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Hygro and Hygrothermo Transducers (capacitive) for climatic applications

- To measure relative humidity and temperature
- For versatile climatic applications and ventilation
- For indoor and air duct mounting
- Compact rod models with connection cable or J-shaped connection head
- With current and voltage outputs as well as passive Pt 100 temperature output
- With fast-response capacitive humidity sensor

Hygro transducers of the 907020 series were specially designed for the most common climatic applications and ventilation.

The transducers measure the relative humidity by means of a humidity dependent capacitor. This capacitive sensing element consists of a support plate carrying the electrodes, covered by a hygroscopic polymer film. This polymer film absorbs or releases water molecules from the medium being measured (air), thereby changing the capacity of the capacitor. An electronic circuit converts the capacity corresponding to humidity, and produces a standardized current or voltage output signal.

The transducers are only designed for atmospheric pressure systems, not for aggressive gases. As standard, the sensing element is protected by a gauze filter (not for the indoor version). The accessories include further exchange filters to allow the use of the transducers outdoors or under extreme conditions.

The transducers non condensing and guarantee reliable humidity measurements in working range of 5 to 95% rH. Versions with an additional temperature measuring range are available for wider applications.

In addition to the standard versions with standardized output signals of 4 to 20mA or 0 to 10V, some of the versions come with a 0 to 20mA output signal or a passive Pt 100 temperature output.

Different constructional styles ensure simple and reliable installation to suit application and location. In particular, compact rod versions with connection cable also come with an optional plug connector and meet the most varied applications. The range is complemented by a new version with sturdy connection head.



Technical Data

Humidity

Sensing element	capacitive (thin film, non-condensing) requires no maintenance in normal clean ambient air
Measuring range	0 to 100% rH
Working range	5 to 95% rH; rod and duct version 10 to 95% rH; indoor version
Measuring accuracy	±2.0% rH; rod version (at 10 to 40°C, outdoor an additional <0.1% rH/K) ±2.0% rH; duct version (at 23°C and 40 to 60% rH) ±2.5% rH; duct version, other application areas ±3.5% rH; indoor version
Temperature coefficient	<0.10% rH/K; rod version (at <10°C, >40°C) <0.15% rH/K; duct version 0.05% rH/K; indoor version (referred to 20°C and 50% rH)
Medium	air, atmospheric pressure, noncorrosive, non-condensing
Humidity output (active) (for wire circuit/wiring diagrams see operating manual)	0 to 20mA, only indoor and duct versions 0 to 1V, only rod version 0 to 10V 4 to 20mA (2-wire circuit)
Air velocity (always at right angles to the sensor)	min. 0.5m/s (at voltage output) min. 1.5m/s (at current output) max. 15m/s
Response time	half-life; 10 to 72s at v = 2m/s (depending on style and filters used, except indoor version)

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Temperature

Sensing element	Pt 100 thin film temperature sensor Class B according to DIN EN 60 751
Measuring range	-30 to +60°C; indoor and duct versions -30 to +70°C; rod version 0 to 50°C; indoor and duct versions 0 to 100°C; duct version (only scaling, please note permissible ambient temperatures)
Working range	-10 to +60°C; indoor version -30 to +80°C; duct version
Measuring accuracy	±0.3K; duct and rod versions ±0.8K; indoor version
Temperature coefficient	±0.01 K/K (at <10°C, >40°C)
Temperature output (active) (for wire circuit/wiring diagrams see operating manual)	0 to 20mA, only indoor and duct versions 0 to 1V, only rod version 0 to 10V 4 to 20mA
Temperature output (passive)	Pt 100 (only duct and rod versions, see ordering code)

Electrical data

Voltage supply	6 to 30V DC, rod versions with output 0 to 1V 15 to 24V DC, indoor versions 15 to 30V DC, duct and rod versions 24V AC, additional indoor and duct version with output 0 to 10V DC
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Burden (I output)

$$\Omega = \frac{\text{Voltage supply} - 10V \text{ DC}}{0.02A} \pm 50\Omega$$

Load resistance	>10kΩ (at 0 to 10V), >2kΩ (at 0 to 1V)
Consumption	<5mA/<1mA for rod versions with output 0 to 1V 15mA; indoor version (per measuring range with 4-wire)
Electromagnetic compatibility	as per EN 61 326

Construction

Case	Indoor version: impact resistant plastic, light gray Duct version: ABS plastic with attached aluminum shaft, painted Rod version: J-shaped aluminum connection head, shaft as for duct version, optional with 1.5m connection cable
Dimensions	Indoor version: 115mm x 70mm x 43mm Duct version: 248mm x 120mm x 80mm (installation length = 200mm, Ø = 20mm) Rod version: Installation length = 122mm, Ø = 20mm
Cable routing	Indoor version: via box concealed Duct version: via cable gland M 20 x 1.5 Rod version: via cable gland, clamping range D = 4 to 8mm (for version with connection head)
Terminal blocks	for conductor cross sections of up to 1.5mm ²
Protection type	Indoor version: IP20 Duct version: IP64 (sensor IP30) Rod version: IP65 (sensor IP30)
Ambient temperature	Indoor version: -10 to +60°C Duct version: -40 to +80°C at shaft head (filter area) -10 to +60°C at the case Rod version: -40 to +80°C
Installation position	Sensor tube vertically downward or horizontal. For the indoor version, the ventilation slits should preferably run at right angles to the air flow. Please install the transducers so that any ingress of water is excluded. Fastening directly through the openings in the case or by means of installation accessories that are optionally available.

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Weight

Indoor version: approx. 200g
Duct version: approx. 400g
Rod version: approx. 140g
Rod version with J-shaped connection head: approx. 340g

Filters

Plastic grid filter with stainless steel net (-40 to +80°C):
(standard), retains coarse soiling, fast response, response time approx. 60s (at v = 1.5m/s)
Plastic grid filter with diaphragm (-40 to +80°C):
For outdoor use, enhanced protection against aerosols, up to v = 10m/s, response time approx. 90 s (at v = 1.5m/s)
Stainless steel sinter filter (-50 to +150°C):
For extreme applications (in proximity of oceans, deserts, mountains) or for applications subject to high air velocities up to 20m/s, response time approx. 90s (at v = 1.5m/s)

Notes for the user

Installation

Install the hygro transducers at a location indoors representative for moisture measurement, on walls or on devices and systems. Do not install above radiators, close to windows and doors (also exterior walls for indoor measurements), or to surfaces subject to heavy impacts/vibration or direct sunlight. Protect the transducers against dirt, dripping and splashing water. Although condensation and splashing water are not harmful to the transducer, they can, however, cause the sensing element to dry and produce faulty readings. Dust generally has no damaging effect, but can impair the dynamic behavior of the transducer. We strongly recommend to adhere to the specified minimum air velocities and the burden matched to the operating voltage for the current output. Deviations could also lead to additional faulty readings resulting from the device heating up. Install the transducers in accordance with the protective measures laid down in the EMC Act to be able to maintain their reliability against interference.

Maintenance note for the humidity sensing element

The capacitive humidity sensing element requires no maintenance in normal clean ambient air. Corrosive media or those containing solvents may cause faulty readings or even failure. Deposits forming a water-repellent film on the sensing element are liable to cause faulty operation. Soiled protective filters must be replaced. Do not touch the surface of the humidity sensor. Only clean by rinsing the sensor with distilled water. Correct readings will be restored once the sensor is completely dry. A soft brush can be used to clean the indoor and rod versions.

Checking and Calibration

Humidity Sensorchecks can be used (we recommend once a year) to test the transducers for accuracy of the humidity measurement. The procedure is described in more detail in DIN 50 008, IEC Publication 260, ISO/R 483-1966. The basic principle consists of an appropriate climate being produced above an aqueous saturated salt solution. Humidity Sensorchecks with values of 33% rH, 55% rH and 76% rH are available as accessories.

Caution

Any manipulations of the internal components will lead to the warranty claims becoming null and void.



Connection diagram

For terminal assignment, please refer to the operating manual coming with the device concerned and forming part of our delivery.

For design planning, operating manuals are also available on the Internet and can be downloaded as PDF files.

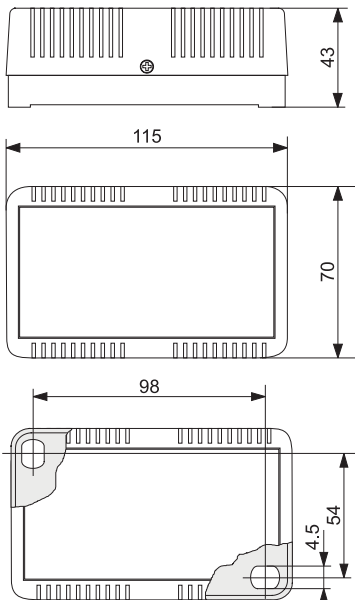
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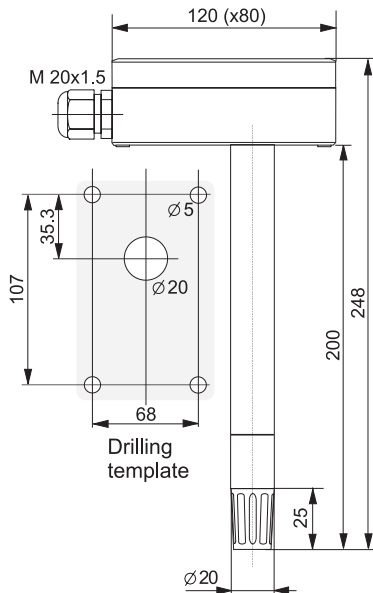
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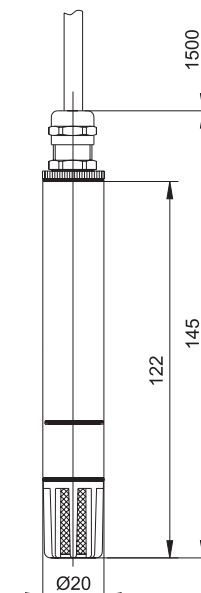
Dimensions



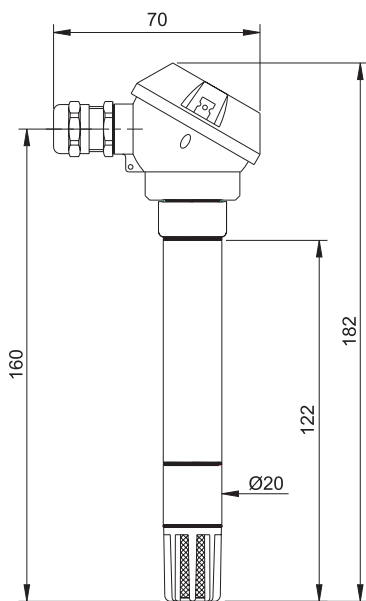
Indoor version



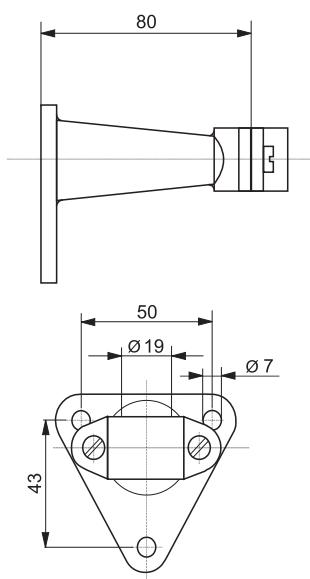
Duct version



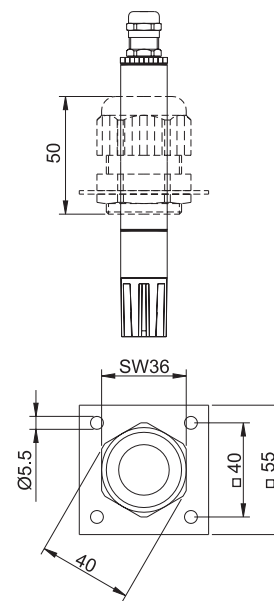
Rod version with connection cable



Rod version with J-shaped connection head



Holder (wall mounted) for duct and rod versions



Mounting flange (plate) mounted with clamping screws for duct and rod versions

Dimensions in mm.

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Order details: Hygro and hygrothermo transducers (capacitive) for climatic applications

(1) Basic version

	907020/10	Hygro and hygrothermo transducer Indoor version
	907020/30	Hygro and hygrothermo transducer Duct version
	907020/40	Hygro and hygrothermo transducer Rod version with 1.5m connection cable
	907020/41	Hygro and hygrothermo transducer Rod version with J-shaped connection head
	(2) Hygro and hygrothermo transducer	
x x x x	1	Humidity
x x x x	2	Humidity and temperature
x x	3	Humidity and temperature (passive)
	(3) Measuring ranges¹	
x x x x	00	0 to 100% rH (only humidity)
x	10	0 to 100% rH; -20 to +80°C
x x	34	0 to 100% rH; 0 to 50°C
x x	21	0 to 100% rH; -30 to +60°C
x x	22	0 to 100% rH; -30 to +70°C
x	36	0 to 100% rH; 0 to 100°C
	(4) Output signals (humidity; temperature)²	
x x x x	005	4 to 20mA; 4 to 20mA
x x	006	4 to 20mA; Pt 100 (passive)
x x	051	0 to 1V; 0 to 1V
x x	052	0 to 1V; Pt 100 (passive)
x x x x	065	0 to 10V; 0 to 10V
x x	066	0 to 10V; Pt 100 (passive)
	(5) Extra codes	
x x x x	000	without extra codes
x x x	764	Holder, wall mounted
x x x	818	Mounting flange (plate) mounted with clamping screws for ventilation ducts (up to 80°C)
x	819	Version with coupling plug (without connection cable)

Ordering code **(1)** **(2)** **(3)** **(4)** **(5)** , ...³
Ordering example 907020/10 - 2 - 34 - 065 / 000

Note:
 Please refer to data sheet 70.7500 for matching power packs for the hygro and hygrothermo transducers.
 Recommended power packs: Type TN-22/02, 055 (1 channel) and TN-67/02, 055 (4 channel)

¹ Please note working ranges, humidity and permissible ambient temperatures (see Technical Data).
² Second output only with combination devices (humidity and temperature).
³ State extra codes one after another, separated by commas.

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**Versions available from stock:**

(1)	(2)	(3)	(4)	(5)	Sales No.:
907020/10	- 1	- 00	- 005	/ 000	90/00315097
907020/10	- 1	- 00	- 065	/ 000	90/00315098
907020/10	- 2	- 21	- 005	/ 000	90/00332708
907020/10	- 2	- 21	- 065	/ 000	90/00403751
907020/10	- 2	- 34	- 005	/ 000	90/00315100
907020/10	- 2	- 34	- 065	/ 000	90/00315101
907020/30	- 1	- 00	- 005	/ 000	90/00315103
907020/30	- 1	- 00	- 065	/ 000	90/00315104
907020/30	- 2	- 21	- 005	/ 000	90/00332698
907020/30	- 2	- 21	- 065	/ 000	90/00403752
907020/30	- 2	- 34	- 005	/ 000	90/00315106
907020/30	- 2	- 34	- 065	/ 000	90/00315107
907020/30	- 2	- 36	- 005	/ 000	90/00332700
907020/40	- 1	- 00	- 005	/ 000	90/00403753
907020/40	- 1	- 00	- 065	/ 000	90/00403755
907020/40	- 2	- 22	- 005	/ 000	90/00403754
907020/40	- 2	- 22	- 065	/ 000	90/00402259
907020/41	- 1	- 00	- 005	/ 000	90/00473743
907020/41	- 1	- 00	- 065	/ 000	90/00473744
907020/41	- 2	- 22	- 005	/ 000	90/00473745
907020/41	- 2	- 22	- 065	/ 000	90/00473746

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Order details: Accessories

(1) Basic version

	907020/90	Exchange filters
	907020/91	Mounting flange (plate) for duct and rod versions
	907020/92	Holder, wall mounted, for duct and rod versions Bracket
	907020/93	Humidity Sensorchecks
	(2) Exchange filter	
x	800	PTFE filter
x	801	Plastic grid filter with diaphragm
x	803	Stainless steel sinter filter
x	804	Plastic grid filter with stainless steel net (standard)
	(2) Mounting flange for duct and rod versions	
x	818	Mounting plate, mounted with clamping screws, for ventilation ducts (up to 80°C)
	(2) Holder for duct and rod versions	
	764	Wall mounted holder (black plastic)
	(2) Humidity Sensorchecks	
	820	33 % rH magnesium chloride
	821	53 % rH magnesium nitrate
	822	76 % rH sodium chloride

Ordering code	(1)	-	(2)
Ordering example	907020/90	-	804

Versions available from stock:

(1)	-	(2)	Sales No.:
907020/90	-	800	90/00511063
907020/90	-	801	90/00403756
907020/90	-	803	90/00352114
907020/90	-	804	90/00367344
907020/91	-	818	90/00403757
907020/92	-	764	90/60171300
907020/93	-	820	90/00332758
907020/93	-	821	90/00332759
907020/93	-	822	90/00332760