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INSTALLATION INSTRUCTION



TSS80

Mounting the tube probes
into the pipeline



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Pipe Probe TSS80 / TSS85

1.1 Before and during installation

The pipe probes TSS 80/85 must be protected against moisture and mechanical damage before and during installation.

- Remove the blue heat-shrinkable sleeve from the coax connection only once the coax cable is connected. (Version with separate MTI)

Pipe probe types:

TSS80 DN.. SF MTI Gd FIX

TSS80 ANSI.. SF MTI Gd FIX

TSS85 DN.. SF MTI G FIX

TSS85 ANSI.. SF MTI G FIX

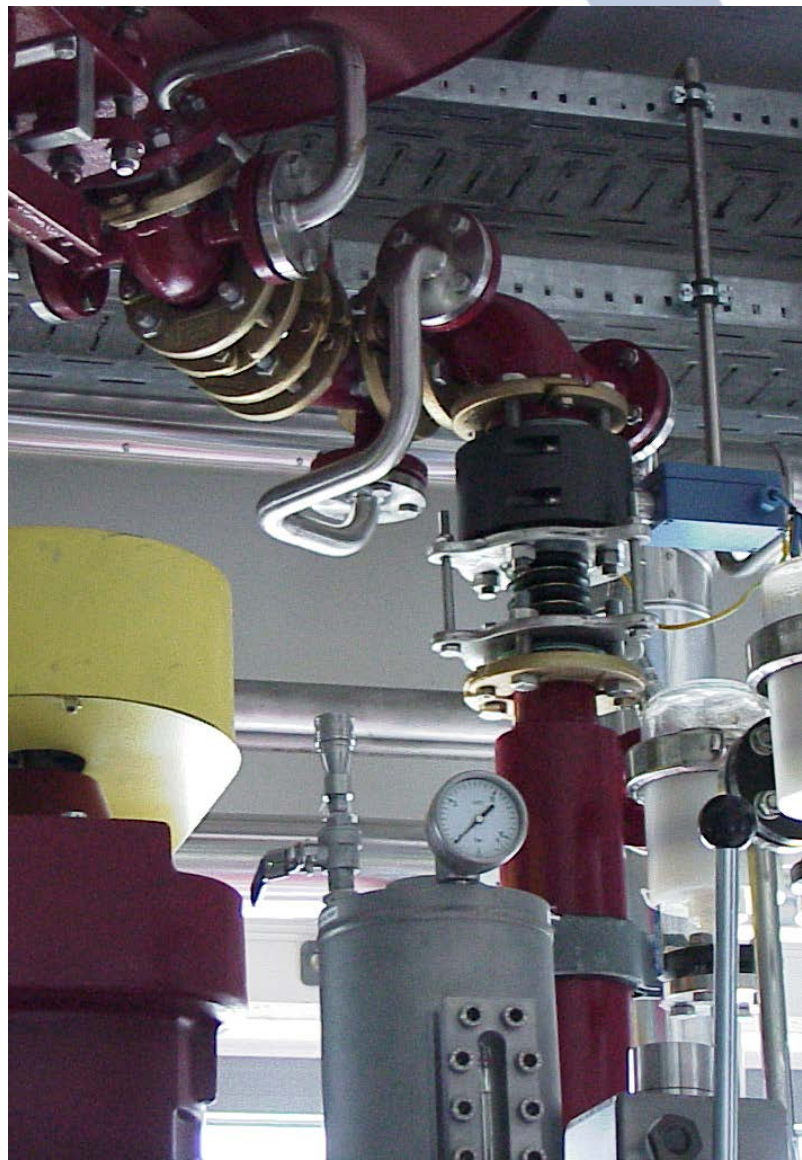
with on-site MTI measuring electronics with cooling element for temp. $>100^{\circ}\text{C}$ and/or connection extension for insulated lines

1.2 Mounting position

Mounting position from 3% slope to vertical alignment, depending on the application.

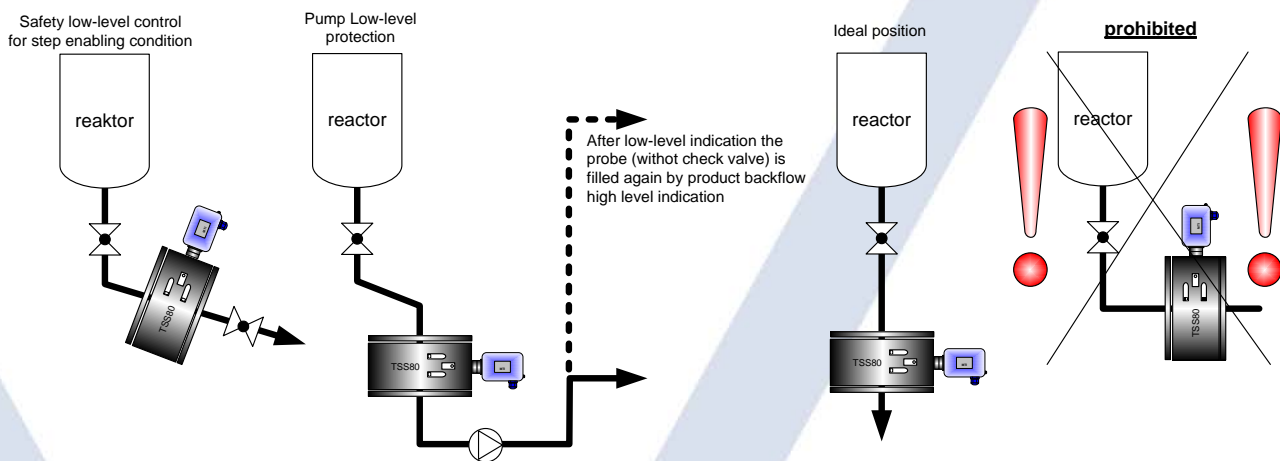
- The empty-running of the pipe probe must be guaranteed; commissioning – observe checklist for interfacial detection with pipe probe.
- The installation direction is independent of the flow direction.
- Installation between 2 flat flanges PN 16 / 150 lbs with two seals (1.6 mm each)

Caution: Observe the flange distance for different nominal widths, as in the sealing regulations described in Section 2.



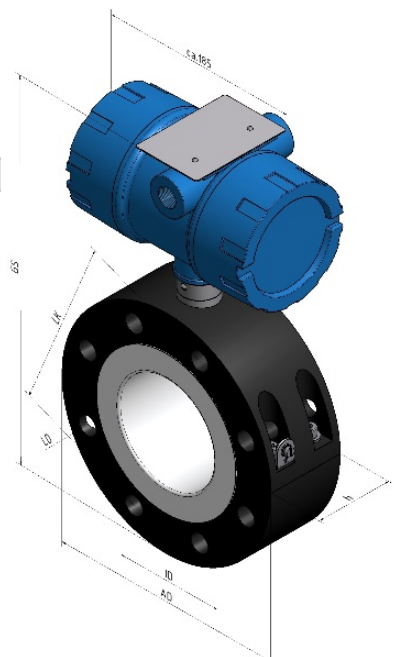
Assembly instruction for pipe probes TSS80/85

- The flat seals protect the Teflon inner body and guarantee tightness.
- The PTFE inner body protrudes 0.5 mm on both sides.
- Caution: The inner O-rings only guarantee 100% tightness of the pipe probe once installed.
- The black probe body is optimally protected against corrosion. Damage to this protective layer is to be avoided.
- For pipe probe installation without external insulation, it is possible to attach the on-site electronic unit (MTI) to the flange using a mounting bracket.



1.3 Dimensions of the TSS 80 pipe probes

Line							Steel	enamelled
Nominal widths	AD	(DN) ID	LD Bore holes	LK	DD	Mounting h	FLA incl. seal	FLA incl. sandw.
DN 32/40	150	32/40	8 x ø 18	100/110	77	70	73.2	83.6
DN 50	165	50	4 x ø 18	125	97	92	95.2	105.6
DN 80	200	80	8 x ø 18	160	123	74	77.2	87.6
DN 100	220	100	8 x ø 18	180	146	74	77.2	87.6
DN150 (TSS85)	220	150	8 x ø 22	(240)	191	46	49.2	63
ANSI 2"	152.4	50	4 x ø 19.1	120.7	97	92	95.2	105.6
ANSI 3"	190.5	80	4 x ø 19.1	152.4	123	74	77.2	87.6
ANSI 4"	228.6	100	8 x ø 22.4	190.5	146	74	77.2	87.6



Assembly instructions for pipe probe TSS80/85

1.4 El. connection of the probe

1.4.1 Earthing

- Connect earth terminal to metallic pipeline (4 mm² copper wire); potential equalisation line
- Connect pipe probe earth terminal to potential equalisation line

Basis: Ex regulation SEV 09/ ATEX

Error-free function in steel apparatus

1.4.2 Coaxial cable connection (version with separate MTI)

1. Remove heat-shrinkable sleeve from coax connection of probe.
2. The pipe probe is connected to the on-site electronic unit with an original coax cable. (ready-to-connect)
3. Pull black heat-shrinkable sleeve over both sides of the coax cable with plug.
4. Screw coax connector into probe and on-site electronic unit. (tighten well by hand)
5. Push heat-shrinkable sleeve over coax connector and sealing ring with groove and shrink evenly with hot-air gun.
6. The tight-fitting heat-shrinkable sleeve protects the plug connection from water spray and corrosion.

1.4.3 Connection the MTI measuring electronic to the control unit

1. Connection in 2-wire technology (1x2x0.75mm²), shielded CY/EIG.
2. The shield is earthed on one or preferably on both sides. (EMV)
3. Use the wire end sleeves for the stripped cable ends for screw terminals.
For spring terminals [Cage Clamp®], no wire end sleeves are required.
4. Proceed according to the enclosed system wiring diagram.

2. Torque values for TSS 80

2.1 Material of seals

No.	seal	supplier	Surface pressing [N/mm ²]		
			min	recommended	max
1	Gylon Standard	Kubo Tech	20	25	35
2	Gylon blue	Kubo Tech	10	15	35
3	UCAR 323	Angst+Pfister	20	28	35
4	Lollipops	Angst+Pfister	5	10	20

- The max. surface pressure values were taken in to account up to 200°C.
- The application limit for PTFE is approx. 50 N/mm², at which point a strong cold flow occurs.
- Our values are 30% lower than this, which greatly minimises the cold flow

2.2 Thread friction coefficient

The friction coefficient of stainless steel screw connections is between 0.23 - 0.5 without lubrication and 0.10 - 0.20 lubricated with MoS₂. Due to the lower tightening torque and reduced fretting, our data refers to lubricated screw connections with an average friction coefficient of 0.14.

2.3 Bolt connection, material and sizes

Due to the pre-tensioning forces, we recommend using stainless screws of strength class 70 - 80.

Nominal diameter of pipe probe:

DN 32 – 50	4 bolts M 16
DN 80 – 100	8 bolts M 16
DN 150	8 bolts M 20
ANSI 2-3"	4 bolts M 16 / 5/8" x 11G
(ANSI 4"	8 bolts M 16 / 5/8" x 11G)

Installation of pipe probes TSS80/85

2.4 Sealing surface

TSS 80 DN 32/40	2 x 3150 mm ²
TSS 80 DN 50 / ANSI 2"	2 x 5100 mm ²
TSS 80 DN 80 / ANSI 3"	2 x 6350 mm ²
TSS 80 DN 100 / (ANSI 4")	2 x 8250 mm ²
TSS 85 DN150 / (ANSI 6")	2 x 13000 mm ²

2.5 Tightening torque

Using the conversion factor (norm table), the tightening torque is determined from the pre-tensioning force,

taking into account the friction coefficient

thread	Coefficient of friction	conversion factor
M16	0.10	2.17
	0.12	2.54
	0.14	2.92
M18	0.10	2.48
	0.12	2.90
	0.14	3.32
M20	0.10	2.71
	0.12	3.18
	0.14	3.65
5/8" x 11G		2.98

Formula:

Pre-tensioning force (FV [N]) per screw:

$$FV [kN] = \text{surface pressure [kN/mm}^2] \times \text{seal surface [mm}^2] / \text{number of screws}$$

Example TSS 80 DN 50, sealing material Gylon blue, minimal surface pressure.

$$0.01 \text{ kN/mm}^2 \times 5100 \text{ mm}^2 / 4 = \underline{12.75 \text{ kN}}$$

2.6 Mounting instructions

Tighten screws in a crosswise sequence with 50% of the nominal torque. For the second tightening procedure, apply 80% of the torque, and for the third, apply the full tightening torque. Check after 24h to adjust possible shifting of seal

2.7 Type of seal

For connections (collars etc.) which are not positioned on the entire Teflon surface of the pipe probe, or for surfaces which are not flat, e.g. enamel-coated flanges, sealing packages with steel core are to be used. E.g. PTFE seal with integrated steel disc and Gylon seals 6.8 mm thick. Suitable sealing packages are available from Aquasant.

2.8 Tightening torque table

Probe type TSS 80/85...	Seal 1 Tightening torque [Nm]			Seal 2 (Gylon blue) / Sealing package Tightening torque [Nm]			Seal 3 Tightening torque [Nm]			Seal 4 Tightening torque [Nm]		
	min	recom mende d	max	min	recom mende d	max	min	recom mende d	max	min	recom mende d	max
DN 32/40 SF	48	60	84	24	36	84	48	68	84	10	20	40
DN 50 SF	78	98	137	40	60	137	78	110	137	20	32	60
DN 80 SF	48	60	84	24	36	84	48	68	84	10	20	40
DN 100 SF	62	78	109	31	47	109	62	87	109	13	26	52
DN150 SF				52	77	180	102	144	180	26	52	103
ANSI 2" SF	88	110	154	44	66	154	88	124	154	19	38	76
ANSI 3" SF	104	135	189	54	81	189	104	151	189	12	24	48
(ANSI 4" SF)	70	88	123	35	53	123	70	98	123	16	31	62



Assembly instructions for pipe probe TSS80/85

3. Installation

The pipe probe is to be aligned such that the field housing is horizontal with the screwed cable gland M20x1.5 and facing downward. The inside diameter of the inlet line must correspond to the inside diameter of the pipe probe.

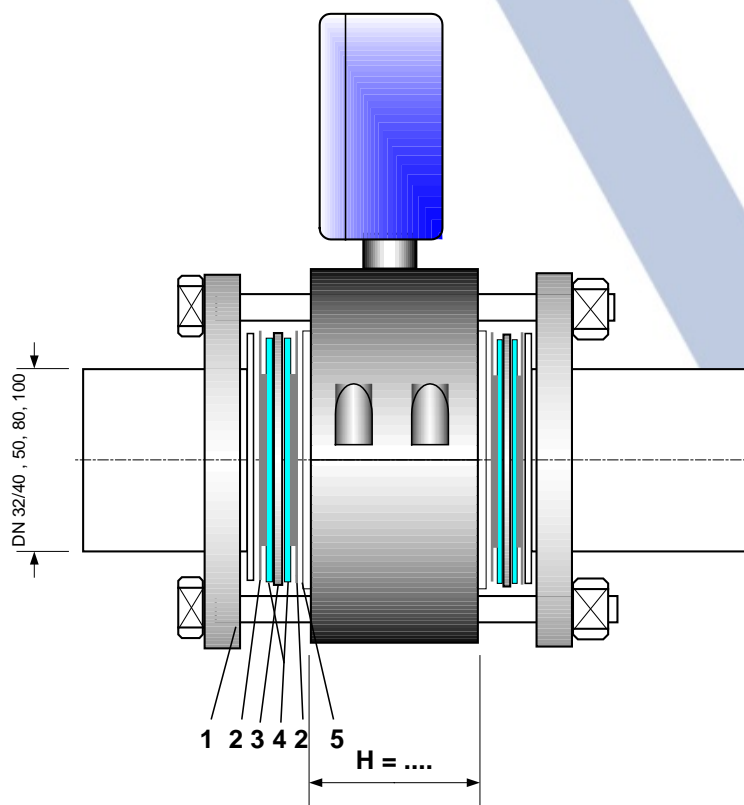
For pipe probes with Exd offshore housing, pressure-proof, the position of the connection head can be freely selected!

- Mounting position from 3% slope to vertical, depending on the application (see assembly instructions TSS)
- Installation direction independent of the flow direction
- Installation between two flat flanges or collar flanges, loose-type flanges only with special installation protection seals
- Note: Observe flange distance (FLA) for different nominal widths, the Teflon inner body protrudes 0.2 mm on both sides
- Additional “Gylon” flat gaskets protect the PTFE inner body (with corresponding tightening torque)
- Internal company assembly guidelines corresponding to the seal type are to be used.
- Observe internal safety regulations for open tanks
- Mounting in pipeline with corresponding probe flange nominal width with flat seal and tightening torque (see assembly instructions TSS80)
- The pipe insulation must not enclose the cooling element
- Ambient temperature: max permissible temperature in probe head must not exceed +60°C, if the pipe probe is insulated and the measuring electronics are positioned laterally
- At pipe temperatures >60°C, the MTI probe head must be mounted horizontally or facing downward and fastened in any 360° position with an adjusting screw.

- The pressure test must be carried out with assembled probe
- Note: Probe body is leak-proof only when flanged in

3.1 Note

Assembly by qualified personnel in accordance with the acknowledged technical rules. During pipe probe assembly, the recommended max. tightening torque may not be exceeded, so that the PTFE probe body is not damaged. Excessive tightening leads to deformation of the probe body. Assembly by qualified personnel in accordance with the acknowledged technical rules.



Sandwich seal structure:

1. Flange DN/ANSI ... PN.
Sealing package consisting of:
2. PTFE coating
3. Supporting disc
4. Gylon flat seal
5. PTFE body closure of pipe probe TSS80

Certifications / Tests

3.2 Notice to liability and warranty claims

Liability and warranty claims are excluded in cases of improper handling of the pipe probes, such as:

- Opening the probe screw fittings
- Mech. actions on the probe body and Teflon inner body, such as drilling, milling etc.
- Improper assembly and electrical connections
- Immersing the entire probe in liquid
- Use of unsuitable assembly materials such as seals, assembly screws etc.
- Repairs by third parties
- Connection to external devices
- Inadmissible operation with regard to specifications, such as pressure, temperature and medium
- Improper disposal

3.3 Not an equipment element for pressure safety control function

Additional pressure safety equipment may be required at the plant for the process measurement.

3.4 Uninstallation

- Empty tank and rinse with nitrogen or water as per operating instructions (observe internal safety regulations)
- Remove electrical connections. Dismantle probe, lift up by flange. Caution, residual liquid may leak out
- Data sheets for personal safety purpose need to be enclosed with repair shipments to aquasant

4.1 Pressure Equipment Directive

PED Directive 2014/68/EU

 0036

Test report no.:


P-EU-CH-WAL-16-11-2688560-24132018

4.2 ATEX test certificate

Ex certification according to Directive 94/9/EC (ATEX 95 A)

Confidential test certificate no. 08-IK-0395.01

EC-type examination certificate
SEV09 ATEX 0133 X

 1254

Description

Pipe probes of the TSS 80* MTI**/* series with fixed measuring electronics (MTI) connection are used in combination with the mipromex® M** **** *(SEV09 ATEX 0132) control unit for signal detection for different product layers (e.g. interfacial detection) in hazardous areas (observe MTI data sheet)

Ex classification:

Gas

II 1/2G Ex ia Gb IIC T6

Staub



II 1/2D Ex iaD 20/21 IP65 T85°C

II 1/2G Ex d ia IIC T6

Overview of application of mipromex[®] types MIQ/MAT/MLS

Interfacial layer: MIQ

Batch separation or continuous interfacial level measurement, detection of two immiscible liquids.

Limit value: MLS

Level switch or limit level display for organic to aqueous liquids.

Universal measuring unit: MAT

Product monitoring and identification, and concentration of organic chemical reactions

