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JUMO

More than sensors + automation

Humidity

Innovative solutions for the most demanding standards

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Dear Reader,

As a leading manufacturer of measurement and control systems, JUMO also offers an extensive assortment of suitable measurement technology for air humidity and air quality for use with air conditioning technology and ventilations systems and in building automation. Different measuring probes are available depending on the application with both capacitive and hygrometric sensor technology, as well as hygrostats for use as simple switching devices. CO_2 measuring probes with proven infrared technology are used for measuring the concentration of carbon dioxide.

Sturdy, top-quality microprocessor-controlled measuring-probes are available for challenging industrial measurement tasks. They also allow for output of measurement variables such as absolute humidity, dew point temperature, mixing ratio, etc. Outstanding features include stable and reliable measurements, high measuring accuracy, retraceable measurement results and a variety of configuration options directly on the measuring probe.

Devices with intelligent interchangeable probes or intrinsically safe measuring probes for applications in Ex areas complete the product range.

We are also pleased to provide reliable after-sales service if requested for repair, maintenance calibration purposes. With JUMO as partner, customers are truly in the best hands for humidity measurements

Yours
Horst Damm

You can find detailed information about our products under the specified type/product group number at www.jumo.de.

Contents

Humidity measurements

Together with temperature, humidity is a very important process variable. For example, the relative air humidity of an environment has a major effect on our sense of well being and state of health.
In industrial processes, the right humidity level is often a determining factor in the competitiveness and quality of products. A correctly adjusted humidity level can also contribute to considerable savings in energy consumption.
The list of applications in which air humidity measurements are important could be continued indefinitely. Continuous monitoring of the air humidity is very important wherever chemical, physical or biological processes are caused or affected by the content of water vapor in the air.

Application: Air conditioning monitoring

Hygrotransducers, hygrothermal transducers and CO_2-measuring probes for air conditioning monitoring

Rod version
Type 907021/40

With over 8.3 million visitors, the „Musée du Louvre" is the most visited museum in the world

"JUMO ensures a good climate!"

The temperature and humidity of the room in the „Salle des Etats" at the Louvre in Paris, where Leonardo da Vinci's famous painting the „Mona Lisa" hangs, is monitored by JUMO sensors. A total of twelve hygrothermal transducers (rod version) are installed in the exhibit room. In every corner of the room at heights of two and four meters, type 907021/40-2-14-051 measuring probes are mounted. Four additional hygrothermal transducers are also mounted in the display case. This version was preferred because it is a small design type and has very fast response time as well as good accuracy. These combined measuring probes for humidity and temperature also feature outstanding long-term stability.

The standardized analog output signals for measurement variables relative air humidity and temperature, with 0 to 1 V each, were connected to a Control controller, which performs the air conditioning tasks for the entire room.

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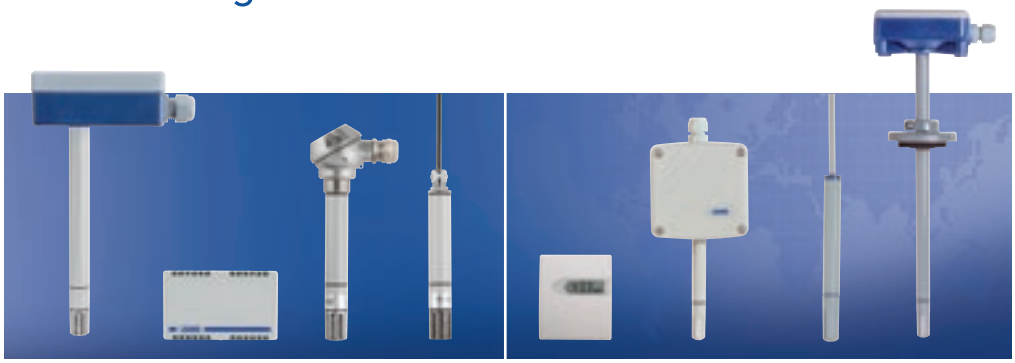
Capacitive measuring probes

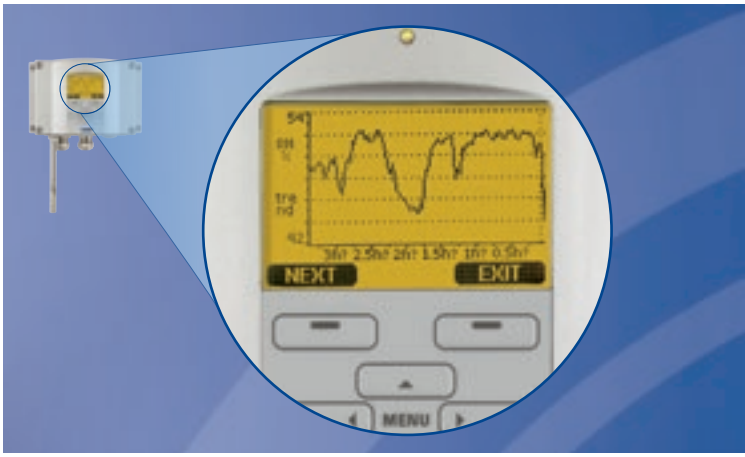
Capacitive measuring probes work according to the principle of absorption. This means the sensor constructed in the multilayer system functions essentially like a moisture-dependent condenser. The key point is that a special hygroscopic polymer layer makes it possible to store water molecules. The dielectric constant changes depending on how much moisture is stored, which in turn causes the capacitance to change. Then a downstream electronics unit generates a corresponding standardized electrical output signal.

The introduction of capacitive sensors for humidity measurements has opened up entirely new possibilities for both industrial and air conditioning applications. Some of the outstanding features of these devices include small sizes and fast response times. They are also largely impervious to normal dirt, dust and condensation. But above all it is the complete measurable range of humidity and wide temperature range as well as the mechanical and electronic additions that allow for such a wide range of applications.

Measuring probes for air conditioning measuring technology and building automation



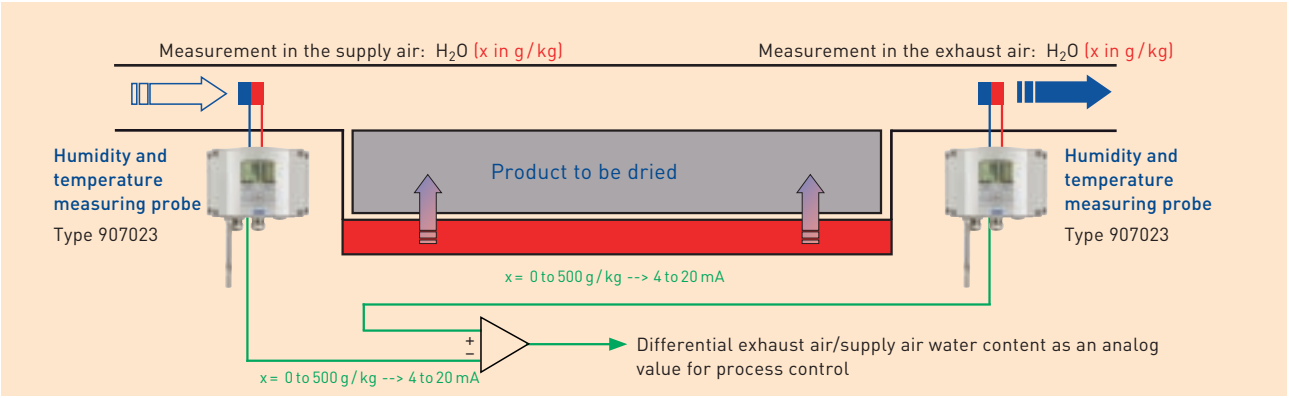
	Designation	**Hygrotransducer and hygrothermal transducer**	
	Type / data sheet	907020	907021
Application	**Version**	Indoor, duct and rod versions	Indoor, duct, wall and rod versions
Application	**Applications**	Ventilation and air conditioning technology	Building automation, storerooms, Air conditioning and ventilation control systems
Technical data	**Sensing element**	Capacitive (resistant to condensation, fast response)	
Technical data	**Process medium**	Air, unpressurized (not corrosive)	Air, unpressurized
Technical data	**Measuring range**	RH = 0 to 100 % rH T = – 40 to +80 °C (depending on the type)	
Technical data	**Outputs**	4 to 20 mA, 0 to 1 V, 0 to 10 V and Pt 100 (with T passive)	4 to 20 mA, 0 to 1 V, 0 to 5 V, 0 to 10 V and Pt 100 / Pt 1000 (with T passive)
Technical data	**Power supply**	24 V DC (standard), others depending on the version	
Technical data	**Protection type**	IP 20, indoor version, IP 64, duct and rod version	IP 20, indoor version, IP 65, wall, duct and rod version
Technical data	**Approvals**	GOST	
Technical data	**Special features**	Holders and replaceable filters optionally available as accessories	Protective covers for outside and replaceable filters- optionally available as accessories,additional sensor protection (coating) can be requested



Measuring probes for challenging industrial and clean room applications

	Designation	**Humidity and temperature measuring probe in a sturdy industrial version**	**Intrinsically safe industrial transducers for humidity, temperature and derived variables**	**Capacitive hygrothermal transducers with intelligent interchangeable probes**
	Type/data sheet	907023	907025	907027
Application	**Version**	Industrial version in wall design type with process-specific probes	Industrial version in wall design type (ATEX) with intelligent interchangeable probes	Air conditioning and lab version in wall design type with intelligent interchangeable probes
Application	**Applications**	Measurements in challenging industrial applications and under harsh operating conditions	Pharmaceutical, petrochemical, and food industries	Air conditioning measuring technology, pharmaceuticals, greenhouses, clean rooms, storerooms and cold stores
Technical data	**Sensing element**	Capacitive (resistant to condensation, fast response)		
Technical data	**Process medium**	Air, compressed air, vacuum		Air, unpressurized
Technical data	**Measuring ranges**	RH=0 to 100 % rH, T=–70 to +180 °C (depending on the type), optionally with: d+Tdf+a+x+Tw+ppm+pw+pws+h+dT	RH = 0 to 100 % rH, T = – 40 to +180 °C (depending on the type), optionally with: Td+a+x+Tw	RH = 0 to 100 % rH, T = – 40 to +80 °C
Technical data	**Outputs**	4 to 20 mA, 0 to 20 mA, (optionally 3 channels), 0 to 1 V, 0 to 5 V, 0 to 10 V	4 to 20 mA, (optionally 2 channels)	4 to 20 mA 0 to 1 V, 0 to 5 V, 0 to 10 V
Technical data	**Power supply**	10 to 35 V DC, 24 V AC, (optionally 100 to 240 V AC, also with connection cable)	24 V DC (via Ex"i" supply isolator or zener barrier)	24V DC (standard), others depending on the version
Technical data	**Protection type**	IP 65, wall version (metal case)		IP 65, wall version (metal case), IP 10 / IP 40, with cable entry in the rear
Technical data	**Approvals**	GOST	Ex II 1 G Eex ia IIC T4 Ga (ATEX) Ex II 1 D IP65 T=70 °C Da (with protective cover)	–
Technical data	**Special features**	Case with graphical LCD display and operator panel; 7 probes with various process connections and sensor cable 2, 5 or 10m long; serial interfaces, relays	Case with LCD display and operator panel; 5 probes with various process connections and cable length 2, 5 or 10 m; Ex approval	Case optionally with LCD display; adapter cables 2m, 5m or 10m long, duct installation kits as well as various replaceable filters are in stock and available immediately as accessories.

Application: "Industrial drying process"



Application – humidity measurement technology

Humidity measurements in the drying process

If a product needs to be dried, it is generally necessary to have continuous information regarding the water content (material humidity) of the product that is drying to control the drying process optimally. In actual applications, however, problems large and small often stand in the way of implementing this measurement task.

Example: Industrial drying process

A humidity transducer with integrated computing function for absolute humidity in g/kg (x = mixing ratio) is mounted in the supply air and in the exhaust air duct of a drying chamber. The difference between the two measured values is an indication of the amount of water discharged, which enables optimum control of the drying process.

Operating principle

The amount of water present in the air is determined in the supply air duct, through which the drying chamber is supplied with fresh air from outside. The same process is repeated in the exhaust air chamber.

If the material being dried is then heated in the chamber, it will not be able to absorb any more humidity from the outside. Instead it will give off the soluble moisture it contains into the environment by evaporation.

The moisture in the exhaust air therefore increases by the corresponding amount and will then be higher than the moisture content in the supply air. Since absolute humidity is expressed in g/kg, differences in temperature between the supply and exhaust air do not play a role. A controller with a differential input for standardized output signals in a downstream electronics unit can then take over active control tasks.

Benefits

- Compared to time-based control, this solution activates the heating process for just exactly as long as needed until there is a difference between the humidity of the supply and exhaust air. This saves heating costs, which can now be reduced to a necessary minimum!
- The solution with two measuring probes (measurement in the supply and exhaust duct) can also be easily used with many different types of drying materials.
- Time-consuming trial and error to determine process parameters, which are required with a single-point measurement, can also be eliminated.

CO_2 measuring probes

These devices from JUMO work according to the infrared principle (NDIR). The gas exchange with the CO_2 sensor takes place through a membrane by means of diffusion, i.e. the air circulates in a closed system and there is no contamination load in the optical measurement section. The patented autocalibration process also compensates the effects of aging, even without fresh air being introduced, thereby ensuring outstanding long-term stability.

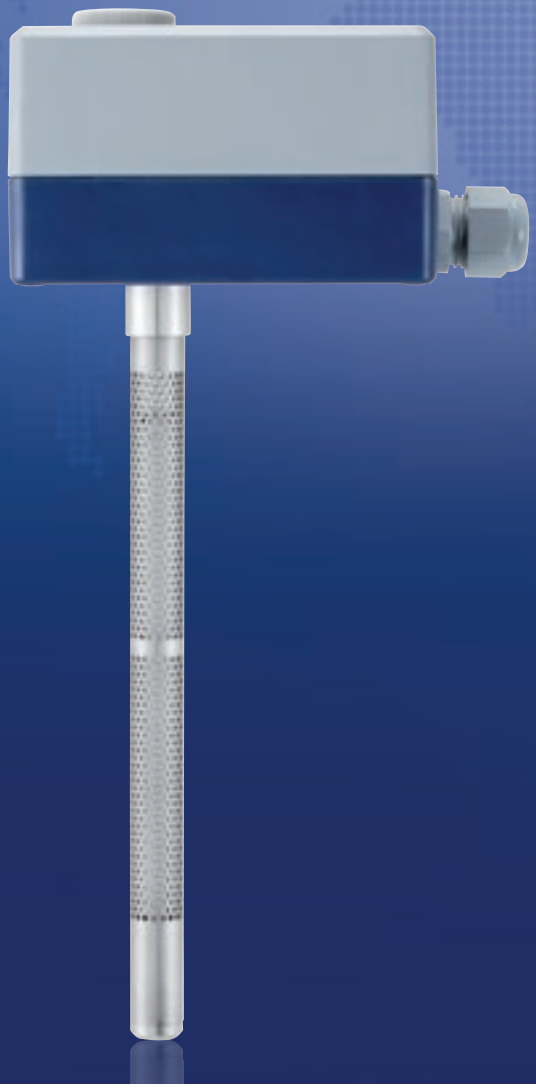
Our modern CO_2 measuring probes now make it possible to control air exchange precisely in rooms, open spaces, halls, etc.. As a result they ensure a healthy room climate and optimum physical comfort for the people in it. They also offer major potential for savings in energy, as required for example by EU standards and regulations such as the stricter Energy Conservation Regulation (EnEV) of 2009. Measuring ranges extend optionally through 0 to 2000 / 5000 / 10.000 ppm. Standardized analog outputs with 0 to 10 V or 4 to 20 mA are available as the measurement signal.

CO_2 measuring probes for determining air quality (concentration of carbon dioxide)

	Designation	**CO_2 measuring probe**
	Type/data sheet	907021
Application	**Version**	Indoor and duct version
Application	**Applications**	Building automation, storerooms, air conditioning and ventilation control systems
Technical data	**Sensing element**	NDIR method (non-dispersive infrared technology)
Technical data	**Process medium**	Air
Technical data	**Measuring range**	CO_2 = 0 to 2000 / 5000 / 10000 ppm, T = 0 to 50 °C (scaling active with analog output), RH = 0 to 100 %rH
Technical data	**Outputs**	4 to 20 mA, 0 to 10 V and Pt 100 / Pt1000 (with T passive)
Technical data	**Power supply**	24 V DC (standard), others depending on the version
Technical data	**Protection type**	IP 20, indoor version, IP 65, duct version
Technical data	**Ambient temperature**	– 20 to +60 °C, indoor and duct version, – 5 to +55 °C, indoor design with LCD display

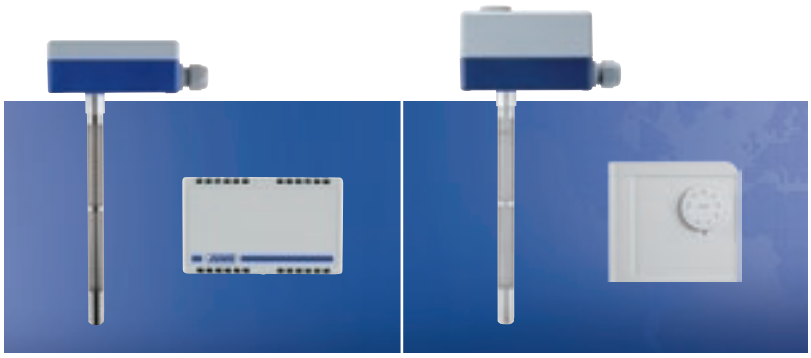
Hygrometric measuring probes and hygrostats

The special properties of hygroscopic fibers are used in hygrometric measuring probes to determine the relative air humidity. Due to a special preparation, the hair measuring element is capable of absorbing moisture. The change in length of this element is the externally measurable effect that is used to determine the prevailing air humidity.



Hygrometric humidity transducers are suitable for both air conditioning applications and humidity measurements for industrial applications. The main advantage they offer is the highly water resistant sensing element. Another advantage is zero voltage operation for device versions with a passive output or for hygrostats with a switching output.

Measuring probes for air conditioning measuring technology and ventilation systems



	Designation	**Hygrotransducers and hygrothermal transducers**	**Hygrostats**
	Type/data sheet	907031	907032
Application	**Version**	Indoor and duct version	
	Applications	Air conditioning and ventilation technology, greenhouses, curing chambers, fruits and vegetables (storage)	Humidifying and dehumidifying, storage, cold stores, greenhouses, control cabinets
Technical data	**Sensing element**	Hygrometric (water-resistant element)	
	Process medium	Air, unpressurized (not corrosive)	
	Measuring/ working range	RH = 0/30 to 100 % rH, T = – 40 to +80 °C	RH = 30 to 100 % rH
	Outputs	4 to 20 mA, 0 to 20 mA 0 to 10 V as well as various resistance outputs	Switching output, floating changeover contact max. 250 VAC / 15 A, depending on the version, also with double contact.
	Power supply	24 V DC (standard), not required with passive version	–
	Protection type	IP 20, indoor version, IP 64, duct version	
	Approvals	GOST	–
	Special features	Holders, sun and rain protection as well as filter pipes	

Services & Support

It is the quality of our products that is responsible for such a high level of customer satisfaction. But our reliable after-sales service and comprehensive support are also appreciated. Let us introduce you to the key services we provide around our innovative JUMO products. You can count on them – anytime, anywhere.

JUMO services & support – so that it all comes together!

Production Service

Are you looking for a competitive and efficient system or component supplier? Whether you seek metal technology, electronic modules or perfectly fitting sensors, whether small batches or mass production, – we will gladly be your partner. From development to production, we can provide all the stages from a single source. Our experts will work together closely with your company to find the optimum solution for your application, and will take on all the engineering. JUMO will then make the product for you. You will benefit from state-of-the-art production technologies, as well as our uncompromising quality assurance systems.

Customized Sensor Technology

- Development of temperature probes, pressure transmitters, conductivity sensors or pH and redox electrodes as per your requirements
- Numerous test and inspection systems
- Taking over qualification for the application
- Materials management
- Mechanical testing
- Thermal testing

Electronic modules

- Development
- Design
- Test concept
- Materials management
- Production
- Logistics and distribution
- After-sales service

Metal production

- Tool manufacture
- Stamping and forming systems
- Flexible sheet metal working
- Float production
- Welding, jointing, and assembly systems
- Surface engineering
- Material testing service

Information & Training

Would you like to improve your process quality, or optimize one of your company plants? Then take us up on our offer on the JUMO homepage and participate in the know-how of a globally respected manufacturer. Under the “Services & Support” menu item, for example, you will find a highly diverse range of seminars. Available under the keyword “eLearning” are videos on specific measurement and control system topics, and under “Literature”, you can find important information for beginners and practitioners. It goes without saying that you can also download the latest version of the JUMO software you require, as well as technical documentation for old and new products.

Product Service

For competent support right across our product portfolio, our customers have recourse at any time to the efficient sales network we maintain on all five continents. Whether you seek advice, a selection of products, engineering or making optimum use of our products, there is always a team of competent JUMO colleagues somewhere nearby, ready to answer your questions. You can count on us after commissioning, as well. You will get a fast response from our telephone support hotline. If an on-site fault has to be eliminated, our express repair service and our 24-hour spare part service are at your disposal. That is real security.

Maintenance & Calibration

Our maintenance service helps you to maintain optimum system and equipment availability. In this way you prevent failure and downtime. We will work out a far-sighted maintenance concept together with your company officers, and will willingly prepare all the requisite reports, documentation and protocols. Because we know how important precise measurement and control results are for your processes, we naturally also undertake the professional calibration of your JUMO instruments on site, at your company premises. We then record the result in a calibration certificate, as defined by EN 10204.

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