we create solutions

aquasant

INSTALLATION INSTRUCTIONS

TSS90/100

Assembling instruction for pipe probes in the petrochemical industry

Aquasant Messtechnik AG | Postfach 107 | Hauptstrasse 22 | 4416 Bubendorf | Switzerland
T: +41 61 935 50 00 | info@aquasant-mt.com | www.aquasant-mt.com

Pipe probe TSS90 / TSS100

1.1 Before and during installation

The pipe probes TSS 90/100 must be protected against mechanical damages before and during installation.

Pipe probe types:

TSS90 DN.. SF MTI Gd FIX

TSS90 ANSI.. SF MTI Gd FIX

TSS100 DN.. SF MTI G FIX

TSS100 ANSI.. SF MTI G FIX

with on-site measuring electronics MTI with heat sink for temp.> 100 ° C and or connection extension for insulated cables

1.2 Mounting position

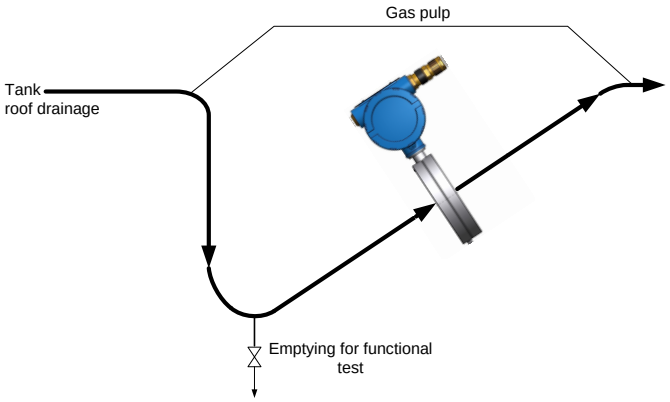
Mounting position from horizontal up to vertical, depending on application

The pipe probe empty drain off must be assured;

- Commissioning – Checklist for surveillance measures with analogue transmitter MAT and pipe probes must be observed.
- Mounting direction independent of flow direction.
- The inner diameter of the input pipeline must as much as possible correspond to the inner diameter of the TSS 90 pipe probe.
- Mounting between 2 flanges PN 16 / ANSI 150 or 300 lbs with 2 seals (min. 1.6 mm each)

Installation of pipe probes

- **Caution!** Observe the flange distance for the different nominal diameters as well as the sealing
- instructions described in chapter 2
- The housing must be horizontal with the cable gland aimed downward.
- Untight the hexagon set screw, turn/aim housing and tight hexagon set screw again
- Even if not installed, the inner O-ring seals assure a 100% impermeability of the probe



1.3 Dimension of the TSS 90 probe

Nominal diameter	AD	ID	LD Bohrungen	LK	mounting H
DN 50 PN16/40	165	52	4 x ø 18	125.0	40
DN 80 PN16	200	82	8 x ø 19.1	160.0	40
DN 100 PN16	220	102	8 x ø 18.0	180.0	40
DN 150 PN16	285	150	8 x ø 22.0	240.0	44
ANSI 2" 150 lbs	152.4	52	4 x ø 19.1	120.7	38
ANSI 2" 300 lbs	165.1	52	8 x ø 19.1	127.0	45
ANSI 3" 150 lbs	190.5	82	4 x ø 19.1	152.4	48
ANSI 3" 300 lbs	209.5	82	8 x ø 22.3	168.1	57
ANSI 4" 150 lbs	228.6	102	8 x ø 19.1	190.5	48
ANSI 4" 300 lbs	254.0	102	8 x ø 22.3	200.1	64
ANSI 6" 150 lbs	279.4	150	8 x ø 22.3	241.3	51
ANSI 6" 300 lbs	317.5	150	12 x ø 22.3	269.7	73

Dimension of the TSS 100 probe

Nominal diameter	AD	ID	LD Bohrungen	LK	mountin g H
DN 15 PN16	95	15	4 x ø 14	65	
DN 20 PN16	105	20	8 x ø 14	75	
DN 25 PN16	115	25	4 x ø 14	85	
ANSI ½" 150 lbs	88	15	4 x ø 15.7	60.5	
ANSI ½" 300 lbs	95.2	15	4 x ø 15.7	66.5	
ANSI ½" 600 lbs	95.2	15	4 x ø 15.7	66.5	
ANSI ¾" 150 lbs	98.6	20	4 x ø 15.7	69.9	
ANSI ¾" 300 lbs	117.3	20	4 x ø 19.0	82.5	
ANSI 1" 150 lbs	108.0	25	4 x ø 15.7	79.2	
ANSI 1" 300 lbs	123.9	25	4 x ø 19.0	88.9	

1.4 El. connection of the pipe probe

- Earth terminals to be connected to a metallic pipe (4 mm2 Cu-cable); Equipotential bond
- Earth terminals to be connected to the equipotential bond line

Reason: Regulation for hazardous area SEA 09/ ATEX / Fault free operation in steel installations

1.4 Connection MTI measuring electronic to the control unit

1. Connection in 2-wire technique (1 x 2 x 0.75 mm2) shielded
2. The shield to be earth grounded on 1 or better on both sides (EMC)
3. Use end splice for the non-isolated cable end
4. Proceed as per accompanying wiring diagram of the systems

2. Torque values

2.1 Material of seals

no	Sales	Surface pressure [N/mm²] recommended
1	Gylon Standard	25
2	Gylon blue	15
3	UCAR 323	28
4	Klingerseal C 4300	20
5	Durlan 7900	20
6	Durlan 8500	20

2.2 Thread coefficient of friction

The coefficient of friction for stainless steel bolt connections is, without lubrication, between 0.23 – 0.5 and 0.10 – 0.20 with MoS2 lubricant. In reason of the low torque and reduced scoring tendency, all our indications are related to lubricated stainless steel bolts connections with an average coefficient of friction of 0.14.

2.3 Bolt connection, material and sizes

n reason of the pretension we recommend the use of stainless steel bolts of the solidity class 70 – 80.

Installation instructions of the tube probe

Nominal diameter of pipe probe:

DN 50 / 80 PN 16/40 4 - 8 bolts M 16

ANSI 2" - 6" 150 lbs 4 - 8 bolts 5/8" x 11G bore hole ø 19.1

ANSI 2" - 6" 300 lbs 8 - 12 bolts 3/4" x 10G bore hole ø 22.4

Formula:

Pretension (FV [N]) per bolt:

FV [kN] = surface pressure [kN/mm2] x sealing surface [mm2] / quantity of bolts

Example TSS 90 DN 50, seal material Gylon blue, minimal surface pressure

0.01 kN/mm^2 x 5100 mm^2 / 4 = 12.75 kN

2.4 Sealing surface

TSS 90 DN 50	2 x 5100 mm^2	TSS 90 ANSI 6"	2 x 18929 mm^2
TSS 90 ANSI 2"	2 x 4507 mm^2	TSS 100 ANSI ½" 600 lbs	2 x 800 mm^2
TSS 90 ANSI 3"	2 x 7382 mm^2	TSS 100 DN15	2 x mm^2
TSS 90 ANSI 4"	2 x 11231 mm^2	TSS 100 DN20	2 x mm^2

2.5 Torque

The torque is determined with the conversion factor (Bosshard table), taking into consideration the coefficient of friction of the pretension

conversion factor M 16: 2.92

conversion factor 5/8“: 2.98

conversion factor 3/4“: 3.50

2.6 Mounting instructions

Tighten the bolts crosswise with 50% of the nominal torque. With 80% at the second tightening and apply the full torque at the third. Check after 24 hours to eventually compensate seal setting.

2.7 Type of seal

As per customer specifications.

Installation of pipe probes

2.8 Torque table

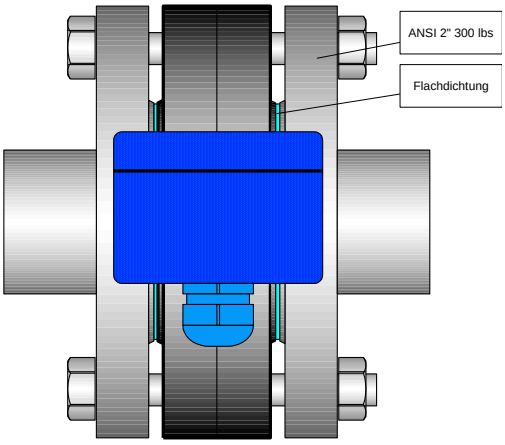
Probe type TSS 90/100...	Seal 1 Torque[Nm]	Seal 2 (Gylon blau) Torque[Nm]	Seal 3 Torque[Nm]	Seal 4, 5 + 6 Torque[Nm]	Probe type
	recommended	recommended	recommended	recommended	TSS
DN 15 PN 40					100
DN 20 PN 40					100
DN 25 PN 40					100
DN 50 PN 16	98	60	110	78	90
DN 80 PN 16	60	36	68	48	90
DN 100 PN16					90
DN 125 PN16					90
DN 150 PN16					90
ANSI 1" 300 lbs					90
ANSI 2" 150 lbs	110	66	124	50	90
ANSI 2" 300 lbs	100	60	110	26	90
ANSI 3" 150 lbs				84	90
ANSI 3" 300 lbs				47	90
ANSI 4" 150 lbs				65	90
ANSI 4" 300 lbs				72	90
ANSI 6" 150 lbs				120	90
ANSI 6" 300 lbs				80	90

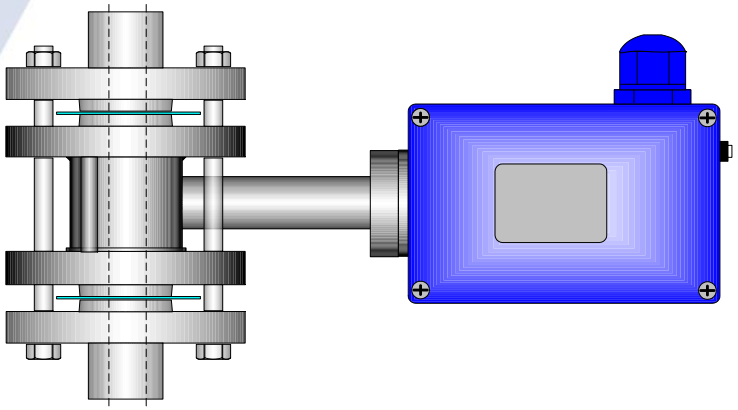
3. Mounting of the pipe probe

The pipe probe must be oriented in order to obtain the housing of the measuring electronic in a horizontal position with the M 20 x 1.5 cable gland aiming downward.

The inner diameter of the input line must correspond to the inner diameter of the pipe probe.

Pipe probes with Exd Offshore housing flameproof, the position of the connection head can be freely selected!





Installation instructions of the pipe probe

- Installation position of a 3 % slope to vertical, depending on the application (see mounting directions for TSS)
- Installation independent of the flow direction
- Installation between two smooth flanges or flared, loose flanges only with special installation protection gaskets
- Caution! Note flange to flange distance for different nominal widths
- Additional flat gaskets "Gylon" (with appropriate tightening torque)
- Internal installation guidelines always have to be followed and suitable sealing types used.
- Observe internal safety regulations for open tanks
- Installation in pipes with appropriate nominal diameter with flat gasket and tightening torques (see mounting directions for TSS90)
- The pipe insulation must not enclose the cooling rod
- Ambient temperature: max. allowed temperature in the connection head must not exceed +60 °C, if pipe probe is insulated and measuring electronics is detached installed
- The connection electronics MTI must be mounted at pipe temperatures of >60 °C horizontal or downwards.
- Pressure tests have to be conducted with mounted probe

3.1 Note

Mounting by qualified people and as per recognized rules of the technique.

3.2 Notice to liability and warranty claims

Haftungs- und Garantieansprüche werden ausgeschlossen bei unsachgemässer Behandlung der Rohr-sonden wie:

- opening of the probe threaded joint
- mechanical act upon probe body or PTFE body/lining element, like drilling, milling, or similar
- non conform installation and/or electrical connections
- Immerse the whole probe in liquid!
- use of non appropriate mounting material like seals, mounting bolts, or similar
- repair through third party
- connection to third party equipment
- non appropriate use referring to specifications as i.e. pressure, temperature and products
- non conform disposal

3.2 Not an equipment element for pressure safety control function

On the installation side the process measurement might require an additional pressure safety device.

3.4 Test pressure of the tube probes

Built in the pipeline

TSS90 DNxx PN16 on max. 20 bar

TSS90 DNxx PN40 on max. 60 bar

TSS90 ANSIxx 150 lbs on max. 30 bar

TSS90 ANSIxx 300 lbs on max. 50 bar

Higher pressures can deform the PTFE inner body!

3.5. Uninstallation of pipe probes

- Empty the lines and rinse them with nitrogen or water as per company regulations (observe the plant operation safety regulation)
- Dismount the pipe probe
- Install the new probe as per installation instructions (observe the internal safety regulations for open pipe lines).

Certificates / exams

4.1 Pressure Equipment DirectiveTSS90

PED Directive 2014/68/EU, Modul A2, Kat. 2, Tüv Süd

CE 0036

4.2 ATEX Examination Certificate

Ex certification according to the directive 2014/34 EU

Confidential test report no. 08-IK-0395.01

EC-type examination SEV09 ATEX 0133 X

Description

CE 1254

The pipe probes of the type series TSS 90 * MTI *** / * with fixed connection measuring electronics (MTI) are used in conjunction with the control unit "mipromex®" type M ** **** * (SEV09 ATEX 0132), as signal acquisition of different product phases (eg Separation layer detection) in potentially explosive areas (observe MTI data sheet)

Ex-Klassifikation:

Gas	II 1/2G Ex ia IIC T6 Ga/Gb
Staub	II 1/2D Ex ia tb IIIC T85°C Da/Db
	II 1/2G Ex d ia IIC T6 Ga/Gb

Application mipromex® types MIQ/MAT/MLS on overview

Interface: MIQ

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

Limit Switch: MLS

Full / empty detector or level indicator for organic to aqueous liquids, foams or powders with very low bulk densities

Universal Measuring: MAT

Product monitoring and identification, and concentration of organic chemical reactionsund - Identifikation, und Konzentration von organischen chemischen Reaktionen

Aquasant Messtechnik AG | Postfach 107 | Hauptstrasse 22 | 4416 Bubendorf | Switzerland
T: +41 61 935 50 00 | info@aquasant-mt.com | www.aquasant-mt.com