JUMO

MORE THAN SENSORS
AND AUTOMATION

Flow

Innovative solutions for the toughest requirements

Flow measurement

Flow measurement is an important measurement task in many industries, especially in those in which the quantity or velocity of liquids, gases, or steam must be determined. The JUMO product range offers the right measuring device for a variety of applications: from paddlewheel sensors to highly complex electromagnetic flowmeters and ultrasonic flowmeters.

Your path to the product

The following criteria should be considered during the planning phase when finding the suitable measuring device for an application:

- Flow area
- Nominal width
- Installation conditions
- Accuracy
- Pressure and temperature
- Pressure loss
- Material selection based on corrosion and abrasion resistance
- Measuring task

If several measuring principles are available, acquisition costs, user-friendliness, and maintenance costs can also play an important role in the selection. The exact definition of the application is decisive for the perfect choice. JUMO will then provide you with expert support in selecting the optimum measuring system.

The right measuring device for your application




	MAGNETIC-INDUCTIVE		PADDLEWHEEL	DIFFERENTIAL PRESSURE		ULTRASONIC
JUMO product	JUMO flowTRANS MAG I series	JUMO flowTRANS MAG H20 and OPTIFLUX series	JUMO flowTRANS PW I01	JUMO flowTRANS DP R series	JUMO flowTRANS DP P series	JUMO flowTRANS US series
Installation	Insertion	Inline	Insertion	Inline	Insertion	Inline
Accuracy	3.5 % of the measured value	0.5 % of the measured value	2.5 % of the measured value	0.5 % of the measured value*	1 % of the measured value*	1 % or 2 % of the measured value
Inlet and outlet sections	–	+	–	±	±	±
Costs	±	–	±	–	–	±
Maintenance requirements	±	+	–	±	±	+
Applications with conductive liquids	✓	✓	✓	✓	✓	✓
Applications with non-conductive liquids	×	×	✓	✓	✓	✓
Applications with gas or steam	×	×	×	✓	✓	×
Approvals	None	None	None	Ex	Ex	None

* = uncertainty of the primary element

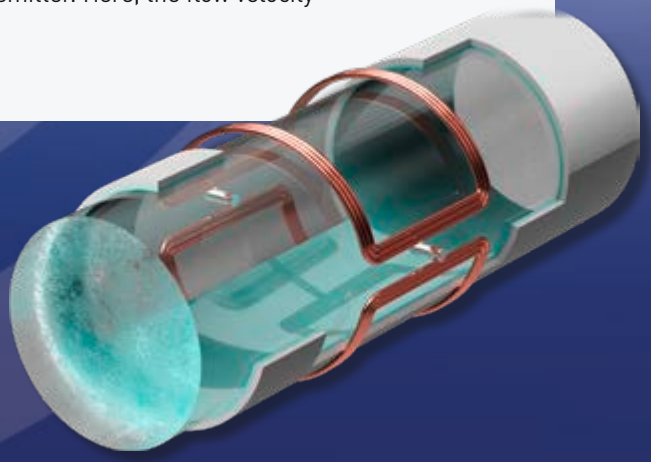
+ = low ± = medium – = high ✓ = suitable × = unsuitable

Electromagnetic flowmeters

JUMO offers electromagnetic flowmeters especially for flow measurements in liquids with an electrical conductivity greater than 5 µS/cm. The devices in the JUMO flowTRANS MAG series were designed for the process industry. They are used in various liquid media with different features (e.g. for viscosity, concentration, and density). Examples of these media include water, drinking water, wastewater, pastes, acids, solvents, sludge, fruit juices, and puree.

The measuring principle

The Faraday laws of induction provide the basis for the electromagnetic flow measurement. If a conductor or conductive liquid moves through a magnetic field, electrical voltage is induced. The induced voltage is guided through 2 opposite measuring electrodes to a transmitter. Here, the flow velocity is proportional to the induced voltage.



Electromagnetic flowmeters

JUMO flowTRANS MAG I series

Product name	JUMO flowTRANS MAG I01	JUMO flowTRANS MAG I02
Designation	Electromagnetic flowmeter for liquids	
Type	406010	406011
Type of installation	Insertion	
Nominal width	DN 15 to DN 400	
Nominal pressure	Up to PN 16	
Measuring accuracy	⩽ ±3.5 % of the measured value (standard calibration factor) ⩽ ±0.5 % of the measured value (Teach-In)	
Measuring range	0.2 to 10 m/s	
Materials in contact with the medium	Stainless steel 316L (1.4404); FKM or EPDM; PEEK	
Minimum conductivity	20 µS/cm	
Maximum medium temperature	150 °C	110 °C
Input and output	4 to 20 mA (three-wire); frequency; relay	4 to 20 mA (three-wire); frequency; 2 × relay; digital input
Protection type	IP65	
Voltage supply	DC 18 to 36 V	
Special feature	–	With display
Accessories	T-fittings made of PVC or stainless steel; PE or stainless steel welded socket; PP connection clamps (type 406090)	

Electromagnetic flowmeters

JUMO flowTRANS MAG H20

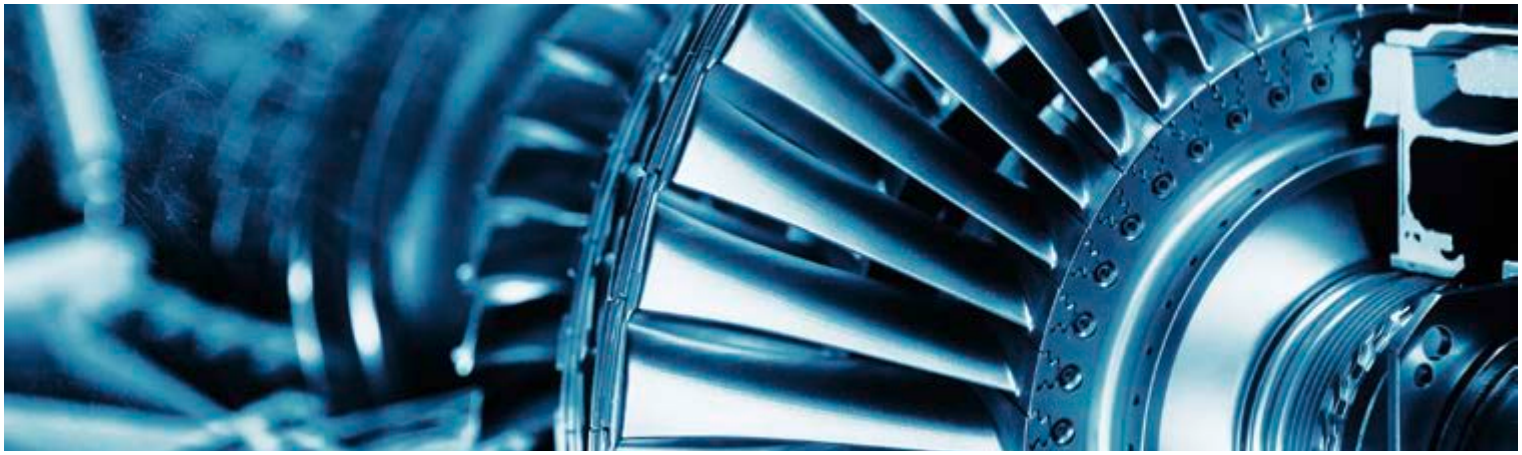
Product name	**JUMO flowTRANS MAG H20**
Designation	Electromagnetic flowmeters
Type	406065
Type of installation	Inline
Nominal width	DN 06 to DN 25
Nominal pressure	PN 16
Measuring accuracy	0.5 % of the measured value
Process connection	G-type external thread and Tri-Clamp DIN 32676
Materials in contact with the medium	Stainless steel, glass fiber PEEK; carbon fiber; EPDM
Maximum medium temperature	Up to 90 °C
Input and output	SPE with PoDL (Modbus TCP, JUMO Cloud gateway); IO-Link (config.: 4 to 20 mA/0 to 10 V, pulse, digital input/output)
Protection type	IP65/IP67
Voltage supply	DC 18 to 30 V, PELV

Electromagnetic flowmeters

OPTIFLUX series



Product name	**OPTIFLUX 1000 and IFC 050**	**OPTIFLUX 2000 and IFC 050**	**OPTIFLUX 6000 and IFC 100**
Designation	Electromagnetic flowmeters		
Type	406062, 406068	406063, 406068	406064, 406069
Type of installation	Sandwich, (compact/remote mount)	Flange, (compact/remote mount)	Variable process connection also available with stainless steel transmitter, (compact/ remote mount)
Nominal width	DN 10 to DN 150	DN 25 to DN 300	DN 2.5 to DN 150
Nominal pressure	Up to PN 40, (max. operating pressure 16 bar)	Up to PN 40	Up to PN 40
Measuring accuracy	0.5 % of the measured value	0.5 % of the measured value	0.3 % of the measured value
Measuring range	Up to 190 m3/h	Up to 3050 m3/h	Up to 190 m3/h
Materials in contact with the medium	Lining: PFA Electrodes: HAST. C	Lining: PP, HR; electrodes: HAST.C, stainless steel, titanium	Lining: PFA; electrodes: HAST.C, stainless steel, titanium
Minimum conductivity	5 µS/cm, (20 µS/cm for water)	5 µS/cm, (20 µS/cm for water)	1 µS/cm, (20 µS/cm for water)
Maximum medium temperature	120 °C	80 °C, (90 °C for PP)	120 °C, (140 °C remote mount)
Input and output	4 to 20 mA/HART® + pulse/frequency/status		4 to 20 mA/HART® + pulse/ frequency + status
Protection type	IP66/IP67	IP66/IP67, (IP68 available as an optional extra for remote mount)	IP66/IP67
Voltage supply	100 to 230 VAC, 50/60 Hz; 24 VDC	100 to 230 VAC, 50/60 Hz; 24 VDC	100 to 230 VAC, 50/60 Hz; 24 VDC
Certificate	–	–	EHEDG, 3A

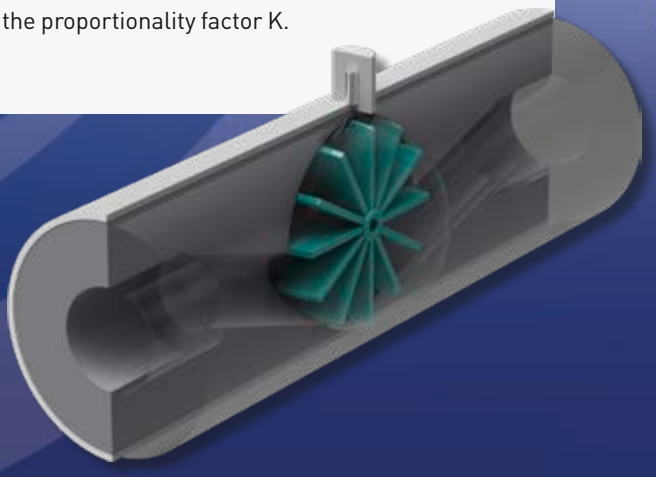


Paddlewheel flowmeters

A simple flow measurement in liquids can be carried out with the JUMO flowTRANS MAG PW I01 paddlewheel flowmeter. This device consists of a sensor and a paddlewheel. Paddlewheel technology allows flows in a wide variety of liquids to be measured and monitored. The measuring device can be used universally in many applications and is ideally suited for installation in confined spaces.

The measuring principle

Paddlewheel technology is based on a contactless transfer of the rotary motion into a frequency signal. The flowing liquid sets the paddlewheel in motion. Permanent magnets used in the paddlewheel, which are not in contact with the medium, generate a frequency signal which is proportional to the flow velocity of the liquid. Conversion of the flow velocity into a flow signal is defined by the proportionality factor K.



Paddlewheel flowmeters

JUMO flowTRANS MAG PW I01

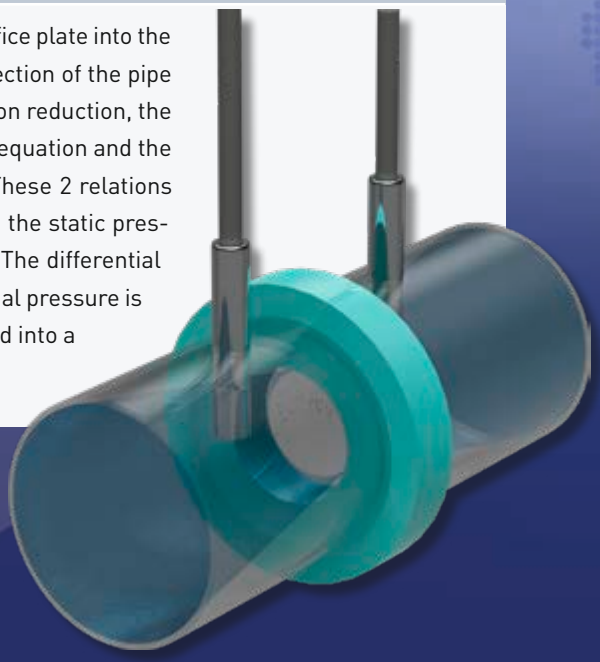
Product name	**JUMO flowTRANS MAG I01**
Designation	Paddlewheel flowmeter for liquids
Type	406020
Nominal width	DN 20 to DN 400
Nominal pressure	Up to PN 10
Measuring accuracy	≤ ±2.5 % of the measured value (standard calibration factor) ≤ ±1 % of the measured value (Teach-In)
Measuring range	0.3 to 10 m/s
Materials in contact with the medium	PVDF, ceramic, FKM, or EPDM
Maximum medium temperature	80 °C
Input and output	Frequency (three-wire)
Protection type	IP65
Voltage supply	DC 12 to 36 V
Accessories	T-fittings made of PVC or stainless steel; PE or stainless steel welded socket; PP connection clamps (type 406090)

Flowmeters according to the differential pressure principle

Flow measurement according to the differential pressure principle is used especially in gases and steam, but also in all liquids. For this purpose JUMO offers devices from the JUMO flowTRANS DP P and JUMO flowTRANS DP R series, which are based on differential pressure measurement. You can measure the flow using either a pitot tube or orifice plate. The generated differential pressure is acquired with the JUMO dTRANS p02 or JUMO dTRANS p20 DELTA differential pressure transmitter and converted into a proportional flow signal.

The measuring principle

The differential pressure method involves the installation of an orifice plate into the pipe as a measuring insert. The orifice plate reduces the cross section of the pipe and causes a pipe flow constriction. As a result of the cross-section reduction, the flow velocity of the medium increases according to the continuity equation and the static pressure decreases according to the Bernoulli equation. These 2 relations can be related to the volume flow. To determine the volume flow, the static pressure is measured immediately before and after the orifice plate. The differential pressure is calculated from these values. The generated differential pressure is measured with the differential pressure transmitter and converted into a proportional flow signal.



Flowmeters according to the differential pressure principle

JUMO flowTRANS DP P and JUMO flowTRANS DP R

Product name	JUMO flowTRANS DP P01/P02/P03/P04	JUMO flowTRANS DP R01/R02
Designation	Pitot tube	Orifice plate
Type	409601	409602
Nominal width	DN 25 to DN 2000	DN 10 to DN 1000
Nominal pressure	Up to PN 100	Up to PN 400
Measuring accuracy	1 % of the measured value*	0.5 % of the measured value*
Process connection	Ring nut screw connection, flange	Flange according to DIN or ASME
Installation	Insertion	Inline
Product variant	Dynamic pressure pipe	Orifice plate
Materials in contact with the medium	Stainless steel 1.4571 (more upon request)	Stainless steel 1.4404 (more upon request)
Maximum medium temperature	Up to 1175 °C	Up to 450 °C

** Refers to the uncertainty of the pitot tube or orifice plate. For the accuracy of the measuring point, the uncertainty of the differential pressure transmitter must be taken into account.*

Differential pressure transmitter for the primary elements

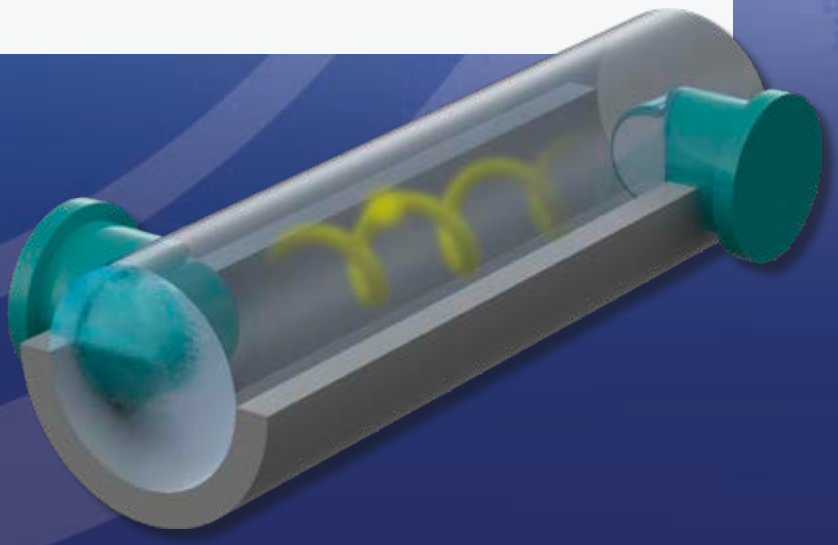
Product name	JUMO dTRANS p20 DELTA	JUMO SIRAS P21 DP
Designation	Differential pressure transmitter	Process pressure transmitter
Type	403022	403024
Measuring ranges	10 mbar; 1 bar; 6 bar; 100 bar	1 bar; 6 bar; 100 bar
Linearity	≥ ±0.07 % of the measuring range end	0.05 %
Nominal pressure	PN 02 (for 10 mbar); PN 210 (not for 10 mbar); optionally PN 420 (not for 10 mbar)	PN 210
Medium temperature	Up to 110 °C	-40 to +85 °C
Output	4 to 20 mA, two-wire; HART®	
Approval	Ex; SIL	SIL

Ultrasonic flowmeters

Absolut wear and maintenance-free ultrasonic technology allows the flowmeters to measure with high precision and independent of the conductivity. The metal-free housing and the plastic pipe in various nominal sizes allow the measuring devices to be used in a flexible manner – even when dealing with corrosive media. In addition, the flowmeters can be expanded with temperature and pressure sensors. The JUMO flowTRANS US W02 can be integrated into sensor networks via JUMO digiLine or IO-Link interface. Configuration is convenient via Bluetooth and app.

The measuring principle

Ultrasonic flowmeters measure the velocity of a flowing medium using acoustic waves. Here, the time is measured against and with the flow direction. The difference between the 2 times is proportional to the speed of the flowing medium.



Ultrasonic flowmeters

JUMO flowTRANS US series

		
Product name	**JUMO flowTRANS US W01**	**JUMO flowTRANS US W02**
Designation	Ultrasonic flowmeter for liquids	Ultrasonic flowmeter
Type	406050	406051
Type of installation	Inline	
Nominal width	DN 15 to DN 32	
Nominal pressure	PN 16	
Measuring accuracy	2 % of the measured value	1 % of the measured value
Measuring range	0.6 to 520 l/min	
Measuring dynamics	1:100 (0.1 m/s to 10 m/s)	
Process connection	G-type external thread with integrated seal	
Materials in contact with the medium	PPSU, PEEK, EPDM (FKM)	
Maximum medium temperature	Up to 80 °C (up to 95 °C with lower accuracy)	
Maximum ambient temperature	Up to 70 °C	Up to 60 °C
Display	Status LED	TFT display
Input and output	Digital output (up to 10 kHz); analog output (4 to 20 mA, optionally 0 to 10 V)	Digital input; digital output (up to 10 kHz); analog output (4 to 20 mA/0 to 10 V)
Communication	–	IO-Link; Bluetooth
Protection type	IP65/IP67	
Voltage supply	DC 18 to 30 V, SELV/PELV	
Additional measurands	–	Temperature; pressure (optional)
Special features	Metal-free plastic housing	Configuration via: JUMO smartCONNECT app (Bluetooth) and IODD (IO-Link)

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 valued. Let us introduce you to the key services we provide for our innovative JUMO products. You can count on them – anytime, anywhere.

JUMO Services & Support – so that it all comes together!

Manufacturing Service

Are you looking for a competitive and efficient system or component supplier? Regardless of whether you seek electronic modules or perfectly fitting sensors – either for small batches or mass production – we are happy to be your partner. From development to production we can provide all the stages from a single source. In close cooperation with your business our experienced experts search for the optimum solution for your application and incorporate all engineering tasks. Then JUMO manufactures the product for you.
As a result you profit from state-of-the-art manufacturing technologies and our uncompromising quality management systems.

Customer-specific sensor technology

- Development of temperature probes, pressure transmitters, conductivity sensors, or pH and redox electrodes according to your requirements
- A large number of testing facilities
- Incorporation of the qualifications into application
- Material management
- Mechanical testing
- Thermal test

Electronic modules

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

Metal technology

- Toolmaking
- Punching and forming technology
- Flexible sheet metal machining
- Production of floats
- Welding, jointing, and assembly technology
- Surface treatment technology
- Quality management for materials

Information & Training

Would you like to increase the process quality in your company or optimize a plant? Then use the offers available on the JUMO website and benefit from the know-how of a globally respected manufacturer. For example, under the menu item "Services and Support" you will find a broad range of seminars. Videos are available under the keyword "E-Learning" about topics specific to measurement and control technology. Under "Literature" you can learn valuable tips for beginners and professionals. And, of course, you can also download the current version of any JUMO software or technical documentation for both newer and older products.

Product Service

We have an efficient distribution network on all continents available to all of our customers so that we can offer professional support for everything concerning our product portfolio. Our team of professional JUMO employees is near you ready to help with consultations, product selection, engineering, or optimum use of our products. Even after our devices are commissioned you can count on us. Our telephone support line is available to give you answers quickly. If a malfunction needs to be repaired on site our Express Repair Service and our 24-hour replacement part service are available to you. That provides peace of mind.

Maintenance & Calibration

Our maintenance service helps you to maintain optimum availability of your devices and plants. This prevents malfunctions and downtime. Together with the responsible parties at your company we develop a future-oriented maintenance concept and are happy to create all required reports, documentation, and protocols. Because we know how important precise measurement and control results are for your processes we naturally also professionally calibrate your JUMO devices – on site at your company or in our accredited DAkkS calibration laboratory for temperature. We record the results for you in a calibration certificate according to EN 10 204.

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