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JUMO flowTRANS US W02

Ultrasonic flowmeter for liquids

Areas of application

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



Type 406051/...

Special features

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

Description

The ultrasonic flowmeter measures the flow, temperature and (optionally) the pressure of conductive and non-conductive liquid media.

It is mounted in pipes made from plastic or metal.

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Approval marks and certificates

Certificates for approved device versions are available for download on the manufacturer's website.

Technical data

Electrical safety

Requirements	DIN EN 61010-1 The device must be equipped with an electrical circuit that meets the requirements for "Limited-energy circuits".

Electrical data

Device version with IO-Link

Voltage supply	DC 18 to 30 V SELV, PELV, Class 2
Current consumption	
IO-Link operation	≤ 100 mA
Operation with switching output	≤ 600 mA
Power consumption	
IO-Link operation	≤ 3 W
Operation with switching output	≤ 18 W
Protection rating	DIN EN 61140, Class III (protective low voltage)
Electrical connection	
Connection elements	
Device	M12 plug connector, grounding terminal M2.5
Connecting cable	M12 plug connector
Grounding cable	Cable lug 2.5 – 1 DIN 46237
M12 plug connector	IEC 61076-2-101
Version	4-pole, shielded
Connecting cable	
Conductor cross section	
IO-Link operation	≥ 0.08 mm^2
Operation with switching output	≥ 0.5 mm^2
Version	4-core, copper, shielded
Line length	≤ 20 m
Temperature resistance	≥ 80 °C
For UL application	
Approved cables[a]	CYJV2/8, CYJV/7, PVVA2/8, PVVA/7
Grounding cable	
Conductor cross section	0.5 to 1 mm^2
Version	1-core, copper
Temperature resistance	≥ 80 °C

[a] The cables must be suitable for the voltage, current and temperature used.

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Device version with RS485

Voltage supply	DC 4.5 to 5.5 V or DC 18 to 30 V SELV, PELV, Class 2
Current consumption	≤ 100 mA
Power consumption	≤ 3 W
Protection rating	DIN EN 61140, Class III (protective low voltage)
Electrical connection	
Connection elements	
Device	M12 plug connector, grounding pin M2.5
Connecting cable	M12 plug connector
Grounding cable	Cable lug 2.5 – 1 DIN 46237
M12 plug connector	IEC 61076-2-101
Version	5-pole, shielded
Protection type	IP67
Connecting cable	
Conductor cross section	≥ 0.08 mm^2
Version	5-core, copper, shielded
Temperature resistance	≥ 80 °C
For UL application	
Approved cables[a]	CYJV2/8, CYJV/7, PVVA2/8, PVVA/7
Grounding cable	
Conductor cross section	0.5 to 1 mm^2
Version	1-core, copper
Temperature resistance	≥ 80 °C

[a] The cables must be suitable for the voltage, current and temperature used.

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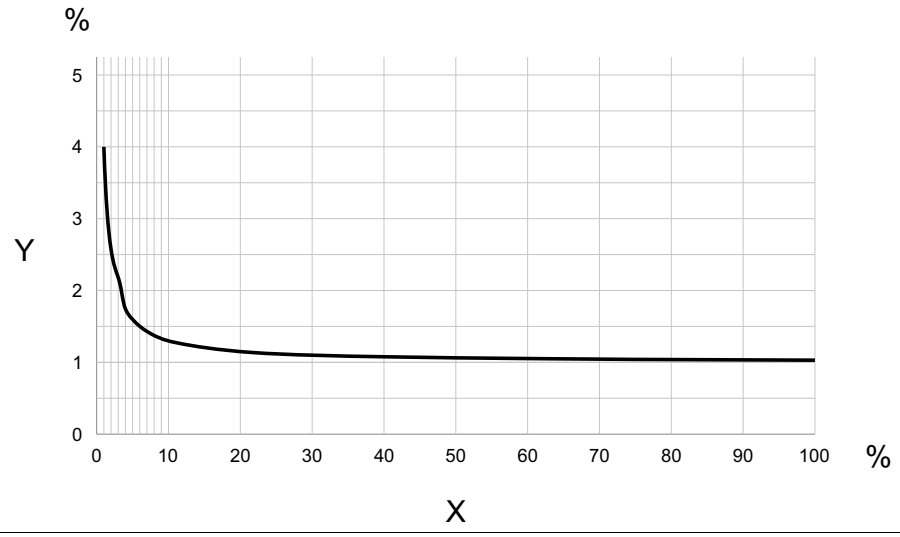
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Inputs

Measurands

Flow

$Flow_{max}$	
DN 15 (low-flow calibration)	60 l/min
DN 15	80 l/min
DN 20	210 l/min
DN 25	320 l/min
DN 32	520 l/min
DN 50	1200 l/min
Accuracy[a]	
Pulse output	≤ ±1.0 % of measured value ±0.03 % of $flow_{max}$
Current output	Like pulse output, additionally ≤ ±0.1% of 16 mA
Voltage output	Like pulse output, additionally ≤ ±0.1% of 10 V
Reproducibility	≤ ±0.5 % of measured value ±0.03 % of $flow_{max}$
Temperature drift	≤ ±0.05 % of measured value per 10 K temperature change (at -20 to +80 °C)
Response time t_{90}	≤ 2 s
Reference conditions	
Measurement medium	Water
Medium temperature	23 °C ±5 K
Ambient temperature	23 °C ±5 K
Medium pressure	1 to 4 bar
Measuring tube	Horizontal installation, compliance with the required inlet and outlet sections
Measuring tube inner diameter (Di)	
DN 15	16.5 mm ±5 %
DN 20	21.5 mm ±5 %
DN 25	27 mm ±5 %
DN 32	34 mm ±5 %
DN 50	57 mm ±5 %
X = Flow (%) in relation to $flow_{max}$ Y = Deviation (%) from measured value	

[a] Under reference conditions.

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Temperature

Measuring range	-40 to +125 °C
Accuracy	±2 K

Pressure (optional)

Measuring range	
DN 15, DN 20, DN 25	-1 to +16 bar relative pressure
DN 32	-1 to +10 bar relative pressure
Accuracy	
At 20 °C[a]	±0.4% MSP[b]
At -20 to +100 °C[c]	±1% MSP

[a] Includes: linearity, hysteresis, repeatability, deviation of measuring range initial value, and measuring range end value.

[b] MSP = measuring span.

[c] Includes: linearity, hysteresis, repeatability, deviation of measuring range initial value, and measuring range end value, thermal effect on measuring range start and measuring span.

Digital inputs

Device version with IO-Link

Function	Reset totalizer, start/stop batch, measured value suppression
Type	Logic input (external voltage aupply)
Switching voltage V_{DI}	DC -30 V ≤ V_{DI} ≤ +30 V
Protection	Against polarity and voltage peaks
Internal resistance	> 100 kΩ
Switching thresholds	PLC level: logic level "0" < 7 V, logic level "1" > 15 V

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Outputs

Analog outputs

Device version with IO-Link

Current output	
Function	Output of the flow process values, temperature or pressure (optional), output of a signal for error message
Signal range	4 to 20 mA
Signal limits	3.8 to 20.5 mA
Error message	3.4 or 22 mA
Temperature influence	75 ppm/K
Burden	≤ 500 Ω
Burden influence	≤ ±0.02% per 100 Ω
Voltage output	
Function	Output of the flow process values, temperature or pressure (optional), output of a signal for error message
Signal range	DC 0 to 10 V
Signal limits	DC 0 to 10.3 V
Error message	DC 0 or 11 V
Temperature influence	75 ppm/K
Load	≥ 2000 Ω
Load influence	≤ ±15 mV

Digital outputs

Device version with IO-Link

Type	Transistor output as switching output or pulse output (I/O pin 1 only)
Protection	Against polarity reversal, short circuiting and overload
Output signal	Push-pull, PNP, NPN
Ampacity	≤ 200 mA
Voltage drop	≤ 3 V
Switching output	
Function	Limit value monitoring function
Input signal	Flow, temperature or pressure (optional)
Output signal	Limit value switch, batch active, batch error, device error
Switch-on and switch-off delay	0 to 100 s
Limit value function	Hysteresis (NO contact/NC contact), window (NO contact/NC contact), switch-on and switch-off delay
Switching point	Configurable
Pulse output	
Function	Output of the flow process value
Pulse frequency	0 to 10 kHz
Duty cycle	50 %
Output value at nominal width[a]	Pulses per liter (l)
DN 15 (low-flow calibration)	10000
DN 15	4800
DN 20	2850
DN 25	1875
DN 32	1150
DN 50	500

[a] Default setting (configurable).

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Interfaces

Bluetooth

Function	Transfer of configuration data and device information, display of process values
Communication	Via end device with JUMO smartCONNECT app
Authentication	Via Bluetooth® radio module and NFC tag
Connection status (configurable)	
Permanently	Active
Temporarily	Restricted (via NFC)
Range	10 m under reference conditions
Radio frequency	
Bluetooth® radio module	2.4 GHz
NFC tag	13.56 MHz
Max. transmission power	
Bluetooth® radio module	0 dBm
NFC tag	–
JUMO smartCONNECT app	
System requirements	
iOS device	iPhone 7 or later (recommended) with iOS 14
Android device	Android 12 or later

IO-Link

Function	Transfer of process data, configuration data and device information, displaying of process values
Communication	Via end device with IO-Link master and device description file (IODD)
Communication interface	IO-Link device V 1.1
Data transfer rate (baud rate)	COM 3 (230.4 kBaud)
Cycle time	≥ 5 ms
Profile	Common Profile, Smart Sensor Profile

RS485

Function	Transfer of process data, configuration data, and device information
Communication	Via end device with JUMO DSM software, Modbus master, PLC
Data transmission	Serial
Transmission protocol	JUMO digiLine Modbus RTU
Data format	8 - 1 - no parity 8 - 1 - odd parity 8 - 1 - even parity 8 - 2 - no parity
Data transmission rate	9600 baud 19200 baud 38400 baud
Min. response time	0 to 500 ms
Device address	1 to 247

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Display

Type	TFT display
Size	
Display range	35.04 × 28.03 mm
Screen size (diagonal)	1.77″
Resolution	128 × 160 RGB
Brightness	15 levels active + 1 level inactive (configurable)
Rotation	0°, 90°, 180°, 270° (configurable)

Environmental influences

The product is UL-approved. The approval stipulates that the product may be used indoors only.

Admissible ambient temperature	DIN 60068-2-1, DIN 60068-2-2
≤ DN 32	
At a medium temperature ≤ 50 °C	-20 to +50 °C
At a medium temperature ≤ 80 °C[a]	-20 to +60 °C
At a medium temperature > 80 °C[a]	-20 to +45 °C
DN 50	
At a medium temperature < 60 °C[a]	-20 to +60 °C
Admissible storage temperature	-20 to +60 °C
Climatic conditions	DIN EN 60721-3-1, DIN EN 60721-3-3, DIN EN 60068-2-78
Climate class	3K6
Air temperature	-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 61326-2-3:2022
Interference emission	Class B[b]
Interference immunity	Industrial requirements
Oscillation	DIN EN 60068-2-6
Amplitude	0.35 mm at 10 to 60.1 Hz
Acceleration	50 m/s^2 at 60.1 to 2000 Hz
Shock	DIN EN 60068-2-27
Peak acceleration	200 m/s^2
Shock duration	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 ≤ 50	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] Without UL approval.

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

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Mechanical features

Device

Weight[a]	
Without screw connection	215 to 445 g

[a] Depending on version and DN.

Materials

Housing	PA66-GF25
Display cover	PMMA
Components in contact with the medium	
Measuring tube	
≤ DN 32	PPSU
DN 50	PP[a]
Transducer	PEEK
Seals (process connection, transducer)	
≤ DN 32	EPDM or FKM[a] (optionally)
DN 50	FKM[a]
Approvals	
Components in contact with the medium	Drinking water certified materials (when using EPDM seals)

[a] Without UL approval.

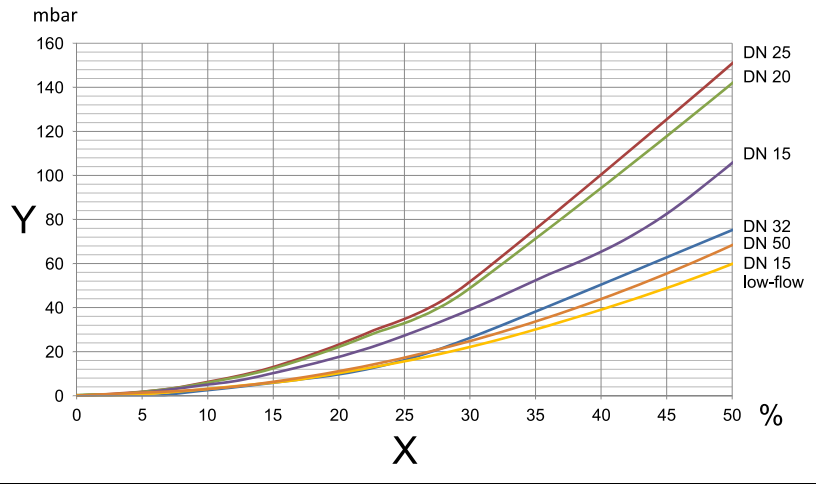
Nominal pressure

Nominal pressure level	
DN 15, DN 20, DN 25	PN 16
DN 32, DN 50	PN 10

Pressure loss diagram

Created under reference conditions ⇨page 4.

X = $Flow_{max}$ (%)
Y = Pressure loss (mbar)



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Measurement media

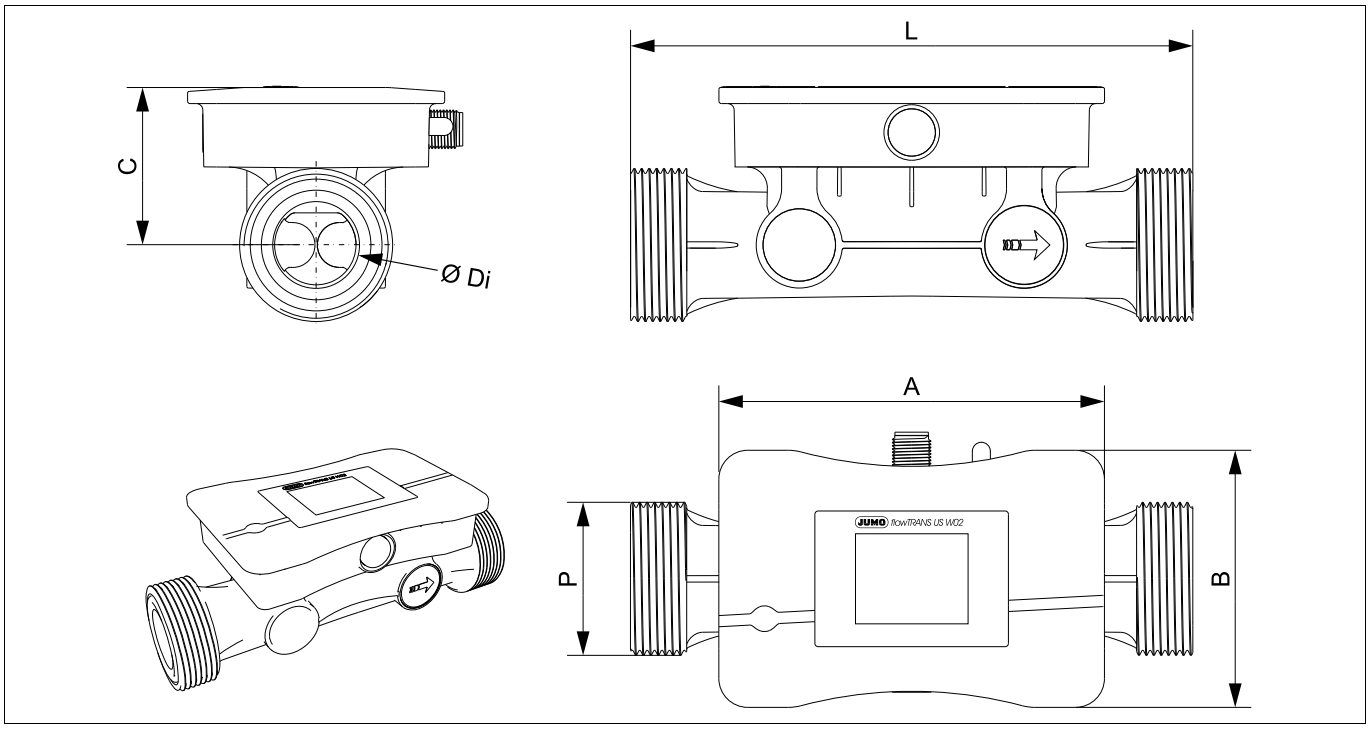
Medium type	Conductive or non-conductive liquids
Viscosity	≤ 100 mPas
Foreign matter content	
Solids	≤ 5 % vol
Gases	≤ 1 % vol
Medium temperature	
Temperature range	
≤ DN 32	-20 to +95 °C
Within the accuracy	-20 to +50 °C
Within the accuracy[a]	-20 to +80 °C
Outside of the accuracy[a, b]	> 80 to 95 °C
DN 50[a]	-20 to +60 °C

[a] Without UL approval.

[b] Return to the accuracy after cooling down.

Dimensions

Device



Nominal width	Ø Di [mm]	P	A [mm]	B [mm]	C [mm]	L [mm]
DN 15	16.5	G 1	120	80	43.5	155
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
DN 50	57	G 2 3/4			63.6	200

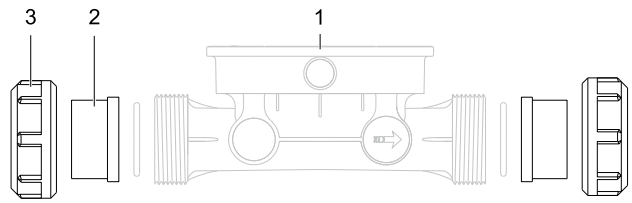
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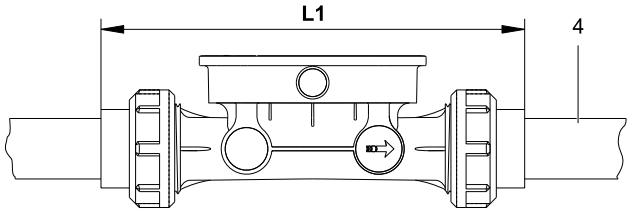
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Accessories

Mounting sets

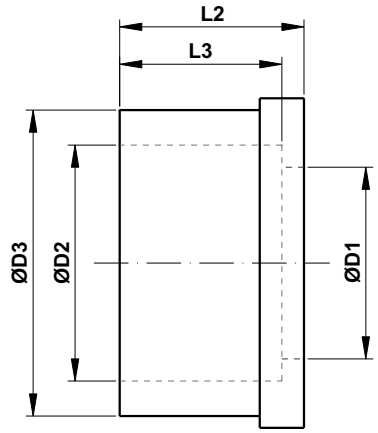


Device (1) with mounting set – consisting of union ends (2) and union nuts (3)



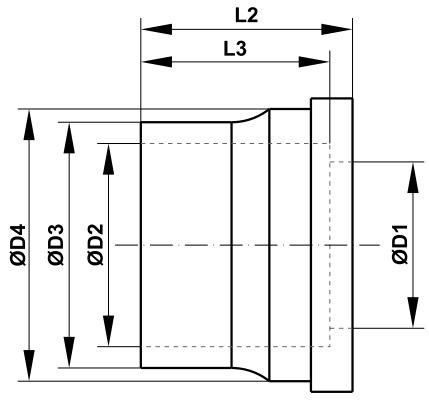
Total installation length (L1) of device and mounting set – installed in the pipe (4)

Union end PVC-U metric



Nominal width	ØD1 [mm]	ØD2 [mm]	ØD3 [mm]	ØD4 [mm]	L1 [mm]	L2 [mm]	L3 [mm]
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
DN 50	57	63	74	–	282	41	38

Union end PVC-U ASTM



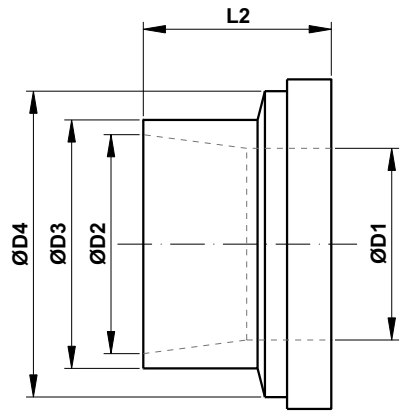
Nominal width	ØD1 [mm]	ØD2 [in]	ØD3 [mm]	ØD4 [mm]	L1 [mm]	L2 [mm]	L3 [mm]
DN 15 to DN 10	–	–	–	–	–	–	–
DN 15	15	1/2	28	–	205	25	22
DN 20	22	3/4	32,5	36	221	28	25
DN 25	26	1	42	–	239	32	29
DN 32	33	1 1/4	50	53	255	35	32
DN 50	52	2	70	74	282	41	38

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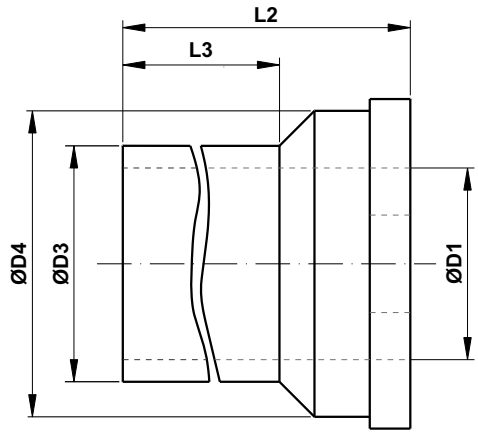
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Union end stainless steel metric



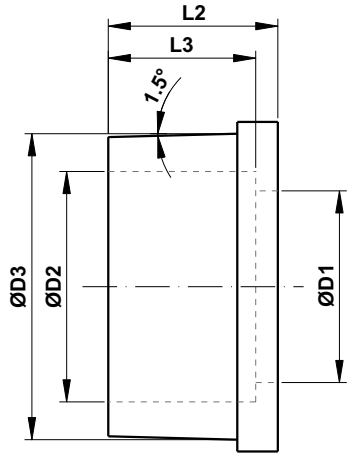
Nominal width	ØD1 [mm]	ØD2 [mm]	ØD3 [mm]	ØD4 [mm]	L1 [mm]	L2 [mm]	L3 [mm]
DN 15 to DN 10	10.5	16	23.5	27.5	203	24	16
DN 15	15	17.3	21.3	27.5	203	21.5	–
DN 20	22	22.9	26.9	36	210	22.5	–
DN 25	26	29.7	33.7	41.5	226	25.5	–
DN 32	33	38.4	42.4	53	236	25.5	–
DN 50	52	55.1	60.3	74	263	31.5	–

Union end PP butt-welding metric



Nominal width	ØD1 [mm]	ØD2 [mm]	ØD3 [mm]	ØD4 [mm]	L1 [mm]	L2 [mm]	L3 [mm]
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
DN 50	51.4	–	63	74	337	68.5	45

Union end PP socket-welding metric



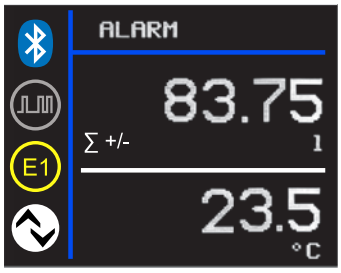
Nominal width	ØD1 [mm]	ØD2 [mm]	ØD3 [mm]	ØD4 [mm]	L1 [mm]	L2 [mm]	L3 [mm]
DN 15	17	19.35	27.5	–	198	19	16
DN 20	21	24.3	36	–	207	21	18
DN 25	26	31.25	41.5	–	221	23	20
DN 32	33	39.2	53	–	235	25	22
DN 50	55	62.05	74	–	264	32	29

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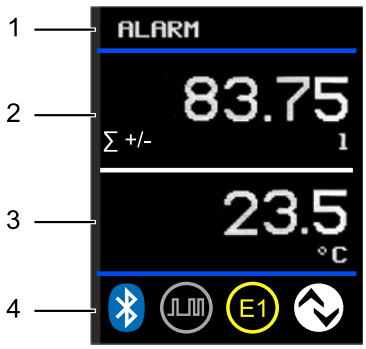
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Display elements



Orientation: 0°, 180°



Orientation: 90°, 270°

Pos.	Designation	Description
1	**Status bar**	Shows information about the device status.
2, 3	**Process value display 1**, **process value display 2**	Show the following values and messages: • Both configured process values (actual values) • The process value system units • The totalizer for the totalizer function • The fill volume or residual volume for the batch function • Error messages
4	**Toolbar**	Shows: • The configuration and status of I/O pin 1 and I/O pin 2 • The configuration and status of the interface connections

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Installation notes

The installation instructions in the data sheet provide preliminary information on installing the device.

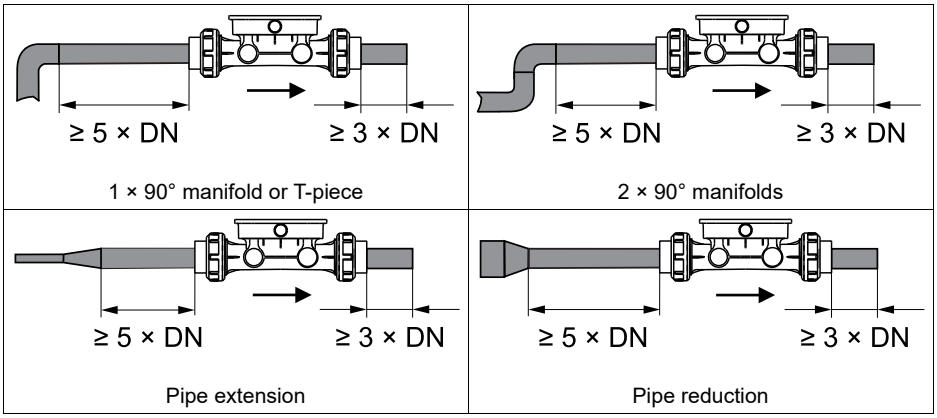
For the mechanical connection, only use the installation instructions or the operating manual.

Inlet and outlet sections

To ensure measurement accuracy, longer inlet and outlet distances may be required depending on the application.

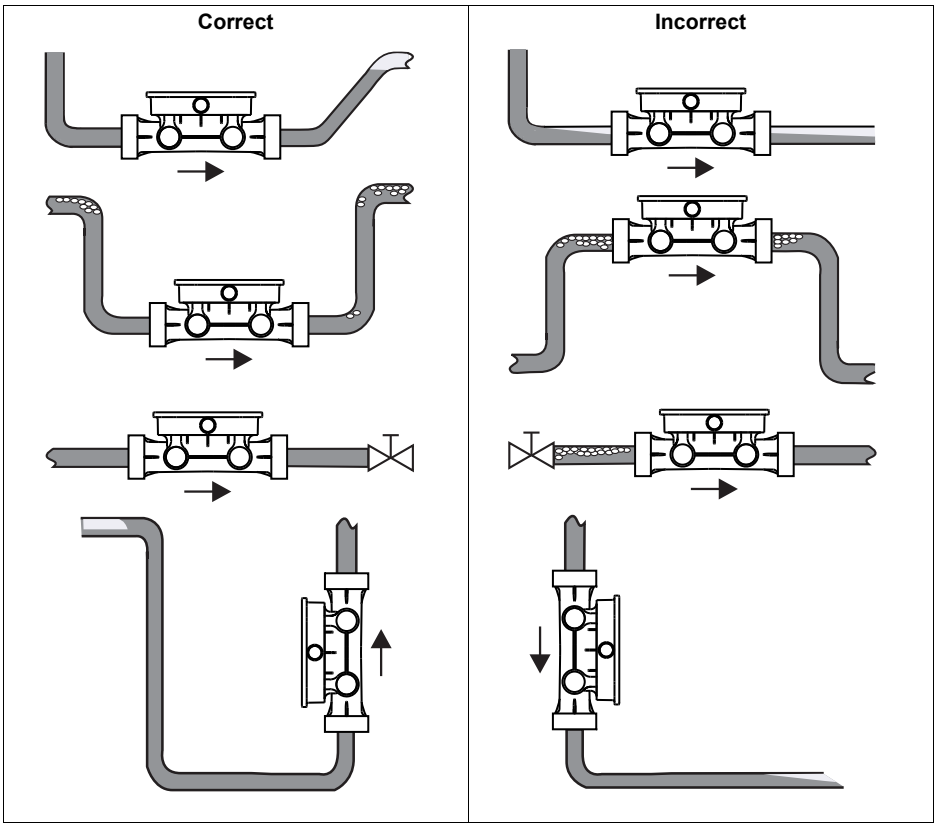
DN = Nominal pipe width

⟶ = Flow direction



Installation position

⟶ = Flow direction



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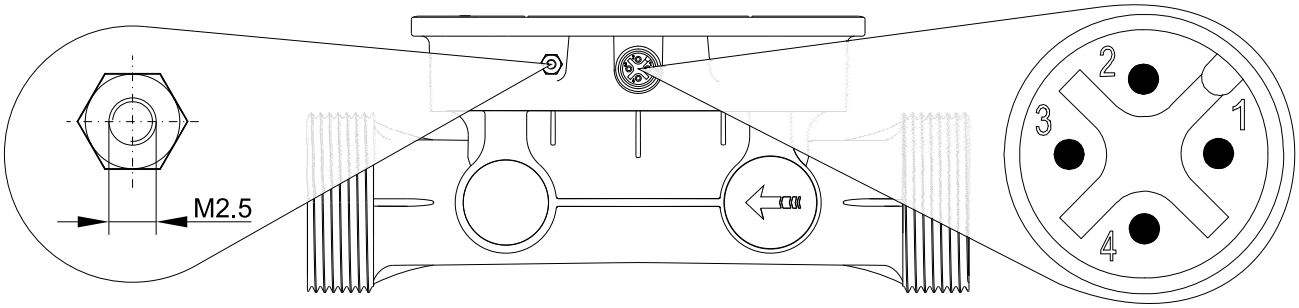
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Connection elements

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.

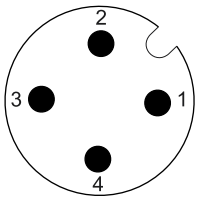


Grounding terminal | Device (rear view) | M12 plug connector

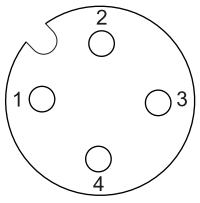
Terminal assignment

M12 plug connection

Designation	Description	Assignment
IO-Link	DC 24 V	1 BN (Brown)
	I/O-Pin 2[a]	2 WH (White)
	GND	3 BU (Blue)
	IO-Link, I/O-Pin 1[b]	4 BK (Black)



Device

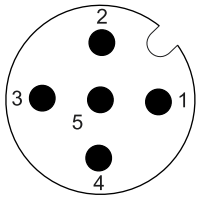


Connecting cable

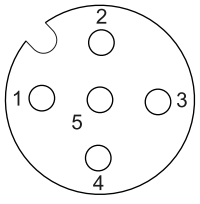
[a] Configurable as: Digital input, digital output, analog output.

[b] Configurable as: IO-Link, digital output, analog output.

Designation	Description	Assignment
RS485	DC 5 V	1 BN (Brown)
	DC 24 V	2 WH (White)
	GND	3 BU (Blue)
	RS485 (RxD/TxD-)	4 BK (Black)
	RS485 (RxD/TxD+)	5 GY (Grey)



Device



Connecting cable

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Scope of delivery

Device in the ordered version
Calibration certificate
Brief instructions
2 O-rings (seal for the process connection) in the ordered version
Grounding kit

Accessories

Without UL approval

Designation	Part no.
Mounting set PVC-U metric, DN 10 with PP-Nut	00750869
Mounting set PVC-U metric, DN 15 with PP-Nut	00750871
Mounting set PVC-U metric, DN 20 with PP-Nut	00750872
Mounting set PVC-U metric, DN 25 with PP-Nut	00750874
Mounting set PVC-U metric, DN 32 with PP-Nut	00750876
Mounting set PVC-U metric, DN 50 with PP-Nut	30062265
Mounting set PVC-U ASTM, DN 15 with PP-Nut	30079302
Mounting set PVC-U ASTM, DN 20 with PP-Nut	30079306
Mounting set PVC-U ASTM, DN 25 with PP-Nut	30079303
Mounting set PVC-U ASTM, DN 32 with PP-Nut	30079304
Mounting set PVC-U ASTM, DN 50 with PP-Nu	30079305
Mounting set PP metric, socket welding DN 15	00750888
Mounting set PP metric, socket welding DN 20	00750890
Mounting set PP metric, socket welding DN 25	00750927
Mounting set PP metric, socket welding DN 32	00750926
Mounting set PP metric, socket welding DN 50	30062268
Mounting set PP metric, butt welding DN 15	00750878
Mounting set PP metric, butt welding DN 20	00750881
Mounting set PP metric, butt welding DN 25	00750884
Mounting set PP metric, butt welding DN 32	00750887
Mounting set PP metric, butt welding DN 50	30062267
Mounting set stainless steel metric, DN 10 with PP nut	00750924
Mounting set stainless steel metric, DN 15 with PP nut	00750923
Mounting set stainless steel metric, DN 20 with PP nut	00750920
Mounting set stainless steel metric, DN 25 with PP nut	00750919
Mounting set stainless steel metric, DN 32 with PP nut	00750918
Mounting set stainless steel metric, DN 50 with PP nut	30062269
JUMO smartCONNECT (App)	00770436
IO-Link master, 1-channel (TMG Device Tool), including mini USB cable for use with Windows® PC	00694070
Line socket, 4-pole, M12 × 1, straight, length 2 m	00404585
Line socket, 4-pole, M12 × 1, angled, length 2 m	00409334
M12 digiLine master connecting cable for 705001, 5-pole, A-coded, length 10 m	00665547
M12 digiLine master connecting cable for 705001, 5-pole, A-coded, length 5 m	00665539
M12 digiLine master connecting cable for 705001, 5-pole, A-coded, length 1.5 m	00665529
M12 digiLine master connecting cable, 5-pole, A-coded, length 10 m	00638341
M12 digiLine master connecting cable, 5-pole, A-coded, length 5 m	00638337
M12 digiLine master connecting cable, 5-pole, A-coded, length 1.5 m	00638333
M12 connection cable, 5-pole, length 15 m	00638324
M12 connection cable, 5-pole, length 10 m	00638322

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Designation	Part no.
M12 connection cable, 5-pole, length 5 m	00638315
M12 connection cable, 5-pole, length 1.5 m	00638313
M12 connection cable, 5-pole, length 0.5 m	00638312
Y-splitter, 5-pole	00638327
USB-RS485 converter, DC barrel connector, M12	00746250
Interchangeable plug-in power supply 24 V/1 A	00743955
JUMO digiLine hub	00646871
JUMO DSM software for JUMO digiLine sensors	00655787
JUMO DSM digiLine inclusive data management	00663703

With UL approval

Designation	Part no.
IO-Link master, 4-channel – TURCK TBEN-S2-4IOL	00759867
IO-Link master, 8-channel – TURCK TBEN-LL-8IOL	00759875
Connection line M8/voltage supply, length 2 m, IO-Link master, 4 channel	00767913
Connection line M12/voltage supply, length 2 m, IO-Link master, 8 channel	00767914
Connection line M8/Ethernet, length 2 m, IO-Link master, 4 channel	00767923
Connection line M12/Ethernet, length 2 m, IO-Link master, 8 channel	00767927
Connection line M12, M12, black, PUR, length 2 m (straight coupling/straight connector; 5 pole; A-coded)	00777804
JUMO power supply unit for digiLine hub	00661597

Further information and downloads

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