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# JUMO flowTRANS US W01

## Ultrasonic flowmeter for liquids

### Applications

- Reverse osmosis
- Desalination of seawater
- Wash water recovery
- Waste water (galvanic, surface treatment)
- Cooling towers



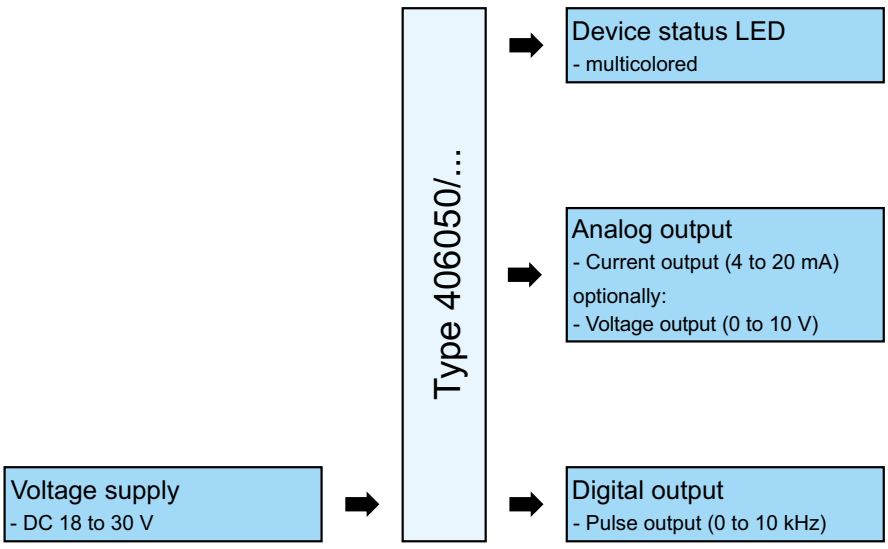
**Type 406050/...**

### Brief description

The ultrasonic flow meter measures the volume flow of conductive and non-conductive media. The volume flows can be output in analogue as a current signal (4 to 20 mA) and digitally as a pulse signal (0 to 10 kHz).

The inline device is available in nominal widths DN 15 to DN 32 and can be installed horizontally or vertically in existing plastic or metal pipes using installation accessories. Another mounting set enables the flow-optimized transition of the nominal width DN 15 to DN 10 (low-flow calibration).

### Block diagram




### Special features

- Easy installation
- Corrosion-resistant
- Low-wear
- Easy to clean

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# Technical data

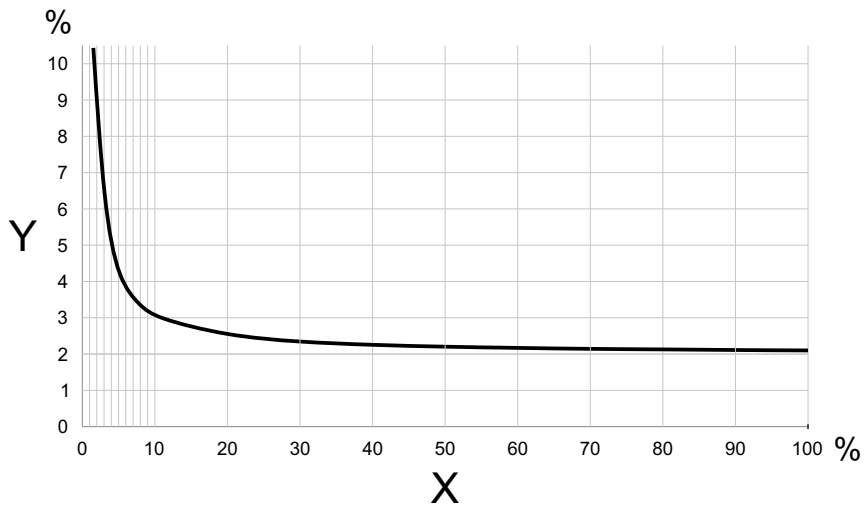
## Input

### Measuring range and accuracy

| **Nominal width** | **Default settings for analog output**[a, b] | **Flow$_{max}$**[a] |
|---|---|---|
| DN 15 (Low-flow calibration) | 0 to 30 l/min | 60 l/min |
| DN 15 | 0 to 62.5 l/min | 80 l/min |
| DN 20 | 0 to 105 l/min | 210 l/min |
| DN 25 | 0 to 160 l/min | 320 l/min |
| DN 32 | 0 to 260 l/min | 520 l/min |

[a] Low flow cut off: 0.05 % of flow$_{max}$.

[b] Optionally expandable up to flow$_{max}$.

| | |
|---|---|
| X = Flow$_{max}$ (%)<br>Y = Measuring deviation from the measured value ± (%) |  |
| Measuring deviation[a] | |
| Pulse output | ≤ ±2.0 % of measured value ±0.1 % of flow$_{max}$ |
| Current output | Like pulse output, additionally ≤ ±0.1 % of 20 mA |
| Voltage output | Like pulse output, additionally ≤ ±0.1 % of 10 V |
| Reproducibility | ≤ ±0.5 % of measured value[a] ±0.03 % of flow$_{max}$ |
| Temperature drift | ≤ ±0.15% of measured value[a] per 10 K temperature change (at -20 to +80° C) |
| Response time $t_{90}$ | ≤ 2 s |

[a] Under reference conditions.

### Reference conditions

| | |
|---|---|
| Measurement medium | Water |
| Medium temperature | 23 °C (73 °F) ±5 K |
| Ambient temperature | 23 °C (73 °F) ±5 K |
| Medium pressure | 1 to 4 bar |
| Meter run | Horizontal installation, compliance with the required inlet and outlet sections |

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# Output

## Analog output

| | |
|---|---|
| Type | Current output |
| Function | Output of the current flow rate, output of a signal for error messages, display via device status LED |
| Signal range | 4 to 20 mA |
| Signal limits | 3.8 to 20.5 mA |
| Error message | 3.4 or 22 mA (default settings: 3.4 mA) |
| Temperature influence | 75 ppm/K |
| Burden | ≤ 500 Ω |
| Burden influence | ≤ ±0.02 % per 100 Ω |

| | |
|---|---|
| Type | Voltage output (optionally) |
| Function | Output of the current flow rate, output of a signal for error messages, display via device status LED |
| Signal range | DC 0 to 10 V |
| Signal limits | DC 0 to 10.3 V |
| Error message | DC 0 or 11 V (default settings: 0 V) |
| Temperature influence | 75 ppm/K |
| Burden | ≥ 700 Ω |
| Burden influence | ≤ ±0.02 % per 100 Ω |

## Digital output

| | |
|---|---|
| Type | Transistor output |
| Function | Pulse output |
| Switching output | Push-Pull, PNP/NPN (optionally) |
| Ampacity | ≤ 200 mA |
| Voltage drop | ≤ 2 V |
| Protection | Against polarity reversal, short circuiting and overload |
| Pulse frequency | 0 to 10 kHz |
| Duty cycle | 50 % |
| Output value at nominal width | Pulses per Liter (l) |
| DN 15 (Low-flow calibration) | 10000 |
| DN 15 | 4800 |
| DN 20 | 2850 |
| DN 25 | 1875 |
| DN 32 | 1150 |

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# Electrical data

| | |
|---|---|
| Voltage supply | DC 18 to 30 V SELV, PELV, Class 2 |
| Current consumption | 50 mA, with digital output 300 mA |
| Power consumption | ≤ 10 W |
| Protection rating | DIN EN 61140, Class III (protective low voltage ) |
| Electrical safety | The device must be equipped with an electrical circuit that meets the requirements of DIN EN 61010-1 with regard to "Limited-energy circuits". |

# Mechanical features

## Materials

| | |
|---|---|
| Housing | PA66-GF25 |
| Components in contact with the medium | |
| Meter run | PPSU |
| Transducer | PEEK |
| Seals | |
| Process connection, transducer | EPDM or FKM (optionally) |
| Approvals | |
| Components in contact with the medium | Drinking water certified materials (when using EPDM seals) |

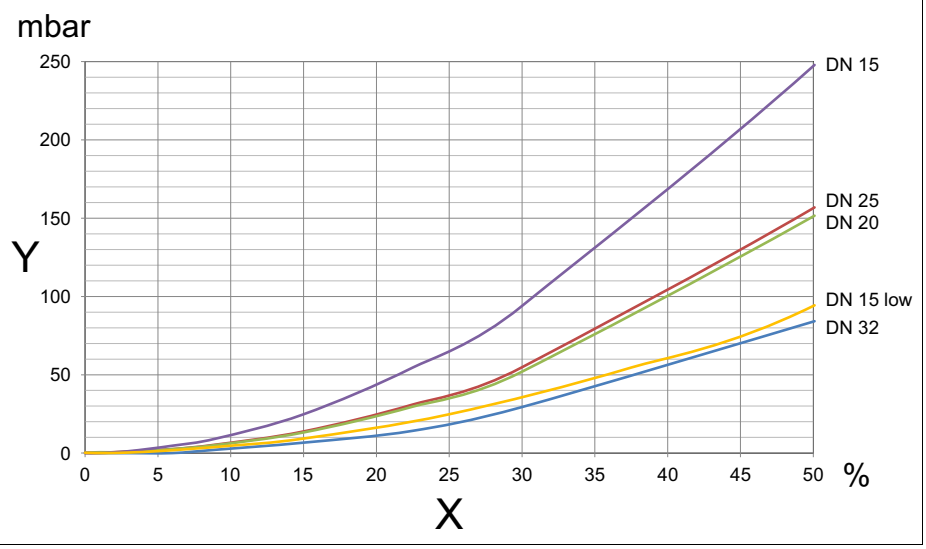
## Nominal pressure

| | |
|---|---|
| Nominal pressure levels | PN 16 |

## Pressure loss diagram

Created under reference conditions ⇨ "Reference conditions", Page 2.

X = Flow rate$_{max}$ (%)
Y = Pressure loss (mbar)



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## Measurement media

| | |
|---|---|
| Medium type | Conductive or non-conductive liquids |
| Viscosity | ≤ 100 mPas |
| Foreign matter content | |
| Solids | ≤ 5 % vol |
| Gases | ≤ 1 % vol |
| Medium temperature | |
| Temperature range | -20 to +95 °C |
| within the accuracy specifications | -20 to +80 °C |
| outside of the accuracy specifications[a] | > 80 to 95 °C |

[a] Return to the accuracy specifications after cooling down.

## Environmental influences

| | |
|---|---|
| Admissible ambient temperature | DIN 60068-2-1, DIN 60068-2-2 |
| at a medium temperature of ≤ 80 °C | -20 to +70 °C |
| at a medium temperature of > 80 °C | -20 to +45 °C |
| Climatic conditions | DIN EN 60721-3-1, DIN EN 60721-3-3, DIN EN 60068-2-78 |
| Climate class | 3K6 |
| Temperature range | -20 to +55 °C |
| Relative humidity | ≤ 100 % – Condensation on device outer shell |
| Protection type | DIN EN 60529, EN 50102 |
| | IP65, IP67 |
| Electromagnetic compatibility (EMC) | DIN EN 61326-1, DIN EN 61326-2-3 |
| Interference emission | Class B[a] |
| Interference immunity | Industrial requirements |
| Vibration resistance | DIN EN 60068-2-6, DIN EN 60068-2-27 |
| Vibration resistance | 5 g at 10 to 2000 Hz |
| Shock resistance | 20 g over 11 ms |
| Pressure Equipment Directive | 2014/68/EU |
| Group 1 fluids - DN ≤ 25 | Sound engineering practice acc. to Art. 4, para. 3 i. c. w. Art. 4 para. 1c.i |
| Group 2 fluids - DN ≤ 32 | Sound engineering practice acc. to Art. 4, para. 3 i. c. w. Art. 4 para. 1c.i |
| Group 1 fluids | Sound engineering practice acc. to Art. 4, para. 3 i. c. w. Art. 4 para. 1c.ii |

[a] The product is suitable for industrial use as well as for households and small businesses.

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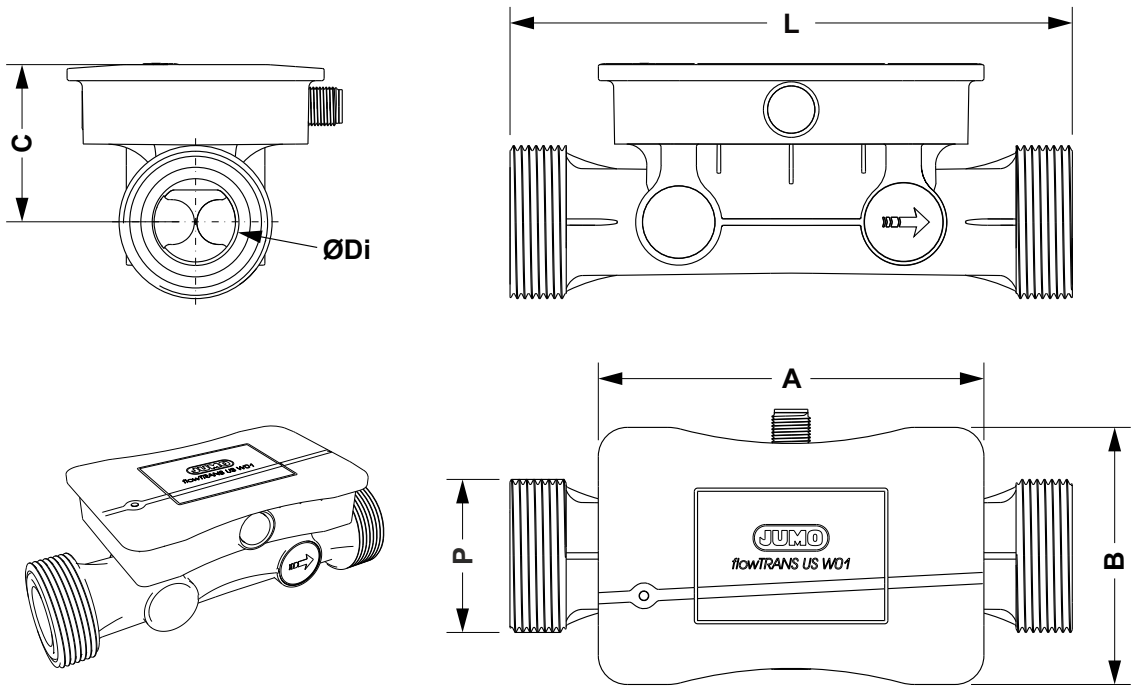
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# Dimensions

## Device




| Nominal width | ØDi [mm] | P | A [mm] | B [mm] | C [mm] | L [mm] |
|---|---|---|---|---|---|---|
| DN 15 | 16.5 | G 1″ | 120 | 80 | 43.5 | 160 |
| DN 20 | 21.5 | G 1 1/4″ | | | 46 | 165 |
| DN 25 | 27 | G 1 1/2″ | | | 49 | 175 |
| DN 32 | 34 | G 2″ | | | 52.5 | 185 |

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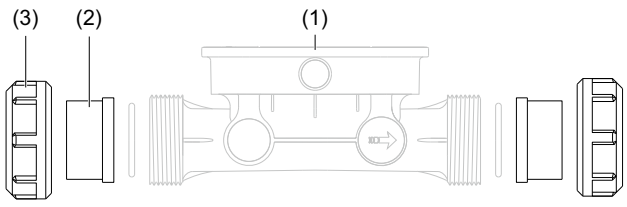
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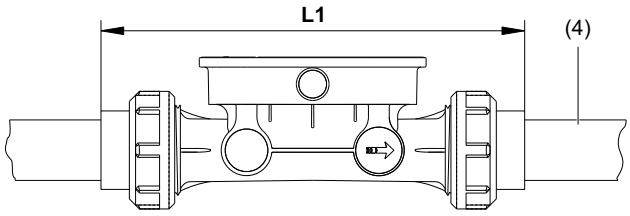


# Installation accessories

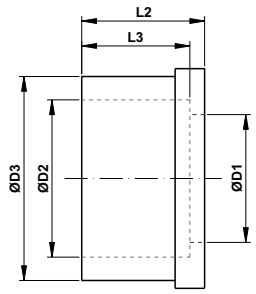
## Mounting sets – DN 15 to DN 32



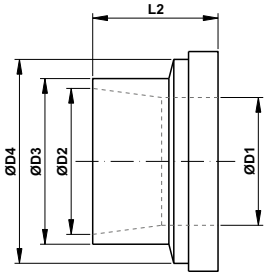

**Device (1) with mounting set – consisting of union ends (2) and union nuts (3)**



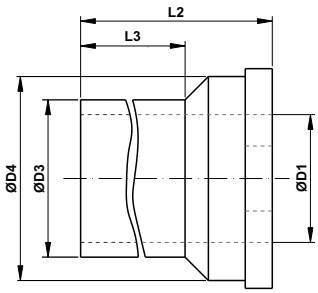

**Overall installation length (L1) of device and mounting set – installed in the pipe (4)**



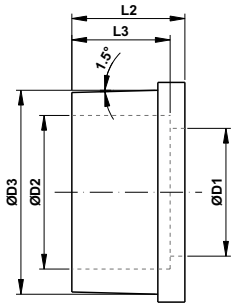

**Union end PVC**




**Union end stainless steel**




**Union end PP butt-welding**




**Union end PP socket welding**

| Nominal width | ØD1 [mm] | ØD2 [mm] | ØD3 [mm] | ØD4 [mm] | L1 [mm] | L2 [mm] | L3 [mm] |
|---|---|---|---|---|---|---|---|
| **Union end PVC** | | | | | | | |
| DN 15 to DN 10 | 10.5 | 16 | 23.5 | 27.5 | 203 | 24 | 16 |
| DN 15 | 15 | 20 | 27.5 | - | 198 | 19 | 16 |
| DN 20 | 22 | 25 | 36 | - | 209 | 22 | 19 |
| DN 25 | 26 | 32 | 41.5 | - | 225 | 25 | 22 |
| DN 32 | 33 | 40 | 53 | - | 243 | 29 | 26 |
| **Union end stainless steel** | | | | | | | |
| DN 15 to DN 10 | 10.5 | 16 | 23.5 | 27.5 | 203 | 24 | 16 |
| DN 15 | 15 | 17.3 | 21.3 | 27.5 | 203 | 21.5 | - |
| DN 20 | 22 | 22.9 | 26.9 | 36 | 210 | 22.5 | - |
| DN 25 | 26 | 29.7 | 33.7 | 41.5 | 226 | 25.5 | - |
| DN 32 | 33 | 38.4 | 42.4 | 53 | 236 | 25.5 | - |
| **Union end PP butt-welding** | | | | | | | |
| DN 15 | 15/16.2 | - | 20 | 27.5 | 266 | 53 | 37.75 |
| DN 20 | 19.8 | - | 25 | 36 | 277.8 | 56.4 | 38.6 |
| DN 25 | 26 | - | 32 | 41.5 | 293 | 59 | 41.25 |
| DN 32 | 32.6 | - | 40 | 53 | 310.6 | 62.8 | 41.8 |
| **Union end PP socket-welding** | | | | | | | |
| DN 15 | 17 | 19.35 | 27.5 | - | 198 | 19 | 16 |
| DN 20 | 21 | 24.3 | 36 | - | 207 | 21 | 18 |
| DN 25 | 26 | 31.25 | 41.5 | - | 221 | 23 | 20 |
| DN 32 | 33 | 39.2 | 53 | - | 235 | 25 | 22 |

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# Installation notes

The installation notes in the data sheet provide information on product selection.

**For the mechanical connection, only use the installation instructions or the operating manual.**

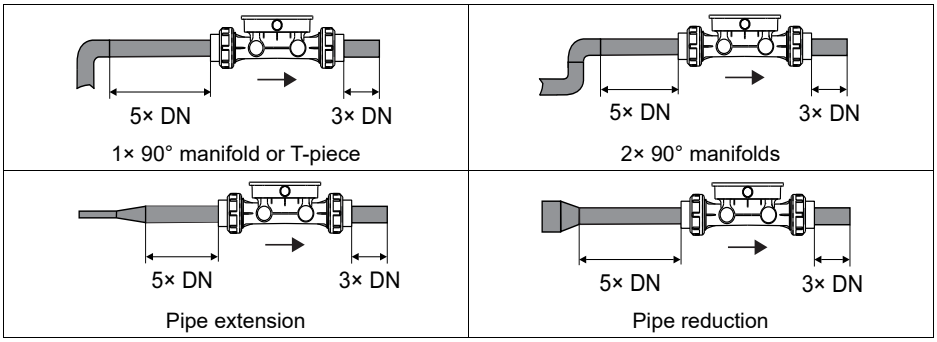
## Inlet and outlet sections

To calm the flow in the pipeline, the specified inlet and outlet sections are required at the very least.

For increased accuracy, the inlet and outlet sections can be made longer.

DN = Nominal pipe width

⟶ = Flow direction

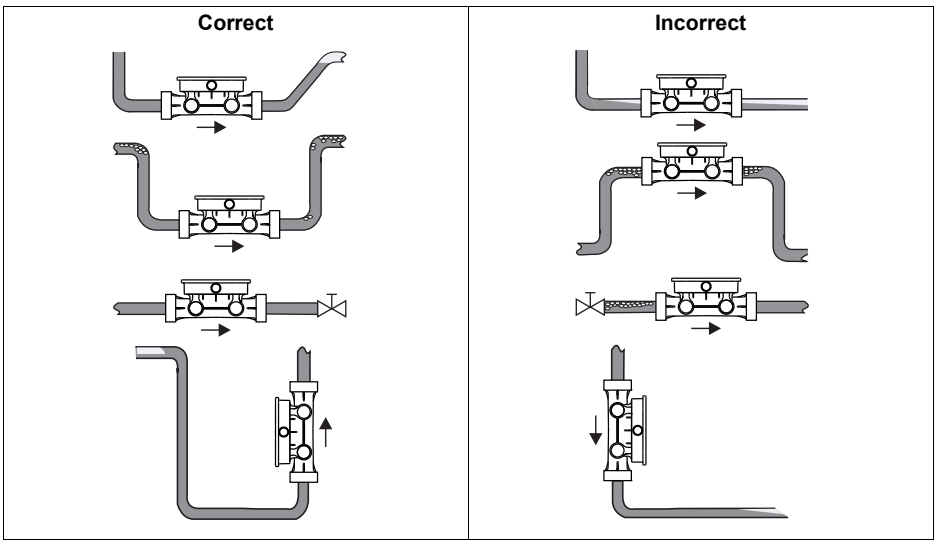



## Installation position

Mount the device in either the horizontal or vertical pipe.

Requirements:

- The pipe around the transducers must be filled.
- The flow direction (⟶) must run upward when mounting vertically.
- Avoid the formation of air bubbles in the pipe and right at the device.



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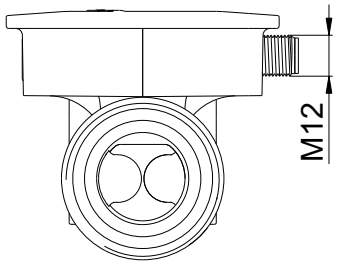
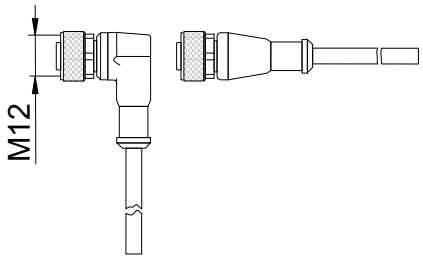
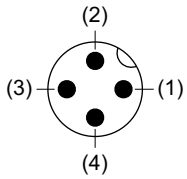
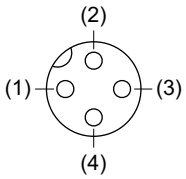


# Connection elements

The connection elements in the data sheet provide information on product selection.

**For the electrical connection, only use the installation instructions or the operating manual.**

## Pin assignment of the M12 connector

| Connection | **Device** | **Connecting cable**[a] |
|---|---|---|
| |  |  |
| Pin assignment and color coding[b] | | |
| Figure |  |  |
| Voltage supply V+ (DC 24 V) | (1) | (1) – BN (brown) |
| Analog output | (2) | (2) – WH (white) |
| GND | (3) | (3) – BU (blue) |
| Digital output | (4) | (4) – BK (black) |
| Connection type | Plug connector M12 | Plug connector M12 with screw locking |

[a] Connecting cable for plug connector M12 ⇨ "Spare parts and accessories", Page 11.

[b] The color coding is only valid for A-coded standard cables!

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# Order details

| | | |
|---|---|---|
| | **(1)** | **Basic type** |
| 406050 | | JUMO flowTRANS US W01 |
| | **(2)** | **Basic type extension** |
| 000 | | None |
| | **(3)** | **Nominal width** |
| 0012 | | DN 15 (1/2″) with Low-flow-calibration |
| 0015 | | DN 15 (1/2″) |
| 0020 | | DN 20 (3/4″) |
| 0025 | | DN 25 (1″) |
| 0032 | | DN 32 (1 1/4″) |
| | **(4)** | **Material sensor** |
| 121 | | PPSU |
| | **(5)** | **Process connection** |
| 32 | | External thread ISO 228 |
| | **(6)** | **Mat. seals sensor** |
| 58 | | EPDM |
| | **(7)** | **Signal inputs and outputs** |
| 12 | | Pulse, 4 to 20 mA |
| | **(8)** | **Extra codes** |
| 000 | | None |
| 100 | | Customer-specific configuration (specifications in plain text) |

| | (1) | | (2) | | (3) | | (4) | | (5) | | (6) | | (7) | | (8) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Order code** | | / | | - | | - | | - | | - | | - | | / | | ...[a] |
| **Order example** | 406050 | / | 000 | - | 0015 | - | 121 | - | 32 | - | 58 | - | 12 | / | 000 | |

[a] List extra codes in sequence and separate using commas.

# Scope of delivery

| |
|---|
| 1× JUMO flowTRANS US W01 – Device in the ordered version, including test certificate |
| 2× O-ring (seal for the process connection) in the ordered version |
| 1× JUMO flowTRANS US W01 operating manual |

# Stock versions

| Order code | Part no. |
|---|---|
| 406050/000-0012-121-32-58-12/000 | 00749926 |
| 406050/000-0015-121-32-58-12/000 | 00744920 |
| 406050/000-0020-121-32-58-12/000 | 00744932 |
| 406050/000-0025-121-32-58-12/000 | 00744899 |
| 406050/000-0032-121-32-58-12/000 | 00744941 |

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# Spare parts and accessories

| Product name | Part no. |
|---|---|
| Installation accessories | |
| Mounting set PVC DN 15 with PP-Nut | 00750871 |
| Mounting set PVC DN 20 with PP-Nut | 00750872 |
| Mounting set PVC DN 25 with PP-Nut | 00750874 |
| Mounting set PVC DN 32 with PP-Nut | 00750876 |
| Mounting set PP socket-welding DN 15 | 00750888 |
| Mounting set PP socket-welding DN 20 | 00750890 |
| Mounting set PP socket-welding DN 25 | 00750927 |
| Mounting set PP socket-welding DN 32 | 00750926 |
| Mounting set PP butt-welding DN 15 | 00750878 |
| Mounting set PP butt-welding DN 20 | 00750881 |
| Mounting set PP butt-welding DN 25 | 00750884 |
| Mounting set PP butt-welding DN 32 | 00750887 |
| Mounting set stainless steel DN 15 with PP-Nut | 00750923 |
| Mounting set stainless steel DN 20 with PP-Nut | 00750920 |
| Mounting set stainless steel DN 25 with PP-Nut | 00750919 |
| Mounting set stainless steel DN 32 with PP-Nut | 00750918 |
| Mounting set PVC DN 10 with PP-Nut | 00750869 |
| Mounting set stainless steel DN 10 with PP-Nut | 00750924 |
| Connecting cable for plug connector M12 | |
| Cable socket, straight, 4-pole, M12 × 1, 2m | 00404585 |
| Cable socket, angled, 4-pole, M12 × 1, 2m | 00409334 |

**Further information on this chapter:**

| | |
|---|---|
| Installation accessories | ⇨ "Installation accessories", Page 7 |
| Connecting cable for plug connector M12 | ⇨ "Pin assignment of the M12 connector", Page 9 |

## Further information and downloads

qr-406050-en.jumo.info