More than sensors + automation

# JUMO flowTRANS MAG Series

Electromagnetic flowmeters for the process industry and for hygienic applications

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# Dear Reader,

Until now, JUMO has relied on differential pressure measuring devices when it comes to flow measurement. JUMO is meeting customer requests with the expansion of the product range to include the new electromagnetic flowmeters from the flowTRANS MAG series. After all, with a market share of around 25 percent, magnetic-inductive flow measurement is one of the most widely used methods of measuring around the world.

The electromagnetic flowmeters from JUMO are available in two versions: JUMO flowTRANS MAG H for hygienic applications and JUMO flowTRANS MAG S for all other applications. The devices in the JUMO flowTRANS MAG series are generally wear and maintenance free, which is why they are suitable for a variety of application areas. They can measure the flow of acids, lyes, liquid food, water, wastewater, and many other liquids.

The most common application areas for the JUMO flowTRANS MAG S are in the water, wastewater, and chemical industries. The free cross section of the devices allow for easy cleaning in production plants.

JUMO flow TRANS MAG H is the first choice in the food and pharmaceutical industry. The sensor in this version features a corresponding lining that is compliant with the standards required in the food and pharmaceutical industry.

Furthermore, a distinction is made in the devices between basic functionalities and expanded functions/options. The JUMO flowTRANS MAG H02, for example, covers smaller nominal widths, provides greater basic accuracy, and includes more advanced software for diagnosis and batches compared to the JUMO flowTRANS MAG H01.

On the whole, the features included with electromagnetic flowmeters can be selected with regard to the lining materials and other materials coming into contact with the medium. This means that even applications with abrasive and corrosive components can be covered (e.g. in pulp or black liquor for paper production). Provided that the process and environmental influences are moderate, the magnetic inductive flow sensors are only limited by the fact that the medium must have a certain conductivity. The devices measure very precisely and do not cause a loss in pressure.

This brochure provides an overview of the wide range of features available in the JUMO flowTRANS MAG series. In addition, we would be happy to work with you to attain solutions that are tailored to your specific requirements. We look forward to hearing from you.

PS: Detailed information about our products can be found using the given type/product group number at www.jumo.net.

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# JUMO flowTRANS MAG series

JUMO also 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 and for hygienic applications. They are used in various liquid media with a wide range of features such as viscosity, concentration, and density. Examples of these media include water, drinking water, wastewater, pastes, acids, solvents, sludge, fruit juices, and puree.

They are particularly flexible. JUMO supplies them with a large variety of nominal widths, measuring tube linings, and process connections. The JUMO flowTRANS MAG series distinguishes itself with a high excitation frequency of the sensor and therefore has a fast response time. High measuring accuracy is also possible under the most difficult process conditions thanks to the modern filtering methods that separate the measuring signal from disturbances.

# Added value for your industry

Our wide range of different device versions provides reliable process solutions for an array of industries including water, wastewater, as well as food and pharmaceutical. In addition to the standard devices, JUMO offers individual customer-specific versions for special applications. The magnetic-inductive measurement method distinguishes itself through a free pipe cross section and therefore a negligible loss of pressure in the pipe. In addition, these devices only require little maintenance.

# JUMO flowTRANS MAG S

## Electromagnetic flowmeters for the process industry

### Technical data

| Designation | JUMO flowTRANS MAG S01/02 |
|---|---|
| Data sheet | Sensor:<br>406012, 406013<br>Transmitter:<br>406018, 406019 |
| Nominal width | DN3 to DN2000 |
| Nominal pressure | PN6 to PN100 |
| Measuring accuracy | 0.3 % (optional: 0.2 %) of the measured value |
| Process connection | Flange according to DIN, ASME, JIS |
| Lining material | PTFE; hard rubber; soft rubber; PFA; ETFE; ceramic carbide (more upon request) |
| Measuring electrode material | Stainless steel: 1.4539, 1.4571; HASTELLOY® C-4; titanium; tantalum; platinum-iridium; tungsten-carbide; double layer |
| Maximum medium temperature | 180 °C |
| Input/output | Analog output 4 to 20 mA; HART®; digital input; digital output |
| Communication | HART® (standard); PROFIBUS PA; FOUNDATION Fieldbus |
| Protection type | IP65; IP67 (NEMA 4X); IP68 |
| Voltage supply | AC 100 to 230 V; AC/DC 24 V |
| Special feature | SIL 2 |

# JUMO flowTRANS MAG S

Electromagnetic flowmeters for the process industry

## Brief description

JUMO flowTRANS MAG S is a robust, reliable, and user-friendly flowmeter based on the magnetic-inductive measuring principle – predestined for applications in the process industry. The device has different nominal widths, measuring electrode materials, and lining materials. As a result, a large variety of conductive liquids – ranging from process water to the chemical and paper industries – in which the devices have to deal with aggressive media, pastes, and sludges can be measured. The result is always the same – an application that ensures process reliability and long-term stability. The modular design of the sensor and transmitter reduces storage costs and assures a high degree of availability. The intelligent module design of the transmitter slot enables simple dismantling without unscrewing cables or removing connectors. Modern diagnostic functions monitor the functional capacity of the JUMO flowTRANS MAG S and the procedural process. Critical states can therefore be detected at an early stage and countermeasures can be taken. Status messages are classified in accordance with the demands of NAMUR NE 107.

## Your benefits in a nutshell:

- Applicable to corrosive or abrasive liquids and for sludge
- Suitable for a variety of processes thanks to a wide range of nominal widths, lining materials, and measuring electrode materials
- Wear and maintenance free
- High degree of process reliability due to great measuring accuracy and short response times
- Modular design: available either as a compact device or with a remote transmitter
- Universal transmitter electronics with self-monitoring and minimal energy consumption
- Robust, reliable, and easy to operate
- Simple and quick startup

## The JUMO flowTRANS MAG S01/02 versions in comparison

Apart from the standard version of the JUMO flowTRANS MAG S01, another series – S02 – is also available with additional functionalities and features.

The table below contains a precise comparison of the features.

| | JUMO flowTRANS MAG S01 | JUMO flowTRANS MAG S02 |
|---|---|---|
| **Measuring accuracy** | | |
| • 0.4 % (optional: 0.2 %) of the measured value | ✔ | – |
| • 0.3 % (optional: 0.2 %) of the measured value | – | ✔ |
| **Batch functions** | | |
| • Preselection counter<br>• After-flow quantity correction<br>• External start/stop function<br>• Batch limit contact | – | ✔ |
| **Diagnostics functions** | | |
| • Gas bubble detection<br>• Electrode deposit detector<br>• Conductivity monitoring<br>• Temperature monitoring<br>• Fingerprint<br>• Trend | – | ✔ |
| **Hardware options** | | |
| • Versions for extremely abrasive media (ceramic-carbide lining, tungsten-carbide measuring electrodes, double-layer measuring electrodes) | – | ✔ |
| **Startup functions** | | |
| • Grounding check | – | ✔ |

## JUMO flowTRANS MAG S – for applications in explosion protection

The significance of and need for explosion protection in sensor technology is constantly increasing. Explosion hazards need to be considered in the chemical, petrochemical, oil, and gas industries as well as in a variety of additional applications. The electromagnetic flowmeters in the JUMO flowTRANS MAG S series have explosion protection approval according to ATEX/IECEx. The devices in the series are available both as compact and remote versions. They are therefore suitable for all applications. The approval includes gas and dust explosion protection for zone 1, zone 2, and zone 21. The overview below outlines the product portfolio.

| | Compact device | External transmitter | Controller module |
|---|---|---|---|
| Standard (without Ex) |  |  |  |
| Zone 2 |  |  | |
| Zone 1 |  |  | |

*Versions for the various Ex zones*

# Measurement technology for the harshest conditions

Geothermal energy counts as renewable energy and is defined as thermal energy stored below the surface of the earth. This so-called geothermal energy is a source of energy for heat production that is constantly available. A distinction is fundamentally made between near-surface (up to 400 m) and deep geothermal energy (greater than 400 m up to several thousand meters). In Central Europe, the average temperature increases by about 3 degrees Celsius per every 100 m of depth. As of a depth of 10 m below the surface of the earth, the temperature remains practically constant throughout the entire year.
The first work step in using geothermal energy is to drill a hole using a mobile drilling unit. The geothermal probe is then installed in the drilled hole. After that the hollow space is compactly filled, which thereby ensures the thermal transfer of the probe. Brine is almost always used as the heat transfer medium. It is a mixture of water and antifreeze fluid. This mixture is continuously pumped through the probe into the deep. There it heats up and is transported back to the surface of the earth.

# Application example:
## Flow measurement in liquid concrete

**The company BTD Bohrtechnik AG operates in the field of special civil engineering and in the geothermal sector. Its core expertise lies in manufacturing and developing drilling machines, drilling tools, and backfilling materials. Liquid concrete is used for this technology to strip the drill holes. A reliable flow measurement is absolutely required here to achieve optimum results. That is why BTD Bohrtechnik AG uses electromagnetic flowmeters from JUMO.**

The JUMO flowTRANS MAG S01 electromagnetic flowmeter is used in this application to determine the exact volume flow of the liquid concrete. This is aligned with the calculated and previously planned volume. As a result, process information with respect to possible air pockets can be evaluated. Robust electromagnetic flowmeters often present the only option for these applications to ensure the flow quantity in abrasive and solid-laden liquids with the required measuring performance.


For many years the magnetic-inductive measurement method has been tried and tested in mining industry applications for quantity measurement. One major advantage of this measurement method is the free pipe cross section of the sensor. This means that no additional pressure losses occur and that the measuring pipe can be cleaned very easily. Special materials need to be selected for the pipe coating and the measuring electrodes due to the highly abrasive features of the medium that is to be measured. These materials are the perfect answer to the raw process conditions. This means that service lives can be extended compared to standard coatings and that long-term stability is ensured in the process.

At BTD Bohrtechnik AG, JUMO technology is also used in further process steps such as the final pressure check that is part of the system's leakage test. As the water needs to have a specific temperature in this test, the temperature is controlled using push-in RTD temperature probes. A JUMO paperless recorder is used for acquiring and evaluating data for these process parameters.

*Our engineers and technicians develop customized solutions that are strictly based on your specific requirements. We view complex tasks as challenges that allow us to develop tailored solutions for you and at the same time improve our product portfolio.*

# JUMO flowTRANS MAG H

## Electromagnetic flowmeters for hygienic applications

### Technical data

| Designation | JUMO flowTRANS MAG H01/02 |
|---|---|
| Data sheet | Sensor:<br>406015, 406016<br>Transmitter:<br>406018, 406019 |
| Nominal width | DN1 to DN100 |
| Nominal pressure | PN16, PN40 |
| Measuring accuracy | 0.3 % (optional: 0.2 %) of the measured value |
| Process connection | Screw connection according to DIN; welded socket according to DIN, ISO; Tri-Clamp according to DIN, ASME BPE; connection flange; flange according to DIN, ASME, JIS; 1/8" sanitary connection; external thread according to ISO/DIN |
| Process connection material | Stainless steel with seal (EPDM, silicone) and mounting; without process connection; PVC and POM (with 1/8" sanitary connection) |
| Lining material | PFA (vacuum proof); PEEK (for DN1 to DN2) |
| Measuring electrode material | Stainless steel 1.4539, 1.4571; HASTELLOY® C-4; tantalum; titanium; platinum-iridium (more upon request) |
| Maximum medium temperature | 180 °C |
| Input/output | Analog output 4 to 20 mA; HART®; digital input; digital output |
| Communication | HART® (standard); PROFIBUS PA; FOUNDATION Fieldbus |
| Protection type | IP65; IP67 (NEMA 4X); IP68 |
| Voltage supply | AC 100 to 230 V; AC/DC 24 V |
| Special feature | FDA compliant; SIL 2 |

# JUMO flowTRANS MAG H

Electromagnetic flowmeters for hygienic applications

## Brief description

JUMO flowTRANS MAG H is a robust, reliable, and user-friendly flowmeter based on the magnetic-inductive measuring principle – predestined for hygienic applications in the food and pharmaceutical industry. The device has different nominal widths, measuring electrode materials, and process connections. The JUMO flowTRANS MAG H with nominal widths from DN1 to DN100 – manufactured from FDA-compliant materials – was especially developed for hygienic applications. The dimensionally stable and vacuum-proof PFA lining material therefore also fulfills the industry's hygienic requirements and is suitable for high-temperature applications. The devices in the series are therefore perfectly suited for CIP and SIP cleaning. The sensor does not have any moving parts so that it has low maintenance and is piggable. The hygienic design is rounded off with a stainless steel sensor. Other than the requirements concerning the hygienic design, the series also meets the user's demands for maximum flexibility during the initial startup thanks to a variable connection concept and a screwable adapter.

## Your benefits in a nutshell:

- Meets the highest requirements of the food and pharmaceutical industry
- CIP/SIP cleanability
- Flexible and easy mounting due to a variable connection concept with standardized sensor
- Low maintenance and repair costs
- High degree of process reliability due to great measuring accuracy and short response times
- Improved plant availability through modern diagnostic function
- Simplified spare parts inventory, reduced storage costs
- Robust, reliable, and easy to operate
- Simple and quick startup

## The JUMO flowTRANS MAG H01/02 versions in comparison

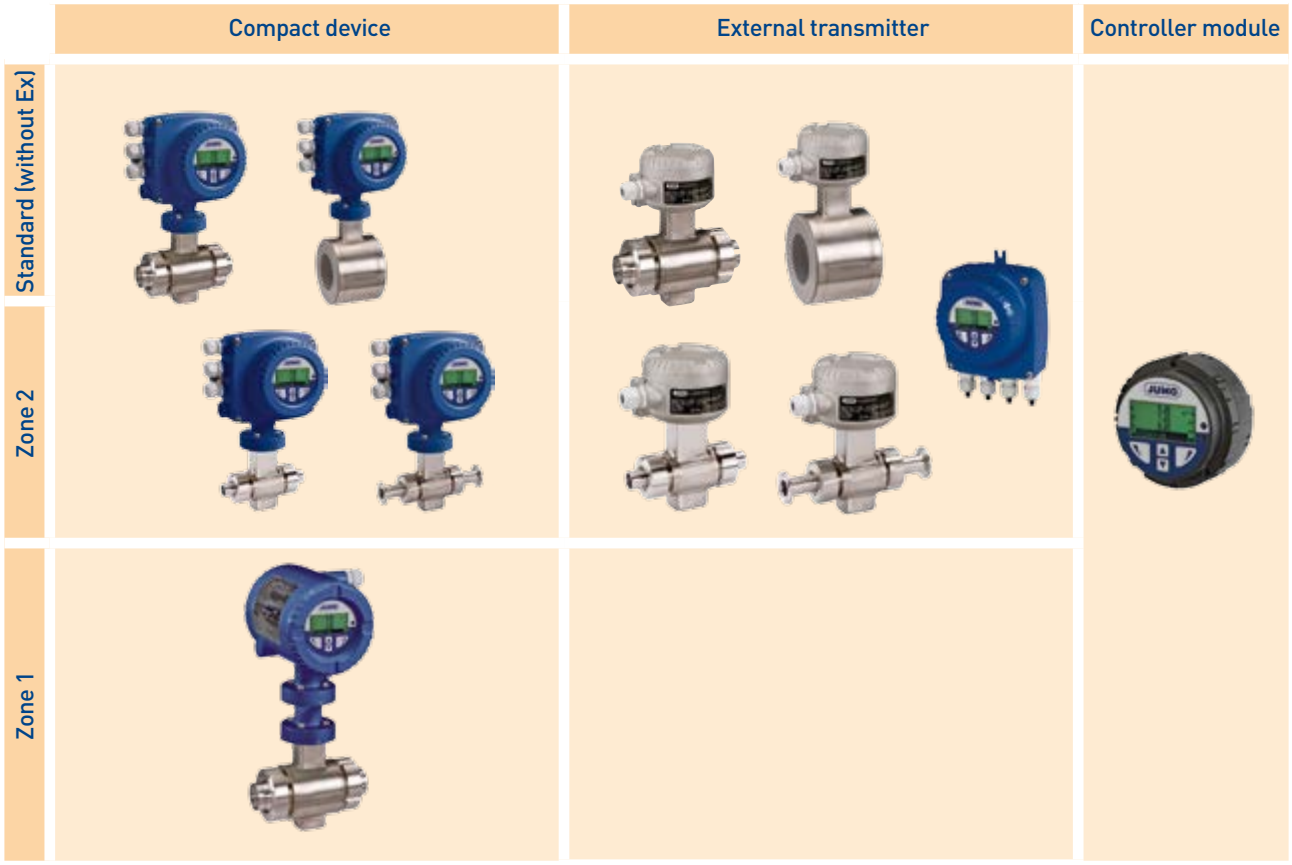
Apart from the standard version of the JUMO flowTRANS MAG H01, another series – H02 – is also available with additional functionalities and features.

The table below contains a precise comparison of the features.

| | JUMO flowTRANS MAG H01 | JUMO flowTRANS MAG H02 |
|---|---|---|
| **Measuring accuracy** | | |
| • 0.4 % (optional: 0.2 %) of the measured value | ✔ | – |
| • 0.3 % (optional: 0.2 %) of the measured value | – | ✔ |
| • 0.7 % of the measured value (for DN1 to DN2) | – | ✔ |
| **Batch functions** | | |
| • Preselection counter<br>• After-flow quantity correction<br>• External start/stop function<br>• Batch limit contact | – | ✔ |
| **Diagnostics functions** | | |
| • Gas bubble detection<br>• Electrode deposit detector<br>• Conductivity monitoring<br>• Temperature monitoring<br>• Fingerprint<br>• Trend | – | ✔ |
| **Hardware options** | | |
| • DN1 to DN2 | – | ✔ |
| **Startup functions** | | |
| • Grounding check | – | ✔ |

## JUMO flowTRANS MAG H – for applications in explosion protection

Due to possible dust explosions that could occur when processing products containing dust, various protective measures must be taken when designing new process plants in the food and pharmaceutical industry. These include the installation of explosion-proof sensors. The devices in the JUMO flowTRANS MAG H series can therefore also be used in the potentially explosive areas. They can be used in both zone 2 and zone 1. They are available in either a compact or a remote mount design type, depending on the application. The devices feature standardized transmitter electronics as a result of which the user can reduce storage costs. The overview below outlines the product portfolio.




*Versions for the various Ex zones*

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