JUMO GmbH & Co. KG
P.O. Box 1209
D-36039 Fulda, Germany
Telefon: +49 661 6003 321
Fax: +49 661 6003 9695
E-Mail: mail@jumo.net
Web: http://www.jumo.net

ООО «КОМТЕК», г. Санкт-Петербург
пр. Александровской Фермы,
д.29 литера ВГ, оф.218
Тел: +7 952 222 12 18
Тел: +7 995 596 01 67
E-Mail: jumo@jumo-russia.ru
Интернет: www.jumo-russia.ru

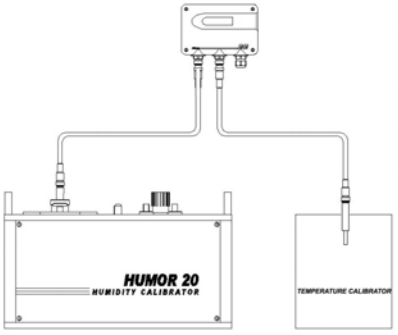
Capacitive hygrothermal transducers with intelligent interchangeable probes

- For measuring relative humidity and temperature
- Measurement over the entire humidity range from 0 to 100% rH
- For operating temperatures from -40 to +80°C
- Intelligent interchangeable probes are easy to exchange without readjusting the device electronics
- With separate measurement probes option for humidity and temperature
- 2m, 5m or 10m long adapter cable for probe extension
- Special rugged metal housing, can be used in clean rooms
- Integrated LC Display (optional)
- With standardized current or voltage outputs
- For versatile applications in the pharmaceutical industry and for greenhouse, clean room, storage and coldstore applications

Plug-in measurement probes that can be interchanged within seconds are the main feature of this new series. Because the calibration data is directly stored in the probe, probes can be exchanged without any loss of accuracy. Highly-accurate calibration procedures and state-of-the-art microprocessor technology also ensure reliable measurement and high measuring accuracy over the entire field of application. The outstanding long-term stability is based on years of experience with the capacitive humidity sensors being used.
For applications in higher ambient temperatures, where space is at a premium or just to extend the probes, simply adapt the 2m, 5m or 10m long adapter cables available as options between the measurement probe and the transducer.
The usual voltage outputs 0 - 1V, 0 - 5V, 0 - 10V or 4 - 20mA (2-wire) current outputs are available as output signals and temperature scaling can be customized ex-factory to the required ranges (see order details).
An integrated LC Display option allows the current humidity and temperature vales to be shown alternately.

On-site calibration of humidity and temperature

The loop calibration of humidity and temperature values recommended by the FDA (Food and Drug Administration) in the pharmaceutical and biological engineering industries can easily be performed by means of the rH and T measurement probes that can also be supplied separately, as an option. Function keys are attached to the inside to make it simple to implement a necessary adjustment to the two analog outputs, when required.



Reference probes

Reference probes are available as accessories to allow you to test the function and accuracy of the measuring loop. The two reference probes can be fitted instead of the interchangeable measurement probes and output fixed humidity and temperature values. Reference probes are supplied together with a test report and simulate a high humidity value and a low temperature value and vice versa (probe 1: 90% rH/5°C and probe 2: 10% rH/45°C). This makes it possible to test the two analog outputs at the top and bottom end of the scaling.

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Email: mail@jumo.net
Internet: www.jumo.net

JUMO UK LTD
JUMO House
Temple Bank, Riverway
Harlow, Essex, CM20 2DY, UK
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JUMO Process Control, Inc.
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Email: info.us@jumo.net
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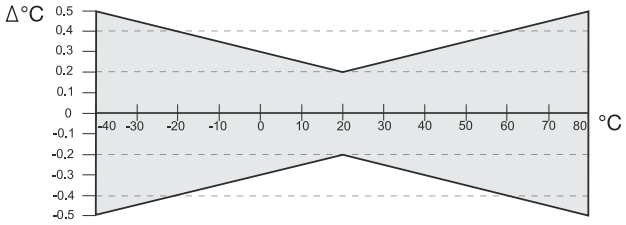
Technical data

Humidity

Sensing element	Type: HC105 capacitive (SMD version, condensation permitted), largely maintenance free in normal, clean air
Measuring/working range	0 to 100 % rH
Medium	air, unpressurized, not corrosive
Accuracy (incl. hysteresis, non-linearity and repeat accuracy)	±(1.5 + 0.5 % x measured value) % rH; (at <90 % rH; -15 to +40 °C) ±2.5 % rH; (at >90 % rH; -15 to +40 °C) ±(1.7 + 1.5 % x measured value) % rH; (at -40 to +80 °C) The tolerance data includes the uncertainty of the factory calibration with an expansion factor k = 2 (double the standard deviation). The tolerance is calculated to EA-4/02, taking GUM (Guide to the Expression of Uncertainty in Measurement) into consideration.
Temperature dependence of the electronics	±0.006 % rH/°C
Response time rH (with stainless steel mesh filter)	typ. <15 s (at 20 °C/$t_{0.9}$)

Temperature

Sensing element	Pt1000 thin film temperature sensor tolerance class A to DIN EN 60 751
Measuring range	-40 to +60 °C, measurement probes directly on the hygrothermal transducer -40 to +80 °C, remote measurement probes, by means of the adapter cable
Measuring accuracy	
Temperature dependence of the electronics	±0,007 °C/°C
Response time T (with stainless steel mesh filter)	typ. <3 mins ($t_{0.63}$), with combined measurement probe (rH+T) typ. <6 mins ($t_{0.63}$), for separate T measurement probe

Analog outputs

0 to 100 % rH/xx to yy °C (for T scaling, see order details)	0 to 1 V 0 to 5 V/0 to 10 V 4 to 20 mA (two-wire)	(-0.5 mA < I_L <0.5 mA) (-1 mA < I_L <1 mA) (R_L <500 ohms)
Temperature sensitivity of the analog outputs		max. 0,2 $\frac{mV}{°C}$ or 1 $\frac{\mu A}{°C}$

Electrical data

Supply for		
0 to 1 V	10 to 35 V DC or 9 - 29 V AC	
0 to 5 V	12 to 35 V DC or 15 - 29 V AC	
0 to 10 V	15 to 35 V DC or 15 - 29 V AC	
4 to 20 mA	10 to 35 V DC	
Burden (I output)	$R_L < \frac{Uv - 10V}{0,02A}[\Omega]$	
Power consumption	typically 10 mA for DC	typically 20 mA_{eff} for AC
Electromagnetic compatibility	EN 61 000-6-3 EN 61 000-6-2	CE

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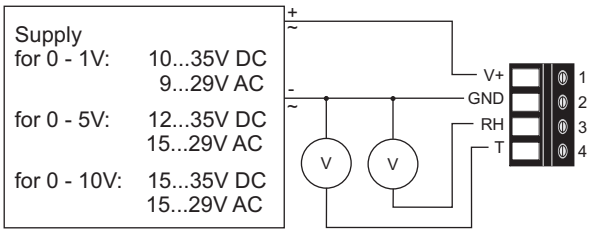
General information

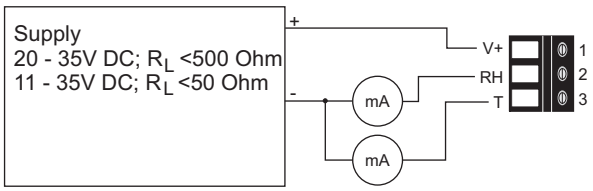
Housing	Al Si 9 Cu 3
Probes	stainless steel 1.4305 (reference probes made of PC plastic)
Dimensions	Housing: 163(135)mm x 90mm x 50mm (W x H x D) (rH/T) probe: 13mm x 91mm (D x L) (T) probe (separate): 12(6)mm x 93mm (D x L)
Cable gland	M 16 x1.5 (Lumberg connector option (RSF 50/11))
Terminals	Screw terminals for cable cross-sections up to 2.5mm^2
Housing protection class	IP65 (IP10 for rear cable entry, IP40 for plain wall mounting)
Ambient temperatures	Measurement probe: -40 to +60°C (+80°C with adapter cable) Electronics: -40 to +60°C Storage temperature: -40 to +60°C
Sensor protection	PTFE filter, pore size: 50µm High chemical resistance, response time $t_{0.1/0.9}$: typ. 14s Stainless steel mesh filter (standard), for average pollution, high mechanical strength, suitable for high humidity applications, response time $t_{0.1/0.9}$: typ. 7s
Weight	approx. 800g

Connection diagrams

Voltage output

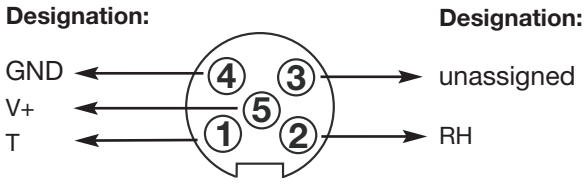


Current output



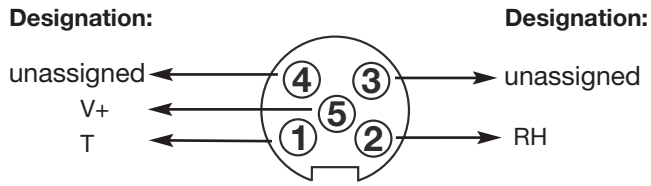
Connection diagrams for a Lumberg connection

Voltage output
Connector for supply and analog outputs
(front view)



European Standard EN

Current output
Connector for supply and analog outputs
(front view)



European Standard EN

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36039 Fulda, Germany
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User information

Mounting

Mount the humidity transducer somewhere in the room that is representative for measuring humidity, on walls or on equipment and systems. Avoid siting it near radiators, windows and doors (when measuring indoors, also avoid outside walls) and on powerfully vibrating surfaces or in direct sunlight. The transducer must be protected against dirt, as well as falling or splashing water. Although condensation and splashwater will not damage the transducer, they can cause faulty readings until the probe element has dried out. Dust is not usually damaging, either, but it does reduce the dynamic response.

Maintenance notes

The capacitive humidity sensing element is largely maintenance free in normally clean air. Corrosive media and those containing solvents, can cause faulty readings and even failure. Deposits that ultimately form a water-repellent film on the sensing element, are also harmful. Dirty protective filters must be replaced in good time. You must not touch the surface of the humidity sensor with your hands. Use a soft brush to clean the sensor. Distilled water can also be used for rinsing, but solvents or cleaning agents must not be used. Once the transducer is completely dry, correct measured values should reappear.

Sensor coating

With some industrial processes, heavily polluted and/or corrosive environments can impair the function of the humidity sensor and the measured values may show signs of drift. The sensor coating, available as an option, offers better protection against this (see order details), as it greatly reduces the impact and noticeably improves the long-term stability of the transducer.

Test and calibration

Humidity sensor check sets can be used to test the accuracy of the humidity transducers from time to time. This process is described in more detail in DIN 50 008, IEC publication 260, ISO/R 483-1966. The basic principle is, that an aqueous, saturated saline solution creates a corresponding climate in an enclosed airspace. Sensor check sets with 33% rH, 55% rH and 76% rH values are available ex-stock as accessories. Calibration intervals depend heavily on the particular application. But we recommend that a check is carried out at least once a year.

Warning

Interfering with internal parts will invalidate any warranty claim.

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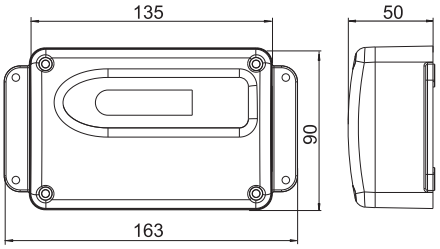
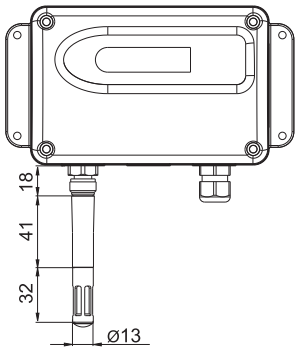
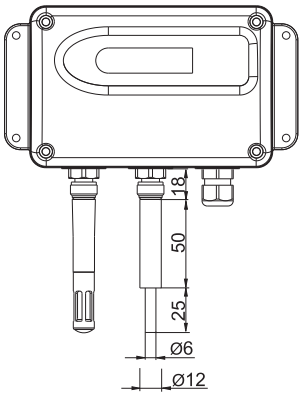
Dimensions



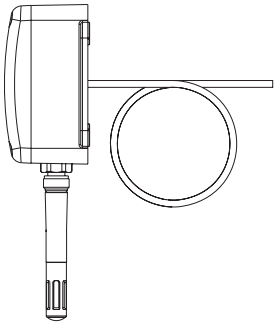
Transducer housing



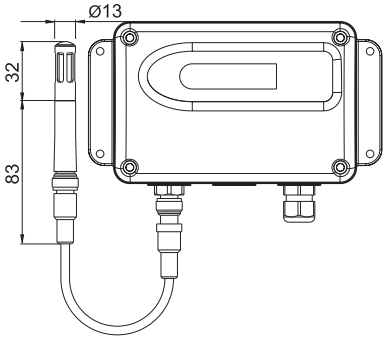
**Hygrothermal transducer for wall mounting
with one plug-in rH+T measurement probe**



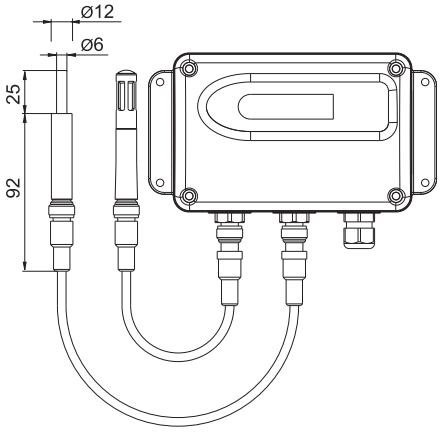
**Hygrothermal transducer for wall mounting
with two plug-in rH+T measurement probes**



**Hygrothermal transducer for wall mounting
with rear cable entry**



**Hygrothermal transducer for wall mounting
with one remote rH+T measurement probe**



**Hygrothermal transducer for wall mounting
with two remote rH+T measurement probes**

Measurements in mm.

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Order details

	(1)	**Basic type**
907027/20		Hygrothermo transducer wall model with combined measurement probe (rH+T)
907027/21		Hygrothermo transducer wall model with separate measurement probe (rH+T)
	(2)	**Version**
2		Humidity and temperature (rH+T)
	(3)	**Ausgang**
005		4 ... 20mA
051		0 ... 1V
057		0 ... 5V
065		0 ... 10V
	(4)	**Line insertion**
10		Line screw connection (M16x1.5), fitted on the bottom
20		Line lead-through, open on the rear (clean room wall mounting)
	(5)	**Type of filter**
800		PTFE filter
889		Stainless steel mesh filter (standard)
	(6)	**Display**
0		Without display (standard)
1		With integrated display
	(7)	**Electrical connection**
00		Connection terminals (standard)
91		Lumberg connector (not available for basic type 907027/21)
	(8)	**Sensor protection**
1		With coating (standard)
	(9)	**Temperature unit**
0		°C (standard)
1		°F
	(10)	**Measuring ranges**
09		0 ... 100 % rH; -20 ... +60°C
10		0 ... 100 % rH; -20 ... +80°C (standard)
14		0 ... 100 % rH; -40 ... +60°C
15		0 ... 100 % rH; -40 ... +80°C
21		0 ... 100 % rH; -30 ... +60°C
22		0 ... 100 % rH; -30 ... +70°C
32		0 ... 100 % rH; 0 ... 60°C
34		0 ... 100 % rH; 0 ... 50°C
38		0 ... 100 % rH; 0 ... 80°C
99		Special measuring range

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)
Order code		-		-		-		-		-		-		-		-		-	
Order example	907027/20	-	2	-	005	-	10	-	889	-	1	-	00	-	1	-	0	-	14

Stock versions

Order code	Part no.
907027/20-2-005-10-889-0-00-1-0-10	00556339
907027/21-2-005-10-889-0-00-1-0-10	00556653

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Accessories

Designation	**Part no.**
Humidity sensor check: 33 % rH, magnesium chloride	00332758
Humidity sensor check: 53% rH, magnesium nitrate	00332759
Humidity sensor check: 76% rH, sodium chloride	00332760
Stainless steel grid filter (standard)	00503576
PTFE filter	00503575
PUR extension cable (shielded); machine plug M12 x 1, 2 m	00503577
PUR extension cable (shielded); machine plug M12 x 1, 5 m	00503578
PUR extension cable (shielded); machine plug M12 x 1, 10 m	00503579
Single measuring probe (T), stainless steel housing	00504581
Combination measuring probe (rH+T), stainless steel housing, grid filter (standard)	00561059
Combination measuring probe (rH+T), stainless steel housing, PTFE filter	00550909
Reference set (with 2 probes (rH+T), fixed simultaneous values)	00504582
Duct installation kit "HA010209"	00515032
LC display, including metal housing cover	00504576