



Hygro/hygrothermal transducers (hygrometric)

- for measuring relative humidity and temperature
- for mounting indoors, outdoors, and in air ducts
- with resistance, current or voltage outputs
- for permanent use in the high-humidity range up to 100% RH (duct version)
- no power supply necessary for passive instruments
- sensing element does not need any maintenance in clean air (no regeneration necessary)

Humidity transducers in the 907031 series make use of the hygroscopic property of specially prepared plastic fibers to determine relative humidity in air. After this preparation, the integrated humidity sensing element is capable of absorbing moisture. The effect that can be measured externally is a change in length. A precision mechanism senses the humidity-dependent change in length, transmits this movement to the slider of a resistive track and produces it as a linearized resistance output at the terminals.

The standard output is 100 — 138.5Ω, thus corresponding to a Pt100 signal. This enables the direct connection to standard measurement, control and recording instruments, for processing the measurement signal.

Other instrument versions with different resistance outputs, with normalized current or voltage output signals as well as humidity transducers with additional temperature acquisition complete the product spectrum.

The humidity transducers are suitable for both climatic applications and industrial humidity measurement. Of particular advantage is the fact that the sensing element is highly resistant to water, which permits continuous use in the high-humidity range, up to saturation level. Under normal atmospheric conditions, the sensing element requires practically no maintenance. Any dirt deposits resulting from dust-laden air can be washed off. The working range of the sensing element covers 30 to 100% RH at permissible ambient temperatures from -40 to +80°C. Instrument versions with a passive output offer the additional advantage of not needing a power supply of their own for operation.

General applications include climate monitoring, ventilation, humidifying and de-humidifying installations, storage of fruit and vegetables as well as ripening areas for food.



Duct version



Indoor version

Technical data

Humidity

Sensing element:	plastic, hygrometric sensing element is water-resistant and largely maintenance-free
Measuring/working range:	0/30 — 100% RH
Measuring accuracy:	±2.5% RH above 40% RH to tolerance characteristic below 40% RH TK = 0.1% RH/°C (referred to 20°C and 50% RH)
Medium:	air, unpressurized, not corrosive
Permissible air velocity:	duct version: 8m/sec max. (15m/sec with wind shield) indoor version: 15m/sec max.
Response times:	50% time: 1.5min at v = 2m/sec stabilization time: 30 to 40min at v = 2m/sec
Humidity output (passive):	0 — 100Ω linear, 2-wire circuit 0 — 200Ω linear, 2-wire circuit 0 — 1000Ω linear, 2-wire circuit 100 — 138.5Ω linear, 2-wire circuit (Pt100 standard values, see Data Sheet 90.6000)
Permissible loading:	1.0W
Electric strength:	42V
Insulation resistance:	10MΩ
Humidity output (active):	0 — 20 mA, 4-wire circuit 4 — 20 mA, 2-wire circuit 0 — 10V, 3-/4-wire circuit



Technical data

Temperature

Sensing element:	Pt100 temperature sensor to EN 60 751
Measuring range:	duct version, passive: -40 to +80°C (take note of permissible ambient temperature) duct version, active: -30 to +100°C (take note of permissible ambient temperature) indoor version, passive: 0 to 60°C
Measuring accuracy:	±0.5°C
Temperature output (passive):	Pt100
Measuring current:	1 mA (recommended)
or	0 – 20mA, 4-wire circuit
current/voltage signal:	4 – 20mA, 2-wire circuit 0 – 10V, 3-/4-wire circuit

Electrical data for active versions with transmitter

Supply voltage:	15 – 30V DC also 24V AC ±10% (for 0 – 10V output)
Burden:	500Ω max. for current output
Load resistance:	10kΩ min. for voltage output
Power consumption:	5mA per measuring range, 10mA with AC version
Linearity error:	<0.5% for temperature output
Output signals:	0 – 20mA; 4 – 20mA; 0 – 10V
Electromagnetic compatibility:	immunity to interference EN 50 082-2 interference emission EN 50 081-2

Construction

Housing:	duct version: ABS plastic fitted with stainless steel probe indoor version: ABS plastic
Cable entry:	duct version: via M 20x1.5 gland indoor version: via flush-type box
Terminals:	for conductor cross-sections up to 0.5mm ²
Protection:	duct version: IP64 indoor version: IP20
Ambient temperature:	duct version: -20 to +60°C on housing, -40 to +80°C on probe indoor version: 0 to 60°C
Operating position:	probe tube vertically downwards or horizontal, mounted directly through openings in housing or, optionally, by mounting flange. On indoor version unrestricted, the ventilation slots preferably at right angles to the air flow.
Weight:	duct version: approx. 400g indoor version: approx. 200g

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Maintenance notes

Humidity sensor

The hygrometric sensor requires no maintenance in normally clean air. Corrosive media or those containing solvents may cause faulty readings or failure depending on the type and concentration. As is the case with nearly all humidity sensors, any deposits that may form a water-repellent film on the sensor are liable to cause damage, for instance, resin aerosols, paint aerosols or fumigating substances.

Avoid direct sunlight.

Indoor version

Cleaning and adjustment of the sensor can only be carried out in the factory.

Duct version

The special sensing element is water-resistant and can be cleaned in water. Do not use strong solvents. When using gentle detergents, rinse the sensing element thoroughly afterwards. Only rinse the plastic sensing element and the stainless steel protection tube in water, not the housing head.

Calibration

A special ageing process ensures long-term stability of the humidity sensing element. The regeneration known from hair sensor elements is not required.

The transducers are factory-calibrated at 23°C room temperature and 50% RH. The calibration can be checked (on the duct version only) using the sensor checks that are available as accessories. In addition, the sensor will indicate 100% RH when the sensing element is wetted with water. Should recalibration become necessary, this can be done by carefully adjusting the setting screw at the tip of the protection tube. Please note that a very slight movement of the adjusting screw when the sensing element is wet will produce a fairly large change in the calibration in the dry range.

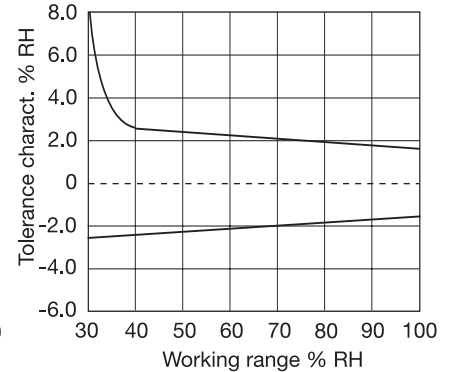
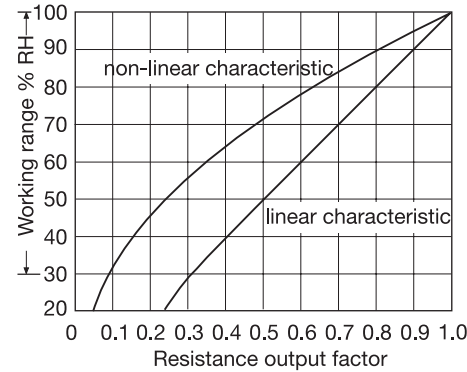
Drying

After cleaning, the humidity sensor must not be dried with warm or hot air, by using a hair drier, for example.

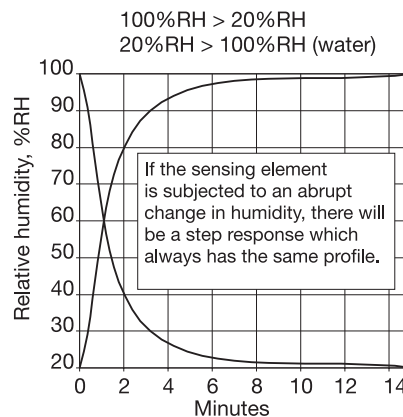
Caution

Interference with internal parts will invalidate any warranty claim.

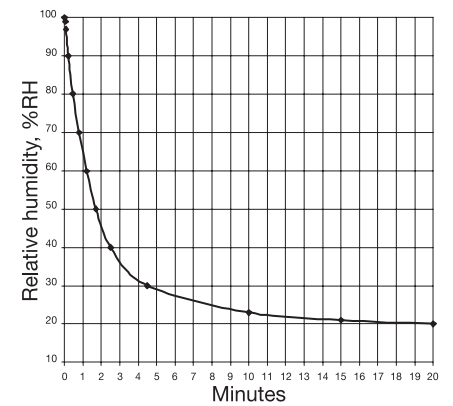
Humidity tolerance characteristic



Step response for Polyga



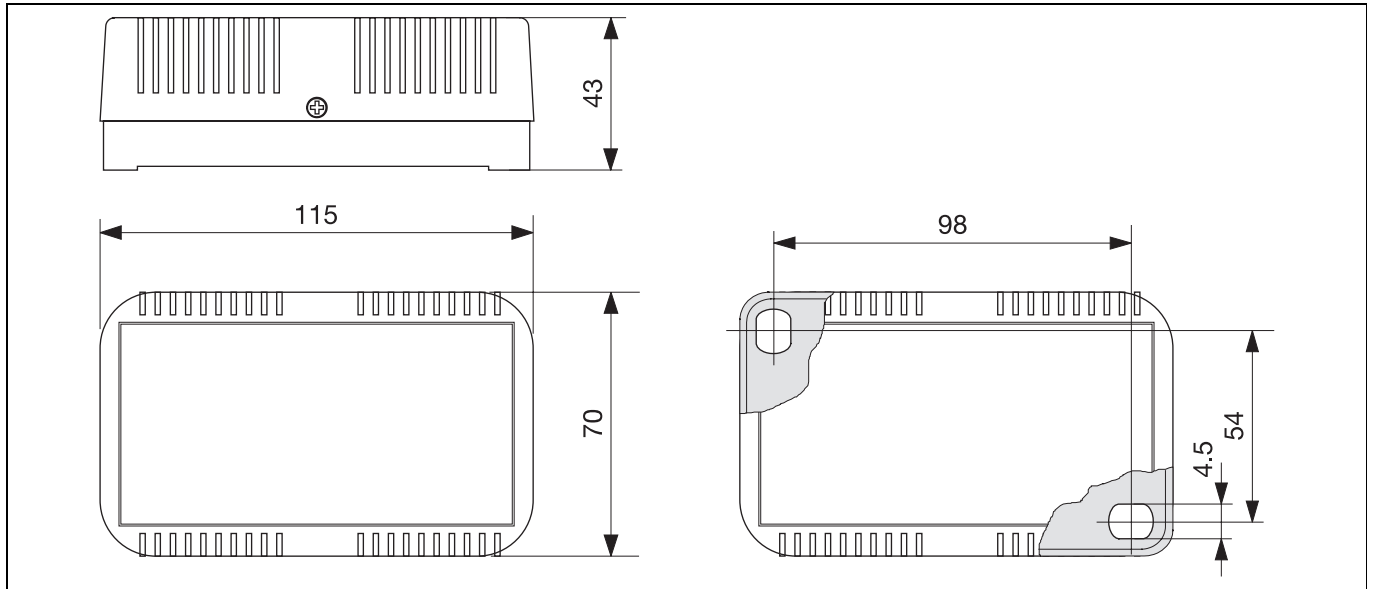
Reaction of the Polyga sensing element



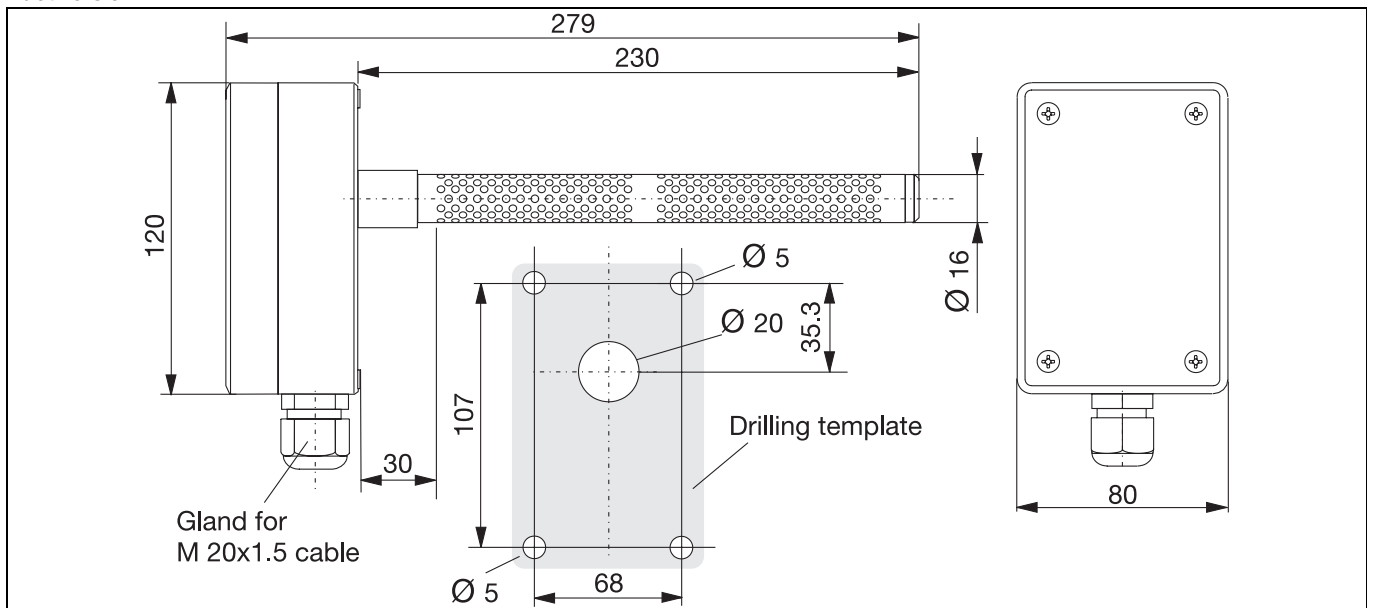


Dimensions

Indoor version

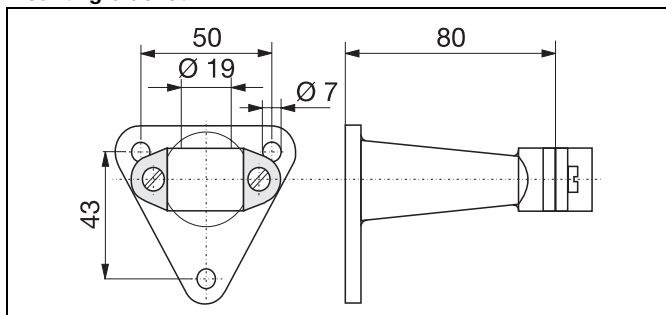


Duct version

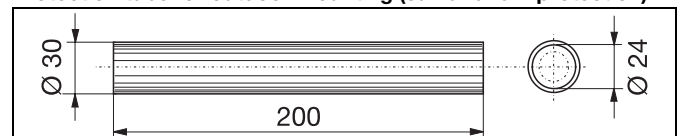


Accessories

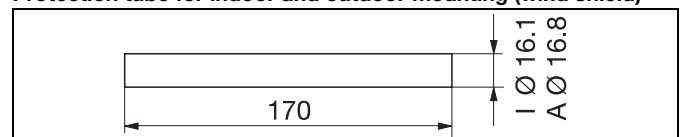
Mounting bracket



Protection tube for outdoor mounting (sun and rain protection)



Protection tube for indoor and outdoor mounting (wind shield)



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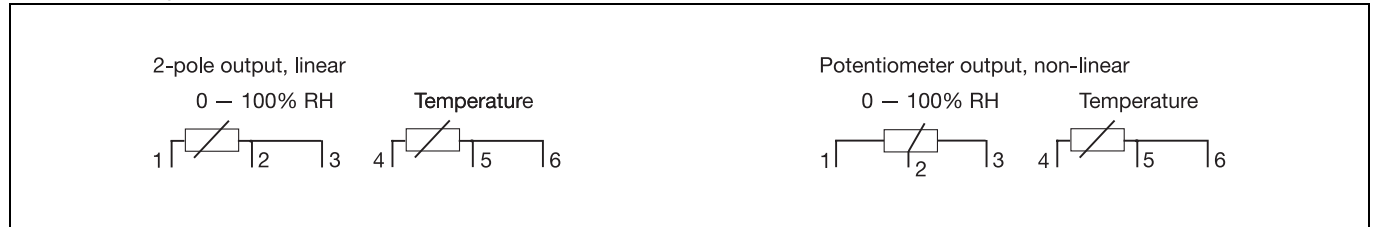
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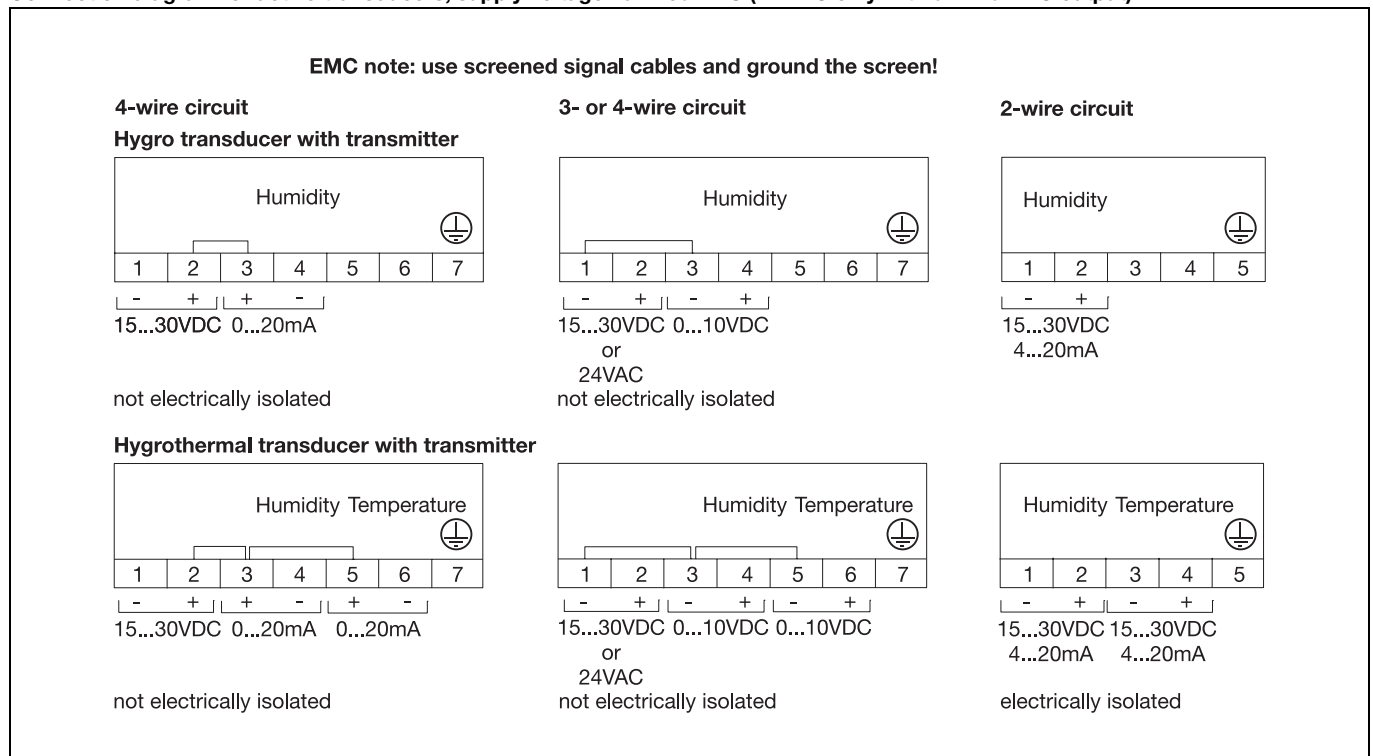


Connection diagrams

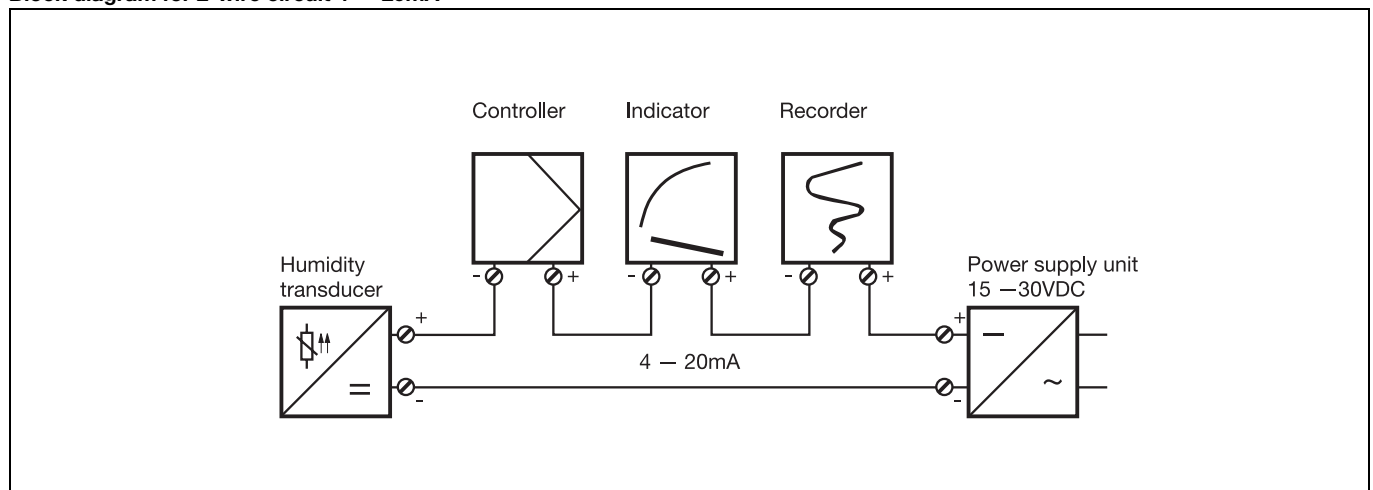
Connection diagram for passive transducers with resistance output



Connection diagram for active transducers, supply voltage 15 – 30V DC (24V AC only with 0 – 10V DC output)



Block diagram for 2-wire circuit 4 – 20mA



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Order details: Hygro/hygrothermal transducers (hygrometric)

(1) Basic version

- 907031/10 Hygro/hygrothermal transducer, indoor version (passive)
- 907031/20 Hygro/hygrothermal transducer, duct version (passive)
- 907031/30 Hygro/hygrothermal transducer, duct version (active)
- 907031/50 Hygro/hygrothermal transducer, duct version (Ex i)***

(2) Hygro/hygrothermal transducers

- x x x x 1 humidity
- x x x x 2 humidity and temperature
- x x x x 3 humidity and temperature (passive)

(3) Ranges*

- x 09 0 to 100 % RH / -20 to +40 °C
- x 21 0 to 100 % RH / -30 to +60 °C
- x 15 0 to 100 % RH / -40 to +80 °C
- x 34 0 to 100 % RH / 0 to 60 °C
- x x 36 0 to 100 % RH / 0 to 100 °C
- x x x 99 special range (on request)

(4) Output signals (humidity / temperature)**

- x x 016 0 – 100Ω (2-pole output, linear) / Pt100 (passive)
- x x 017 0 – 200Ω (2-pole output, linear) / Pt100 (passive)
- x x x 019 0 – 1000Ω (2-pole output, linear) / Pt100 (passive)
- x x x 021 100 – 138.5Ω (2-pole output, linear) / Pt100 (passive)
- x 005 4 – 20mA / 4 – 20mA
- x 011 0 – 20mA / 0 – 20mA
- x 065 0 – 10V DC / 0 – 10V DC
- x x x 999 special output (on request)

(5) Extra codes

- x x x x 000 no extra code
- x x x 764 mounting bracket (for wall fixing)
- x x x 797 wind shield (indoor and outdoor mounting)
- x x x 798 sun and rain protection (outdoor mounting)
- x x x 799 mounting flange (not absolutely necessary)

Order code **(1)** - **(2)** - **(3)** - **(4)** / **(5)**, ...
Order example 907031/10 - 1 - 15 - 016 / 000¹

1. List extra codes in sequence, separated by commas.
 * Please note humidity working range and max. permissible ambient temperature (see Technical data).
 ** With selection (2) type code 1 "humidity", the second output signal is not applicable with selection (4).
 *** The transducer may only be operated in an intrinsically safe circuit.
 Please make sure you only use approved safety barriers, transmitters and devices suitable for the Ex area when operating in the hazardous area!

Note
 Suitable power supply units for transmitters (not for Type 907031/50) can be found in Data Sheet 70.7500 (95.6024).
 Recommended power supply units: Type TN-22/02, 055 (1-channel) and TN-67/02, 055 (4-channel)

Stock versions

(1)	(2)	(3)	(4)	(5)	Sales No.
907031/10	1	34	021	000	90/90590502
907031/10	3	34	021	000	90/90590507
907031/20	1	15	021	000	90/90590512
907031/20	1	15	019	000	90/00403758
907031/20	3	15	021	000	90/90590517
907031/30	1	21	005	000	90/90590541
907031/30	1	21	065	000	90/00332704
907031/30	2	21	065	000	90/00332705
907031/30	2	21	005	000	90/90590544
907031/30	2	36	005	000	90/90590543

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Order details: Accessories

(1) Basic version

	907031/90	Mounting bracket for duct version
	907031/91	Protection tube for duct version
	907031/92	Mounting flange for duct version
	907031/93	Humidity sensor checks
x	(2) Mounting bracket for duct version	
	764	Wall bracket (black plastic)
x	(2) Protection tube for duct version	
x	797	wind shield (indoor and outdoor mounting)
	798	sun and rain protection (outdoor mounting)
	(2) Mounting flange for duct version	
x	799	oval mounting flange (galvanized steel)
	(2) Extra codes	
x	820	33% RH magnesium chloride
x	821	53% RH magnesium nitride
x	822	76% RH sodium chloride

Order code -
 Order example 907031/90 - 764

Stock versions

(1)	(2)	Sales No.
907031/90	764	90/60171300
907031/91	797	90/00323439
907031/91	798	90/00321186
907031/92	799	90/60677200
907031/93	820	90/00332758
907031/93	821	90/00332759
907031/93	822	90/00332760