe	AwT-MHS
• AwTherm sample holders	AwT-PS14 / AwT-PS40
• Disposable sample containers	PS-14 / PS-40

Laboratory device HygroLab

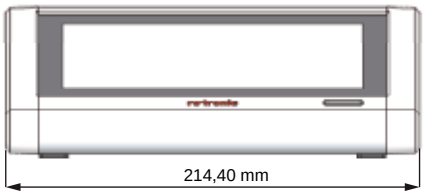
The Rotronic HygroLab is an innovative high-end laboratory analyzer for water activity measurements with up to four measurement probe inputs. Simultaneous or asynchronous measurement with the tried-and-tested AW Quick measuring function for pharmaceutical products, tobacco, coffee, food and many more.

FEATURES

- The reliable AW Quick mode for quick results (typical 4 - 5 min)
- 4 probe inputs for simultaneous or asynchrony measurements
- Standalone laboratory measuring device with 7" touch screen (no additional software necessary)
- Remote access with PC or Tablet
- Firmware updates over the internet



General specifications	
Order code	HygroLab
Operating range	0...40 °C (32...104 °F) / 0...80 %RH
Parameters shown	AW, %RH, °C, °F
Dimensions	215 ×146 ×79 mm
Accuracy @ 23 °C ± 5 % (HC2-AW)	± 0.008 aw / 0.8 %rh / ±0.1 K
Long-term stability (HC2-AW)	‹ 1 %rh / year (Normal conditions)
AW Quick Mode	Yes
Display	7" LCD capacitive touch screen
Power button	Push button (with RGB light indicator)
Trend display	Yes
Clock	Real time clock provides a time stamp for every measurement
Storage capacity	16 GB
Power supply	12VDC 2.0A 24W Max (AC adapter)
Power supply plugs	CH (EU) / UK / US
Probe connections	4 x HC2 station probe (HC2A-S or HC2-AW)
USB (A) types	2x 2.0 and 2x 3.0
USB power supply	5V / 500 mA
Measurement interval	15 s
Start-up time	30 s
Software update	Direct with the HygroLab over the internet
Protocols (values)	Date, time, AW / RH, °C / °F, AW Setpoint, Serial No., etc.
HW4 compatible	No
Acoustic alarm	No
Calculations	No psychrometric calculations available
Housing / Mechanics	
Housing material	Aluminum, ABS, stainless steel
Weight	1.02 kg (2.25 lbs)
Conformity with standards	
CE conform	CE 2014/30/EU
IP protection rating	IP30



Compatible

• Water activity probe	HC2-AW
• Humdity probe	HC2A-S

Delivery package

- HygroLab
- Power adapter
- Pen
- Short instruction manual
- USB WiFi stick (optional)

Handheld instrument HP23-AW-A

In many situations it can be very useful to measure water activity at goods-in, production or storage rooms, e.g. inspection of bulk materials to ensure they meet specifications.

APPLICATIONS

Aw checks of cheese, meat, tobacco, building materials, animal feeds, bakery products, paper, medicines, in horticulture and agriculture, etc.

FEATURES

- Handheld instrument for measurement of water activity, relative humidity and temperature
- AW Quick function for fast measurement results (typically 4-5 minutes)
- Audible alarm to indicate completed measurement
- Saves up to 10,000 data records with %RH, °C, date and time
- Battery charging function

Order code	HP23-AW-A
Probe connections	2
Parameters shown	aw / %RH / °C / °F
AW Quick function	Integrated and via optional HW4 software
Calculations	All psychrometric calculations available
Power supply	9 V battery or 9 V AC adapter via USB-Mini
Interfaces	USB
Range of application	0...1 aW, 0...100 %RH, -10...60 °C
LCD	3-line alphanumeric with trend indicator
Current consumption	Max. 20 mA (with backlight)
Dimensions /Weight	188 x 72 x 30 mm / 200 g
Material	ABS
IP protection	IP30

Compatible

• Water activity probe	HC2-AW
• Insertion probes	HC2-P05, HC2-HP28
• All HC2 probes	
• HW4 software	

Delivery package

- Short instruction manual
- Battery

Accessories

Sample holders WP-14-S / 40 / 40TH

WP-14-S

WP-40

WP-40TH

APPLICATIONS

The stainless steel sample holders were developed specifically for the water activity probes HC2-AW(-USB). There are two sizes available:

- WP-14-S for small samples and for calibration
- WP-40 for larger samples

Both products provide excellent sample containment and optimum temperature stability. The WP-40TH can be attached to a water bath for additional control.

Order code	WP-14-S	WP-40	WP-40TH
Use with	PS-14	PS-14 / PS-40	PS-14 / PS-40
Depth	14 mm	40 mm	40 mm
Internal diameter	46 mm	46 mm	46 mm
Material	V2A steel		Brass, nickel-plated
Weight	350 g	1250 g	1550 g

Disposable sample containers PS-14 / PS-40

PS-14

APPLICATIONS

The disposable sample containers ensure the optimum sample volume is filled into the WP-14-S or WP-40 sample holders. They prevent the sample holders from coming into direct contact with the product being tested, thereby preventing soiling or cross contamination. The sample containers also provide a convenient means of collecting and storing samples.

PS-40

Order code	PS-14	PS-40
Use with	WP-14-S / WP-40 / WP-40TH	WP-40 / WP-40TH
Depth	14 mm	40 mm
External diameter	46 mm	46 mm
Unit	100 pc.	

Clamp sealing mechanism

APPLICATIONS

In the case of very dry or very moist samples additional mechanical sealing of the AW measurement probe and sample holder may be necessary to prevent external conditions influencing the sample.

Order code	AW-KHS
Use with	WP-40 / WP-40TH
Weight	1100 g

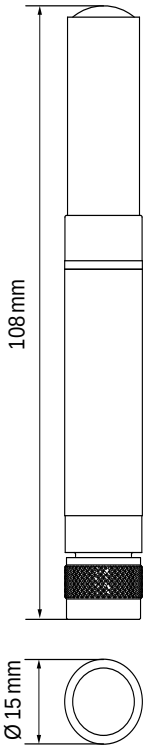
HC2A-S3/S3H

The HC2A-S3 belongs to the family of HC2A-S probes that form the basis of our product portfolio. It measures humidity and temperature and calculates the dew/frost point. The HC2A-S3H fulfills the highest demands for measuring accuracy.

FEATURES

- Measures relative humidity and temperature, calculates the dew/frost point
- Digital interface (UART) and analog outputs 0...1 V
- Adjusted at 23 °C and 10, 35, 80 %RH (HC2A-S3)
- Adjusted at 23 °C and 10, 20, 30, 40, 50, 60, 70, 80, 90 %RH (HC2A-S3H)

Order code	HC2A-S3	HC2A-S3H
Probe type	Meteorology probe, white	
Range of application	-50...100 °C, 0...100 %RH	
Accuracy	±0.8 %RH, ±0.1 K at 10...30 °C	±0.5 %RH, ±0.1 K at 10...30 °C (10...90 %RH)
Power supply	3.3...5 VDC, adjusted at 3.3 VDC	
Long-term stability	<1 %RH / year	
Filter type	Polyethylene standard-filter, 40 µm, white	
Response time	<15 s (without filter)	



Compatible

• Meteorology transmitters	MP102H/402H
• Actively ventilated shield	RS12T / RS24T
• Naturally ventilated shield	AC1000

Delivery package

- Factory adjustment certificate
- Polyethylene filter

Recommended accessories

• Polyethylene filter, white (40 µm)	NSP-PCW-PE40
• Connection cable with voltage regulator and 2 m cable, white	E3-02XX-ACT/01
• Calibration device	ER-15
• Humidity standard for calibration 10 %RH	EA10-SCS
• Humidity standard for calibration 35 %RH	EA35-SCS
• Humidity standard for calibration 80 %RH	EA80-SCS

MP100A / MP400A

Standard meteorology probes with fixed sensors (analog technology).

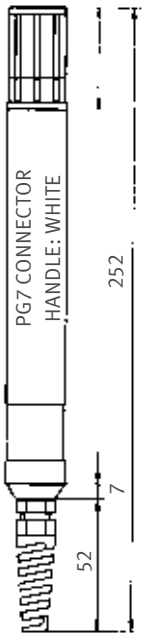
APPLICATIONS

Weather stations, agriculture, ice warning and snow making systems.

FEATURES

- Very robust, therefore high long-term stability
- Voltage and current outputs for humidity and temperature
- HYGROMER® IN-1 Sensor / Pt100 1/3 Class B
- Cable length compensation up to 100 m
- Connection with Tuchel T4/T7 connector or fitted cable with open ends

Order code	MP100A	MP400A
Output	Voltage output 0...1 VDC	Current output 0(4)...20 mA
Range of application	-40...85 °C / 0...100 %RH	
Power Supply	15...24 VDC	5...24 VDC
Accuracy at 10...30 °C	10...95 %RH: ±1.5 %RH Remaining range: ±2.5 %RH	
Measurement	Temperature with Pt100 - direct or linear output signal	
Filter	Wire mesh filter ~ 20 µm pore size	



Compatible

- Actively ventilated shield — RS12T/24T
- Naturally ventilated shield — AC1002 / AC1003

Delivery package

- Factory adjustment certificate
- Wire mesh filter
- Instruction manual

Recommended accessories

- Humidity standard for calibration 10 %RH — EA10-SCS
- Humidity standard for calibration 35 %RH — EA35-SCS
- Humidity standard for calibration 80 %RH — EA80-SCS
- Wire mesh filter — SP-W3-25

Technical data	MP100A (analog)	MP400A (analog)
General		
Parameters	Humidity and temperature	
Housing material	Polyoxymethylene	
IP protection	IP65	
Weight	120 g	
Supply voltage	4.8...30 VDC	10...30 VDC
Current consumption	‹4 mA at 4.8 VDC	‹50 mA at 10 VDC
Range of application / Storage conditions	-40...85 °C	
Cable length compensation	Up to 99 m	
Humidity measurement		
Sensor	ROTRONIC HYGROMER® IN-1	
Measurement range	0..100 %RH	
Accuracy at 0...30 °C	10...95 %RH: ±1.5 %RH	
Long-term stability	‹1 %RH/year	
Response time	‹15 s τ63 (63 % of a jump 35...80 %RH) without filter	
Temperature measurement		
Sensor	Pt100 1/3 Class B	
Measurement range	-50...100 °C	
Accuracy at 0...30 °C	±0.3 K	
Response time	‹15 s τ63	
Analog output		
Current	N/A	0(4)...20 mA
Voltage	0...1 V	N/A
Digital output		
	N/A	

MP102H/402H

For interchangeable probe HC2A-S3

The MP102H and MP402H are meteorology transmitters with an analog output and RS-485 interface. Humidity and temperature are measured with an interchangeable HygroClip2 HC2A-S3 probe. Temperature measurement can be enhanced by an external Pt100 in various accuracy classes.

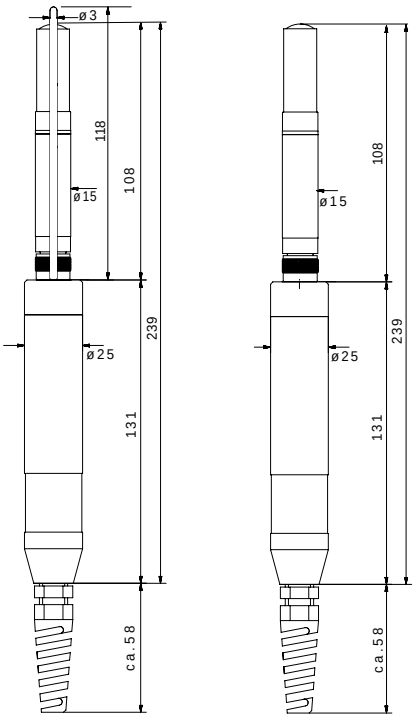
APPLICATIONS

Weather stations, snow guns, status monitoring of roads, bridges and airports, snow and ice warning systems, research in very remote areas.

FEATURES

- Humidity and temperature measurement with interchangeable HC2A-S3 probes (order separately)
- Calculates all psychrometric parameters
- Direct Pt100 sensors available as an option
- Voltage or current output signal
- Freely scalable
- High long-term stability
- Service interface (UART) to PCB
- RS-485 interface
- Connection with cable (3...99 m) with open ends or Tuchel T7 connector

Order code	MP102H	MP402H
Output	Voltage output 0...1/5/10 VDC	Current output 0(4)...20 mA
Range of application	-40..80 °C / 0..100 %RH	
Power Supply	5...24 VDC	15...24 VDC



With external Pt100

Without external Pt100

Compatible

- Meteorology probes — HC2A-S3 and HC2A-S3H
- Actively ventilated shield — RS12T / RS24T
- Naturally ventilated shield — AC1003

Delivery package

- Short instruction manual

Technical data	MP102H	MP402H
General		
Parameters	Humidity and temperature Calculates all psychrometric parameters	
Housing material	Polyoxymethylene	
IP protection	IP65	
Weight	150 g	
Supply voltage	5...24 VDC (0...1 V output) 10...24 VDC (0...5 V output) 20...24 VDC (0...10 V output)	15...24 VDC
Current consumption	‹50 mA	
Application temp. housing / electronics	-40...80 °C	
Cable length compensation	Up to 99 m	
Humidity measurement		
Sensor	ROTRONIC HYGROMER® IN-1 (HC2A-S3)	
Measurement range	0...100 %RH (HC2A-S3)	
Accuracy at 10...30 °C	±0.8 %RH (HC2A-S3)	
Response time	‹15 s τ63 (63 % increase 35...80 %RH) without filter	
Temperature measurement		
Sensor	Pt100 1/3 Class B (HC2A-S3)	
Measurement range	-50...100 °C (HC2A-S3)	
Accuracy at 10...30 °C	±0.1 K (HC2A-S3)	
Response time	‹15 s τ63	
Direct Pt100 (optional)	Pt100 1/3 Class B Pt100 1/5 Class B Pt100 1/10 Class B	
Analog output		
Current	N/A	0(4)...20 mA
Voltage	0...1 VDC 0...5 VDC 0...10 VDC	N/A
Digital output		
	RS-485 UART	

Actively ventilated shields

The ventilated weather and radiation protection shield RS12T with 12 VDC fan and RS24T with 24 VDC fan were developed in close cooperation with MeteoSwiss. This state-of-the-art device reduces the influences of thermal radiation on humidity and temperature measured values to a minimum.

APPLICATIONS

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

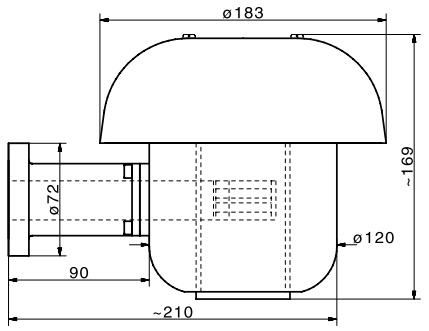
FEATURES

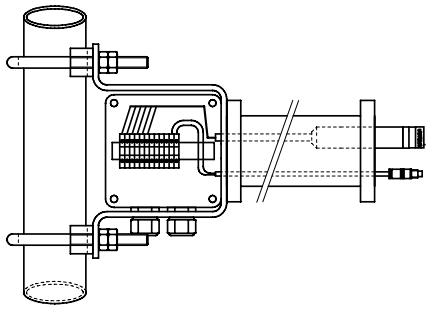
- Easy-to-install protection shield with integrated fan
- Special white coating (RAL 9010) minimizes solar heating
- Simple probe mounting
- Suitable for various probes

Order code	RS12T	RS24T
Range of application	-30...60 °C	
Material	Aluminum, POM, RAL 9010	
Power supply	12 VDC, 2 W	24 VDC
Fan	Papst fan IP54	
Ventilation	3.5 m/s / 900 l/min.	
Fan lifetime	At 40 °C ~70,000 h (approx. 8 years)	

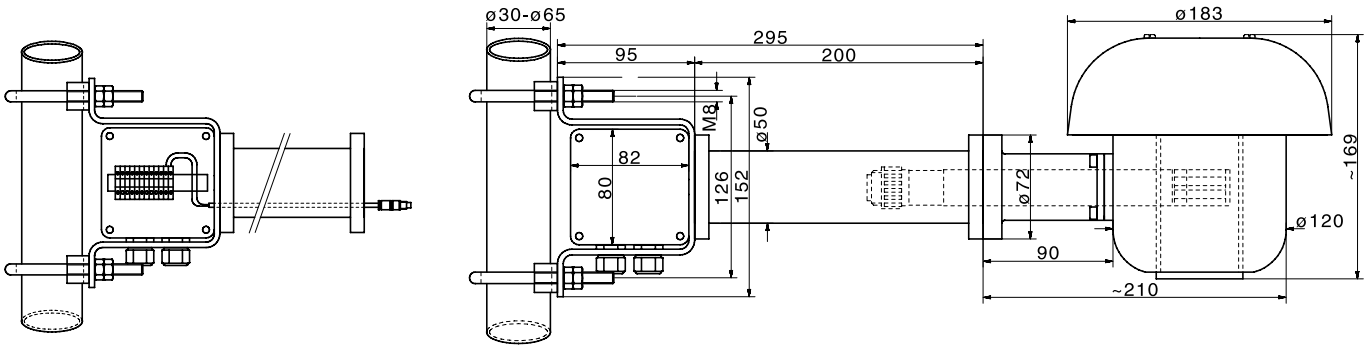
Order code	MKRS-HC2	MKRS-MP102-402
Use with	HC2A-S3/S3H	MP102H/402H
Probe connection	E2 connector	Open ends to terminals
Mast diameter	30-65 mm	

Further models available on request.





MKRS-HC2



MKRS-MP102-402

Compatible

- Mounting sets

Delivery package

- Installation instructions

Naturally ventilated shields

Naturally ventilated radiation shields are used where the natural ventilation (wind) provides sufficient air flow, e,g, measurement stations in the mountains.

APPLICATIONS

Snow guns, weather stations and building management systems.

FEATURES

- Easy-to-install protection shield for wall and mast mounting
- Multi-plate system for natural ventilation
- Simple probe mounting
- For probe diameters of 15 or 25 mm
- For mast diameters of 25...50 mm
- Protection against wind speeds up to 70 m/s and horizontal precipitation

Order code	AC1000	AC1002	AC1003
Mounting probe	Probe screw connection Ø15 mm	Probe screw connection Ø25 mm	
Use with	HC2A-S3/S3H + E3-02A	MP100A/400A	MP102H/402H
Number of plates	9	10	14
Mounting shield	Mounting bracket + clamp for mast mounting (Ø 25...50 mm)		
Dimensions	Ø130 x 140 mm	Ø130 x 160 mm	Ø130 x 215 mm

AC1000 with HC2A-S3+E3-02XX

AC1002 with MP100A-T4

AC1003 with MP102H

Delivery package

- Installation instructions
- Mounting hardware

CRP5 series

The differential pressure measurement of the CRP5 clean room panel is based on diaphragm sensor technology. Thanks to its functionality, this device of the highest Swiss quality can be configured perfectly for the application in question. The CRP5 stands out from the crowd with its front panel manufactured with sturdy glass and removable humidity and temperature probe.

FEATURES

- Designed for cleanrooms
- Removable humidity & temperature probe for simple cleaning
- Conforms to FDA 21 CFR Part 11 and GAMP
- Accuracy: Pressure ±1.0 %FS, Temperature: ±0.2 K / Humidity: ±1.5 %RH
- Digital communication via Ethernet (Modbus TCP, HW4) and RS-485 (Modbus RTU, HW4)
- Analog and digital inputs
- Front-side pressure connections for room pressure measurement or calibration
- High chemical resistance of glass front panel
- Alarms via relay or color TFT display
- Visual operating elements for operation with protective gloves

Power supply

- Low-voltage: 3-wire

Signal output

- 4 independent current and voltage outputs
- Ethernet (Modbus TCP, HW4) / RS-485 (Modbus RTU, HW4)
- 6 relay switch contacts

Version

- Panel version with HC2-CRP probe at the front
- Panel version with probe connection at the back

Measured parameters

- Differential pressure, temperature and relative humidity
- Analog and digital input signals
- Psychrometric calculations such as enthalpy, dew point, etc.

Measurement ranges

- -25...+25 Pa / -50...+50 Pa / -100...+100 Pa / -250...+250 Pa / -500...+500 Pa
- -5...60 °C (23...140 °F) / 0...100 %RH
- Analog IN: 0...3.3 V or 0...24 mA (freely scalable)
  Digital IN: 0...1.5 V (low level) / 3.5...24 V (high level)

Display

- Color TFT display with backlight

CRP5

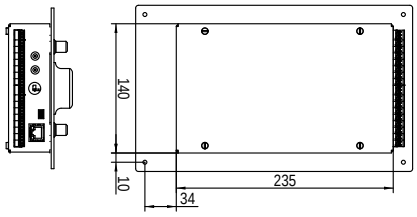
APPLICATIONS

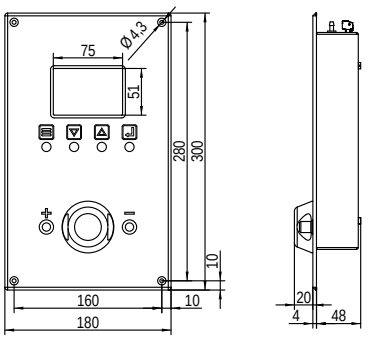
Cleanrooms, operating theaters, food industry and applications where very small pressure differences need to be detected.

Order code	CRP53x
Output signals	0...10 V / 4...20 mA (Customer rescaling possible*) 6 x solid-state relays
Pressure ranges	±50 Pa / ±100 Pa / ±250 Pa / ±500 Pa
Configuration of the pressure connections	• Caps without holes with pressure connections at the back • Cap with hole at «+» connection for room pressure measurement • Cap with hole at «–» connection for room pressure measurement
Humidity probe	Removable probe at the front (HC2-CRP) or probe connection at the back (HC2)
Relays	1 A DC / AC 2 A DC

The magnetic HC2-CRP humidity and temperature probe can also be used independently.

CRP5 with HC2-CRP probe

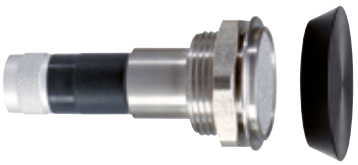




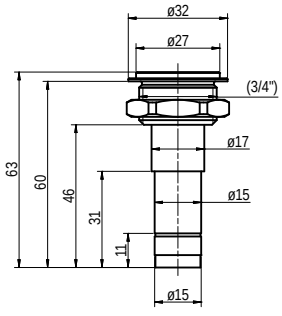
Flush mount probes

The flush mount probe is mounted in the walls of glass cabinets, showcases, gallery walls, laboratories and in cleanrooms for humidity and temperature measurement.

Order code	HC2-IS25
Accuracy	±1.5 %RH, ±0.2 K, at 0...90 %RH and 10...30 °C
Power supply	3.3...5 VDC, adjusted at 3.3 VDC, current: ~4.5 mA
Filter type	Sintered steel
Sensor type	ROTRONIC HYGROMER® WA-1, Pt100 1/3 Class B
Response time	‹20 s
Housing material	Polycarbonate, stainless steel DIN 1.4301
Weight	50 g



HC2-IS25, steel filter, cover



Compatible

- HW4 software

Delivery package

- Factory adjustment certificate
- Short instruction manual

Recommended accessories

- Service cable AC3006 / AC3009*
- Calibration accessories
- HC2A-S probes

* Requires optional HW4 software and service cable.

Technical data	CRP53x
General	
Parameters	Differential pressure, temperature, relative humidity, absolute pressure, digital and analog inputs
Housing material	Front: glass Back: stainless steel
IP protection	Front: IP65 (also with detached probe) Back: IP20
Mounting position	Wall mounting
Dimensions	180 x 300 x 72 mm
Weight	1,700 g (with humidity probe) 1,550 g (without humidity probe)
Display	Color TFT display
Menu navigation	4 optical keys
Electrical connections	Screw terminals at the back
Power supply	20...48 VDC / 16...35 VAC
Current consumption	‹450 mA
Range of application / Storage conditions	-5...60 °C (23...140 °F) / 0...100 %RH
Firmware update	Via HW4 software
Service interface	UART
CE / EMC compatibility	EMC Directive 2014/30/EU
Fire protection class	Corresponds to UL94-HB
FDA / GMP compatibility	21 CFR Part 11 and GAMP5
Differential pressure measurement	
Measurement principle	Diaphragm sensor
Measurement ranges	±50 Pa / ±100 Pa / ±250 Pa / ±500 Pa
Medium	Air and non-aggressive gases
Accuracy at 23 °C ±3 K	±1.0 %FS
Zero drift	Compensated (manual or automatic zero adjustment)
Measurement interval	1 s
Pressure resistance	0.7 bar (70,000 Pa)
Pressure connections	Front: tubing connector Ø 6 mm x 10 mm Back: tubing connector Ø 4 mm x 10 mm
Measurement of temperature and relative humidity	
Probes	HC2-CRP, HC2
Measurement range	-100...200 °C (probe dependent) / 0...100 %RH
Outputs	
Analog outputs	4, freely configurable
Analog output type	0 / 4...20 mA or 0...1 / 5 / 10 V
Switch output	6 solid-state relays
Switching capacity	‹50 VDC at ‹2A if polarity is considered ‹35 VAC at ‹1 A if polarity is not considered
Accuracy analog output	±5 mV (voltage output) ±20 µA (current output)
Permissible load	›10 kΩ (voltage output) ‹500 Ω (current output)
Digital communication	Ethernet (Modbus TCP, HW4) / RS-485 (Modbus RTU, HW4)

HygroFlex5-EX series

The HygroFlex5-EX series is the latest development in two-channel transmitters for precise measurement of humidity and temperature in dust and gas potentially explosive atmospheres. The interchangeable probes are cast into a stainless-steel tube and certified for operation in Zone 0/20. The transmitter itself is certified for Zone 1/21. The intelligent design of the circuitry with electrical isolation permits the measuring system to be operated without an intrinsically safe power supply for many applications.

FEATURES

- Measurement of relative humidity and temperature
- Optional output of dew point and other psychrometric calculations
- Safe operation in potentially explosive environments
- Electrically isolated analog outputs
- No intrinsically safe power supply required
- Interchangeable stainless steel probes
- Certified for two temperature classes (T4 / T5)

Power supply

- Low-voltage: 2-wire

Signal output

- Current output

Versions

- Wall mount (W)
- Duct mount (D)

Measured parameters

- Relative humidity and temperature

Measurement ranges

- 0...100 %RH
- -40...60 °C / -40...85 °C

Display

- Display with trend indicators and keypad
- Without display

HF5-EX duct / wall version

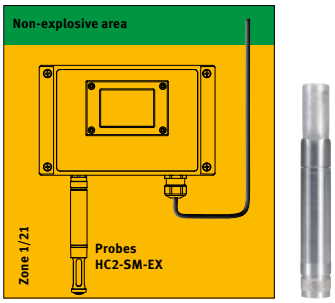
APPLICATIONS

Storerooms, pharmaceutical / biotechnology industry, sugar and flour mills, power stations, oil industry.

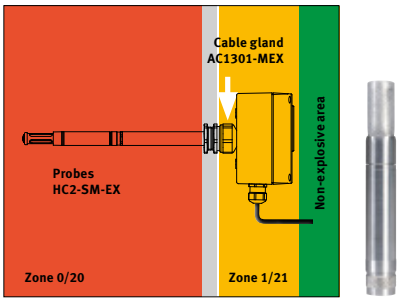
Order code	HF520-EX-x
Output parameters	Relative humidity / Temperature / Psychrometric calculation
Display	Optional (without backlight)
Humidity probe	Interchangeable HygroClip2-EX probes

HF5-EX probes

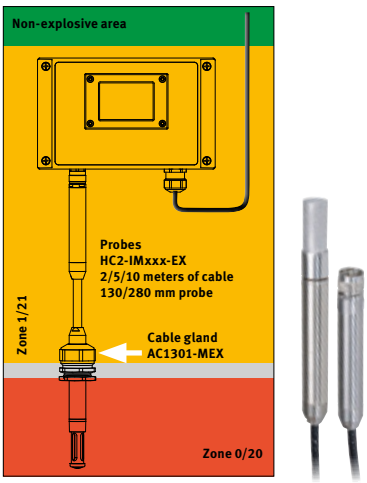
HC2-SM-EX
Wall mounting



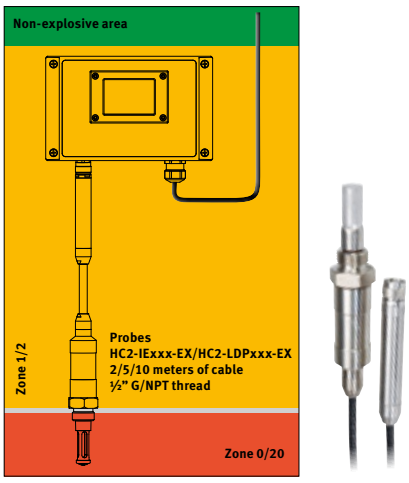
HC2-SM-EX
Duct mounting



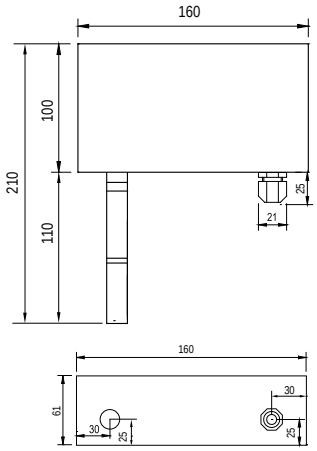
HC2-IMxxx-EX
Cable probe for flexible installations



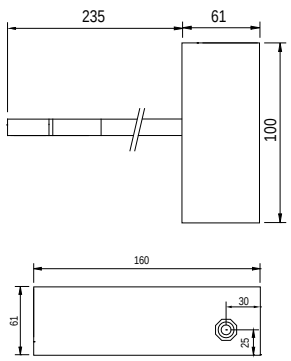
HC2-IExxx-EX / HC2-LDPxxx-EX
Screw-in cable probe for pressure lines or low dew point



Wall version (W)



Duct version (D)



Compatible

- HW4 software

Delivery package

- Factory adjustment certificate, short instruction manual
- Screws for mounting

Recommended accessories

- Service cable AC3006*
- Calibration accessories
- Replacement filters
- Cable gland AC1301-MEX for mounting in ducts

* Requires optional HW4 software and service cable.

Technical data	HF520-EX
General	
Parameters	Humidity and temperature
Calculated parameters	All psychrometric parameters
Housing material	Aluminum (DIN EN 1706 EN AC-AlSi 12 (Fe))
IP protection	IP66
Weight	Wall version: 1,030 g Duct version: 1,140 g
Startup time	Standard cold ‹60 s / warm ‹30 s
Measurement interval	20…240 s
Display	Optional, LCD without backlight
Electrical connections	Connections: Ex-e terminals (0.2…2.5 mm2) Cable gland: M16 x 1.5 (Ø cable 4.5…7 mm)
Power supply	10…28 VDC
Current consumption	2x24 mA startup / 2x20 mA operation
Application temperature housing / electronics	-40…60 °C without display -10…60 °C with display
Service interface	UART internal service interface (only outside the explosive zone)
CE / EMC compatibility	EMC Directive 2014/30/EU
ATEX directives	2014/34/EU (ATEX)
EX identification	II 2(1) G Ex eb mb [ia Ga] IIC T5 Gb II 2(1) D Ex tb [ia Da] IIIC T80°C Db
Analog output	
Number	2
Current	4…20 mA, two-core
Galvanic isolation	Yes
Maximum load	500 Ω
Accuracy at 23 °C	‹20 µA

Technical data	HC2-SM-EX / HC2-IM-EX / HC2-IE-EX / HC2-LDP-EX
General	
Parameters	Humidity and temperature
Housing material / IP protection	Stainless steel (1.4301) / IP66
Cable probes	2/5/10 meters
EX identification	II 1/2 G Ex ia IIC T5…T4 Ga/Gb II 1/2 D Ex ia IIIC T80 °C …T110 °C Da/Db
Humidity measurement	
Sensor	HC2-SM/IM/IE-EX: ROTRONIC HYGROMER® IN-1 HC2-LDP-EX: ROTRONIC HYGROMER® LDP-1
Adjustment	Not via device menu (only outside the explosive zone with HW4 + AC3001)
Measurement range	0…100 %RH
Accuracy at 23 °C	0.8 %RH
Temperature measurement	
Sensor	HC2-SM/IM/IE-EX: Pt100 1/3 Class B HC2-LDP-EX: Pt1000 1/3 Class B
Measurement range	-40…60 °C / -40…85 °C
Accuracy at 23 °C	0.1 K
Accessories	
Filter	SP-FN15, sintered steel filter (1.4401)
Cable gland	AC1301-MEX for duct mounting and cable probes (IM)

Video Universal RMS

Interested? Then scan the QR code!

RMS – For every application

The Rotronic Monitoring System is a modular system of hardware elements and software. It guarantees maximum flexibility at installation time, and ensures excellent availability of the data during operation. The data loggers record all measurements by Rotronic and third-party sensors and transmit them to the database. It stores all information and makes it available to all users, regardless of whether they access the database by PC, Mac, tablet or smartphone.

Data flow

Input transducers

The data loggers read out Rotronic measuring instruments or other input transducers such as cameras or third-party sensors. In this way the RMS monitors various parameters, both from Rotronic and third-party products.

- Rotronic measuring instruments
- Digital measuring instruments from other suppliers
- Analog instruments from other suppliers

Data logger

The data logger stores all measured data and sends it to the database. Should the connection be lost, the logger stores the data internally to protect data integrity and fills the data gaps when the connection has been restored.

- Automatic internal storage
- Backfilling of data gaps
- Wireless/LAN interface

Software / Database

The database covers the complete monitoring system. It contains all the measured values of the system and saves all actions. The server or cloud software alerts the relevant users in the case of problems and manages the user-specific access rights.

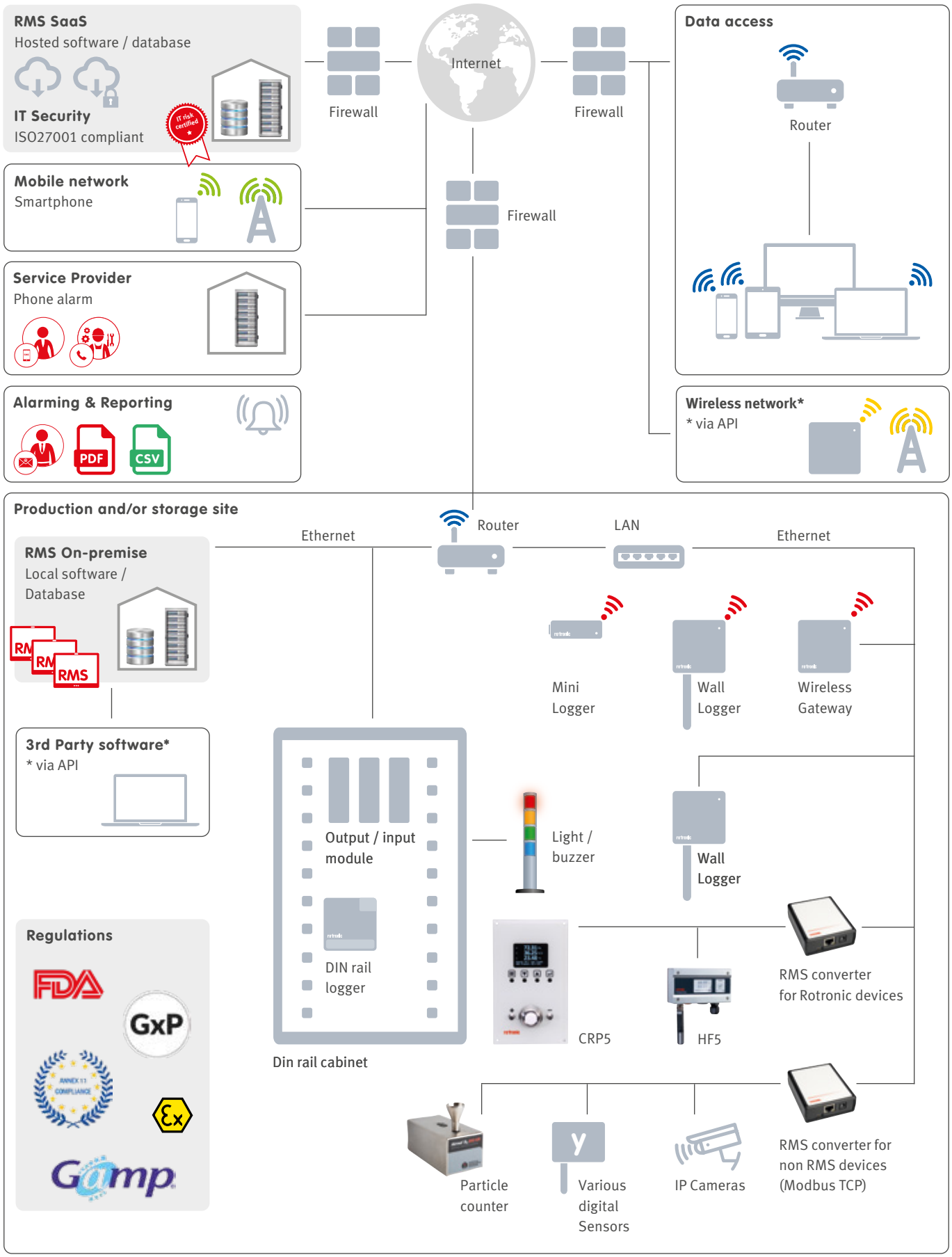
- SQL database
- Cloud solution can be validated
- Server solution can be validated

Output size

The database can be accessed with smartphones, tablets and all PCs with a web browser. Visualization and alerting are therefore possible worldwide and on all common platforms.

- Real-time monitoring
- Supports all common browsers

Network environment



WiFi 868/915 MHz Cellular LoRa/Sigfox

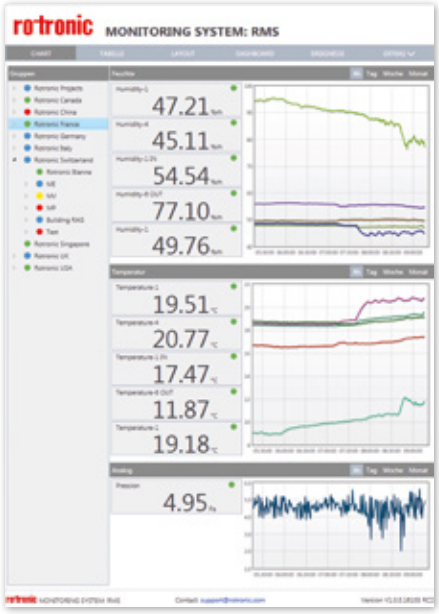
Monitoring software

The RMS Software fulfills all requirements for server-based monitoring. The software is linked to a database that archives all the measured data and actions of the system. The data can be accessed from anywhere in the world via all common platforms as long as an internet connection is available.

Data history always available

The database allows access to all historical data at any time, thereby ensuring traceability according to FDA and GMP. This data can be put together into a complete PDF report quickly, automatically and easily.

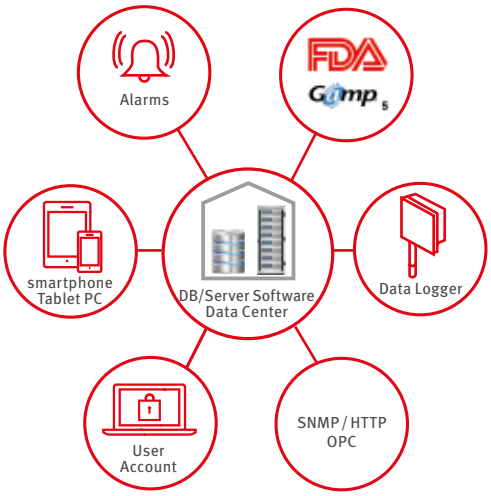
- Chart
- Table
- Layout
- Dashboard
- Events (audit trail)
- Analysis
- Reporting (PDF & CSV)



Alarms

Whether by voice call, email, SMS or switching of an alarm relay: the RMS offers clear alarm functions and records all events in the database:

- Errors
- Warnings
- System messages
- Reminders
- Alarms



Validation at the touch of a button

The RMS On-premise enables validation at the touch of a button. The system checks data integrity automatically by self-test in that it switches all input modules into their various states and checks the alarms that are meant to be triggered. The software then generates a validation report on the complete system.

- The validation documents comply with GAMP5 requirements
  (see Rotronic Validation Guide on the Rotronic website)

Easy user management

The intelligent user management function makes it possible to assign different rights to every user on the basis of data groups. For example, the same user can have only read rights in data group A, while he also has write rights in data group B.

Data analysis

To analyze your data, you can generate reports at any time. These reports can be visualized and formatted at will.

- Charts and tables (PDF or CSV)
- Statistical data (min./max./average/standard deviation)
- MKT: mean kinetic temperature
- Audit trail

RMS software products

The RMS software was developed on the basis of FDA and GAMP5 guidelines.

Type	**RMS On-premise**			**RMS SaaS (SaaS – Software as a Service)**				
Version	**Basic**	**Professional**	**Enterprise**	**Free**	**Small**	**Professional**	**Enterprise**	**Exclusive**
Chart & table view	✓	✓	✓	✓	✓	✓	✓	✓
Layout view		✓	✓			✓	✓	✓
Dashboard view		✓	✓			✓	✓	✓
Data archiving			✓				✓	✓
Audit trail		✓	✓			✓	✓	✓
Calibration/Adjustment	✓	✓	✓		✓	✓	✓	✓
Validation			✓					✓
Alarm scheme		∞	∞			40	200	200
Users (freely extendable)	2	5	10	1	2	5	10	10
Devices or measuring points (freely extendable)	10	40	100	2	10	40	100	100
Storage (freely extendable)	∞	∞	∞		12 months	12 months	12 months	∞

RMS-HCD

This digital probe is characterized by its high performance. Very low current consumption, the highest degree of accuracy and measurement results within 50 ms are its main features. This is enabled by the new AirChip4000, which together with the HYGROMER® HT-1 sensor forms a powerful combination.

FEATURES

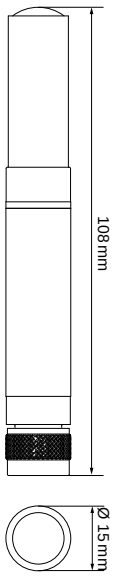
- Measures relative humidity and temperature
- Outstanding accuracy, repeatability and long-term stability
- Advanced probe housing and construction
- Compatible with RMS data loggers and RMS software
- Low power consumption

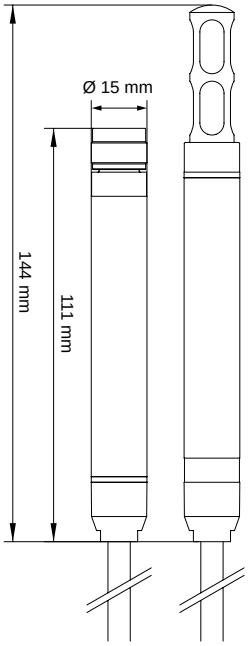
General specifications		
Order code	RMS-HCD-S (black) RMS-HCD-S3 (white)	RMS-HCD-IC102 (Industrial probe, 2 m cable)
Humidity sensor	HYGROMER HT-1	
Temperature sensor	PT 1000, Class 1/3 B	PT 100, Class 1/3 B
Operating humidity	0...100 %RH	
Operating temperature	-40...+85 °C	-40...+85 °C (Electronics) -100...200 °C [1] (Sensor head)
Accuracy @ 23 °C	±0.8 %RH ±0.1 K	
Long-term stability	1 %RH / year	
Startup time	50 ms	90 ms
Measurement interval	500 ms	
Response time sensor	τ63: <15 s without filter, (temperature and humidity)	
Maximum wind velocity	3.5 m/s without filter	
Supply voltage	2.8...5.5 VDC	3.3...5.5 VDC
Current consumption	0.5 mA	<3 mA
Digital interface	UART	
Protocol	Modbus RTU	
Standards		
Compliance	FDA 21 CFR Part 11 / GAMP5	
Housing / Mechanical parts		
Material	PC, PPS, stainless steel 1.4301	
Protection rating	IP65 (except sensor area)	
Weight	10 g	230 g

[1] Peak load: 100 h. Maximum permissible continuous load: 190 °C

RMS-HCD-S

RMS-HCD-IC102





Compatible

- RMS-LOG-L / RMS-LOG-868 / RMS-LOG-915
- AC3001

Delivery package

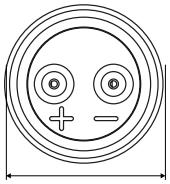
- HygroClip DIGITAL
- Short instruction manual
- Calibration certificate

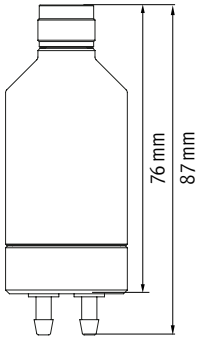
RMS-PCD-S-XXX

The Rotronic differential pressure probes are ideal for clean rooms, operating theaters and applications where even minor differences in pressure can have a big effect. Thanks to our two different measurement methods (thermal mass flow measurement and diaphragm measurement), we offer the perfect solution for every requirement. Together with other measurement parameters, these probes can be integrated in RMS perfectly.

FEATURES

- High-precision measurement and long-term stability
- With ambient pressure compensation
- Large overload range





General specifications		
Sensor type	Flow	Membrane
Accuracy [1] at 23 °C ±3 K	±1% FS	±1% FS [2]
Long-term stability [3]	±0.1% FSS/year	±2% FSS/year for ±25Pa probe ±1% FSS/year for ±50Pa probe ±0.5% FSS/year for ±100Pa probe ±0.25% FSS/year for ±250Pa and ±500Pa probes
Zero point compensation [4]	Automatic, 1x per measurement interval	Manual, with external tube; via RMS software [1]
Medium	Air	Air & non-aggressive gases
Ambient pressure compensation	Automatic	Not necessary
Adjustment and calibration	Factory adjustment/calibration: 5 points Customer adjustment: max. 9 points	
Measurement range	-25...+25Pa/-50...+50Pa/-100...+100Pa/-250...+250Pa/-500...+500Pa	
Burst pressure	5 bar	0.7 bar
Leak rate	‹180 µl/min.	0 µl/min.
Startup time	‹0.5 s	
Measurement interval	1 s probe / ≥10s RMS / 1s Modbus	
Response time τ63	‹1 s	
Range of application	-20...+80°C (0...+70°C temp.-comp.) 0...95% RH non-condensing	
Voltage	3.3 – 5.5 V	
Current consumption	30 mA (avg.)	12 mA (avg.)
Battery life LOG-868/915	350d @ 60s interval	650d @ 60s interval
Battery life LOG-L	395d @ 60s interval	840d @ 60s interval
Protocols	Modbus RTU	
Standards		
Compliance	FDA 21 CFR Part 11 / GAMP5	
Housing / Mechanical parts		
Housing material	Polycarbonate (housing) Stainless steel DIN 1.4305 (nuts, connectors)	
Fire protection class	Corresponds to UL94-HB	
Dimensions	Ø 32 mm x 87 mm	
Pressure connections	Tubing connector internal Ø 4 mm x 10 mm	
Weight	60 g	
IP protection class	IP65	

1 Please see the device manual for detailed considerations.
2 For maximum accuracy, Rotronic recommends strongly to perform a zero point compensation after the installation and initial operation and to repeat it annually. For aggressive environments / gas media, a more frequent zero point compensation is advised. Please see the device manual for detailed considerations.
3 Highly reducible by a zero point compensation of the RMS-PCD-S-Mxx (membrane sensor).
4 A zero point adjustment is recommended for every installation or position change.

Compatible

- RMS-LOG Wireless ≥V1.5/LAN data loggers ≥V1.4

Delivery package

- Differential pressure probe
- Calibration certificate
- Short instruction manual
- Wall-mounted holder
- Short pressure tube internal Ø 4mm x 10cm (PCD-S-Mxx only)

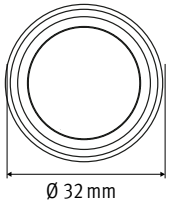
RMS-CCD-S-XX

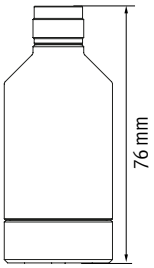
The Rotronic CO_2 probes are ideal for office rooms and applications where the quality of room air has a big effect. Together with other measurement parameters, these probes can be integrated in RMS perfectly.

FEATURES

- High-precision measurement and long-term stability
- With ambient pressure compensation
- Large measurement range
- With automatic CO_2 calibration
- Compatible with RMS-Logger, RMS On-premises software and SaaS solutions

General specifications	
Measurement principle	Infrared (NDIR)
Parameter	CO_2 concentration (ppm / %)
Accuracy @ 25 °C ±10 K, 20 – 60 %RH (after min. 3 weeks ABC)[1]	±50 ppm ±3 % of read value @ 0 – 2000 ppm ±10 % of read value @ 2000–10,000 ppm
Medium	Air & non-aggressive gases
Ambient pressure & temperature compensation	Automatic (300 – 1100 hPa)
Adjustment and calibration	Factory adjustment/calibration: 1 point Customer adjustment: max. 9 points
Measurement range	0...2000 ppm / 5000 ppm / 10'000 ppm
Resolution	1 ppm
Startup time	≤300 s
Measurement interval	16 s probe
Response time τ 63	130 s @ level descending
	87 s @ level ascending
Range of application	0...50 °C, 0...95 %RH non-condensing
Voltage	3.3 – 5.5 V
Current consumption (16 s interval)	20 mA (avg.) / peak 260 mA
Battery life (RMS wireless/LAN logger)	2.7 d @ 10 s/60 s interval
Interface	UART
Protocols	Modbus RTU
Standards	
Compliance	FDA CFR21 Part 11 / GAMP5
Housing / Mechanical parts	
Housing material	Polycarbonate (housing) Stainless steel DIN 1.4305 (nuts)
Fire protection class	Corresponds to UL94-V2
Dimensions	Ø 32 mm x 87 mm
Weight	55 g
IP protection class	IP40





[1] Accuracy relates to the uncertainty of calibration mixtures +- 1 %.

Compatible

- RMS-LOG Wireless ≥V1.5/LAN data loggers ≥V1.4

Delivery package

- CO_2-Probe
- Calibration certificate
- Short instruction manual
- Wall mount holder

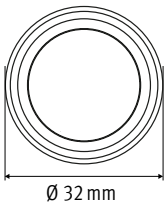
CCA-S-20X-SET

The CCA-S-20X is an analog probe with NDIR technology for measurement of carbon dioxide (CO_2). Developed with a pyroelectric infrared detector with dual temperature compensation and an integrated semiconductor temperature sensor to maximize accuracy and minimize drift. The signal is converted to 4...20 mA by the converter with power supply (CCA-S-20X-SET).

FEATURES

- Measures from 0 to 20 %CO_2
- Suitable for incubators: 37 °C, 95...98 %RH and 5 %CO_2
- Interchangeable probes
- ±0.1 °C accuracy in measurement range

General specifications	
Measurement principle	Infrared (NDIR)
Measured parameter	Carbon dioxide concentration (%)
Accuracy	±10 % of measured value
Medium	Air & non-aggressive gases
Long-term stability	±0.24 %CO_2/year
Temperature dependence	±10 % of measured value
Pressure dependence	±0.15 % of measured value/hPa
Measurement range	0...20 %CO_2
Application range	-20...50 °C / 0...100 %RH, 700...1200 hPa
Storage conditions	-20...30 °C / 0...95 %RH
Startup time	60 s
Power supply	CCA-S-20X: 3...5 VDC / 80 mA CCA-S-20X-Set: 24 VDC / 150 mA
AC adapter requirements	100...240 VAC / 50...60 Hz / 0.3 A
Output signal	4...20 mA (CCA-S-20X-SET) 0.4...2.0 V (CCA-S-20X only sensor)
Conformity with Standards	
FDA / GAMP directives	FDA CFR21 Part 11 / GAMP 5
Housing / Mechanical parts	
Enclosure material	Polycarbonate (housing) Stainless steel DIN 1.4305 (nut)
Fire protection class	Corresponds to UL94-HB
Dimensions	Sensor: 32 mm x 87 mm Converter box: 100 mm x 77 mm x 40 mm (LxWxH)
IP protection class	IP40
Weight	55 g sensor 200 g converter box



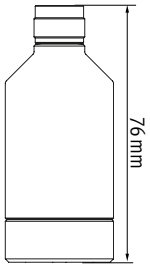


Fig.: CCA-S-20X-SET

Compatible

• Analog Input	RMS-MADC-868/915-A RMS-ADC-L-R
• CO_2 Sensor	CCA-S-20X
• RMS On-Premise	RMS-WEB
• RMS SaaS solutions	RMS-CLD

Delivery package

- CCA-S-20X
- Power supply
- Converter box
- E2-01XX

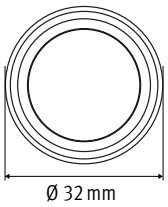
Gas sensor set

Rotronic offer a range of analog probes to measure the following parameters: Carbon monoxide (CO), carbon dioxide (CO_2), chlorine (Cl_2), ethylene oxide (ETO), hydrogen (H_2), hydrogen sulfide (H_2S), hydrogen chloride (HCL), hydrogen cyanide (HCN), ammonia (NH_3), methane (LEL), combustible gas (LEL), combustible gas cat bead (LEL), nitrogen dioxide (NO_2), nitric oxide (N_2O), oxygen (O_2), sulphur dioxide (SO_2) and volatile organic compounds (VOC). Within the sets, the signal from the sensor is converter to 4...20 mA by the converter with power supply.

FEATURES

- Add any of the following gas measurement to the Rotronic Monitoring System

Order code	Gas	Symbol	Range	Resolution	Converterbox
GCA-S-CO-XX50	Carbon Monoxide	CO	0-50 ppm	1 ppm	CONV-PC193
GCA-S-CO-X100	Carbon Monoxide	CO	0-100 ppm	1 ppm	CONV-PC193
GCA-S-CO-X500	Carbon Monoxide	CO	0-500 ppm	1 ppm	CONV-PC193
GCA-S-CO-1000	Carbon Monoxide	CO	0-1000 ppm	‹12 ppm	CONV-PC193
CCA-S-CO2-X2	Carbon Dioxide	CO_2	0-2 %Vol	0.10 %	CONV-PC190
CCA-S-CO2-X5	Carbon Dioxide	CO_2	0-5 %Vol	0.10 %	CONV-PC190
CCA-S-C02-100	Carbon Dioxide	CO_2	0-100 %Vol	1 %Vol	CONV-PC190
GCA-S-ETO-XX20	Ethylene Oxide	ETO	0-20 ppm	0.1 ppm	CONV-PC193
GCA-S-ETO-X100	Ethylene Oxide #2	ETO	0-100 ppm	1 ppm	CONV-PC193
GCA-S-H2-1000	Hydrogen	H_2	0-1000 ppm	2 ppm	CONV-PC193
GCA-S-H2-X100	Hydrogen	H_2	0-100 %Vol	1 %Vol	CONV-PC193
CA-S-H2S-XX50	Hydrogen Sulfide	H_2S	0-50 ppm	1 ppm	CONV-PC193
GCA-S-H2S-X100	Hydrogen Sulfide	H_2S	0-100 ppm	1 ppm	CONV-PC193
GCA-S-H2S-X100	Hydrogen Sulfide	H_2S	0-200 ppm	1 ppm	CONV-PC193
GCA-S-HCL-XX30	Hydrogen Chloride	HCL	0-30 ppm	1 ppm	CONV-PC193
GCA-S-HCN-XX30	Hydrogen Cyanide	HCN	0-30 ppm	1 ppm	CONV-PC193
GCA-S-NH3-X100	Ammonia	NH_3	0-100 ppm	1 ppm	CONV-PC193
GCA-S-NH3-1000	Ammonia	NH_3	0-1000 ppm	‹12 ppm	CONV-PC193
GCA-S-LEL-100	Methane IR	LEL	0-100 %Vol	1 %Vol	CONV-PC190
GCA-S-LEL1-100	Combustible Gas IR	LEL	0-100 %LEL	1 %LEL	CONV-PC190
GCA-S-LEL2-100	Combustible Gas Cat Bead	LEL	0-100 %LEL	1 %LEL	CONV-PC194
GCA-S-NO-X100	Nitric Oxide	NO	0-100 ppm	1 ppm	CONV-PC193
GCA-S-N2O-XXX1000	Nitrous Oxide	N_2O	0-1000 ppm	20 ppm	CONV-PC190
GCA-S-N2O-XXX1	Nitrous Oxide	N_2O	0-1 %Vol	0.01 %	CONV-PC190
GCA-S-O2-XX21	Oxygen	O_2	0-21 %Vol	0.1 %Vol	CONV-PC192
GCA-S-SO2-XX20	Sulphur Dioxide	SO_2	0-20 ppm	0.1 ppm	CONV-PC193
GCA-S-VOC-XX20	Volatile Organic Compounds	VOC	0-20 ppm	0.1 ppm	CONV-PC193



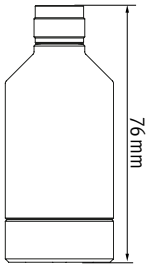


Fig.: CCA-S-20X-SET

Compatible

• Analog Input	RMS-MADC-868/915-A RMS-ADC-L-R
• RMS On-Premise	RMS-WEB
• RMS SaaS solutions	RMS-CLD

Delivery package

- Gas sensor
- Power supply
- Converter box

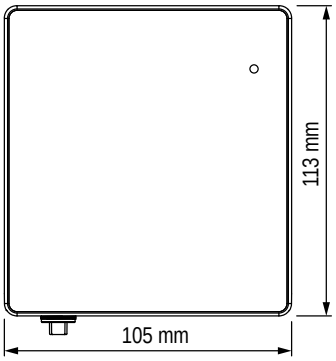
RMS Wall Data Logger

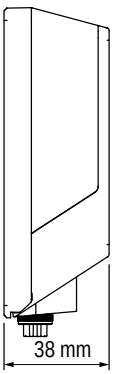
The data logger is the flexible component between the probe and the database in the Rotronic Monitoring System. It stores 44,000 pairs of measured values and transmits them to the RMS database via LAN or wireless link. It guarantees absolute data protection, even if power supply and communications should break down temporarily.

FEATURES

- 44,000 data point memory
- Fail-safe, thanks to internal battery
- Wireless or LAN interface

General specifications			
Measured parameters	Humidity & temperature, CO_2, differential pressure, LDP		
Range of application	-40..70 °C / 0..100 %RH		
Storage conditions	-40..30 °C / 0..95 %RH		
Maximum altitude	2000 m ASL		
Power supply	24 VDC ±10 % / ‹100 mA / Battery: RMS-BAT (2xAA, LiSocl2) / PoE: 802.3af-2003, Class 1		
AC adapter requirements	24 VDC ±10 % / 4 W nominal / ‹15 W power-limited		
Battery life	3 years (at 23 °C, measurement interval 1 min., HCD-S probe)		
Device data			
Measurement interval	10 s to 15 min.		
Startup time	‹ 10 s		
Order code	RMS-LOG-L	RMS-LOG-868	RMS-LOG-915
Interfaces	Ethernet	ISM 868 MHz	ISM 915 MHz
Indoor wireless range	-	20..50 meters	15..25 meters
Protocols	HTTP / MODBUS TCP		
Ethernet cable requirement	Min. Cat. 5, SFTP, max. 30 m		
Conformity with standards			
FDA / GAMP directives	FDA CFR21 Part 11 / GAMP 5		
Housing / Mechanics			
Housing material	ABS		
Fire protection class	UL94 –V2		
Dimensions	105 x 113 x 38 mm		
IP protection class	IP65		
Weight	200 g		





Compatible

- HygroClip DIGITAL HCD/PCD/CCD
- RMS Gateway RMS-GW-868/915
- RMS On-premises software RMS-WEB
- RMS SaaS solutions RMS-CLD

Delivery package

- Data logger
- 2 batteries
- Wall bracket
- Short instruction manual
- 2 screws & 2 plugs

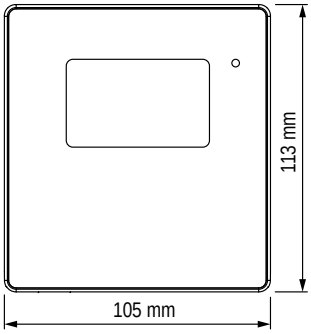
RMS Data Logger with Display

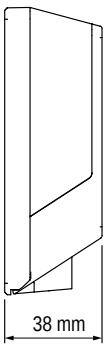
The RMS-LOG-L-D stores up to 44,000 pairs of measured values and transmits them to the RMS database via LAN link. Thanks to its autonomous operation, the logger can display current readings as well as visual and audible alarms even if the power supply and communication should fail temporarily.

FEATURES

- 44,000 data point memory
- Visual and audible alarms
- Autonomous operation on failure
- Redundant power supply

General specifications	
Measurement interval	10 s to 300 s
Startup time	‹ 10 s
Software compatibility	≥ V1.3.0, from V2.1 all functions
Application range	-20…70 °C, non-condensing
Storage conditions	-20…30 °C, non-condensing
Maximum altitude	2000 m ASL
Power supply	24 VDC ±10% / Battery: RMS-BAT (2xAA, LiSocl2)
Current consumption max.	50 mA
AC adapter requirements	24 VDC ±10%, 4 W minimum, › 5 W Limited Power Source
PoE	802.3af-2003, Class 1
Device data	
Order code	RMS-LOG-L-D
Ethernet cable requirement	Min. Cat 5, SFTP, max. 30 m
Interface	Ethernet
Protocols	HTTP / Modbus TCP
Number of measuring points	2
Battery life (@60 s and 600 s interval)	HCD-S / HCD-IC: 7 d
	CCD-S-XXX: 2.4 d
	PCD-S-XXX: 15 d
HCD-S / HCD-IC	7 d
CCD-S-XXX	2.4 d
PCD-S-XXX	15 d
Storage capacity	44,000 data points
Conformity with standards	
Soldering material	Lead free / RoHS conformity
FDA/GAMP directives	FDA CFR21 Part 11 / GAMP 5
Housing / Mechanics	
Enclosure material	PC. ABS
Dimensions	105 x 113 x 38 mm
IP protection class	IP65
Fire protection class	UL94-V2
Weight	240 g





Compatible

- HygroClip DIGITAL HCD/PCD/CCD
- RMS On-premises software RMS-WEB
- RMS SaaS solutions RMS-CLD
- Autonomous operation and audible alarms from V2.1

Delivery package

- Data logger, with clamps
- Short instruction manual
- 2 batteries
- Certificate
- Velcro strips

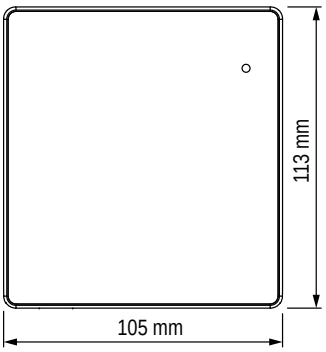
RMS-LOG-T30-L/868/915

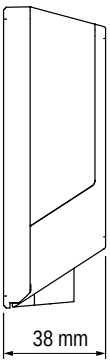
The RMS-LOG-T30 is a data logger with two integrated analog-to-digital converters, to which two PT100 sensors can be connected for high-precision temperature measurement. The measuring accuracy of the data logger with PT100 can be improved by a 1- or 2-point adjustment. The data logger stores 44,000 pairs of measured values and sends them to the RMS database via LAN or wireless interface.

FEATURES

- Saving of up to 44,000 data points
- 2 x PT100 sensor connections
- 2-, 3- or 4-wire connection
- ±0.1 °C accuracy in measurement range

General specifications			
Measured parameters	2-, 3- and 4-wire RTD measurement		
Number of measuring points	2 x PT100 probes		
Accuracy[1] (@23 °C, without PT100)	±0.1 °C (-100 °C to 200 °C)		
	±0.2 °C (-200 °C to 850 °C)		
Application range	-40...70 °C 0...100 %RH		
Storage conditions	-20...30 °C 0...95 %RH		
Power	24 VDC ±10 % / <100 mA / PoE: 802.3 af-2003, Class 1		
AC adapter requirements	24 VDC ±10 % / >4 W / power-limited		
Device data			
Measurement interval	10 s to 15 min.		
Order code RMS-LOG-T30-xxx	T30-L	T30-868	T30-915
Battery life (23 °C, 60 s interval)	3 years	2.4 years	2.4 years
Interfaces	Ethernet	ISM 868 MHz	ISM 915 MHz
Indoor wireless range	-	20...50 meters	15...25 meters
Compatibility with RMS-GW-xxx Firmware	-	V2.1	V2.1
Compatibility with Software	≥ V1.3.0		
Protocols	HTTP / MODBUS TCP (T30-L)		
Ethernet cable requirement	Min. Cat 5, SFTP, max. 30 m		
Conformity with standards			
FDA / GAMP directives	FDA CFR21 Part 11 / GAMP 5		
Housing / Mechanics			
Housing material	PC, ABS		
Fire protection class	UL94-V2		
Dimensions	105 x 113 x 38 mm		
IP protection class	IP65		
Weight	240 g		





[1] In order to improve the measurement accuracy when using the data logger and the PT100, it is possible to carry out a 1-point or 2-point adjustment. To calculate the total accuracy of the RMS-LOG-T30, all variables must be added.

Compatible

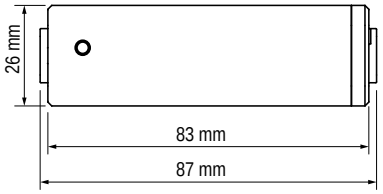
• RMS Gateway	RMS-GW
• RMS On-premises software	RMS-WEB
• RMS SaaS solutions	RMS-CLD
• PT100 probe	T30-000X

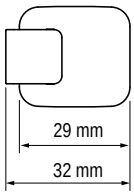
Delivery package

- Data logger
- 2 batteries
- Wall bracket
- Short instruction manual
- 2 cable glands M12 x 1.5

RMS Mini Logger

The wireless mini data logger is the low-cost data logger in the Rotronic Monitoring System. Its small housing and wireless interface make it a really flexible data logger. The mini logger is available in various sensor variants: internal temperature sensor (NTC), external temperature sensor (NTC), light, voltage measurement, current measurement or digital switch contact. With this versatility, it can monitor refrigerators and incubators, as well as door contacts and OEM analog devices.





FEATURES

- Stores 10,000 measured values
- Fail-safe, thanks to internal battery
- Battery life up to 2.5 years
- Depending on the version, it measures temperature, current, voltage or light, or monitors a digital switch input
- ISM band 868 MHz / 915 MHz

General specifications		
Device type	MS-MLOG-XXX-XXX RMS-MDI-XXX RMS-MADC-XXX-X	RMS-MLOG-BT-XXX RMS-MLOG-B-XXX
Memory size	10,000 measured values	13,000 data points
Range of application (electronics)	-30...85 °C / 0...100 %RH	-40...85 °C / 0...100 %RH
Battery life @23°C, 1 minute interval	2.2 years	2.5 years
IP protection class	IP65	IP30 (B), IP65 (BT)
Working range pressure	300...1100 hPa	
Storage conditions	-30...30 °C / 0...95 %RH	
Battery	1x RMS-BAT	
Measurement interval	10 s to 15 min (software dependant)	
Wireless specifications		
Wireless interface	ISM 868 MHz	ISM 915 MHz
Indoor wireless range	20...50 meters	15...25 meters
Conformity with standards		
FDA / GAMP directives	FDA 21 CFR Part 11 / GAMP5	
Housing / Mechanics		
Housing material	ABS	
Dimensions	83 x 29 x 29 mm	
Fire protection class	UL94-V2	

Measured parameters

RMS-MLOG-B-XXX	Temperature & humidity
RMS-MLOG-BT-XXX	Temperature & barometric pressure
RMS-MLOG-T--XXX	Temperature
RMS-MLOG-T10-XXX	Temperature with external probe (NTC)
RMS-MADC-XXX-V (0...10 V)	Power
RMS-MADC-XXX-A (0...20 mA)	Power input
RMS-MDI-XXX	Digital input
RMS-MLOG-LGT-XXX	Illumination

Compatible

• Temperature probe	T10-xxxxx
• RMS Gateway	RMS-GW-868
• RMS On-premise	RMS-WEB
• RMS SaaS solutions	RMS-CLD

Delivery package

- Data logger
- Battery
- Wall bracket
- Short instruction manual
- 2 screws & 2 plugs

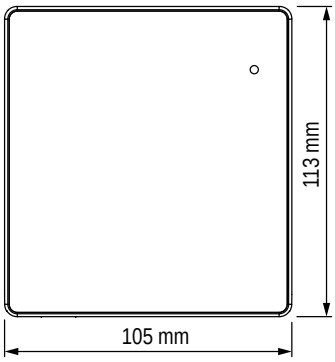
RMS Gateway

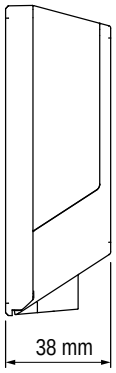
The gateway is the interface between the wireless data logger and the server software. It can manage up to 60 data loggers simultaneously, collecting all wireless-logger measurement data, and passing them on to the server software. When several gateways are used in the same network, they are configured redundantly. If one gateway should fail, the measurement values are automatically sent to the server software via another gateway.

FEATURES

- Connects 60 wireless data loggers simultaneously
- 5 wireless channels for parallel and redundant operation

General specifications		
Range of application	-40..70 °C, 0..100 %RH	
Storage conditions	-40..30 °C, 0..95 %RH	
Maximum altitude	2000 m ASL	
Power supply	24 VDC ±10 % / <100 mA / PoE: 802.3 af-2003, Class 1	
AC adapter requirements	24 VDC ±10 % / 4 W nominal / <15 W power-limited	
Device data		
Measurement interval	10 s to 15 min.	
Startup time	< 10 s	
Order code	RMS-GW-868	RMS-GW-915
Interfaces	Ethernet & ISM868 MHz	Ethernet & ISM 915 MHz
Indoor wireless range	20..50 meters	15..25 meters
Protocols	HTTP	
Ethernet cable requirement	Min. Cat. 5, SFTP, max. 30 m	
Conformity with standards		
FDA / GAMP directives	FDA CFR21 Part 11 / GAMP 5	
Housing / Mechanics		
Housing material	ABS	
Fire protection class	UL94 –V2	
Dimensions	105 x 113 x 38 mm	
IP protection class	IP65	
Weight	200 g	





Compatible

- RMS Data Logger — RMS-LOG
- RMS Mini Logger — RMS-MLOG
- RMS Display — RMS-D
- RMS On-premises software — RMS-WEB
- RMS SaaS solutions — RMS-CLD

Delivery package

- Gateway
- Wall bracket
- Short instruction manual
- 2 screws & 2 plugs

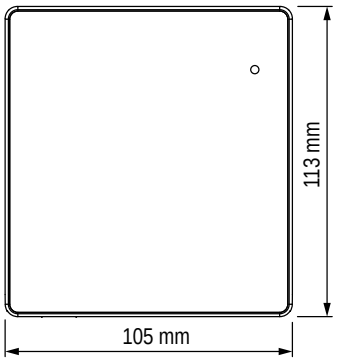
RMS Display

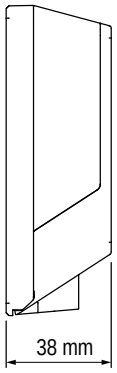
The LAN display is a freely configurable display. As a remote display, it can be placed optimally where it suits the viewer best. It is able to show the measured values, states and alarms of RMS products. The display shows up to four measured values. Two measured values are shown at a time. If more than 2 measured values have been selected, the display alternates between the values that are to be displayed every 5 seconds.

FEATURES

- Shows up to 4 measured values
- Automatic adjustment of backlight on alarm

General specifications	
Device type	RMS Display
Display of measuring points	Up to 4 measuring points
Range of application	-20...70 °C / 0...100 %RH
Storage conditions	-20...30 °C / 0...95 %RH
Power supply	24 VDC ±10 % / <100 mA / PoE: 802.3 af-2003, Class 1
AC adapter requirements	24 VDC ±10 % / >4 W / power-limited
Measurement interval	10 s
Interface	Ethernet
Protocols	HTTP
Conformity with standards	
FDA / GAMP directives	FDA CFR21 Part 11 / GAMP5
Housing / Mechanical parts	
Housing material	PC, ABS
Fire protection class	UL94-V2
Dimensions	105 x 113 x 38 mm
Display diagonal	2.26 inch
IP protection class	IP65
Weight	206 g





Compatible

- All measuring points
- RMS Gateway — RMS-GW-868
- RMS On-premise — RMS-WEB
- RMS SaaS solutions — RMS-CLD

Delivery package

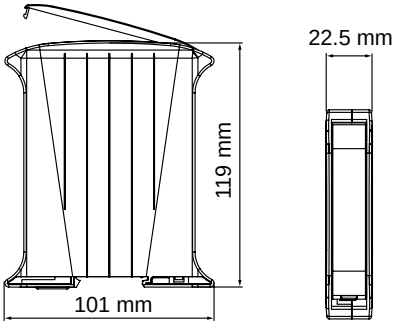
- Display
- Wall bracket
- Short instruction manual
- 2 screws & 2 plugs

RMS-ADC-L-R

The RMS-ADC-L-R is a data logger with two integrated analog-to-digital converters to which two sensors can be connected for high-precision analog measurement. The data logger stores 44,000 pairs of measured values and sends them to the RMS database via LAN.

FEATURES

- 44,000 data point memory
- 2 analog sensor inputs
- Various scaling: 0...1/5/10 V and 0/4...20 mA
- ±0.03 % f.s. measurement range accuracy



General specifications	
Measurement interval	10 s to 15 min
Startup time	‹ 10 s
Software compatibility	≥ V1.3.0
Protocols	HTTP / MODBUS TCP
Ethernet cable requirement	Min. Cat 5, SFTP, max. 30 m
Application range	-40...70 °C, non-condensing
Storage conditions	-20...30 °C, non-condensing
Sensor power supply (Vex)	24 V / 80 mA max.
Current consumption	‹ 160 mA
AC adapter requirements	24 VDC ±10 %, 4 W minimum, › 5 W power-limited
PoE	802.3af-2003, Class 1
Conformity with standards	
Soldering material	Lead free / RoHS conformity
FDA/GAMP directives	FDA CFR21 Part 11 / GAMP 5
Device data	
Accuracy	± 0.03 % full-scale
Temperature accuracy	± 0.02 % full-scale / °C
Measuring resistance / Load	25 kΩ at voltage input 250 Ω at current input
Number of measuring points	1 or 2 analog inputs
Measurement ranges	0...1 V, 0...5 V, 0...10 V, 0...20 mA and 4...20 mA
Storage capacity	44,000 data points
Sensor quality	• Detection of sensor interruption (open loop) • Detection of overload • Detection of underload at 4...20 mA
Housing / Mechanics	
Housing material	PC. ABS
Dimensions	110 x 119 x 22.5 mm
IP protection class	IP20
Fire protection class	UL94-V0
Weight	125 g

Compatible

- RMS On-premises software ≥ V1.3.0 — RMS-WEB
- RMS SaaS solutions ≥ V1.3.0 — RMS-CLD

Delivery package

- Data logger, with clamps
- Short instruction manual
- Certificate

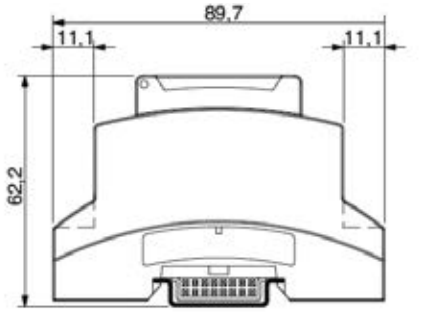
RMS-DI-L-R

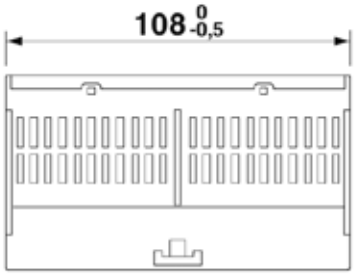
The digital input module stores all measured data on an event basis and sends it to the database via Ethernet. The minimum pulse time is 100 ms. Should the connection be lost, the module stores the data intermediately to protect data integrity and fills up the data gaps when the connection has been restored. The device has a battery so that logging of measured data is also ensured in the event of a failure in the external power supply.

FEATURES

- Two input channels
- Data logging of up to 75,000 measured values

General specifications	
Device type	RMS-DI-L-R
Number of inputs	2 independent digital inputs
Range of application	-40..70 °C / 0..100 %RH non-condensing
Storage conditions	-40..30 °C / 0..95 %RH
Maximum altitude	2000 m ASL
Power supply	24 VDC ±10 % / ‹100 mA / PoE: 802.3 af-2003, Class 1
AC adapter requirements	24 VDC ±10 % / 4 W nominal /‹15 W power-limited
Battery type	RMS-BAT
Battery life	3 years at 23 °C
Device data	
Input frequency	Max. 0.833 Hz or 1.2 s
Pulse recognition	›100 ms (periodically › 1.2 s)
Input circuit	Logic level: 0 V / 5-24 V
	Trigger threshold: ~3.77 V
	Current consumption: ‹1 mA
Reed circuit	Max. load at input 100 kΩ
Max. cable length at input	‹3 m
Measurement interval	Event-based & interval (10 s to 15 min.)
Storage capacity	75,000 data points
Interface	Ethernet
Protocols	HTTP
Conformity with standards	
FDA / GAMP directives	FDA CFR21 Part 11 / GAMP 5
Housing / Mechanical parts	
Housing material	Polycarbonate (PC)
Fire protection class	UL94-V0
Dimensions	89.7 x 62.2 x 108 mm
IP protection class	IP20
Weight	206 g





Compatible

- RMS-Config
- RMS On-premise RMS-WEB
- RMS SaaS solutions RMS-CLD

Delivery package

- Digital module
- 2 batteries
- Wall bracket (wall-mounted housing)
- Short instruction manual
- 2 screws & 2 plugs

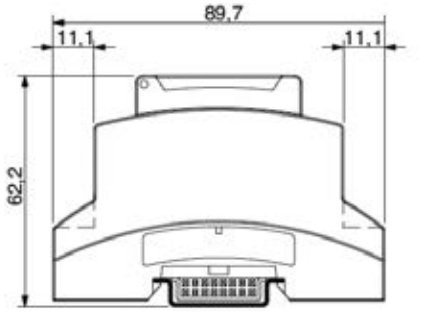
RMS-DO-L-R

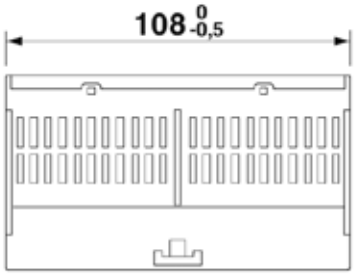
The digital output module serves to display information, issue alarms and control events. The relays can be interrogated or set via Modbus TCP or the RMS software. It is possible to define the conditions in the RMS software and to actuate the outputs on the basis of them.

FEATURES

- Two output channels

General specifications	
Device type	RMS-DO-L-R
Number of outputs	2, polarity-independent
Range of application	-40..70 °C / 0..100 %RH non-condensing
Storage conditions	-40..30 °C / 0..95 %RH
Maximum altitude	2000 m ASL
Power supply	24 VDC ±10 % / ‹100 mA / PoE: 802.3 af-2003, Class 1
AC adapter requirements	24 VDC ±10 % / 4 W nominal /‹15 W power-limited
Device data	
Interface	Digital signal / galvanically isolated
Relay switching capacity	50 VAC (peak) 1 A / 50 VDC/1 A, polarity-independent
Voltage output (VEX)	24 VDC (Note: The maximum current available depends on the external power supply connected)
Max. cable length at input	‹3 m
Measurement interval	›=10 s
Interface	Ethernet
Protocols	HTTP
Conformity with standards	
FDA / GAMP directives	FDA CFR21 Part 11 / GAMP 5
Housing / Mechanical parts	
Housing material	Polycarbonate (PC)
Fire protection class	UL94-V0
Dimensions	89.7 x 62.2 x 108 mm
IP protection class	IP20
Weight	155 g





Compatible

- RMS-Config
- RMS On-premise RMS-WEB
- RMS SaaS solutions RMS-CLD

Delivery package

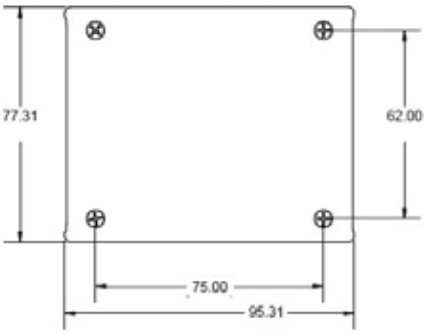
- Digital module
- Wall bracket (wall-mounted housing)
- Short instruction manual
- 2 screws & 2 plugs

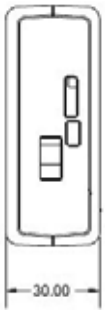
RMS Converter

The RMS Converter allows you to easily integrate existing devices and networks into RMS. The RMS Converter acts as an interface, gathering the data from digital devices and sending them to the RMS server software/MS SQL database. In addition, third party digital devices can be integrated if the communication protocol is MODBUS TCP. However, this function requires support from the Rotronic R&D. Where ever possible Rotronic would recommend replacing previous networks with RMS devices in the long term.

FEATURES

- Integrates digital devices seamlessly into RMS
- Integrates Rotronic digital devices into RMS
- No loss of accuracy due to A/D converters, show up to 5 decimal values





General specifications	
Device type	RMS Converter
Number of measuring points	Integration of up to 100
Range of application	-0 .. 50 °C / 0 .. 95 %RH
Storage conditions	-0 .. 50 °C / 0 .. 95 %RH
Electrical Supply	5 VDC (universal mains adapter included)
Measurement interval	10 s to 15 min
Interface	Ethernet
Protocols	Modbus TCP RoASCII HTTP SNMP Customer-specific enhancements
Supported webcams	D-Link DCS-2121
Conformity with Standards	
FDA / GAMP directives	FDA 21 CFR Part 11 / GAMP5
Housing / Mechanical parts	
Dimensions	94 x 78 x 30 mm
IP protection class	IP20

Compatible

- Transmitter — HF4..HF8 (Ethernet)
- Transmitter — PF4/5 (Ethernet)
- RMS On-Premise — RMS-WEB
- RMS SaaS solutions — RMS-CLD
- Clean room panel — CRP5
- Analogue to digital converter — RMS-8ADC-L-R-A/V
- RTD to digital converter — RMS-4RTD-L-R
- Particle counter — All with Modbus TCP interface

Delivery package

- Converter
- Short instruction manual
- AC adapter
- Ethernet cable
- USB cable

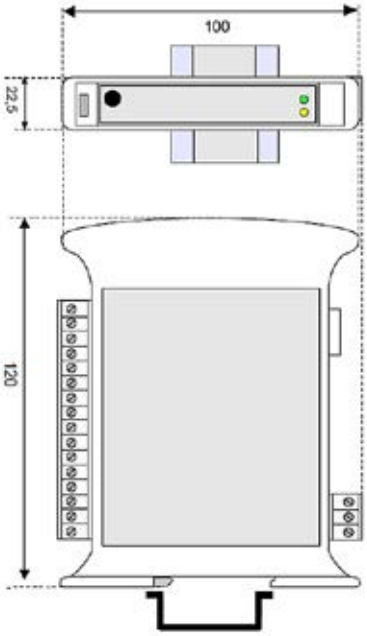
RMS-8ADC-L-R-A

The 8 input, analogue to digital converter was designed to implement all analogue outputs into the digital world of RMS. The 8 inputs offer the flexibilty of using a current system with one of the newest and most flexible monitoring systems on the market today.

FEATURES

- 8 isolated input channels
- Passive input up to ±20 mA
- Programmable via the RMS software
- Signal LED
- No memory
- Function only with RMS-CONVERTER-XXX

General specifications	
Device type	RMS-8ADC-L-R-A
Measured parameters	Current
Memory size	7 days memory with RMS-CONVERTER-XXX
Range of application	-10...60°C, 0...90%rh
Storage conditions	-40...85°C, 0...90%rh
Maximum altitude	2000 m ASL
Electrical supply voltage	14...30VDC
Device Data	
Analog inputs	8 isolated inputs, 0/4...20 mA
Input accuracy mA	±0.05%fs
Linearity mA	±0.1%fs
Thermal drift FS	±0.01%/°C
Measurement interval	10 s to 15 min (dependant on software account)
Interface output	Ethernet RJ-45
Protocol	Modbus TCP
Ethernet cable requirement	Min. Cat 5, SFTP,max. 100m
Interface input	Removable screw-terminals
Housing / Mechanical parts	
Mounting	Din-rail
Dimensions	100 x 120 x 22.5 mm
Weight	160 g
IP protection class	IP20
Installation recommendation	Seperated by at least 5mm
Defaut IP configuration	192.168.1.100



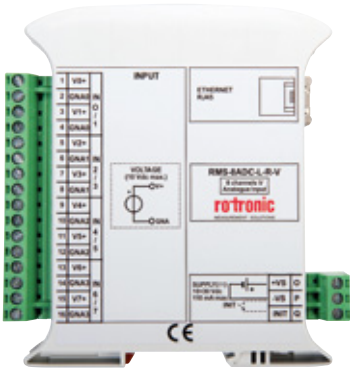
Compatible

- RMS Converter

Delivery package

- Analogue to digital converter

RMS-8ADC-L-R-V

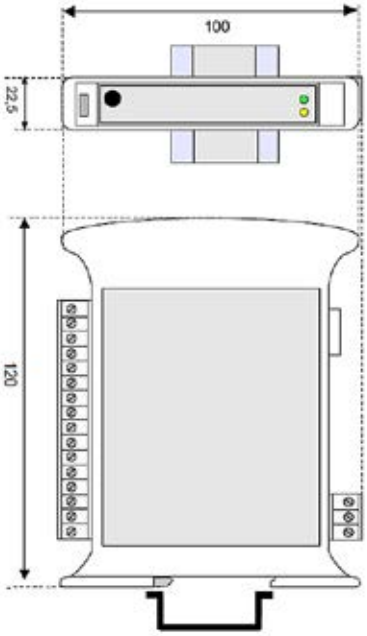


The 8 input, analogue to digital converter was designed to implement all analogue outputs into the digital world of RMS. The 8 inputs offer the flexibilty of using a current system with one of the newest and most flexible monitoring systems on the market today.

FEATURES

- 8 isolated input channels
- Passive input up to ±10 V
- Programmable via the RMS software
- Signal LED
- No memory
- Function only with RMS-CONVERTER-XXX

General specifications	
Device type	RMS-8ADC-L-R-V
Measured parameters	Voltage
Memory size	7 days memory with the RMS-CONVERTER-XXX
Range of application	-10...60 °C, 0...90 %rh
Storage conditions	-40...85 °C, 0...90 %rh
Maximum altitude	2000 m ASL
Electrical supply voltage	14...30 VDC
Device Data	
Analog inputs	8 isolated inputs, 0...10 V
Input accuracy voltage	±0.05 %fs
Linearity voltage	±0.1 %fs
Thermal drift FS	±0.01 %/°C
Measurement interval	10 s to 15 min (dependant on software account)
Interface output	Ethernet RJ-45
Protocol	Modbus TCP
Ethernet cable requirement	Min. Cat 5, SFTP, max. 100 m
Interface input	Removable screw-terminals
Housing / Mechanical parts	
Mounting	Din-rail
Dimensions	100 x 120 x 22.5 mm
Weight	160 g
IP protection class	IP20
Installation recommendation	Seperated by at least 5 mm
Defaut IP configuration	192.168.1.100



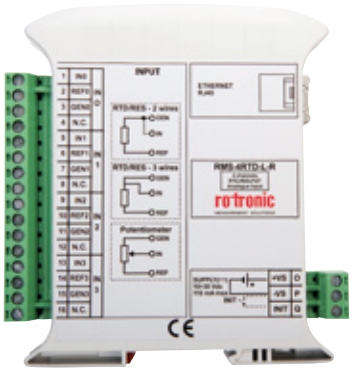
Compatible

- RMS Converter

Delivery package

- Analogue to digital converter

RMS-4RTD-L-R

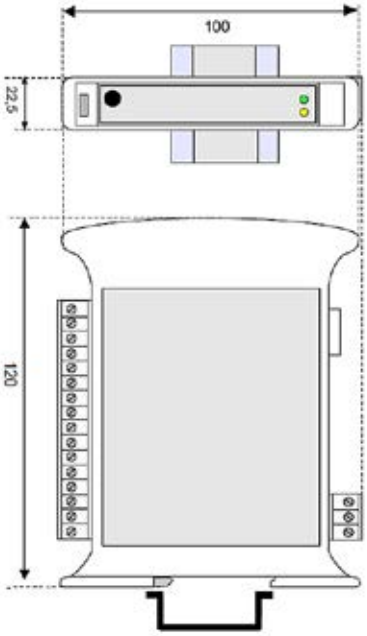


The 4-input analogue to digital converter was developed to implement all temperature sensors in the digital world of RMS. The 4 inputs offer the flexibility of using a modern system with one of the newest and most flexible monitoring systems on the market today.

FEATURES

- 4 isolated input channels
- Input for PT100 & PT1000
- Programmable via the RMS software
- Signal LED
- No memory
- Function only with RMS-CONVERTER-XXX

General specifications	
Device type	RMS-4RTD-L-R
Measured parameters	PT100, PT1000, Potentiometer
Memory size	7-day memory with RMS-CONVERTER-XXX
Application range	-10..60 °C, 0..90 %RH
Storage conditions	-40..85 °C, 0..90 %RH
Maximum altitude	2000 m ASL
Power supply	14..30 VDC
Device data	
Analog inputs	4 isolated inputs
Input accuracy RTD, resistance, potentiometer	±0.05 %FS
Linearity RTD	±0.1 %FS
Influence line resistance RTD/ resistance 3-wire	±0.05 %FS/Ω
RTD field current	0.370 mA
Thermal drift FS	±0.01 %/°C
Start-up time	3 min.
Measurement interval	10 s to 15 min. (dependant on software account)
Interface output	Ethernet RJ-45
Protocol	Modbus TCP
Ethernet cable requirement	Min. Cat. 5, SFTP, max. 100 m
Interface input	Removable screw terminals
Housing / Mechanical parts	
Mounting	DIN rail
Dimensions	100 x 120 x 22.5 mm
Weight	160 g
IP protection	IP20
Installation recommendation	Separated by at least 5 mm
Defaut IP configuration	192.168.1.100



Technical specifications (typical @ 25 °C and normal environment).

Compatible

- RMS Converter

Delivery package

- RTD to digital converter

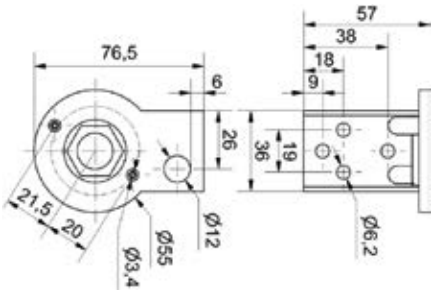
AD-0001

The AD-0001 will warn users both visually and aurally of any alarms that are setup within the Rotronic monitoring system. Alarms can be setup via the alarm scheme as well as via the script function (IF/OR/AMD/THEN) and then triggered from the actions settings.

FEATURES

- Direct visual or sound alarming
- Alarming via thresholds or scripts (IF/OR/AND/THEN)
- Permanent or blinking red LED
- Permanent or pulsing buzzer

General specifications	
Device type	AD-0001
Range of application	-20...50 °C / 0...95 %RH
Storage conditions	-0...50 °C / 0...95 %RH
Electrical supply	24 VDC (power can be supplied via the RMS-DO-L-R)
Light	Red LED
Sound	‹ 85 dB
Housing / Mechanical parts	
Height	154.5 mm without mounting bracket
Diameter	70 mm
IP protection class	IP65
Housing material	PA and PC



Sound pressure level dB (A)

Distance in m												
1	**2**	**3**	**5**	**10**	**20**	**30**	**50**	**100**	**200**	**300**	**500**	**1000**
100	94	90	86	80	74	70	66	60	54	50	46	40
90	84	80	76	70	64	60	56	50	44	40		
85	79	75	71	65	59	55	51	45	39			
70	64	60	56	50	44	40	36					

Compatible

- RMS-DO-L-R

Delivery package

- Device

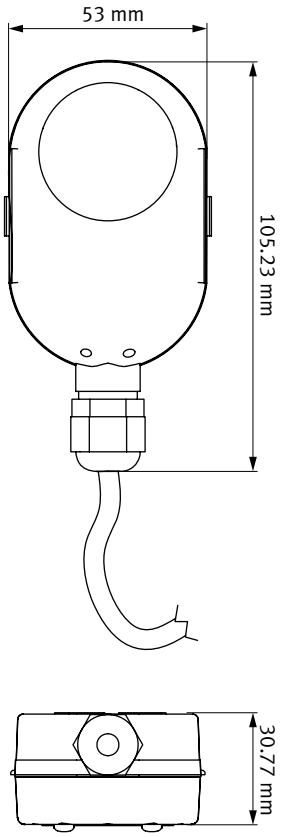
WB-0001

The WB-0001 detects the presence of water or conductive fluids once it reaches a level that bridges the two conductive strips on the bottom of the housing. Once the strips are bridged, audible and visual alerts as well as an internal switch are triggered. The sensing hight can be adjusted from 0.08 mm to 13.5 mm using the included adjustable mounting bracket (that can be attached to any flat surface by either using the attached adhesive strips or mounting screws).

FEATURES

- Detect leaks as soon as they occur
- Visual and audible alarm
- Battery powered
- Adjustable sensing hight
- Relay output

General specifications	
Parameters	Water or conductive fluids
Range of application	0...50 °C
Power supply	3V CR2450 lithium metal battery
Battery lifetime	5 years steady state / 48 hours during alarm condition
Power consumption	0.9 mA steady state / 3.0 mA during alarm condition
Dimensions	53 x 105.23 x 30.77 mm
Housing	ABS and polycarbonate
Cable length	1.5 m
IP protection class	Water tight up to 3/4 of the body hight
Weight	137.5 g
Technical Information / Functions	
Switch type	SPST NO SSR
Audible alarm	At least 85dB @30 cm distance
Visual alarm	Red LED for water level, Yellow LED for low battery



Compatible

- RMS-MDI-868/915
- RMS-DI-L-R

Delivery package

- 1 CR2450 lithium metal battery
- Short instruction manual

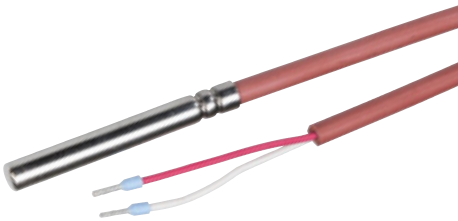
Temperature probes

The RMS temperature portfolio will cover a various array of applications, from the coldest such as liquid nitrogen tanks and cryogenic freezers to freezers, refrigerators and cold rooms to hotter ones such as water baths, incubators, ovens and autoclaves. Certain probes are also designed for specific applications for monitoring legionella within water pipes and monitoring room temperature.

T10-0001

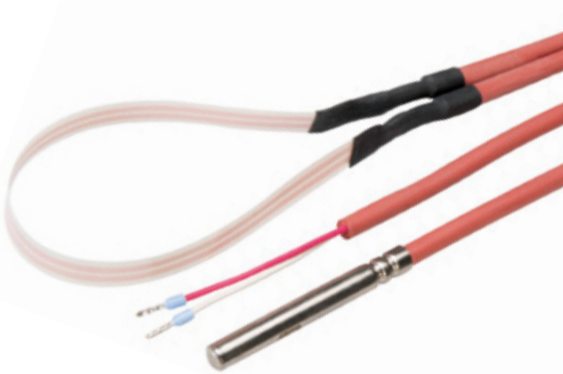
- Applications: liquid nitrogen, cyrogenics...
- Application range: -196...-90 °C
- Cable length: 2 m
- Probe diameter: 6-6.15 mm
- Probe length: 50 mm
- IP65
- Select NTC T10-0001 within RMS

T10-0002



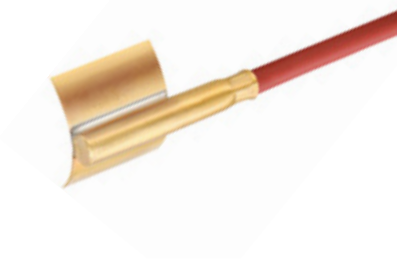
- Applications: Dry ice, freezers...
- Application range: -80...150 °C
- Cable length: 2 m
- Probe diameter: 6-6.15 mm
- Probe length: 50 mm
- IP65
- Select NTC T10-0002/0006 within RMS

T10-0003/T10-0013/T10-0113



- Applications: freezers, fridges, cold rooms, water baths, incubators, ovens...
- Application range: -50...120 °C
- Cable length: 2 m
- Probe diameter: 6-6.15 mm
- Probe length: 50 mm
- IP65
- Select NTC T10-0003/4 within RMS

T10-0004



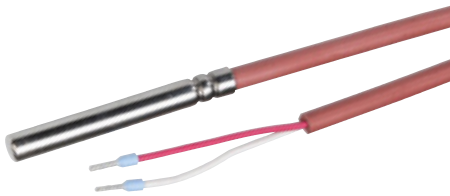
- Applications: pipe monitoring (legionella)
- Application range: -50...120 °C
- Cable length: 2 m
- Probe: duct wrap
- Probe length: 50 mm
- IP65
- Select NTC T10-0003/4 within RMS

Temperature probes

T10-0005

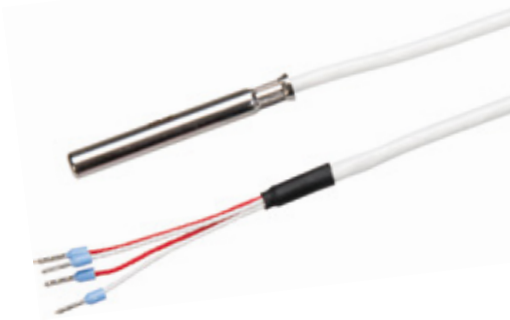
- Applications: Dry ice, freezers...
- Application range: -90...0 °C
- Cable length: 4 m
- Probe diameter: 6-6.15 mm
- Probe length: 50 mm
- IP68
- Select NTC T10-0005 within RMS

T10-0006



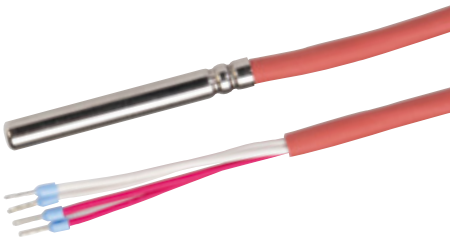
- Applications: freezers, fridges, cold rooms, water baths, incubators, ovens...
- Application range: -80...150 °C
- Cable length: 4 m
- Probe diameter: 6-6.15 mm
- Probe length: 50 mm
- IP65
- Select NTC T10-0002/0006 within RMS

T30-0001



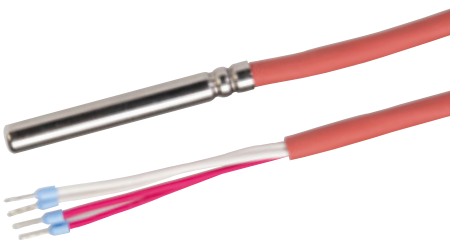
- Applications: Cryotechnology, dry ice
- Application range: -196...260 °C
- Cable length: 2000 mm
- Probe diameter: 6-6.15 mm
- Probe length: 50 mm
- IP68

T30-0003



- Applications: Standard
- Application range: -50...200 °C
- Cable length: 2000 mm
- Probe diameter: 6 mm
- Probe length: 50 mm
- IP65

T30-0006



- Applications: Standard
- Application range: -50...200 °C
- Cable length: 4000 mm
- Probe diameter: 6 mm
- Probe length: 50 mm
- IP65

Software editions

HW4 LITE
Product key: 20 ...
- Free software for visualization, data export and evaluation of measured values for the devices BL-1D, HL-1D, TL-1D, HL-20(D) and HC2-WIN-USB
- A maximum of 3 instruments can be connected simultaneously
- Download at www.rotronic.com (no software key needed)

HW4 STANDARD (ECO)
Product key: 24 ...
- Single-user applications license
- Visualization of multiple loggers and measured values
- Monitoring (one instrument at a time), data logger programming, data retrieval, scaling, instrument settings, alarm function, service and configuration tool for Rotronic instruments, time synchronization, adjustment and calibration of Rotronic probes
- No password protection
  Download at www.rotronic.com
  Order code: HW4-E-V3-Code

HW4 PROFESSIONAL
Product key: 64 ...
- Network applications in the pharmaceutical and food industries
- All functions of the Standard edition
- Multiple-user applications license (same site)
- Fulfils the requirements for electronic data records and signatures (FDA21 CFR Part 11, Annex 11)
- Grouping of devices, graph overlays, printing of reports
  Download at www.rotronic.com
  Order code: HW4-P-V3-Code

HW4 PROFESSIONAL WITH WATER ACTIVITY MEASUREMENT
Product key: 86 ...
- All functions of the Professional edition
- AW Quick function for fast determination of water activity
  Download at www.rotronic.com
  Order code: HW4-P-Q-V3-Code

HW4 PROFESSIONAL WITH OPC SERVER
Product key: 88 ...
- Network applications with integration into the customer's own software package
- All functions of the Professional edition
- Contains an OPC server with which the data can be integrated into the customer's own software
  Download at www.rotronic.com
  Order code: HW4-OPC-V3-Code

HW4 VALIDATED SOFTWARE PACKAGE
Product key: 12 ...
- For users subject to regulatory requirements (GxP)
- Like HW4 OPC but with additional «HW4 e-compliance package»
- This comprehensive documentation tool supports the user in the qualification/validation of HW4-based solutions
  Download at www.rotronic.com
  Order code: HW4-VAL-V3

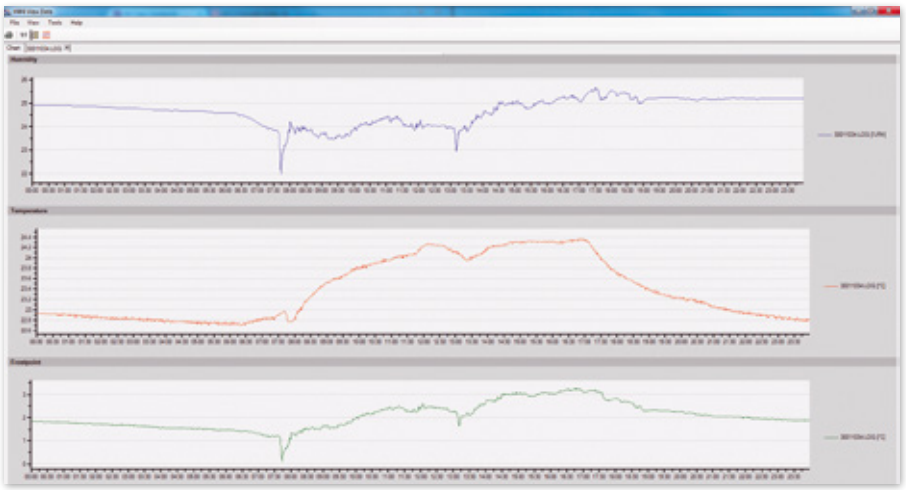
HW4 TRIAL VERSION
Product key: 05 ...
- Full functionality of the Professional edition, including OPC functions
- Limited trial period of maximum 30 days
  Download at www.rotronic.com (contact us for a trial key code)

Function overview

Function overview						
The HW4 software from Rotronic constitutes a professional monitoring and configuration tool and is licensed. Multiple use of one license is permitted as long as the installed software is used at the same site address.	Lite HW4-LITE	Standard HW4-E-V3-Code	Professional HW4-P-V3-Code	Professional with water activity HW4-P-Q-V3-Code	Professional with OPC server HW4-OPC-V3-Code	Validated HW4-VAL-V3
HW4 product key	**20 ...**	**24 ...**	**64 ...**	**86 ...**	**88 ...**	**12 ...**
Viewing of measured values/Monitoring						
Display of measured values on a monitor for multiple instruments	✔	✔	✔	✔	✔	✔
Monitor display of measured values consolidated into groups			✔	✔	✔	✔
Rotronic network products (RS-485)			✔	✔	✔	✔
Archiving of data						
Automatic saving of the measured data (monitoring)			✔	✔	✔	✔
Simultaneous management of the log settings for instruments in a group			✔	✔	✔	✔
Display of measured values						
Numeric and graphic display	✔	✔	✔	✔	✔	✔
Graphic comparisons and overlay functions	✔		✔	✔	✔	✔
Customer-specific room layout		✔	✔	✔	✔	✔
Analysis and calculation tool						
Psychrometric parameters	✔	✔	✔	✔	✔	✔
Statistics	✔	✔	✔	✔	✔	✔
Printing/Reports						
Automatic generation of adjustment, calibration and configuration reports			✔	✔	✔	✔
Printout as table, graph or PDF report	✔	✔	✔	✔	✔	✔
Users and passwords						
Password protection			✔	✔	✔	✔
Users freely selectable. Rights freely definable			✔	✔	✔	✔
Alarms						
Alarm via email, relay, report printout		✔	✔	✔	✔	✔
Alarm via email, SMS, relay, report printout			✔	✔	✔	✔
Flexible programming of alarm priority possible for every instrument			✔	✔	✔	✔
OPC server (OLE for Process Control)						
Server client functions					✔	✔
Electronic record, electronic signature, audit trail						
Logging of all HW4 user events & automatic generation of reports			✔	✔	✔	✔
Data integrity guaranteed at all times			✔	✔	✔	✔

Function overview						
The HW4 software from Rotronic constitutes a professional monitoring and configuration tool and is licensed. Multiple use of one license is permitted as long as the installed software is used at the same site address.	Lite HW4-LITE	Standard HW4-E-V3-Code	Professional HW4-P-V3-Code	Professional with water activity HW4-P-Q-V3-Code	Professional with OPC server HW4-OPC-V3-Code	Validated HW4-VAL-V3
HW4 product key	**20 ...**	**24 ...**	**64 ...**	**86 ...**	**88 ...**	**12 ...**
Standards, laws, directives, instructions						
US FDA: 21 CFR 11			✔	✔	✔	✔
US FDA: 21 CFR 210-211, Drugs and 21 CFR 110, Human Food			✔	✔	✔	✔
EU Guidelines of good manufacturing practice of medicinal products			✔	✔	✔	✔
EU Annex 11 to the EU Guidelines of good manufacturing practice of medicinal products			✔	✔	✔	✔
Validation						
System Qualification Guide CD (only in English)						✔
Water activity measurement						
AwQuick and AwE				✔		✔
Supported interfaces						
RS-232, USB, Ethernet, WLAN	✔	✔	✔	✔	✔	✔
RS-485			✔	✔	✔	✔
Instrument-specific functions						
Instrument settings, scaling, programming, data retrieval, data logging functions	✔	✔	✔	✔	✔	✔
Adjustment and calibration of Rotronic probes	✔	✔	✔	✔	✔	✔
Simultaneous adjustment of probes in one group			✔	✔	✔	✔
Time synchronization for HygroLog NT data loggers		✔	✔	✔	✔	✔
Supported operating systems						
Microsoft, Windows Vista, Windows 7, Windows 8, Windows 10	✔	✔	✔	✔	✔	✔

Description of functions



VIEWING OF MEASURED VALUES/MONITORING

Viewing of measured values is very easy and user-friendly. Files of any device shown in the device tree can be copied and opened directly with the HW4 Explorer. The data is presented in both tabular and graphical formats.

The graph module can be configured by the user.

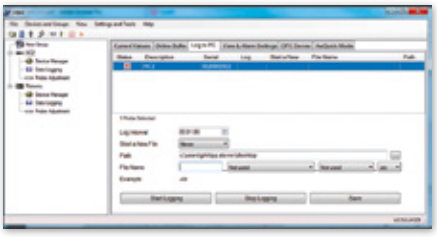
Room layout

For clear presentation of the measured values, the room layout of the building or machine can be stored within the HW4 software.

Drawings and images can be imported in BMP or JPG format. Once the room layout has been imported, the probes can be placed in the room layout and their measured values shown.

Archiving of data/File formats

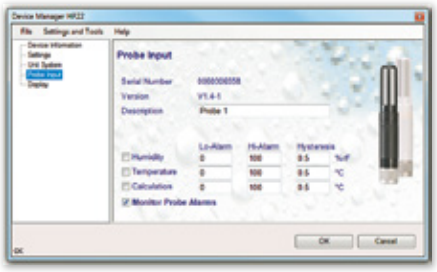
The data can be written automatically to different files. For example, the user can configure the system to create a new file every day, every week or every month. The file formats can be defined by the user. The formats .xls, .csv and .log are available for log files. The .log format saves the data in a binary format that can only be read by HW4, while the .xls format can be opened with an editor or Excel. The data can also be exported in other formats.



Instrument configuration

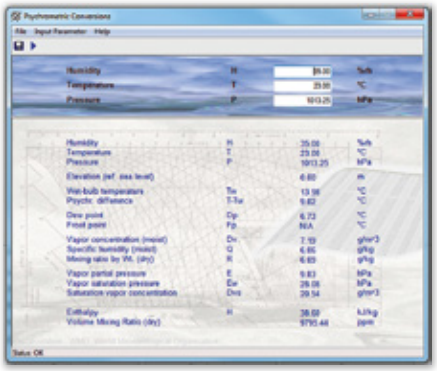
The HW4 software can be used to adjust the settings of Rotronic instruments and probes. Depending on the instrument and probe, the following functions and settings can be changed:

- Assignment and scaling of transmitter outputs
- Definition of alarm values
- Relay switch points
- Adjustment and calibration of probes



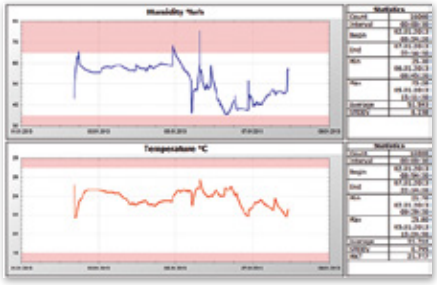
Analysis and calculation tool Psychrometric parameters

All Rotronic instruments measure relative humidity in %RH and temperature in °C/°F. These two values can be used to calculate other psychrometric values such as dew point, mixing ratio, enthalpy and wet bulb temperature. The calculation module in HW4 software uses WMO*-verified formulas for these calculations and allows users to define their own parameters (e.g. mixing ratio & temperature) as input values in order to calculate the relative humidity from them. Other advanced options such as dew/frost point differentiation are also included.



* WMO = World Meteorological Organisation

Statistical functions / PDF report

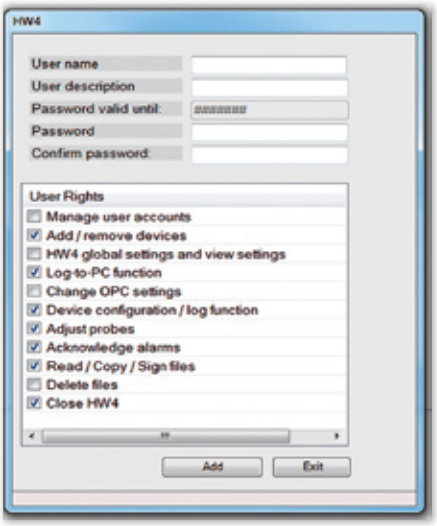


For many users detailed data, which can be very extensive, is not necessarily of much interest. For them it is merely important that the measured values lie within a certain range. The statistical function and integrated PDF report enable simple and detailed data evaluation for this.

It shows the following values:

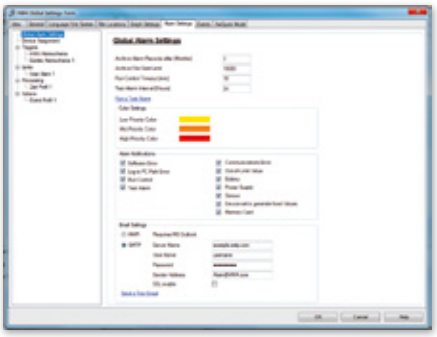
- Min., max. and mean value (during a defined period or during the time of an alarm)
- Standard deviation
- Mean kinetic temperature
- Number of measured values
- Total time measurements exceeded a certain value

Users and passwords



User names and passwords can be defined and assigned freely. Every user can be granted different rights. Users can be blocked and reactivated again. Users that have been deleted cannot be recreated under the same name.

Alarms



In monitoring mode HW4 can trigger an alarm when certain events occur. Such an event can be when a device or a file storage path is not available, when measured values lie outside defined limits or when a data logger sends an error message. The following actions can be carried out when an alarm occurs:

- Reporting of the alarm on the screen
- Sending of emails
- Switching of relays
- Start-up of applications

OPC server (Object Linking and Embedding for Process Control)

HW4-OPC contains an OPC server with which the measured values can be integrated into the customer's own software.

SW21 software

FEATURES

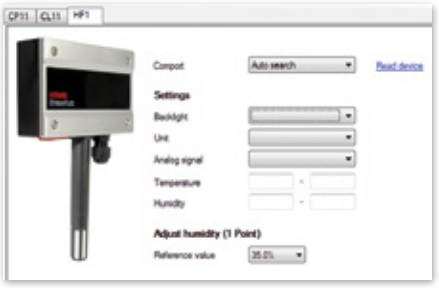
- Free software for configuration and downloading of data from the instruments: CP11 / CL11 / HF1 / CF1
- Stand-alone version or integrated in HW4 software
- Display of measured values in tabular and graphical formats
- Languages: English and German

CP11 / CL11

Instrument configuration and downloading of data.

HF1

Instrument configuration and adjustment of humidity and CO_2.

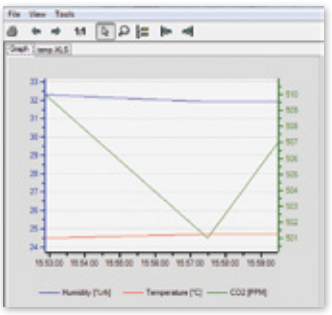


CF1

Instrument configuration and humidity adjustment.

Display of measured values

Measured values can be displayed in tabular or graphical formats.



Video HygroGen2

Interested? Then scan the QR code!

Video mapping

Interested? Then scan the QR code!

GxP consultation

We place our knowledge at your disposal.
With our consulting services in GxP, we support you from project planning (URS) to implementation and testing of your system. This ensures an optimal and efficient design.

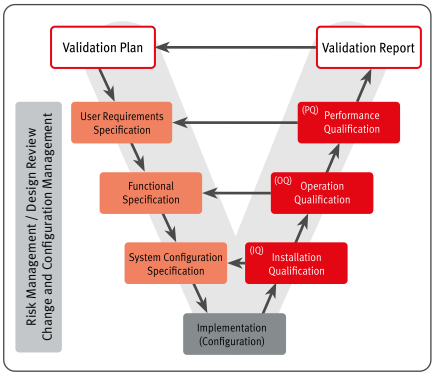
The individuality of your application may require a variety of function-specific settings and measurement systems. Rotronic is one of the leading suppliers in the world for humidity and temperature measurement equipment. Benefit from our know-how and let our application engineers design the optimal measuring system for you.

Validation & qualification

FDA CFR 21 Part 11 is not just a title.
Validation is a process for creating documents that show that a procedure, process or activity maintains the desired level of compliance at all stages.

Missing information and poorly specified or inadequately tested systems represent a risk and can lead to high maintenance costs and losses in productivity.

Rotronic supports you in all areas relating to validation:
1. Development of SOP for system validation
2. Preparation of project-related validation plans and risk analyses
3. Preparation of IQ/OQ-PQ documents
4. Preparation of validation reports
5. And others



V-model (validation)

Your benefits

- Competence in validation directly from the manufacturer
- FDA/GAMP-compliant systems

Queries

support-rh@rotronic.ch

On-site calibration ISO 9001

Benefit from our mobile calibration facilities.
You do not like long downtimes of your measuring equipment/test equipment? Then why not take advantage of our offer to calibrate your measuring equipment at your premises. Our calibration engineers will come to your production line/facilities/premises with portable humidity & temperature generators and calibrate your measuring equipment with minimum downtime.

If you do not wish to have external work carried out on your production lines/facilities/premises directly due to its disruptive nature, we will park in front of your company and calibrate your measuring and testing equipment in our air-conditioned calibration mobile. For further information, please go to: www.kalibriermobil.com

ISO 9001 calibration (laboratory)

Customers have relied on our know-how in calibration since 1965.
In our factory calibration laboratory, we operate systems according to standardized procedures, documented in accordance with ISO 9001, enabling us to ensure top and consistent calibration quality and to guarantee same to our customers. Ongoing communication between the SCS laboratory (ISO 17025) and the calibration team for factory calibrations increases the knowledge of both teams and benefits the customer!

Further, as manufacturer of the internationally known humidity & temperature generator Hygro-Gen HG2, we are able to offer our experience not only to end customers but also to competitors as users of our know-how and equipment.

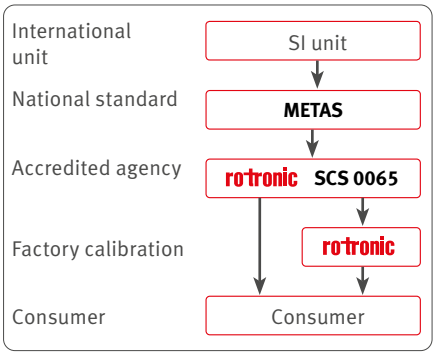
ISO 17025 calibration

The Swiss Rotronic ISO 17025 laboratory has existed since 1995 benefit from our experience.
In our SCS0065 accredited calibration laboratory, we offer the highest and traceable accuracy for your measurements in the fields of temperature and relative humidity. The accuracy of measuring instruments can only be ensured through regular calibration. Rotronic operates its state-of-the-art calibration laboratory (ISO 17025 accredited) with efficiency and the highest quality.

All our references are traceable to the national standard with excellent measurement uncertainty. We calibrate both Rotronic instruments as well as third-party products.

Accredited calibration laboratories worldwide

- Switzerland: SCS 0065 calibration laboratory
  ISO 17025 accredited by SAS and traceable to METAS
- Germany: SCS 0065 calibration laboratory
  ISO 17025 accredited by SAS and traceable to METAS
- England: UKAS 0766 calibration laboratory
  ISO 17025 accredited by UKAS and traceable to NPL
- USA: Cert. no. 5622.01 calibration laboratory
  ISO 17025 accredited by A2LA and traceable to NIST



Calibration hierarchy (e.g. Switzerland)

Your benefits

- Highly accurate SCS calibration (ISO 17025)
- Expedited calibration available

Queries

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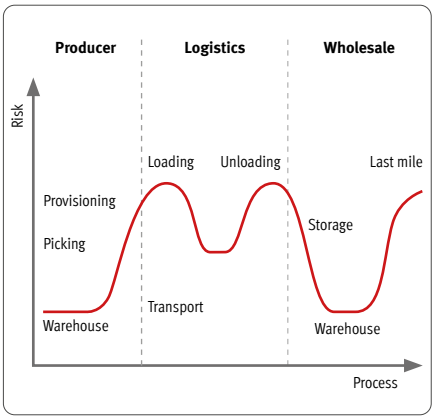
Mapping of warehouses, climate chambers, rooms, etc.

Incorrect climatic conditions can result in expensive damage to your products.
The protection of the quality of temperature-sensitive products during transport and storage is an important and essential component of the GxP directive. The basis for observance of legal regulations is GxP-compliant qualification of the transport equipment or storage facility. We have specialized in these services and offer you an efficient solution tailored exactly to your requirements for:

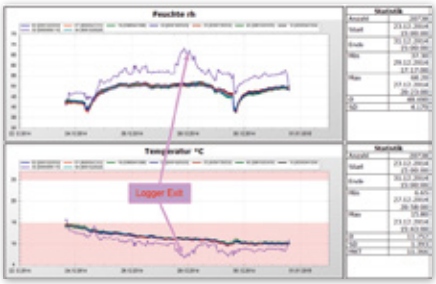
- Storage rooms
- GxP clean rooms
- Fridges
- Freezers
- Trucks
- Shipping boxes
- And many more

Take advantage of our all-round service:

- Advice on compliance with official requirements
- Placement/Distribution of the calibrated Rotronic data loggers
- Evaluation and interpretation of the climatic conditions measured
- Preparation of a GxP-compliant report incl. delivery of the calibration certificates for the loggers used
- A Rotronic qualification engineer will explain and substantiate the GxP-compliant data directly on customer request in the case of a possible audit



Risk assessment for shipping of pharmaceutical products



Example view of a temperature and humidity mapping

Temperature mapping warehouses

Temperature mapping production rooms

Temperature mapping climate chambers

Temperature mapping transport

Your benefits

- Exact data on the climate in the room
- Mapping conforming to FDA & GxP
- Knowledge of possible danger zones in the controlled climate

Queries

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Services

- Warehouse qualification and validation (climate mapping)
- Transport qualification
- Climate chamber mapping
- Maintenance and installation of measuring systems
- On-site calibrations

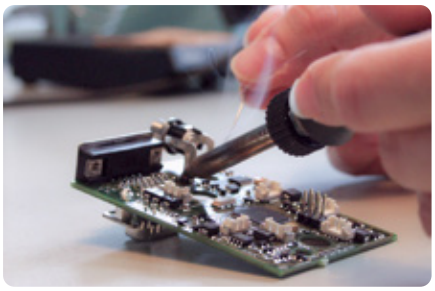
Calibration seminar & training

Experience is the best teacher tap into our wealth of experience!
Our seminars are used by customers working in various fields to refresh their knowledge or to learn the basics of, for example, calibration.

They benefit from, for example, calibrations carried out in practice and apply the knowledge they have acquired immediately. A calibration seminar can be held in the Rotronic training room or carried out at your premises.

Topics:
- Principles of humidity and temperature measurement
- Principles of sensor technology and calibration
- How often should/must calibration be performed?
- What are the pitfalls in calibration?
- Open discussion on your application
- Practical exercises

Repair & maintenance



If it makes sense, we will gladly reduce the mountain of equipment to be disposed of.
Once you have opted for a measurement instrument from Rotronic, you will soon discover you are working with a solution that offers an unmatched benefit: long-term stability!

If, however, your instrument becomes damaged, you can rely on a fast, high-quality and customer-orientated after sales service from Rotronic.

Equipment hire to customers

Rent instead of buying – our equipment is waiting for you.

HygroGen2 (HG2-S) humidity and temperature generator

Many customers have their measuring instruments calibrated in our accredited laboratory others prefer to perform the calibration themselves. Rotronic provides the HygroGen2 humidity and temperature generator for on-site calibrations.

Renting the device saves you investment in your own instrument and you receive equipment with outstanding accuracy that is traceable to our SCS (ISO 17025) laboratory at all times. Calibrate your Rotronic or third-party probes with the easy-to-use HygroGen humidity and temperature generator.

If you initially feel a little unsure, simply hire a Rotronic technician as well. He will explain the calibration procedure to you and help you with your first own calibrations/adjustments.

Features of the HG2-S:

- Generates a stable reference environment (humidity and temperature)
- Calibration solution for the laboratory and on-site
- Humidity equilibrium typically in only 5 minutes
- Calibrates up to 6 probes simultaneously
- Integrated touch screen PC with 9 USB ports
- Integrated FDA 21 CFR Part 11-compliant Rotronic HW4 software
- Range 5…95 %RH (2…99 %RH with range extension option) 0…60 °C

HL-1D data logger

We also rent out data loggers for short-term use. The humidity and temperature data are recorded in an interval defined by you.

Typical applications for the HL-1D data logger are:

- Humidity and temperature monitoring in storage and production rooms
- Humidity and temperature mapping in product packaging, cooling systems, shipping processes, etc. for foods and other sensitive products

The HL-1D data logger records your data in a definable interval of time. Please contact your local Rotronic representative if you are interested.

Your benefits

- Low maintenance costs for measuring systems
- High availability of replacements
- Short production downtimes
- Pick-up service by arrangement

Queries

support-rh@rotronic.ch

Fundamental terms of humidity measurement

Water vapor density (absolute humidity)

This is the amount of water vapor (kg) contained per unit volume (m^3) of the gas mixture. In a gas mixture the water vapor generates a certain partial pressure that is part of the total barometric gas pressure. The vapor pressure can only rise to its saturation limit, which is determined by the temperature. Thereafter water is given off in liquid form (dew). The maximum pressure is called saturation pressure and is temperature dependent. The temperature dependency is, however, not included in the term of absolute humidity.

Relative humidity

Relative humidity is the relationship between the actual water vapor pressure and the maximum possible water vapor pressure.

$$\%RH = 100 \cdot \frac{p}{ps}$$

%RH: Relative humidity percentage
p: Water vapor pressure in the gas mixture at ambient temperature
ps: Water vapor saturation pressure at ambient temperature

100% RH corresponds to the maximum amount of water vapor a gas mixture can contain at constant pressure and constant temperature. At constant water vapor partial pressure and changing ambient temperature, the water vapor saturation pressure changes and consequently the relative humidity also changes (see water vapor saturation pressure).

To obtain useful measurements of relative humidity, it is extremely important that the measurement probe and measured material have the same temperature.

Equilibrium relative humidity (ERH)

A hygroscopic material always tries to reach humidity equilibrium with the surrounding air. Equilibrium relative humidity is the free water content in a hygroscopic material after equilibrium is reached in an environment with constant relative humidity and temperature.

Humidity equilibrium then prevails when the amount of water absorbed and given off is equal.

Response time of Rotronic sensors

Rotronic defines the response time of its sensors as the time taken to complete 63% of a step change in humidity levels. The response time becomes greater at low temperatures and low air movement. It also increases when a filter is used as the water vapor is transported through the filter more slowly due to the reduced air flow and the water exchange takes place with slower diffusion of the water molecules.

Video Humidity

Interested? Then scan the QR code!

Psychrometric parameters

Dew point / Frost point (Dp / Fp)

The dew point is the temperature at which the air over water is saturated with water vapor at a constant air pressure. The water vapor pressure that then prevails is the same as the water vapor saturation pressure.

Wet bulb temperature (Tw)

This is the lowest temperature that can be reached by evaporative cooling. The water given off by a wet surface is then in equilibrium with the water absorption capacity of the surrounding atmosphere.

Enthalpy (H)

To obtain useful measurements of relative humidity, it is extremely important that the measurement probe and measured material have the same temperature. The specific enthalpy of moist air is an energetic property. It is composed of the specific enthalpies of the components in the mixture (dry air, water vapor) and is related to the mass fraction of the dry air. It is given in J/kg.

Specific humidity (Q) in g/kg

This is the ratio of the mass of the water vapor to the mass of the complete gas mixture containing the water vapor.

Vapor concentration (Dv) in g/m³

This is the ratio of the mass of the water vapor to the volume of the complete gas mixture containing the water vapor.

Mixing ratio (R) in g/kg

This is the ratio of the mass of the water vapor to the mass of the dry gas mixture containing the water vapor.

Water vapor partial pressure (E) in hPa

This is the fraction of the total pressure of a gaseous mixture due to water vapor.

Water vapor saturation pressure (Ew) in hPa

This is the maximum pressure that water vapor can reach over a water surface at a given temperature.

Mean kinetic temperature (MKT)

The mean kinetic temperature is the total influence of temperature on an object or product over a certain period of time.

Probe use in practice

As a world-leading manufacturer of humidity measurement instruments, Rotronic is fully aware of its responsibility to offer instruments that can withstand the harshest operating conditions, while remaining user-friendly and requiring minimal maintenance. At the same time we urge our users to ensure excellent performance of the measurement instruments at the expense of little effort. The following checklist is provided as a guide.

1. Analyze the environment in which the humidity probe is used. What suspended substances and/or chemicals exist and in what concentration?
2. Install the probe at a place representative of the measured climate with good airflow across the sensor.
3. Choose the right filter. Measurement is fastest without a filter. For wind velocities higher than 3 m/s, however, a filter must be used. The filter protects the sensor up to airflow velocities of 40 m/s. Suitable filters must also be used in the case of contaminants/pollutants and in harsh environmental conditions.
4. Install the probe correctly to suit the application.
5. Inspect and replace the filter more frequently in harsh operating conditions. Filters can be cleaned in an ultrasonic bath. However, always keep a new filter set in stock.
6. Check that the measurement probe is working correctly by performing a calibration at least every 6 to 12 months.
7. For calibration, use one of our calibration services or the SCS-certified humidity standards. This will ensure your calibration is traceable to national standards.

PT100 temperature sensors

A PT100 sensor changes its electrical resistance with every change in temperature in its environment. Its resistance value is 100 Ohms at 0 °C. This characteristic is used in a bridge circuit to generate a signal suitable for further processing.

There are five quality classes with the following tolerances at 0 °C.
Class B: ±0.3 K
Class A: ±0.15 K
Class B 1/3: ±0.1 K
Class B 1/5: ±0.06 K
Class B 1/10: ±0.03 K

The table below illustrates the tolerances for each PT100 sensor class at different temperatures.

	Tolerance									
	Class A		Class B		1/3 Class B		1/5 Class B		1/10 Class B	
Temp. °C	± K	± Ω	± K	± Ω	± K	± Ω	± K	± Ω	± K	± Ω
-200	0.55	0.24	1.3	0.56	0.44	0.19	0.26	0.11	0.13	0.06
-100	0.35	0.14	0.8	0.32	0.27	0.11	0.16	0.06	0.08	0.03
0	0.15	0.06	0.3	0.12	0.1	0.04	0.06	0.02	0.03	0.01
100	0.35	0.13	0.8	0.3	0.27	0.1	0.16	0.05	0.08	0.03
200	0.55	0.2	1.3	0.48	0.44	0.16	0.26	0.1	0.13	0.05
300	0.75	0.27	1.8	0.64	0.6	0.21	0.36	0.13	0.18	0.06
400	0.95	0.33	2.3	0.79	0.77	0.26	0.46	0.16	0.23	0.08
500	1.15	0.38	2.8	0.93	0.94	0.31	0.56	0.19	0.28	0.09
600	1.35	0.43	3.3	1.06	1.1	0.35	0.66	0.21	0.33	0.1
650	1.45	0.46	3.6	1.13	1.2	0.38	0.72	0.23	0.36	0.11

New standard
The manufacturing tolerances were formerly sub-divided into the accuracy Classes A and B (see above). The new standard contains the additional classes AA and C. Within the validity range of every class for wire-wound resistors and film resistors, the limit deviations (tl) are given in dependence on the temperature (t) in Celsius:
Class AA: $tl = 0.1\ K + 0.0017 \cdot t$
Class A: $tl = 0.15\ K + 0.002 \cdot t$
Class B: $tl = 0.30\ K + 0.005 \cdot t$
Class C: $tl = 0.6\ K + 0.01 \cdot t$

Example for Class B: At 200 °C deviations in the measured value of up to ± 1.3 K are allowed.

Accuracy of HC2 probes

ACCURACY SPECIFICATION FOR HUMIDITY AND TEMPERATURE

With its accuracy specification, Rotronic states the maximum permissible deviation of the HygroClip probe from the Rotronic SCS reference. The accuracy specification applies at the adjusted humidity and temperature values.

A validated and permanently monitored process guarantees that all HygroClip probes undergoing production match the Rotronic references used. In addition to this, samples are taken from every production batch and checked for accuracy against SCS references.

Humidity

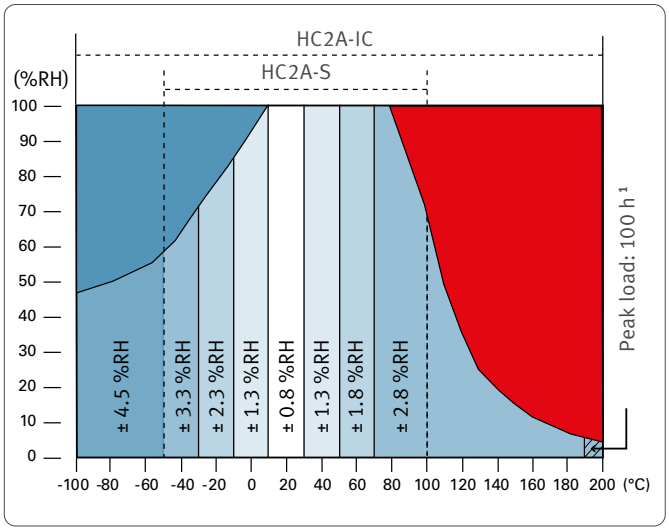
ACCURACY OF HUMIDITY MEASUREMENTS OVER THE MEASURING RANGE

HygroClip2 industrial probes
HC2A-IC / HC2A-IM / HC2A-IE / XD-Industrial

HygroClip2 probes
HC2A-S(3) / HC2A-SM / XD
HC2-HK / HC2-C / HC2-P / HC2-HP / HC2-HS

Continuous load
Rotronic HC2A industrial probes are designed for continuous loads of up to 190 °C. Rotronic standard probes up to 100 °C.

[1] **Peak load:**
The peak load at 200 °C is 100 h. See the sensor data sheet for detailed information on the pollution loads for the sensor.

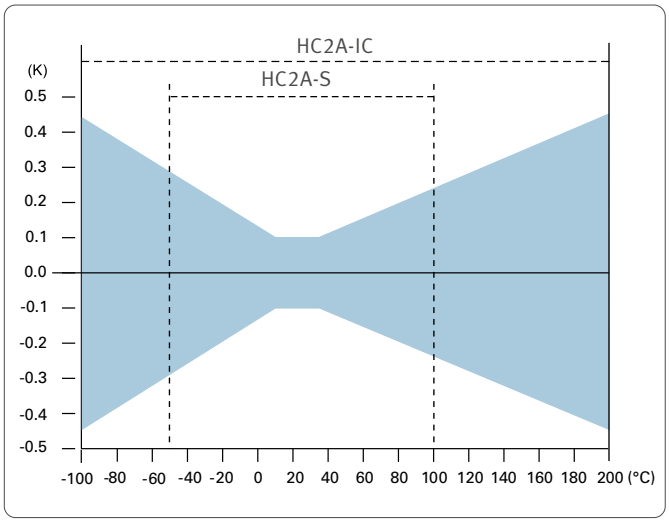


Temperature

ACCURACY OF TEMPERATURE MEASUREMENTS OVER THE MEASURING RANGE

HygroClip2 industrial probes
HC2A-IC / HC2A-IM / HC2A-IE / XD-Industrial

HygroClip2 probes
HC2A-S(3) / HC2A-SM / XD
HC2-HK / HC2-C / HC2-P / HC2-HP / HC2-HS



Contaminants/Pollutants

Some gases and contaminants/pollutants can damage Rotronic humidity sensors. The contaminants/pollutants can be divided into two categories: gases without influence and gases with an influence on the humidity sensors.

For contaminants/pollutants with an influence on the sensors and therefore with an influence on the measurement result, the maximum constant concentration must be known (see table below).

Contaminants/Pollutants with an influence

Contaminant/Pollutant	Formula	MAC value		Permissible constant concentration					
				IN-1		HH-1		HT-1	
		ppm	mg/m³	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
Acetone	CH_3COCH_3	1000	2400	3300	8000	3700	9000	3300	8000
Ammonia	NH_3	25	18	5500	4000	5500	4000	5500	4000
Petrol		300	1200		150000		150000		150000
Chlorine	Cl_2	0.5	1.5	0.7	2	1.5	4.5	0.7	2
Acetic acid	CH_3COOH	10	25	800	2000	1000	2500	800	2000
Ethyl acetate	$CH_3COOC_2H_5$	400	1400	4000	15000	4000	15000	4000	15000
Ethanol	C_2H_5OH	1000	1900	3500	6000	5800	10000	3500	6000
Ethylene glycol	$HOCH_2CH_2OH$	100	260	1200	3000	1200	3000	1200	3000
Formaldehyde	HCHO	1	1.2	2400	3000	2400	3000	2400	3000
Isopropanol	$(CH_3)2CHOH$	400	980	4800	12000	6000	15000	4800	12000
Methanol	CH_3OH	200	260	3500	6000	6000	8000	3500	6000
Methyl ethyl keton	$C2H_5COCH_3$	200	590	3300	8000	3300	8000	3300	8000
Ozone	O_3	0.1	0.2	1	2	1.5	3	1	2
Hydrochloric acid	HCl	5	7	300	500	300	500	300	500
Sulfur dioxide	SO_2	5	13	5	13	5	13	5	13
Hydrogen sulfide	H_2S	10	15	350	500	350	500	350	500
Nitrous gases	NOx	5	9	5	9	5	9	5	9
Toluene	$C_6H_5CH_3$	100	380	1300	5000	1800	7000	1300	5000
Hydrogen peroxide	H_2O_2	1	1.4	90	130	880	1200	90	130
Xylene	$C_6H_5(CH_3)_2$	100	440	1300	5000	1800	7000	1300	5000

Contaminants/Pollutants without influence

Note that the common sealing material silicone damages the sensor! When probes are installed, silicone must not be used!

Contaminant/Pollutant	Formula
Argon	Ar
Butane	C_4H_{10}
Natural gas	
Ethane	C_2H_6
Helium	He
Methane	CH_4
Neon	Ne
Propane	C_3H_8
Oxygen	O_2
Nitrogen	N_2
Hydrogen	H_2

Water activity

The measurement of water activity or equilibrium relative humidity (ERH) is a key parameter in the quality control of moisture sensitive products or materials. Water activity is by definition the free or non-chemically bound water in foods and other products. The bound water cannot be measured with this method.

WHY IS WATER ACTIVITY MEASURED?

The free water in a product influences its microbiological, chemical and enzymatic stability. This is especially important in the case of perishable products such as foodstuffs, grain, seeds, as well as for many products in the pharmaceutical and cosmetic industries. If there is too much free water available, the products spoil, and if there is too little water available, other product properties can be influenced negatively.

The table shows typical growth thresholds below which the specified organism cannot reproduce and therefore spoil the product. Control of water activity therefore has a significant impact on the shelf life of a product.

The measurement of water activity also provides useful information on properties such as the cohesion, storage life, agglomeration or pourability of powders, tablet stability, and the adherence of coatings.

Water activity	Contaminant
aw = 0.91..0.95	Many bacteria
aw = 0.88	Many yeasts
aw = 0.80	Many mildews
aw = 0.75	Halophile bacteria
aw = 0.70	Osmiophile yeasts
aw = 0.65	Xerophile mildew

The Rotronic water-activity probes work with digital HygroClip technology, which ensures their high performance and simple, digital calibration. They can therefore be used in practically all fields of application.

All water activity stations and probes incorporate temperature measurement as a standard feature. The water activity measurement stations measure in a range of 0...1 aw, which equates to 0...100 %RH, and supply a digital output signal, which can be displayed directly on a PC (HC2-AW-USB) or the HygroLab C1 and HP23-AW-A display units.

Digital calibration can be performed with these instruments or with HW4 software running on a PC. The HC2-AW probes have a large thermal mass. This means they react very slowly to temperature changes so that virtually no variations arise during measurement – especially when using the AW Quick function. The extremely small internal volume of the sensor chamber ensures humidity equilibrium is reached very quickly for all products.

Download aw white paper from **www.rotronic.com/aw**

Video water activity

Interested? Then scan the QR code!

CO_2

Principles

Carbon dioxide (CO_2) is a colorless and odorless gas that exists in the earth's atmosphere and which is dangerous in high concentrations. The proportion of CO_2 in natural ambient air is about 0.04 % or 400 ppm. When humans and animals exhale this gas, it is quickly mixed with the ambient air, including in rooms that are well ventilated.

A high CO_2 content becomes apparent in humans through rapid fatigue and loss of concentration. The negative effects become noticeable more quickly in small rooms in which there are many people (e.g. conference rooms).

In order to initiate suitable countermeasures such as an increase in the supply of fresh air, it is important in modern climate control systems to measure not only parameters such as relative humidity and temperature, but also the CO_2 content. The concentration of CO_2 is regarded as an important indicator for the indoor air quality.

Guidelines

350 – 450 ppm	400 – 1,200 ppm	› 1,000 ppm	5,000 ppm (0.5 %)	38,000 ppm (3.8 %)	› 100,000 ppm (10 %)
Fresh air outdoors	Room air	Fatigue and loss of concentration become apparent	Maximum permissible value at the workplace during an 8-hour workday	Breathing air (direct exhalation)	Nausea, vomiting, loss of consciousness and death

Measurement technique

The measurement technique is based on the principle of NDIR (non-dispersive infrared) sensors. This gas sensor works as a spectroscope and analyzes which wavelengths emitted by a light transmitter reach a receiver.

Calibration

All probes are pre-calibrated and have a lifetime of more than 15 years in normal applications. The automatic baseline correction means the sensors require no further calibration if they are used in indoor air applications.

Video CO_2

Interested? Then scan the QR code!

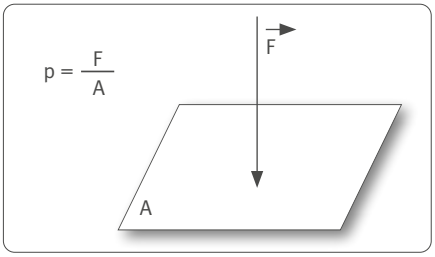
Differential pressure

What is pressure?

Pressure is the physical measurement of force per unit area and is often given in the SI unit Pascal [Pa]. Other units of measurement are also very widely used in pressure measurement technology. The automatic baseline correction means the sensors require no further calibration if they are used in indoor air applications.

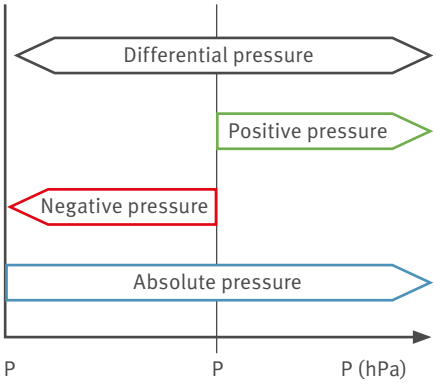
Conversion table

bar	mbar	psi	atm
1.00	1,000.00	14.50	0.987
Pa	**hPa**	**kPa**	**MPa**
100,000.00	1,000.00	100.00	0.10
mmH_2O	**$inchH_2O$**	**mmHg**	**inchHg**
10,197.16	401.46	750.06	29.53



What is differential pressure?

Three different types of pressure are generally considered in pressure measurement technology: absolute pressure, relative pressure and differential pressure. Differential pressure is the drop in pressure between two spaces with different absolute pressures.

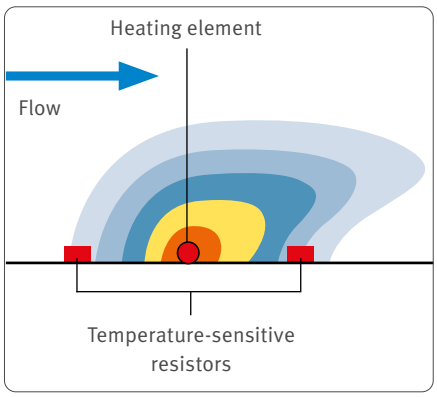


Where does Rotronic measure differential pressure?

Cleanrooms, i.e. environments in which a very low level of contamination may prevail, are pressurized slightly. This positive pressure guarantees controlled removal of dirt particles from the room. To monitor this positive pressure, one needs pressure transmitters with a very high measuring accuracy and a very low pressure measurement range. Rotronic offers such instruments.

How does Rotronic measure differential pressure?

- Thermal mass flow principle
  In this measurement technique, a heating element is placed between two temperature sensitive resistors. Due to a gas flow, the temperature profile is moved towards one of the resistors, which can be measured and evaluated.
- Strain gauge principle
  In this technique the pressure is converted into a force, which stretches a diaphragm and is measured by a piezo-resistive MEMS diaphragm sensor.



Pressure measurement technology – Glossary

Measurement range:	Pressure range in which the sensor can measure
Full scale:	Difference between the maximum and minimum measured pressure
% Full scale:	Measurement deviation in relation to full scale
System pressure:	Ambient pressure (often given as relative pressure, e.g. air pressure: 1013 hPa)

Dew point

What is dew point?

As the term implies, it is the climate point at which the relative air humidity equals 100% and begins to condense. The dew point is given in °C Td. The dew point temperature is a measurement of the water vapor content in a gas. If air is compressed or expanded, its dew point temperature changes. If air is compressed, it is able to absorb less water and the dew point rises until the air is saturated and begins to condense. In this connection, the term pressure dew point measurement is also used to describe measurement of the dew point in gases above the ambient temperature.

What does low dew point measurement mean?

A low dew point is usually when the dew point temperature falls below -30 °C Td. This means that the air is extremely dry and contains almost no water molecules. A dew point of -38 °C Td corresponds at 23 °C to a humidity value of 0.8 %RH, which corresponds to the accuracy of a Rotronic Hygro-Clip2 probe. This shows why low dew point measurement is very demanding. Very complex electronics and a highly sensitive sensor are needed to deliver high-quality results in the measurement of residual moisture.

What is important in low dew point measurement?

The measurement of such small numbers of water molecules places high demands on the measuring point. For example, it is important that there is always good airflow across the sensor so that representative measured values can be obtained. Rotronic offers a special measurement chamber for this that was developed specifically for the mechanical design of the dew point probe. Excessive flow can lead to a local pressure drop, which influences the measurement, while insufficient flow can result in measurement of a local microclimate. The constant airflow of the measurement chamber of 1 l/min. thus guarantees stable and reliable measurement results.

The equilibrium times in dew point measurements can be considerably longer than those for humidity measurements. All the materials in the system and around the sensor must be dried out. Under certain circumstances it can take hours before a low dew point system has balanced out and the residual moisture has escaped from all the materials.

Why is low dew point measured?

There can be many reasons for monitoring the dew point. Compressed air systems with an excessively high dew point can condense, thereby causing valves to become blocked or corroded. In addition to this, dry compressed air systems require less maintenance, which saves costs. Equipment connected to the system places high demands on dryness and require a low dew point of the compressed air. Further, there are sensitive processes such as the drying of injection molding granulate and the compressed air for spray painting systems, which place particularly high demands on the dew point of the system. Compressed air systems can further be classified according to ISO 8573. Depending on the classification of the system, there are different dew points that need to be monitored and controlled.

Video dew point measurement

Interested? Then scan the QR code!

ATEX

What does ATEX mean?

ATEX comes from French and stands for Atmosphères Explosibles. The aim of this directive is to protect people when working in potentially explosive environments. It comprises two directives that define explosion protection for operation and products in risk environments. Rotronic ATEX devices are based on the ATEX Product Directive 94/9/EC.

How are ATEX devices specified?

There are two device groups. Device group I is suitable for use in mining/above ground and underground. Device group II is suitable for use in other potentially explosive atmospheres. Rotronic offers devices falling in device group II. Potentially explosive environments are subdivided into zones. A distinction is drawn between whether the explosion hazard exists because of dust or gas present in the environment.

Gas zone	Dust zone	Hazard
0	20	Constantly, frequently or over a longer period of time
1	21	Occasionally
2	22	Rarely and briefly

Temperature classes define by how much the surface of the device may heat up in the case of a fault. This temperature is stated in the case of dust versions. Gas versions, by contrast, are subdivided into the following classes:

Class	T1	T2	T3	T4	T5	T6
Max. surface temperature	450 °C	300 °C	200 °C	135 °C	100 °C	85 °C

What does the classification label of ATEX devices mean?