

Technical Information

Flowphant T DTT31, Flowphant T DTT35 Flow switch

Safe monitoring of flow rates and temperature in industrial processes. Compact and cost-saving



Field of application

Flow switch for monitoring and displaying the relative mass flow rates of liquid media in the range from 0.03 to 3 m/s (0.1 to 9.84 ft/s):

- Flowphant T DTT31 – with threaded connections or compression fitting.
- Flowphant T DTT35 – with process connections for hygienic applications.

Applications:

- Monitoring of cooling water circuits of pumps, turbines, compressors and heat exchangers
- Leak monitoring in process pipes
- Monitoring of pump functions
- Monitoring of lubrication circuits
- Filter monitoring in the beverages industry

Benefits

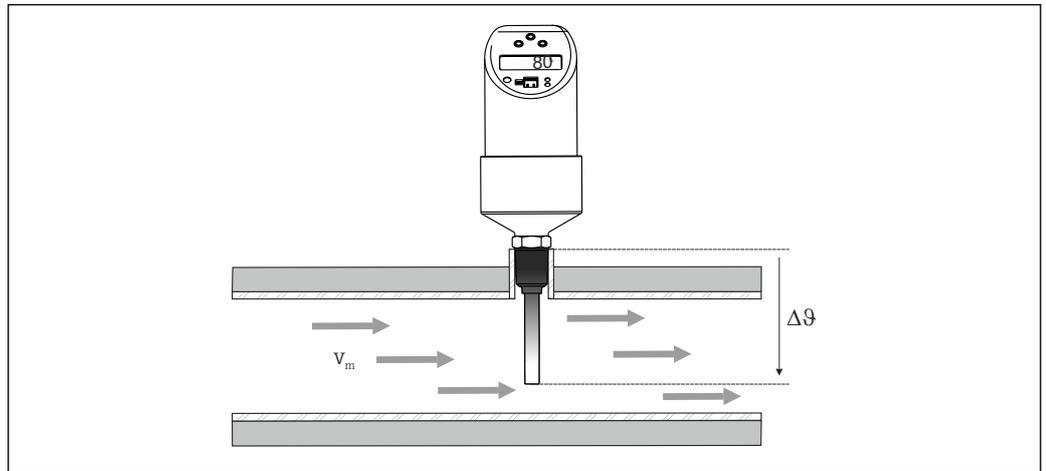
- Practically no pressure loss
- Configuration software FieldCare for quick configuration and reliable storage of device settings
- Optional: second switch output or 4 to 20 mA analog output for temperature monitoring or for outputting the flow as a percentage
- Function check and process information on site thanks to digital display at device
- Top housing section which can be rotated 310° and rotatable display make it possible to read the measured values in all orientations
- Marine approval
- 3-A mark

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Function and system design

Measuring principle



The device measures the mass flow of a liquid medium using the calorimetric measurement method. The calorimetric measuring principle is based on the cooling of a heated temperature sensor. Heat is removed from the sensor by forced convection due to medium flowing by. The extent of this heat transfer depends on the flow velocity of the medium and the difference in temperature between the sensor and the medium (King's Law). The higher the flow velocity or the mass flow of the medium, the greater the temperature sensor cooling.

Measuring system

Overview

Flowphant product family	Flowphant T DTT31	Flowphant T DTT35
	<p>A0005276</p>	<p>A0023194</p>
Sensor	RTD	RTD
Field of application	Monitoring of mass flow of water, water-like substances and low-viscosity oils (viscosity: 0.184 to 20 mPa·s; thermal conductivity: 29 to 688 mW/m·K). Example: aqueous solution monoethylene glycol (20 vol%) at 20 °C: viscosity: 1.65 mPa·s; thermal conductivity: 512 mW/mK	Monitoring of mass flow of liquid media in hygienic processes (viscosity: 0.184 to 20 mPa·s; thermal conductivity: 29 to 688 mW/mK). Example: aqueous solution monoethylene glycol (20 vol%) at 20 °C: viscosity: 1.65 mPa·s; thermal conductivity: 512 mW/mK

Flowphant product family	Flowphant T DTT31	Flowphant T DTT35
Process connection	Industrial: <ul style="list-style-type: none"> ▪ Compression fitting ▪ Thread: <ul style="list-style-type: none"> ▪ G½" and G¾" ▪ ANSI NPT¼" and NPT½" 	Hygiene: <ul style="list-style-type: none"> ▪ Conical metal-metal G½" ▪ Clamp 1" - 1½", DIN 32676 ¹⁾, DN25 to 40 ▪ Clamp 2", DIN 32676, DN50 ▪ Varivent F, N ▪ DIN 11851 ▪ APV Inline
Measuring range	Mass flow as a relative value from 0 to 100%. Process measuring limit for liquids: 0.03 to 3 m/s (0.1 to 9.84 ft/s)	

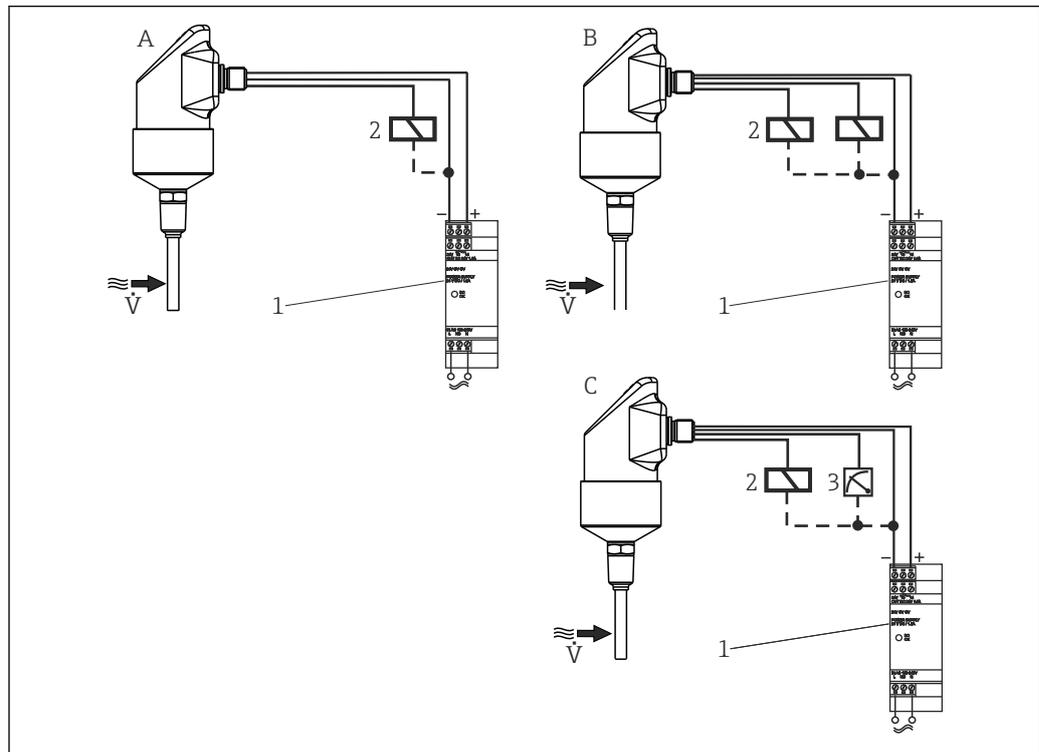
1) DIN 32676 replaces ISO 2852.

DC voltage version (DC)

PNP switch output of electronics.

Power supply with a power supply unit.

Preferably in connection with programmable logic controllers (PLC) or for controlling a relay.



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- A 1 x PNP switch output
- B 2 x PNP switch output
- C PNP switch output with additional analog output 4 to 20 mA (active)
- 1 Transmitter power supply unit
- 2 Load (programmable logic controller, process control system, relay)
- 3 Indicator (at the 4 to 20 mA analog output)

Input

Measured variable

- Flow velocity of liquid media (calorimetric measuring principle)
- Temperature (RTD), optionally for two switch outputs or additional analog output

Measuring range	Flow	0.03 to 3 m/s (0.1 to 9.84 ft/s)
	Temperature	-20 to 85 °C (-4 to 185 °F)

Output

Output signal	<p>DC voltage version (short-circuit proof version):</p> <ul style="list-style-type: none"> ▪ 1x PNP switch output (flow) or ▪ 2x PNP switch outputs (flow or temperature, configurable) or ▪ 1x PNP switch output and 1x 4 to 20 mA output, active (flow or temperature, configurable) <p> The analog output reports the measured flow as a relative value expressed as a percentage of the set measuring range.</p>
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Signal on alarm	Analog output: signal on alarm according to NAMUR NE43
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Underranging	Linear drop to 3.8 mA
Overranging	Linear rise to 20.5 mA
Sensor breakage; sensor short-circuit	≤3.6 mA or ≥ 21.0 mA (output 21.7 mA is guaranteed for setting ≥ 21.0 mA)
Switch outputs	In the safe state (switch open)

Load	Max. $(V_{\text{power supply}} - 6.5 \text{ V}) / 0.022 \text{ A}$ (current output)
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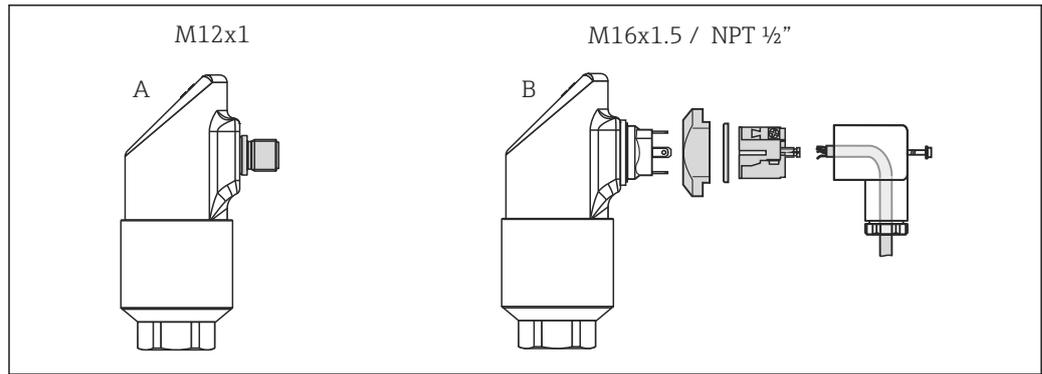
Range of adjustment	Switch output	Switch point (SP) and switchback point (RSP) in increments of 1% with min. hysteresis of 5%
	Damping	User-configurable 0 = off (no damping) or 10 to 40 s in increments of 1 s
	Unit	%, optionally °C, °F (with two outputs and temperature monitoring)

Switching capacity	DC voltage version:
Switch status ON	$I_a \leq 250 \text{ mA}$
Switch status OFF	$I_a \leq 1 \text{ mA}$
Switching cycles	> 10,000,000
Voltage drop PNP	≤ 2 V
Overload protection	Switching current checked automatically: switched off in the event of overcurrent. Switching current checked again every 0.5 s. Max. capacitive load: 14 µF at max. supply voltage (without resistive load). Periodic disconnection from a protective circuit in event of overcurrent ($f = 2 \text{ Hz}$) and "Warning" displayed.

Inductive load	To prevent electrical interference, only operate an inductive load (relays, contactors, solenoid valves) with a direct protective circuit (free-wheeling diode or capacitor).
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Electrical connection

Available device plugs	 Hygiene version: According to the 3-A Sanitary Standard and the EHEDG, electrical connecting cables must be smooth, corrosion-resistant and easy to clean.
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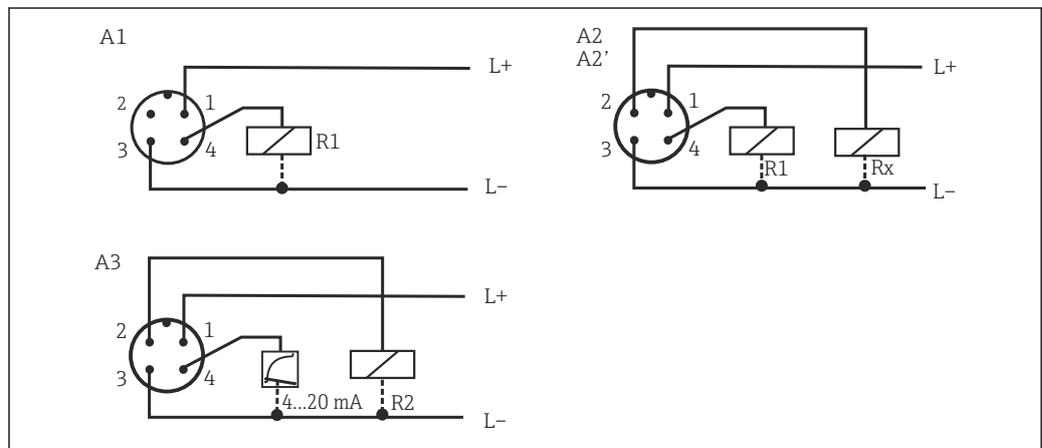


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- A M12x1 connector
 B Valve connector M16x1.5 or NPT 1/2"

Terminal assignment

DC voltage version with M12x1 connector

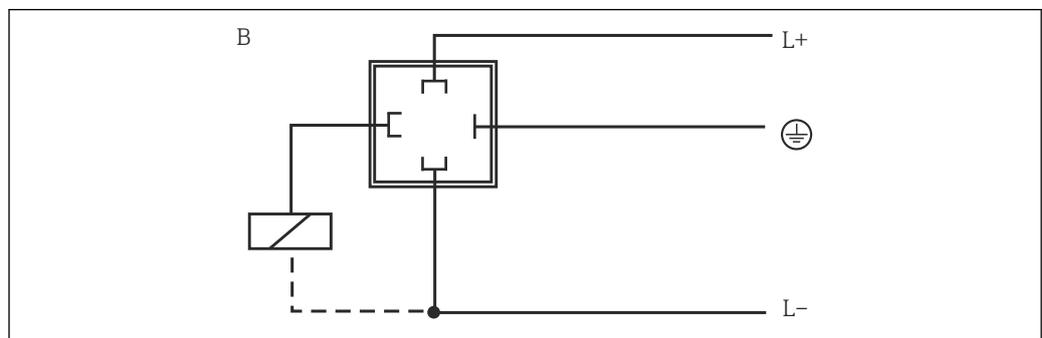


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1 Version with M12x1 connector

- A1 1 x PNP switch output
 A2 2 x PNP switch output R1 and Rx (R2)
 A2' 2 x PNP switch output R1 and Rx (diagnostics/NC contact with "DESINA" setting)
 A3 1 x PNP switch output and 1 x analog output (4 to 20 mA)

DC voltage version with M16x1.5 valve connector or NPT 1/2"



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B 1 x PNP switch output

Supply voltage

DC voltage version: 18 to 30 V_{DC} (reverse polarity protection)

Behavior in the event of overvoltage (>30 V)

- The device works continuously up to 34 V_{DC} without any damage
- No damage in the event of transient overvoltage up to 1 kV (according to EN 61000-4-5)
- If the supply voltage is exceeded, the specified characteristics are no longer guaranteed

Behavior in the event of undervoltage

If the supply voltage falls below the minimum value, the device switches to a defined off state (condition as without supply voltage = switch open)

 The device may be powered only by a power supply unit that operates using a limited energy circuit in accordance with UL/EN/IEC 61010-1, Section 9.4 and the requirements in Table 18.

Current consumption

< 100 mA (no-load) at 24 V_{DC}, max. 150 mA (no-load); with reverse polarity protection

Performance characteristics

The percentages in the "Performance characteristics" section refer to the full scale value or the set maximum value (100% value) of the monitoring range.

Reference operating conditions

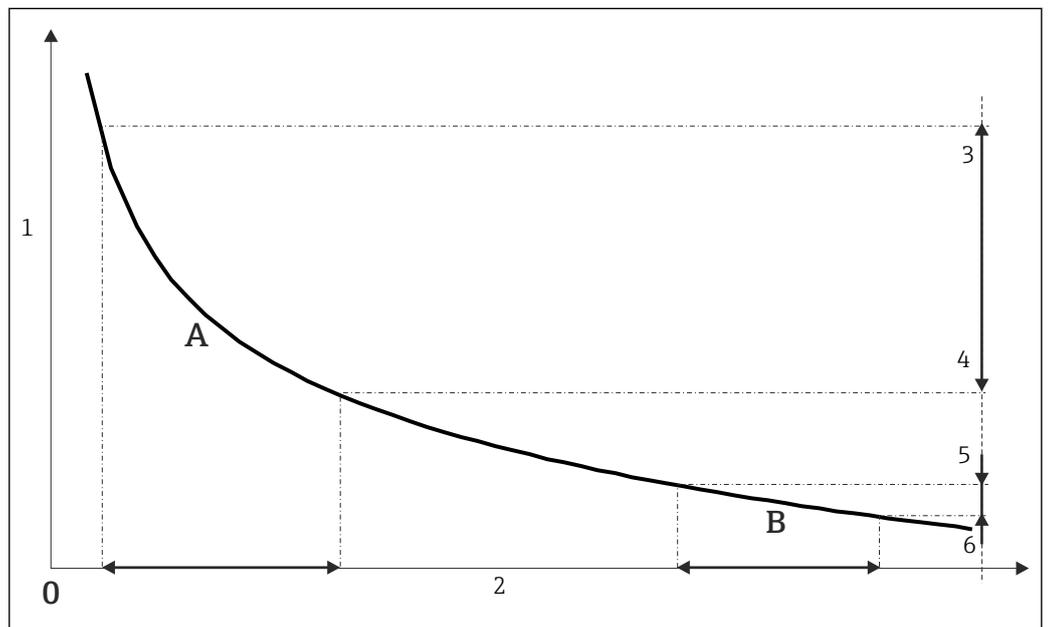
As per DIN IEC 60770 or DIN IEC 61003

T = 25 °C (77 °F) ± 5 °C (9 °F)

- Relative humidity 45 to 75%
- Atmospheric pressure 860 to 1060 kPa (124 to 153 psi), using water as the test medium
- Supply voltage U = 24 V_{DC}

Maximum measurement error

The device records flow velocities relatively in relation to a set flow monitoring range (0 to 100% as the display value). Absolute measurement of the flow velocity or the mass flow is not possible. The sensitivity of the sensor changes with the flow velocity of the medium. It increases with decreasing flow velocity. In the case of water, the greatest sensor sensitivity is in the range from 0.03 to 0.5 m/s.



 2 Standard characteristic

A, B Configured flow monitoring ranges (example)

1 Sensor signal

2 Flow velocity

3, 5 LOWF 0%: Setting for the minimum flow velocity occurring in monitoring range A or B (0% value)

4, 6 HIF 100%: Setting for the maximum flow velocity occurring in monitoring range A or B (100% value)

Temperature

- Measurement accuracy: 2 K (3.6 °F)
- Reproducibility: 1 K (1.8 °F)
- Influence of ambient temperature: 0.05%/K of full scale value

Switch point non-reproducibility

Measuring range (water as medium)	% of maximum value	Influence of medium temperature	Influence of ambient temperature
0.03 to 0.5 m/s (0.1 to 1.6 ft/s)	$\leq 2 \%^{1)}$	0.05 %/K	0.04 %/K
0.03 to 1 m/s (0.1 to 3.28 ft/s)	$\leq 3 \%^2$	0.10 %/K	0.05 %/K
0.03 to 2 m/s (0.1 to 6.56 ft/s)	$\leq 5 \%^2$	0.15 %/K	0.10 %/K
0.03 to 3 m/s (0.1 to 9.84 ft/s)	$\leq 10 \%^2$	0.20 %/K	0.30 %/K

1) For a Reynolds number $> 10,000$



If the medium experiences a temperature change of ≥ 0.5 K/min, temporary display drifts are possible which can exceed the specified non-reproducibility values of the switch point.

Sensor response time 6 to 12 s

Long-term drift $<0.5\%$ per year under reference operating conditions

Long-term reliability

Mean time between failure (MTBF) calculated according to SN29500 (at 40 °C)	
Low stress environment: <0.1 g	227 years
High stress environment: <0.1 g	48 years

Switch output response time 100 ms

Analog output

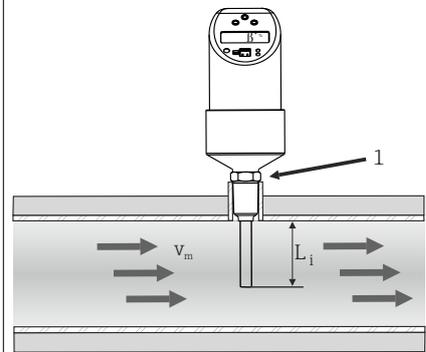
Measurement error	Switch point and display deviation $+0.1\%$
Rise time t_{90}	≤ 200 ms
Settling time t_{99}	≤ 500 ms

Installation

Ensure self-draining in the process. Make sure that the opening to detect leaks at the process connection is at the lowest possible point.

Installation instructions

- Make sure that the sensor tip is completely surrounded by medium.
- Position the sensor tip in the area of maximum flow velocity (pipe center).
- Minimum sensor immersion length:
 $L_i \geq 10 \text{ mm}$ (0.4 in).

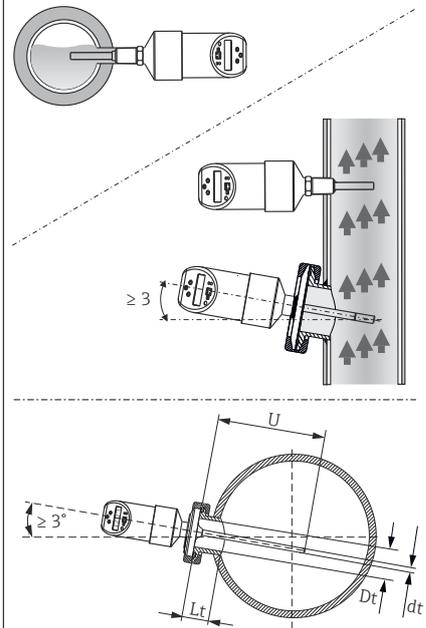


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3 Installation instructions (example)

Orientation

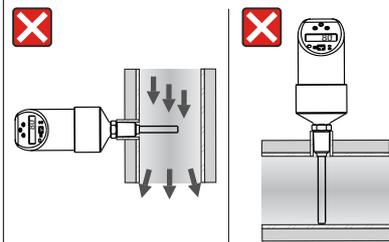
- For horizontal pipes: lateral installation. Installation from above only if the pipe is completely filled with medium
- For vertical pipes: installation in the ascending pipe
- For device model Flowphant T DTT35: install at an angle of at least 3° to guarantee self-draining



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4 Correct orientation

-  Do not install in down pipes open towards the end. Make sure that the sensor tip is not touching the pipe wall.



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5 Incorrect installation!

- The display can be rotated electronically by 180° .
- The top housing section can be rotated mechanically by up to 310° .

Hygiene-compliant installation**⚠ CAUTION**

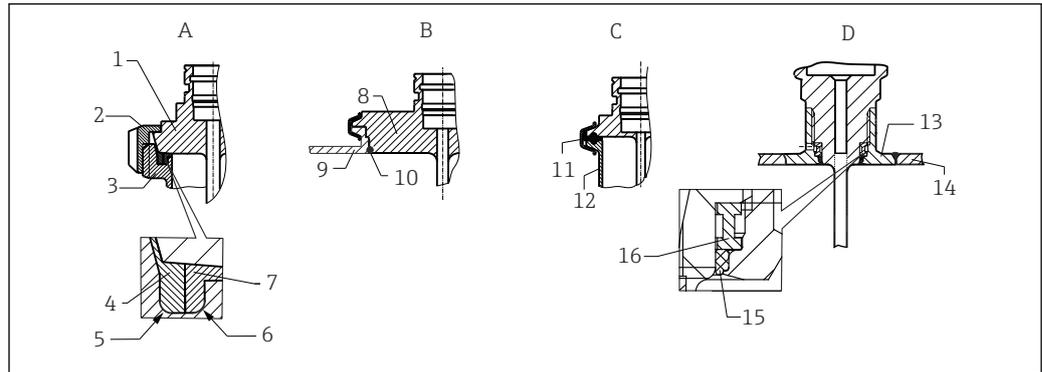
In the event of a defective sealing ring (O-ring) or seal, perform the following steps:

- ▶ Remove the device.
- ▶ Clean the thread and the O-ring joint/sealing surface.
- ▶ Replace the sealing ring and the seal.
- ▶ Perform process cleaning after installation.

i Ensure compliance with the requirements of the EHEDG and the 3-A Sanitary Standard.

Installation instruction EHEDG/cleanability: $Lt \leq (Dt-dt)$

Installation instruction 3-A/cleanability: $Lt \leq 2(Dt-dt)$



6 Detailed installation instructions for hygiene-compliant installation

A Dairy fitting according to DIN 11851, only in conjunction with EHEDG-certified and self-centering sealing ring

- 1 Sensor with dairy fitting
- 2 Groove slip-on nut
- 3 Counterpart connection
- 4 Centering ring
- 5 R0.4
- 6 R0.4
- 7 Sealing ring

B Varivent® process connection for VARINLINE® housing

- 8 Sensor with Varivent connection
- 9 Counterpart connection
- 10 O-ring

C Clamp according to DIN 32676, DN25-40

- 11 Molded seal
- 12 Counterpart connection

D Liquiphant M G1" process connection, horizontal installation

- 13 Weld-in adapter
- 14 Vessel wall
- 15 O-ring
- 16 Thrust collar

For welded connections, perform welding work on the process side as follows:

1. Ensure the surface is honed and mechanically polished, $Ra \leq 0.76 \mu\text{m}$ (30 μin).
2. Use suitable welding material.
3. Avoid crevices, folds and gaps.
4. Flush-weld or weld with welding radius $\geq 3.2 \text{ mm}$ (0.13 in).

Welding work has been carried out properly.

To maintain cleanability, observe the following when installing the thermometer:

1. The installed sensor is suitable for CIP (cleaning in place). Cleaning is carried out in combination with piping or tank. For tank installation, use process connection nozzles to ensure the cleaning assembly directly sprays this area to clean it effectively.
2. The Varivent® connections enable flush-mounted installation.

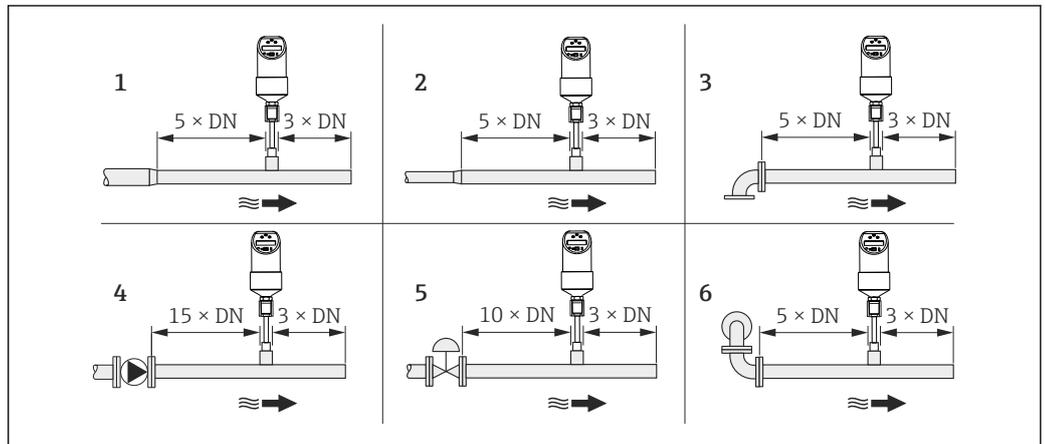
Cleanability is retained after installation.

Inlet and outlet runs



The thermal measuring principle is sensitive to disturbed flow conditions.

- Install the device as far away as possible from any flow disturbances. For further information, please refer to ISO 14511.
- If possible, install the device upstream of fittings such as valves, T-pieces or elbows.
- To attain the specified measurement accuracy of the device, the inlet and outlet runs mentioned below must be maintained at the very minimum.
- If several flow disturbances are present, maintain the longest specified inlet run.



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- 1 Reduction
- 2 Expansion
- 3 90° elbow or T-piece
- 4 Pump
- 5 Control valve
- 6 2 x 90° elbow, 2- or 3-dimensional

Environment

Ambient temperature	-40 to 85 °C (-40 to 185 °F)					
Storage temperature	-40 to 85 °C (-40 to 185 °F)					
Operating altitude	Up to 4 000 m (13 123.36 ft) above sea level					
Degree of protection	<table border="1"> <tr> <td>IP65</td> <td>M16 x 1.5 or NPT ½", valve connector</td> </tr> <tr> <td>IP66</td> <td>M12 x 1 connector</td> </tr> </table>	IP65	M16 x 1.5 or NPT ½", valve connector	IP66	M12 x 1 connector	
IP65	M16 x 1.5 or NPT ½", valve connector					
IP66	M12 x 1 connector					
Shock resistance	50 g as per DIN IEC 68-2-27 (11 ms)					
Vibration resistance	<ul style="list-style-type: none"> ■ 20 g as per DIN IEC 68-2-6 (10-2000 Hz) ■ 4 g as per marine approval 					
Electromagnetic compatibility (EMC)	<p>Electromagnetic compatibility in accordance with all the relevant requirements of the IEC/EN 61326 series and NAMUR Recommendation EMC (NE21). For details refer to the EU Declaration of Conformity.</p> <p>Maximum measurement error <1% of the measuring range.</p> <p>Interference immunity as per IEC/EN 61326 series, industrial requirements</p> <p>Interference emission as per IEC/EN 61326 series, Class B equipment</p>					
Electrical safety	<ul style="list-style-type: none"> ■ Protection class III ■ Overvoltage category II ■ Pollution level 2 					

Process

Process temperature range -20 to 85 °C (-4 to 185 °F).

The sensor can be exposed to process temperatures up to 130 °C (266 °F) without being damaged. The monitoring system switches off automatically at $T \geq 85$ °C (185 °F) and starts again at $T \leq 85$ °C (185 °F).

Process pressure range Maximum permissible process pressure $P_{\max} \leq 10$ MPa = 100 bar (1 450 psi)

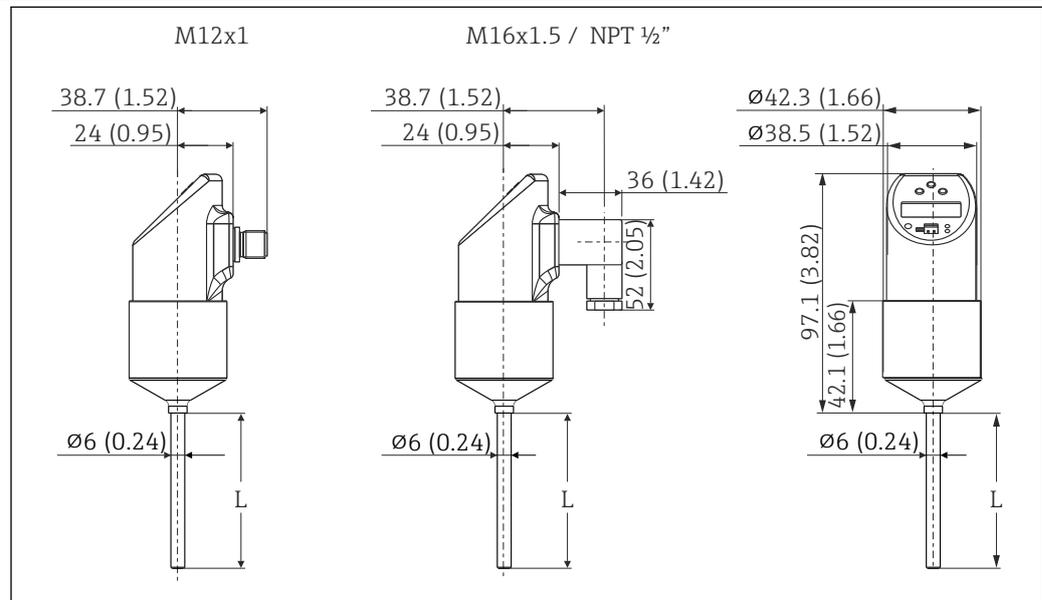
i The maximum process pressure for the conical metal-metal process connection (MB option) for the device is 1.6 MPa = 16 bar (232 psi).

Flow limit Liquids: 0 to 3.0 m/s (0 to 9.84 ft/s)

Operational range Liquids: 0.03 to 3.0 m/s (0.1 to 9.84 ft/s)

Mechanical construction

Design and dimensions



7 All dimensions in mm (in)

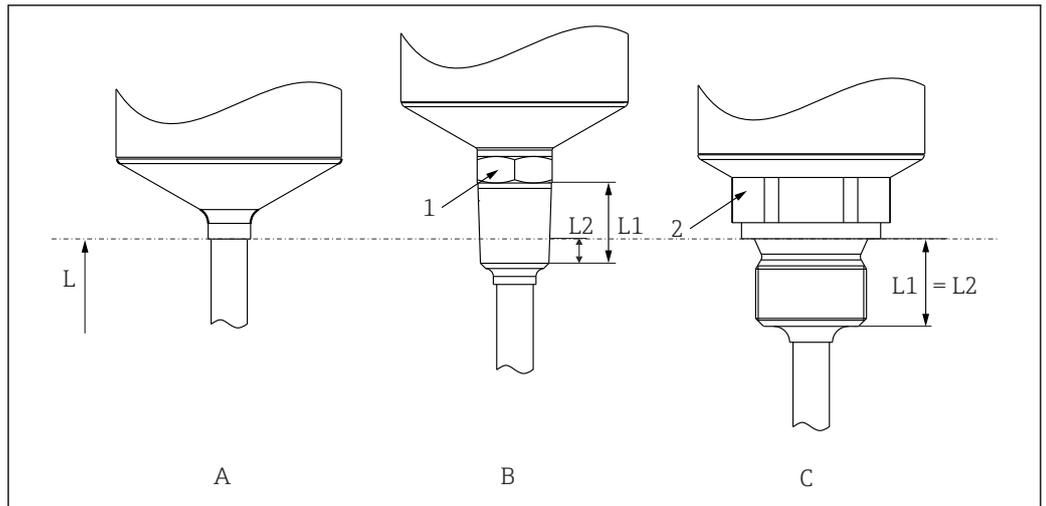
L: Insertion length

Left: M12x1 connector as per IEC 60947-5-2

Center: Valve connector M16x1.5 or NPT 1/2" as per DIN 43650A/ISO 4400

Process connections

The following process connections can be configured for the industrial version of the device.



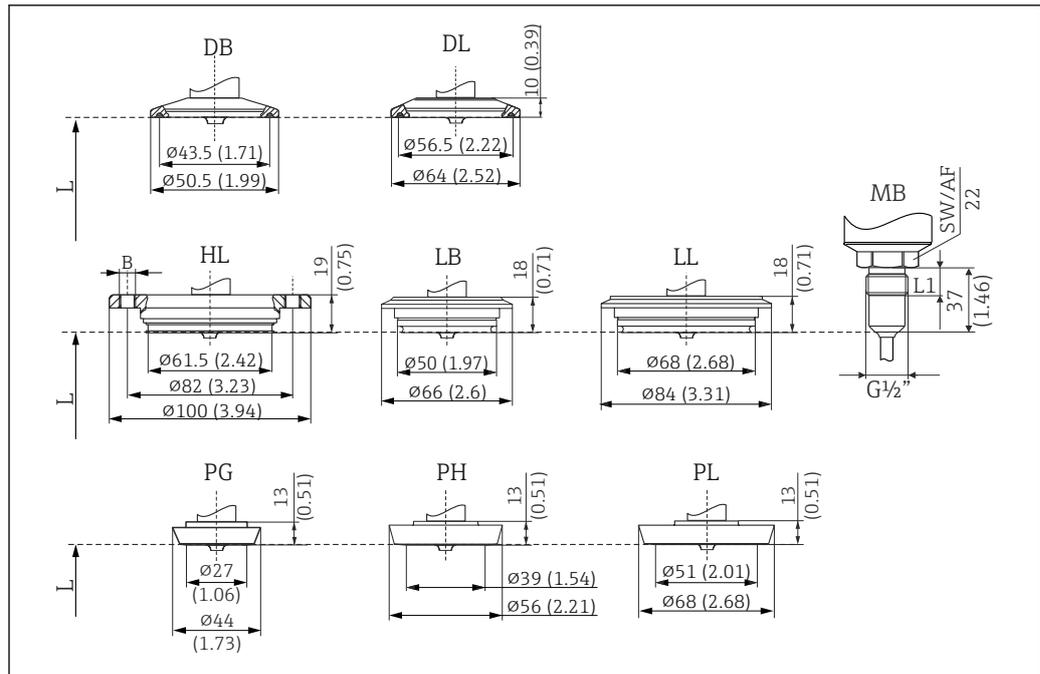
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8 Process connection versions

- 1 Threaded process connection
- 2 Threaded process connection, inches, cylindrical as per ISO 228
- L Insertion length
- L₁ Thread length
- L₂ Screw-in length

Item no.	Process connection versions	Thread length L ₁	Screw-in length L ₂
A	Without process connection. Use of suitable welding bosses and compression fittings.	-	-
B	Threaded process connection: <ul style="list-style-type: none"> ■ ANSI NPT ¼" (1 = AF14) ■ ANSI NPT ½" (1 = AF27) 	<ul style="list-style-type: none"> ■ 14.3 mm (0.56 in) ■ 19 mm (0.75 in) 	<ul style="list-style-type: none"> ■ 5.8 mm (0.23 in) ■ 8.1 mm (0.32 in)
C	Threaded process connection, inches, cylindrical as per ISO 228: <ul style="list-style-type: none"> ■ G¼" (2 = AF14) ■ G½" (2 = AF27) 	<ul style="list-style-type: none"> ■ 12 mm (0.47 in) ■ 14 mm (0.55 in) 	-

The following process connections can be configured for the hygienic device version.



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9 Process connection versions, all dimensions in mm (in)

L Insertion length

Item no.	Process connection versions	Hygiene standard
DB	Clamp 1" - 1½", DN25 to 40 DIN 32676 ¹⁾	3-A marked and EHEDG certified (only in conjunction with seal according to EHEDG position paper)
DL	Clamp 2", DN50 DIN 32676 ¹⁾	
HL	APV Inline, DN50, PN40, 316L, B = bores 6 x Ø8.6 mm (0.34 in) + 2 x M8 thread	3-A marked and EHEDG certified
LB	Varivent F DN25-32, PN 40, 316L	
LL	Varivent N DN40-162, PN 40, 316L	
MB	Metal sealing system for hygienic processes, G½" thread, thread length L1 = 14 mm (0.55 in). Suitable welding boss available as an accessory. 316L	-
PG	DIN 11851, DN25, PN40 (including coupling nut), 316L	3-A marked and EHEDG certified (only in conjunction with self-centering seal according to EHEDG position paper)
PH	DIN 11851, DN40, PN40 (including coupling nut), 316L	
PL	DIN 11851, DN50, PN40 (including coupling nut), 316L	

1) DIN 32676 replaces ISO 2852.

Weight

300 g (10.58 oz), depends on process connection and sensor length.

Materials

Process connection AISI 316L

- Surfaces in contact with the process in hygienic version
- Coupling nut AISI 304
- Housing AISI 316L
- O-ring between housing and sensor module: EPDM

Electrical connection

- M12 connector, exterior AISI 316L, interior polyamide (PA)
- Valve connector, polyamide (PA)
- M12 connector, exterior 316L

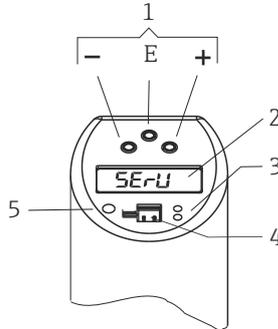
- Cable sheath polyurethane (PUR)
- O-ring between electrical connection and housing: FKM
- Display, polycarbonate PC-FR (Lexan®)
- Seal between display and housing: SEBS THERMOPLAST K®
- Keys: polycarbonate PC-FR (Lexan®)

Surface roughness $R_a \leq 0.76 \mu\text{m}$ (30 μin)

Operability

Operation concept

The device is operated via three keys. The digital display and the light emitting diodes (LED) assist navigation through the operating menu.



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10 Position of the operating elements and possibilities for display

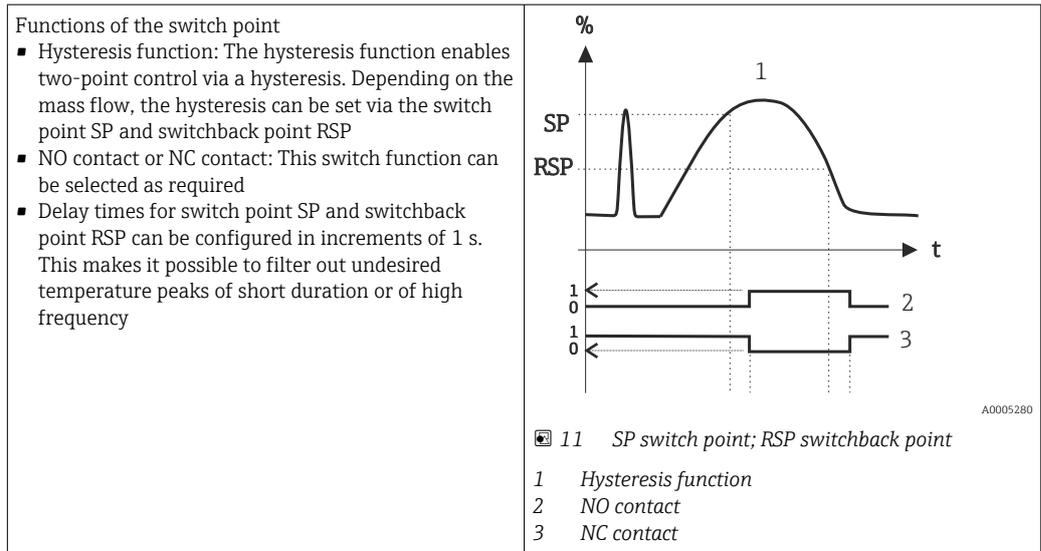
- 1 Operating keys
- 2 Digital display: illuminated white (= ok); red (= alarm/error)
- 3 Yellow LED for switching states: LED on = switch closed; LED off = switch open
- 4 Communication jack for PC configuration
- 5 LED for status display: green = OK; red = error/fault; flashing red/green = warning

Local display

Menu-guided operation using operating keys.

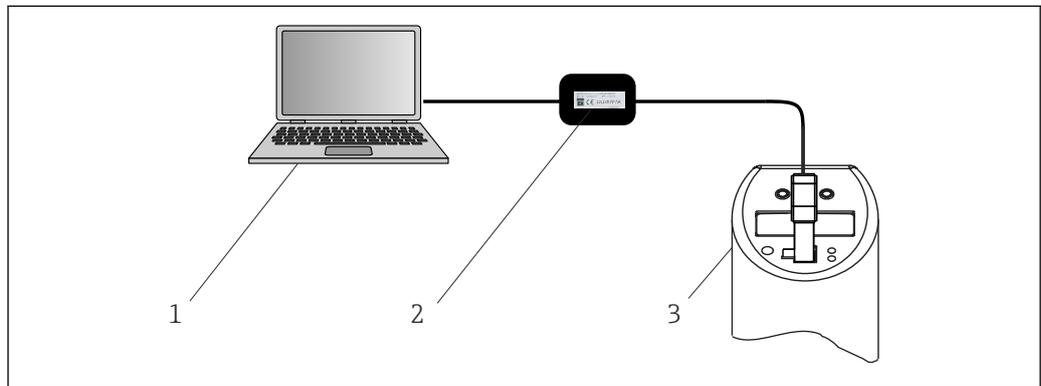
Function group	Function (display)		Description
BASE (basic functions)	DISP	Display	Display assignment: <ul style="list-style-type: none"> ▪ OFF ▪ Display of current measured value or of configured switch point (switch 1) ▪ Display of current measured value or of configured switch point (switch 1) rotated by 180° ▪ Display of current medium temperature ▪ Display of current medium temperature rotated by 180° ▪ Factory setting: current measured value
	UNIT	Technical unit	Medium temperature displayed in the unit °C or °F Factory setting: °C Only visible if the current medium temperature TMP is selected in the DISP mode.
	TAU	Damping	Measured value damping with regard to display value and output: 0 (no damping) or 9 to 40 s (in increments of 1 s) Factory setting: 0 s
	DESI	DESINA Only for 2 x PNP switch outputs	Behavior as per DESINA: The PIN assignment of the M12 connector is in accordance with the DESINA Guidelines (DESINA = distributed and standardized installation technology for machine tools and manufacturing systems) Factory setting: NO
CAL Calibration	HIF	Learn High Flow	Setting for the maximum flow rate that occurs. 100% value
	LOWF	Learn Low Flow	Setting for the minimum flow rate that occurs. 0% value
Switch outputs OUT (setting for the 1st output) OUT2 (setting for the 2nd output) OUT Output 2	MODE	Switching mode	Process value for analog output: flow or temperature Factory setting: flow
	UNIT	Technical unit	Temperature unit selection (°C or °F) Function is only visible if the switching mode MODE is set to temperature TEMP in the 2nd output. Factory setting: °C

Function group	Function (display)		Description
	FUNC FNC2	Function 1 Function 2, optional	Switch output function: Hysteresis function NC contact or NO contact (see the following diagram)
	SP SP2	Switch point Switch point 2, optional	Enter value 5 to 100% in increments of 1%, only if High and Low Flow (HIF and LOWF) have been configured beforehand. Factory setting: 50% or optionally for SP2: Enter value -15 to 85 °C (-5 to 185 °F) in increments of 1 K if the switching mode MODE is set to temperature TEMP. Factory setting: 55 °C
	SPL SP2L	Switch point learn Switch point learn 2, optional	Take current flow rate as SP.
	RSP RSP2	Switchback point Switchback point 2, optional	Enter value 0 to 95% in increments of 1%. Factory setting: 40%  Value must be at least 5% less than switch point 2 (SP2). or optionally for RSP2: Enter value -20 to 80 °C (-4 to 176 °F) in increments of 1 K if the switching mode MODE is set to temperature TEMP. Factory setting: 50 °C  Value must be at least 5 °C (9 °F) less than switch point SP2.
	TSP TSP2	Switch point delay Switch point 2 delay, optional	Can be configured as required from 0 to 99 s in increments of 1 s Factory setting: 0 s
	TRSP TRSP2	Switchback point delay Switchback point 2 delay, optional	Can be configured as required from 0 to 99 s in increments of 1 s Factory setting: 0 s
Analog output 4-20 (setting for the analog output, optional)	MODE	Output mode	Process value for analog output: flow or temperature Factory setting: flow
	FCUR	Fault current	Specify the fault current: Choice of MIN = ≤3.6 mA MAX = ≥21.7 mA HOLD = last current value Factory setting: MAX
SERV (service functions)	PRES	Reset	Reset all entries to the delivery settings.
	REVC	Static revision counter	Configuration counter, incremented each time the configuration is changed.
	LOCK	Locking code	Enter the device locking code.
	Code	Edit locking code	Locking, only visible if the locking code is valid.
	STAT	Device status	
	LSTA	Last error	Displays the last error to occur.
Simulation: Version 2 x switch output	SIMU SIM2	Simulation 1 Simulation 2, optional	Simulation switch output 1: on/off with display, optionally corresponding to switch output 2.
Simulation: Version 1 x analog output and 1 x switch output	SIM SIMA	Simulation 1 - switch output Simulation 2 - analog output	Simulation switch output 1: on/off with display Simulation values for analog output in mA.



Remote operation

Operation, visualization and maintenance with PC and FieldCare PC configuration software.



12 Operation, visualization and maintenance with PC and configuration software

- 1 PC with FieldCare, ReadWin configuration software
- 2 Configuration kit TXU10-AA or FXA291 with USB port
- 3 Industrial or hygienic device version

In addition to the operation options listed in the previous "Onsite operation" section, further information about the device is available via the FieldCare configuration software:

Function group	Function (display)	Description
SERV (service function)	Switching operations 1 Switching operations 2, optional	Number of changes in the switching state for switch output 1; optionally for switch output 2
INFO (device information)	TAG 1 TAG 2, optional	Tagging, 18-digit
	Order code	Order code
	Serial number	Device serial number
	Sensor serial number	Sensor serial number
	Electronics serial number	Electronics serial number
	Device version	Displays overall version
	Hardware revision	Hardware version
	Software revision	Software version

Certificates and approvals

Current certificates and approvals for the product are available at www.endress.com on the relevant product page:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Downloads**.

Hygiene standard

- EHEDG Certificate, Type EL CLASS I. EHEDG-certified/tested process connections.
- 3-A certificate authorization no. 1144, 3-A Sanitary standard 74-07. Listed process connections.
- FDA-compliant.
- All surfaces in contact with the medium are free from materials derived from bovine animals or other livestock (ADI/TSE).

Materials in contact with food/product (FCM)

The process contact parts (FCM) are in conformity with the following European Regulations:

- Regulation (EC) No 1935/2004, on materials and articles intended to come into contact with food, article 3, paragraph 1, article 5 and 17.
- Regulation (EC) No 2023/2006 on good manufacturing practice for materials and articles intended to come into contact with food.
- Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food.

Ordering information

Detailed ordering information is available from your nearest sales organization www.addresses.endress.com or in the Product Configurator at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Configuration**.



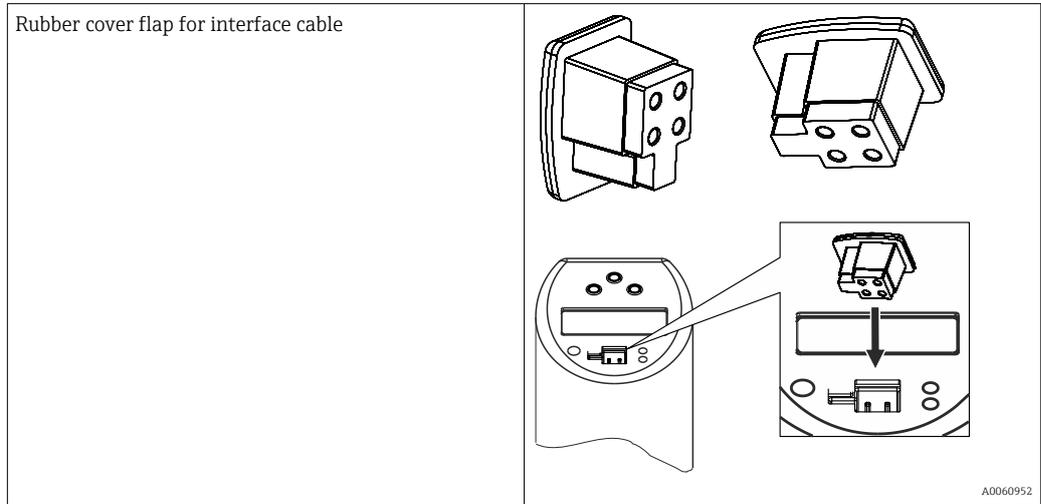
Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
- Depending on the device: direct input of information specific to the measuring point, such as the measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

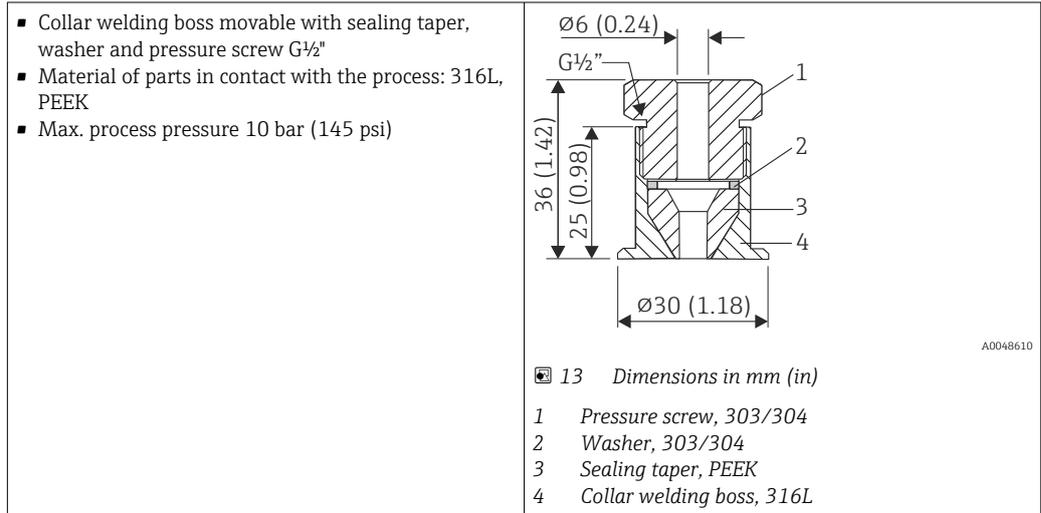
Accessories

Device-specific accessories

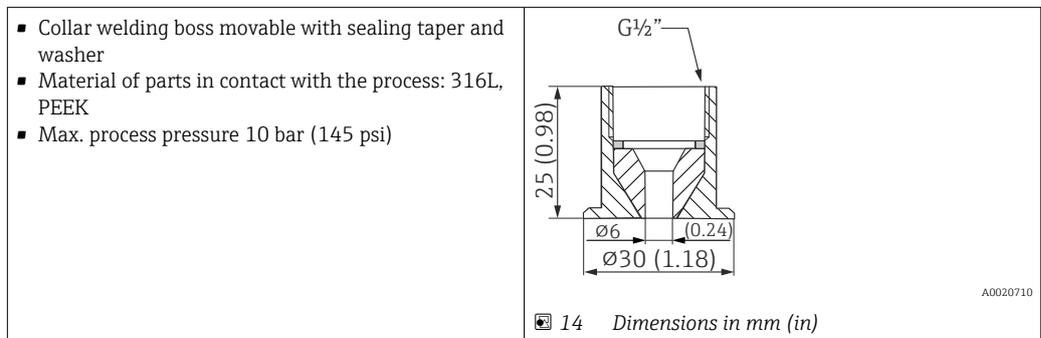
Rubber cover flap for interface cable



Welding boss with sealing taper

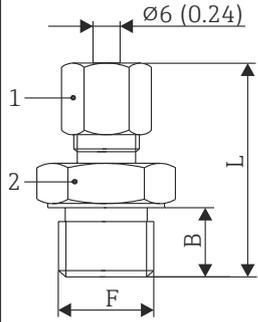


Collar welding boss



Compression fitting

- Movable clamping ring, various process connections
- Material of compression fitting and parts in contact with the process: 316L



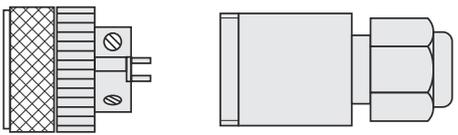
15 Dimensions in mm (in)
1 AF14

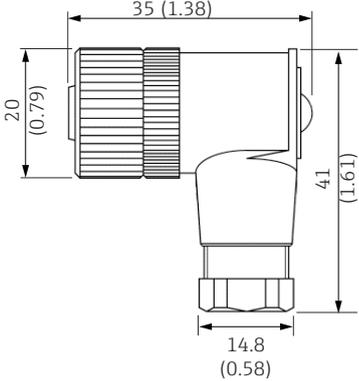
A0048609

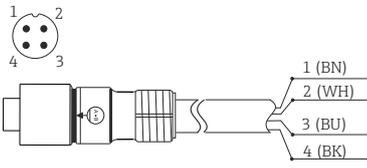
Version	F in mm (in)		L in mm (in)	B in mm (in)	Clamping ring material	Max. process temperature	Max. process pressure
TA50	G½"	AF 27	47 mm (1.85 in)	15 mm (0.6 in)	SS316 ¹⁾	800 °C (1472 °F)	40 bar at 20 °C (580 psi at 68 °F)
				20 mm (0.8 in)	PTFE ²⁾	200 °C (392 °F)	5 bar at 20 °C (72.5 psi at 68 °F)
	G¾"	AF 32	63 mm (2.48 in)	20 mm (0.8 in)	SS316 ¹⁾	800 °C (1472 °F)	40 bar at 20 °C (580 psi at 68 °F)
					PTFE ²⁾	200 °C (392 °F)	5 bar at 20 °C (72.5 psi at 68 °F)
	G1"	AF 41	65 mm (2.56 in)	25 mm (0.98 in)	SS316 ¹⁾	800 °C (1472 °F)	40 bar at 20 °C (580 psi at 68 °F)
					PTFE ²⁾	200 °C (392 °F)	5 bar at 20 °C (72.5 psi at 68 °F)
	NPT½"	AF 22	50 mm (1.97 in)	20 mm (0.8 in)	SS316 ¹⁾	800 °C (1472 °F)	40 bar at 20 °C (580 psi at 68 °F)
R½"	AF 22	52 mm (2.05 in)	20 mm (0.8 in)	PTFE ²⁾	200 °C (392 °F)	5 bar at 20 °C (72.5 psi at 68 °F)	
R¾"	AF 27	52 mm (2.05 in)	20 mm (0.8 in)	PTFE ²⁾	200 °C (392 °F)	5 bar at 20 °C (72.5 psi at 68 °F)	

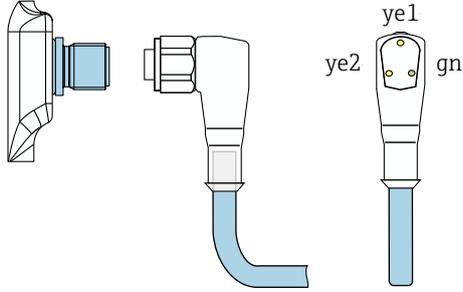
- 1) SS316 clamping ring: can only be used once. Once released the compression fitting cannot be repositioned on the thermowell. Fully adjustable immersion length on initial installation.
- 2) PTFE/Elastosil® clamping ring: reusable; once loosened, the compression fitting can be moved up or down on the thermowell. Fully adjustable immersion length.

Communication-specific accessories

Accessories	Description
<ul style="list-style-type: none"> ▪ Coupling M12x1; straight ▪ Connection to M12x1 housing connector ▪ Materials: body PA, coupling nut CuZn, nickel-plated ▪ Degree of protection (fully locked): IP67 	 <p style="text-align: right;">A0035843</p>

Accessories	Description
<ul style="list-style-type: none"> ■ M12x1 coupling; elbowed, for termination of connecting cable by user ■ Connection to M12x1 housing connector ■ Body materials PBT/PA ■ Coupling nut GD-Zn, nickel-plated ■ IP67 degree of protection (fully locked) ■ Voltage: max. 250 V ■ Current carrying capacity: max. 4 A ■ Temperature: -40 to 85 °C (-40 to 185 °F) 	 <p style="text-align: right; font-size: small;">A0020722</p>

Accessories	Description
<ul style="list-style-type: none"> ■ PVC cable, 4 x 0.34 mm² (22 AWG) with M12x1 coupling nut made of epoxy coated zinc, straight socket contact, screw plug, 5 m (16.4 ft) ■ IP69K protection (optional) ■ Voltage: max. 250 V ■ Current carrying capacity: max. 4 A ■ Temperature: -20 to 105 °C (-4 to 221 °F) <p>Wire colors:</p> <ul style="list-style-type: none"> ■ 1 = BN brown ■ 2 = WH white ■ 3 = BU blue ■ 4 = BK black 	 <p style="text-align: right; font-size: small;">A0020725</p>

Accessories	Description
<ul style="list-style-type: none"> ■ PVC cable, 4 x 0.34 mm² with M12x1 coupling, with LED, elbowed ■ 316L screw plug, length 5 m (16.4 ft), specially for hygiene applications ■ Degree of protection (fully locked): IP69K <p>Display:</p> <ul style="list-style-type: none"> ■ gn: device is operational ■ ye1: switch status 1 ■ ye2: switch status 2 <p> Not suitable for 4 to 20 mA analog output.</p>	 <p style="text-align: right; font-size: small;">A0035844</p>

Configuration kit

- Configuration kit for PC-programmable transmitters and temperature switches; Configuration software and interface cable for PC with USB port and 4-pin post connector
Order code: TXU10-AA
- "Commubox FXA291" configuration kit with interface cable for PC with USB port. Intrinsically safe CDI interface (Endress+Hauser Common Data Interface) for transmitters with 4-pin post connector. Suitable configuration software is FieldCare for example.
Order code: **FXA291**

Configuration software

Download the free FieldCare "Device Setup" configuration program directly from the Internet at the following address:

www.endress.com/fieldcare

You can order FieldCare 'Device Setup' from the manufacturer's sales department.

System components

RN series active barrier

Single- or two-channel active barrier for safe separation of 0/4 to -20 mA standard signal circuits with bidirectional HART transmission. In the signal duplicator option, the input signal is transmitted to two galvanically isolated outputs. The device has one active and one passive current input; the outputs can be operated actively or passively.

For more information, please refer to: www.endress.com

Process indicators from the RIA product family

Easily readable process indicators with various functions: loop-powered indicators for displaying 4-20 mA values, display of up to four HART variables, process indicators with control units, limit value monitoring, sensor power supply, and galvanic isolation.

Universal application thanks to international hazardous area approvals, suitable for panel mounting or field installation..

For more information, please refer to: www.endress.com

Data Manager of the RSG product family

Data Managers are flexible and powerful systems to organize process values. Up to 20 universal inputs and up to 14 digital inputs for direct connection of sensors, optionally with HART, are available as an option. The measured process values are clearly presented on the display and logged safely, monitored for limit values and analyzed. The values can be forwarded via common communication protocols to higher-level systems and connected to one another via individual plant modules.

For more information, please refer to: www.endress.com

Documentation

The following document types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads), depending on the product configuration:

Document type	Purpose and content of the document
Technical Information (TI)	Planning aid This document contains all the technical data on the product and provides an overview of everything that can be ordered with the product.
Brief Operating Instructions (KA)	Quick guide to obtaining the first measured value The Operating Instructions contain all the essential information about the product from incoming acceptance to initial commissioning.
Operating Instructions (BA)	Reference The Operating Instructions contain the information that is required in the various phases of the life cycle of the product: From product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.
Description of Device Parameters (GP)	Reference for parameters The document contains detailed explanations of readable or configurable parameters in the product. The description is aimed at those who work with the product over its entire life cycle and perform specific configurations.
Safety Instructions (XA)	Safety Instructions for electrical equipment in hazardous areas are supplied with the product depending on the approval. These are an integral part of the Operating Instructions.  The nameplate indicates the Safety Instructions (XA) that are relevant to the product.
Supplementary device-dependent documentation (SD/FY)	Always comply strictly with the instructions in the relevant supplementary documentation. The supplementary documentation is an integral part of the product documentation.



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