Ultrasonic Flowmeter Series 6

Field Service Manual

Index

Revision	Date	Description	Made By	Checked	Approved
A	2019-08-20	First issue	CVHO	MVHO	MVGR
B	2018-04-12	Cleaning rust, Leak detection	CVHO	BSAI	WKLA
C	2018-07-05	New Bracket Retraction tool	CVHO	BSAI	WKLA
D	2019-08-21	Extra remarks treatment & painting	CVHO	BSAI	WKLA
E	2020-02-20	Next generation gasket	BHOL	CVHO	CKLI
F	2020-05-02	Added gasket exchange only + connector exchange	BHOL	CVHO	CKLI
G	2021-11-17	Add Valve for Next generation gasket	CBIE	CVHO	CKLI

1 Introduction

This documents provides information on field service works to prevent moisture entry on Ultrasonic Flow Meters Series 6. These works can include, where necessary:

- In-field upgrade of older meters that do not have *Moisture Protection Gasket* yet
- In-field gasket exchange for meters that were equipped with a previous version of gasket before
- In-field exchange of cable connectors

Warning!

All activities described may only take place when no explosive gas atmosphere is present and the Ultrasonic Flowmeter is not pressurized.

Maintenance and replacement may only be carried out by qualified personnel under safe conditions and in compliance with all applicable regulations.

Refer to the Elster Ultrasonic Flow meter Series 6 documentation delivered with your flow meter as well as the Quick Start manual of your particular flowmeter (latest valid revision) and Safety Instructions (22.100.200.001.02/2/ latest valid version) for additional information including safety prescriptions.

Before starting the procedure, read this manual carefully. When questions arise feel free to contact Honeywell or its local representative.

2 General

Depending on the type of service different upgrade kits are available. These kits include a selection from the parts shown in the sketch below.

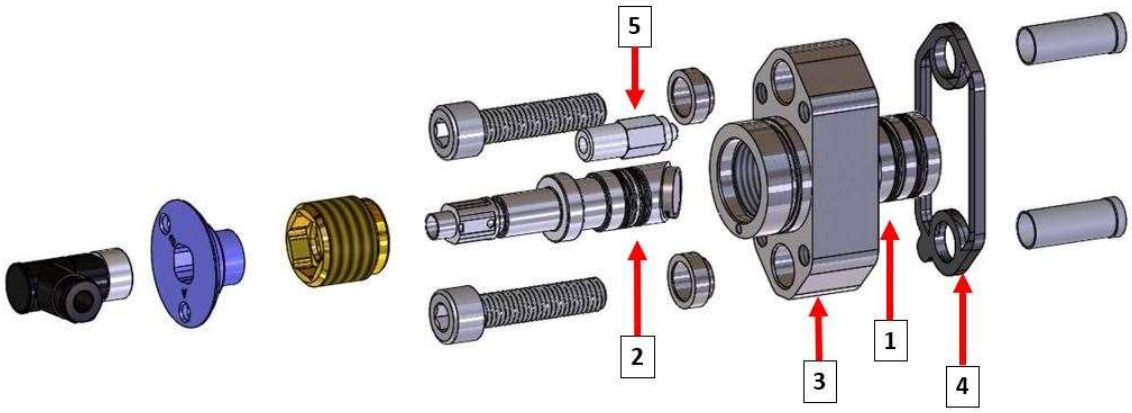


Figure 1: Exploded view of a NG-3 transducer mounting set assembly

2.1 Spare parts available for your work

2.1.1 Kits to upgrade older meters without any *Moisture Protection Gasket*

Table 1: Transducer NG-3 new mounting bracket with *Moisture Protection Gasket* upgrade kit bill of SS304 materials

Item	Material	SAP productcode	Quantity
1	O-ring 17.17x1.78, FKM 514322, 75° Shore A	C-902-000-001-776	2
2	O-ring 10.82x1.78, FKM 514322, 75°ShoreA	C-903-200-002-006	2
3	Transducer mounting bracket SS304	73024335 d	1
4	*Moisture Protection Gasket*	73025161	1
5	*Check Valve*	73025523	1

Table 2: Transducer NG-3 new mounting bracket with *Moisture Protection Gasket* upgrade kit bill of SS316material

Item	Material	SAP productcode	Quantity
1	O-ring 17.17x1.78, FKM 514322, 75° Shore A	C-902-000-001-776	2
2	O-ring 10.82x1.78, FKM 514322, 75°ShoreA	C-903-200-002-006	2
3	Transducer mounting bracket SS316	73024333 d	1
4	*Moisture Protection Gasket*	73025161	1
5	*Check Valve*	73025523	1

2.2 Tolerance of Anti-Rust Solution parts

Before doing upgrade, please check and measure the delivered parts listed in Table 1, Table 2 and **Error! Reference source not found.**, especially on item 3 and 4 according to the following specification.

2.2.1 Specification of transducer mounting bracket

The recess of the transducer mounting bracket shall have a dimension of: $1.5_{-0.05}$ mm, (1.45 … 1.5 mm)

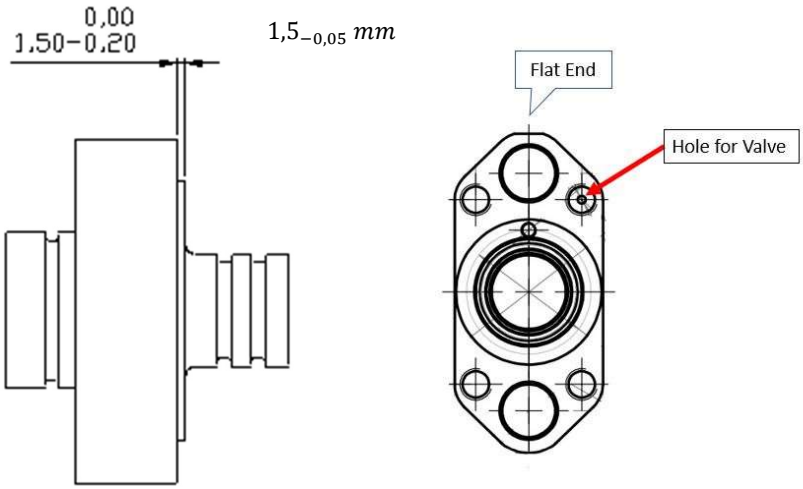


Figure 2 Bracket drawing in doc 73024335 / 73024336

2.2.2 Specification of *Moisture Protection Gasket*

The thickness of the *Moisture Protection Gasket* shall be 2,8±0,15 mm (2,65 … 2,95 mm) measured without any compression force.

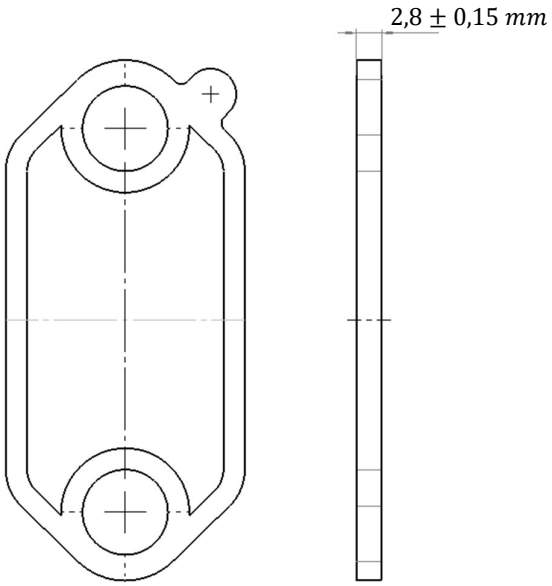


Figure 3 *Moisture Protection Gasket* drawing in doc. 73025161

2.3 Required equipment and tools

Before starting work on the Ultrasonic Flow Meter please make sure that you have these tools available

- Torque wrench (calibrated / range 8Nm - 12Nm)
- 6mm hex wrench socket
- UT-NG torque wrench socket (SAP code 903-101-001-035)
- 8mm torque open-end wrench
- Flat-blade screwdriver
- Cleaning rag
- Gloves
- Tray
- *Optional: pipe wrench

** The optional pipe wrench can be used for removing brass rivets from the transducer mounting bracket. See step 7 to help identify which type of rivets are currently used in the mounting bracket.*

3 Upgrade of meters with new *Moisture Protection Gasket* and *Check Valve*

With the new *Moisture Protection Gasket*, every mounting bracket mus be exchanged as well, so that the *Check Valve* can be installed in the mounting bracket. There fore there is no differentiation, if there is already a gasket installed in the meter or not, the following steps must be performed with every upgrade.

3.1 Upgrade procedure

1. Before starting the upgrade procedure, make sure that:

   a. The Ultrasonic Flowmeter is not pressurized.
   b. A gas detector remains enabled and present during the entire procedure.
   c. Gloves are worn during the entire procedure.
   d. One transducer is upgraded at a time.
   e. The working space is clean

2. Disconnect the cables from the transducers by left hand turning the screw cap of the connector

Figure 4: Disconnecting transducers

3. Note down or make a picture of the location of each transducer assembly on the meter body. Also note down the orientation of each transducer and alignment disc in relation to the mounting bracket. The orientation is determined by the direction the connector pins point to.

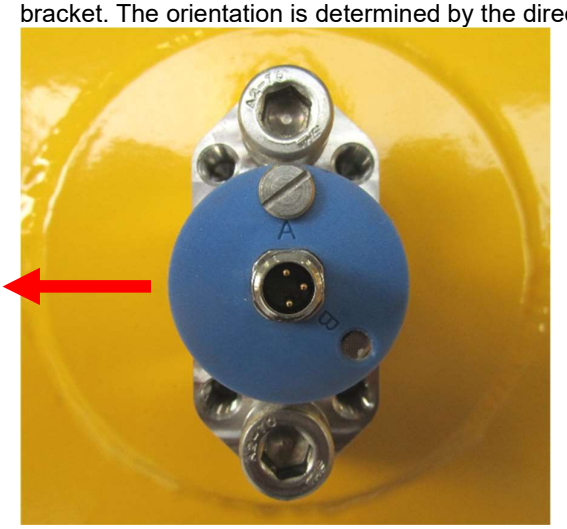


Figure 5: Transducer alignment & direction

4. Use the flat-blade screwdriver to unscrew the bolt that secures the plastic alignment disc by left hand turning.

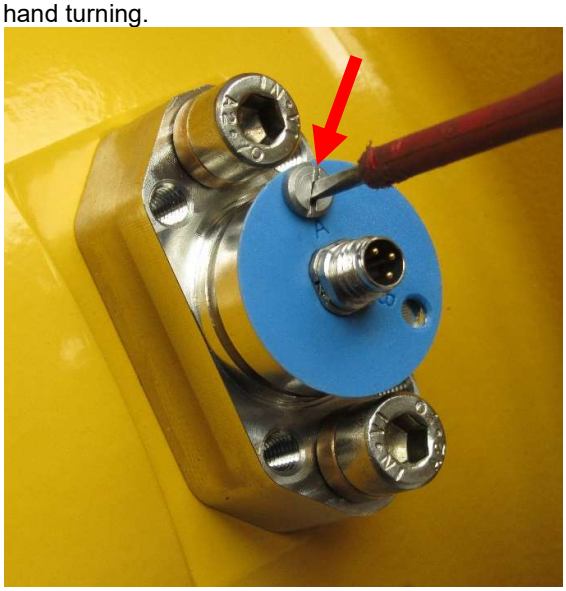


Figure 6: unscrew the alignment disc bolt

5. Pull the plastic alignment disc out of the transducer mounting bracket by hand, see Figure 7. Ensure that the red O-ring that sits underneath the alignment disc is not lost.

Figure 7: removing the alignment disc including the red O-ring

Use the UT-NG torque wrench socket in combination with the torque wrench to loosen the brass lock inner nut 1 or 2 turns. Do not entirely remove the brass lock inner nut at this stage.

Figure 8: Loosening the brass lock inner nut

6. Using the 6mm hex wrench socket, unscrew the two transducer mounting bolts and put them in the tray.

Figure 9: Unscrewing the transducer mounting bolts

7. Remove the rivets from the transducer bracket by pulling from the top side by hand as shown in Figure 10. In case the rivets are made of brass, they can be hard to remove due to deformation of the soft material. See Figure 11 to determine which type of rivets are currently used in the transducer mounting bracket. The Bracket shall be mounted with the two-part rivet.

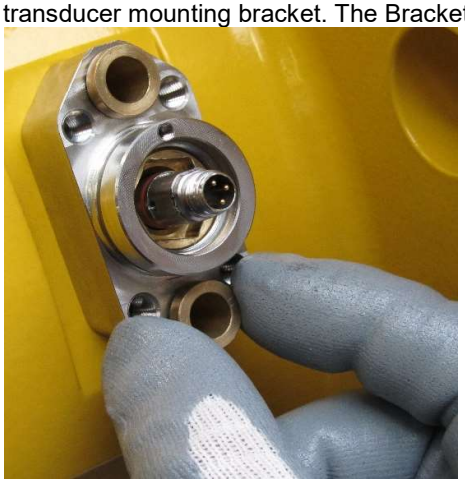


Figure 10: Removing the rivets

Figure 11: Types of rivets used in the mounting bracket

8. Pull the transducer mounting set out of the meter body by hand using gloves. The mounting bracket can be hard to remove due to the tight tolerance between the mounting bracket and the transducer holes. By gently turning and rocking the transducer mounting bracket while pulling, removal can be eased.

Only trained and qualified staff (HON Engineers, Service and Channel partners) shall be allowed to execute service.

If puling the old transducer mounting bracket by hand is not possible, **never use extensive force or any sharp tools** like screwdrivers or anything that could damage personnel and/or the meter.

For this purpose, a special bracket retraction tool is available. Please pay attention to the instructions given in section 3.2 “Removing the mounting bracket with the “Retraction Tool”

To order the retraction tool please contact aftersales@honeywell.com.

Figure 12: removing the transducer mounting set from the meter body

9. Use the cleaning rag to remove any contamination like grease, oil or dirt from the transducer mounting bracket and the transducer hole in the meter body. Inspect the mounting bracket and ensure it is free of any burrs, nicks and scratches.
10. Use the UT-NG torque wrench socket to unscrew and remove the brass lock inner nut from the transducer mounting bracket by left hand turning.

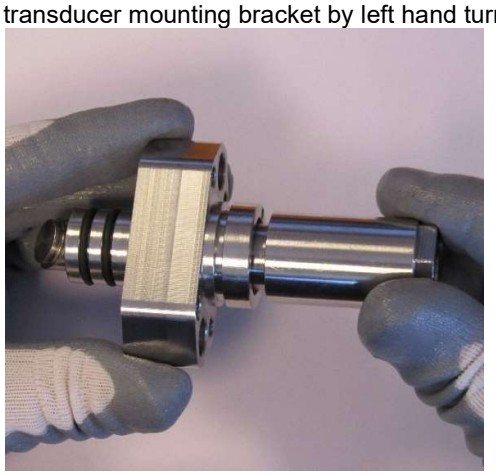


Figure 13: removing the brass lock inner nut

Push the transducer out of the mounting bracket by hand in the direction as shown in Figure 14. If necessary, clean the transducer shaft and inside of the mounting bracket to ensure they are free of any grease and contamination.

Figure 14: pushing the transducer out of the mounting bracket

3.2 Removing the mounting bracket with the “Retraction Tool USM Bracket”

If puling the old transducer mounting bracket by hand is not possible, never use extensive force or any sharp tools like screwdrivers or anything that could damage personnel and/or the meter. In this case please use the “Retraction Tool USM Bracket Serie 6” (Part. No. 73024690) as described below.
To order the retraction tool please contact aftersales@honeywell.com.

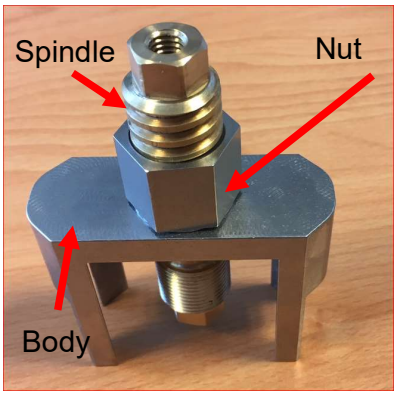
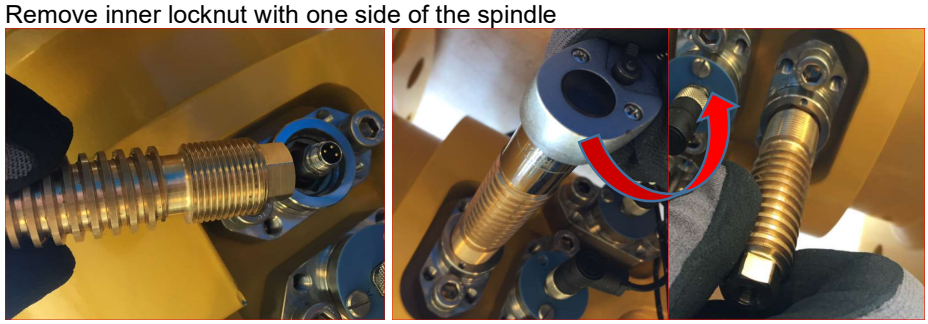


Figure 15 Retraction Tool USM Bracket Serie 6

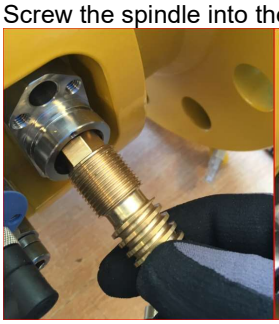
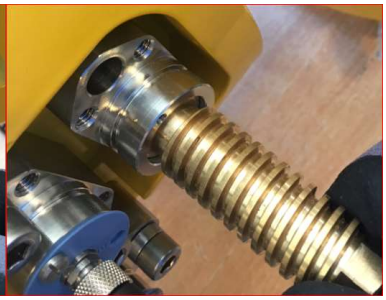
1. Remove inner locknut with one side of the spindle



2. Attach other side of the spindle to the transducer and retract transducer out of the bracket

3. Remove M8 bracket screws

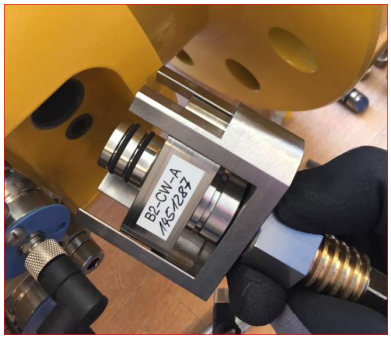
4. Screw the spindle into the bracket till the end

Place body over the bracket

5. Attach nut to the spindle

6. Use wrench SW 24 and spin the nut until the bracket is released

3.3 Notice on re-use of old brackets

When the old mounting brackets are taken from the meter, keep and accumulate them in certain quantities so that they can be sent back to the factory to be modified to the new version.
For more information, contact the service department in Mainz-Kastel. Email address: PMT-Reparatur@Honeywell.com.

3.3.1 Marking sign of re-machined old brackets for traceability

After old brackets are re-machined, there is special marking for traceability. The serial numbers should be interpreted together with marking sign on the bottom of the bracket, which is to distinguish the old one brackets from re-machined ones in Figure 16.

Figure 16. Marking sign on re-machined old bracket

3.4 Rust removal

Before assembling the new mounting bracket and *Moisture Protection Gasket* it is necessary to clean the surface and remove any rust. See chapter 5 for details.

3.5 Mounting the new bracket and *Moisture Protection Gasket*

1. Insert the mounting bolts and rivets into the mounting bracket as shown in Figure 17. Be sure that the thick end of the rivet shaft is facing towards the meter.

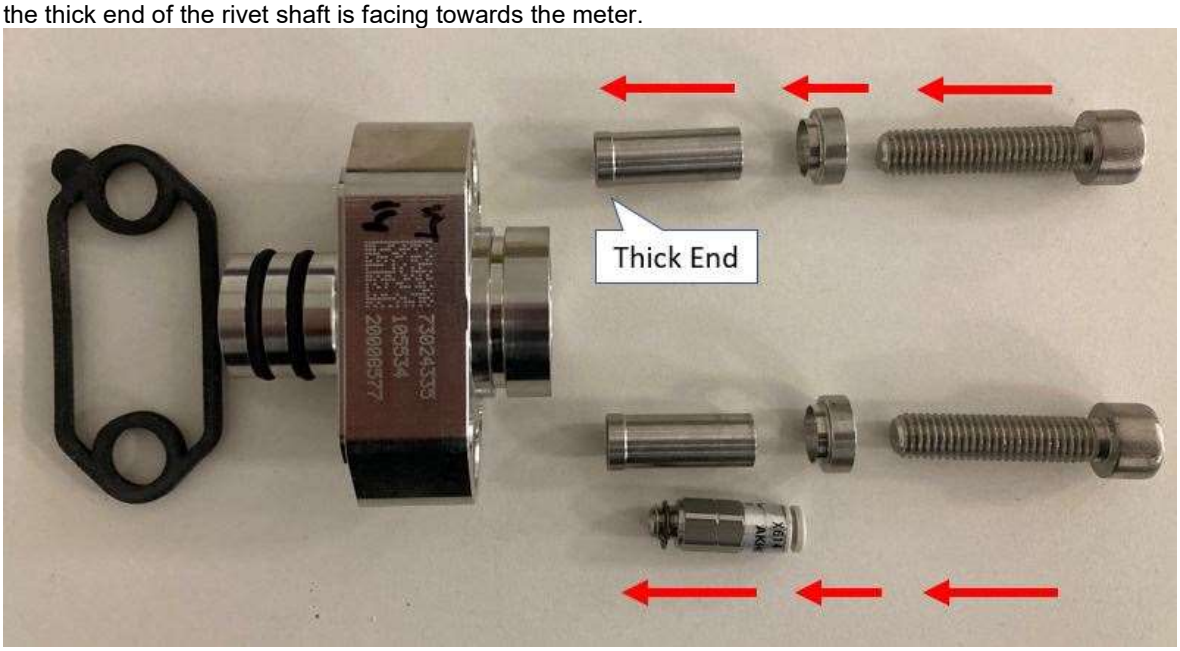


Figure 17: correct assembly of mounting bolts and rivets

2. Place and align a new *Moisture Protection Gasket* on the bracket. Figure 18 shows the correct positioning of the gasket.
   Please make sure that you only use the new version of the *Moisture Protection Gasket*. The version is visible by an additional flap on one edge of the *Moisture Protection Gasket* (see Figure 18).

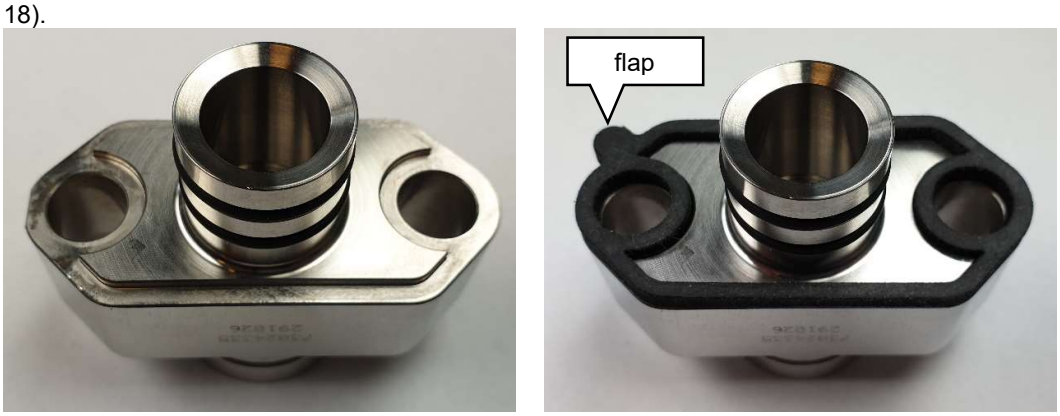


Figure 18: correct positioning of the *Moisture Protection Gasket* on the transducer bracket

3. Before installing the bracket on the meter body the Check Valve shall be installed to the bracket. This step can be done also in a later stage, but due to easier installation, it is recommended to do it prior to the installation of the brackets on the meter body.Verify that the valve is put on the correct position, as shown in Figure 20. The valve shall be tightened with a 8mm torque open-end wrench with 4 Nm.

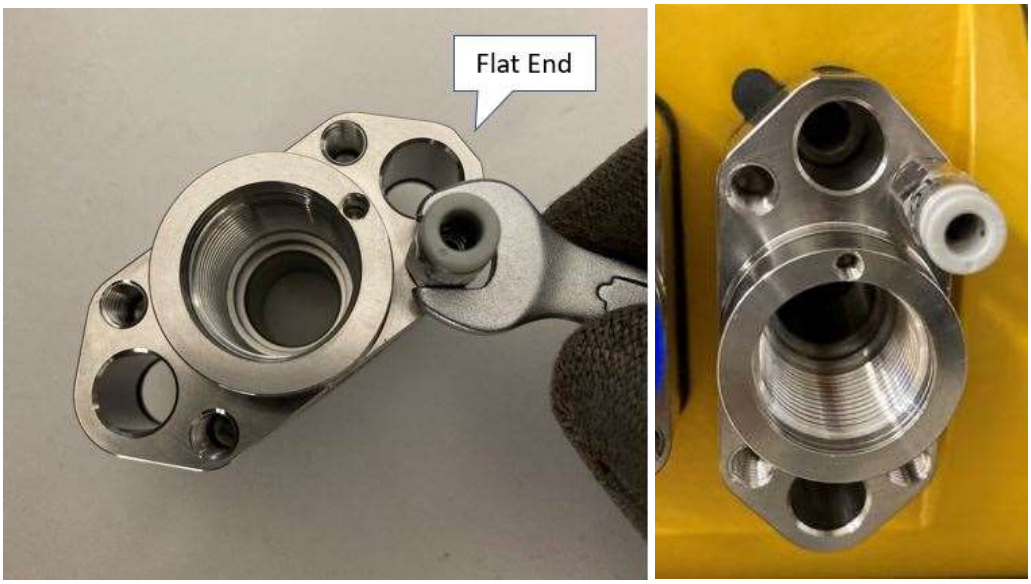


Figure 19: correct positioning of the *Check Valve* on the transducer bracket

4. Insert the mounting bracket into the meter body. Doing so please consider the orientation/position you noted during disassembly of the bracket before.
   It is essential to pay special attention to the placement of the *Moisture Protection Gasket* to ensure that the *Moisture Protection Gasket* can work properly.

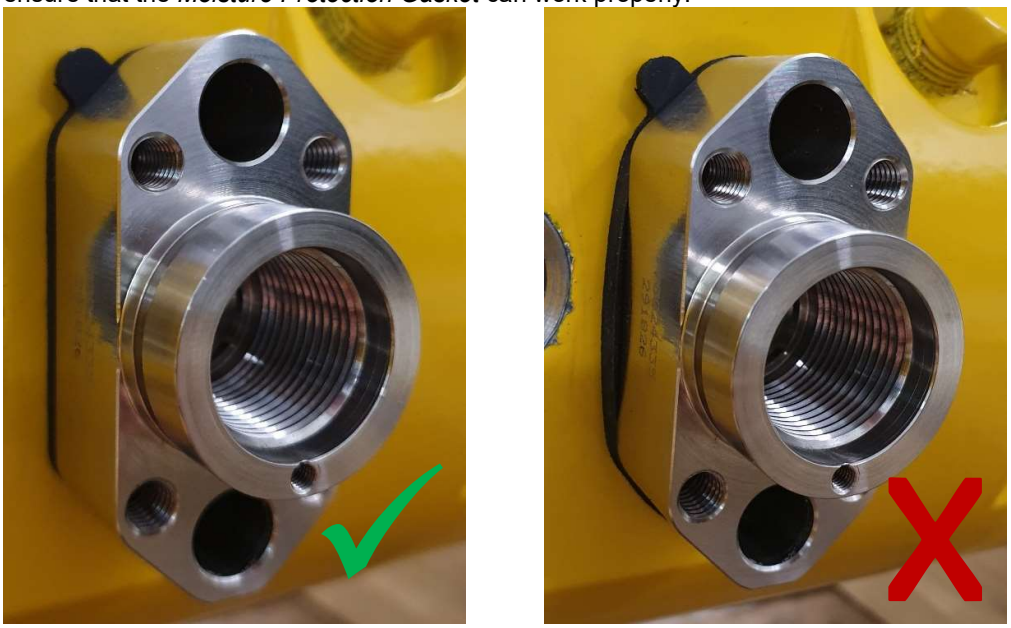


Figure 20: Correct placement of the *Moisture Protection Gasket*: good (left) vs. bad (right)

5. Tighten the transducer mounting bolts to **8 Nm** using the torque wrench and 6mm hex socket.

   IMPORTANT: ensure that the torque wrench is calibrated.

Figure 21: tightening the transducer mounting bolts to 8 Nm

6. Insert the transducer shaft back into the mounting bracket by hand.

Figure 22: reinserting the transducer shaft

7. Insert the brass lock inner nut back into the mounting bracket. Use the UT-NG torque wrench socket to turn the lock nut clockwise until it cannot be screwed any further, then loosen ¼ turn.

Figure 23: reinserting the brass lock inner nut

8. Insert the alignment disc back into the mounting bracket and align the transducer as noted down during step 3. By rotating the alignment disc the transducer will rotate with it. Alternatively, the back side of the UT-NG torque wrench socket can be used, which fits over transducer

Figure 24: aligning the transducer

9. After the transducer has been correctly aligned, remove the alignment disc and torque the brass lock inner nut to **12 Nm** using the UT-NG torque wrench socket.

IMPORTANT: ensure that the torque wrench is calibrated.

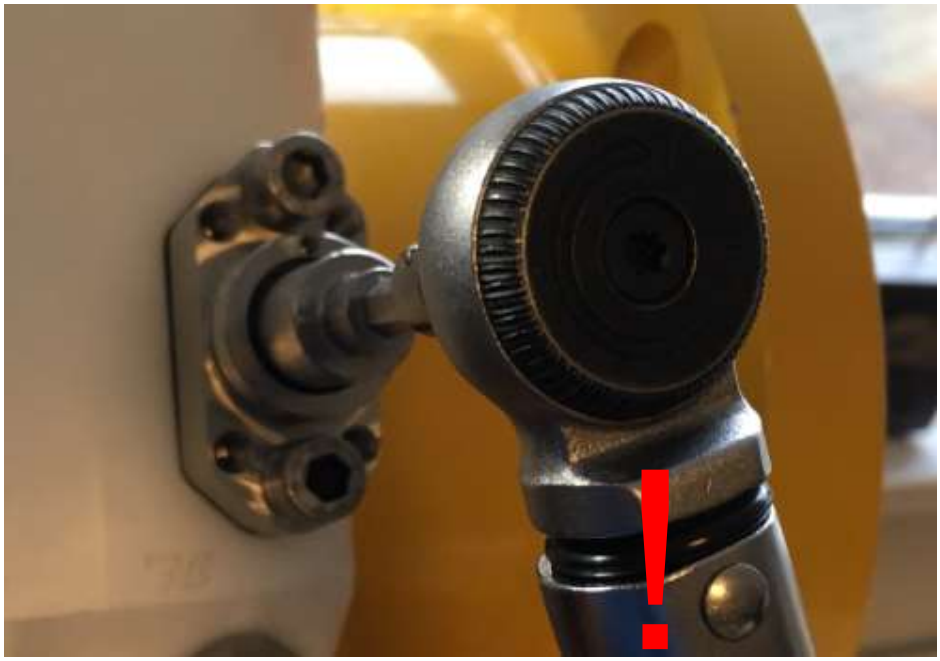


Figure 25: reinstall the brass lock inner nut and apply 12 Nm torque

10. The mounting bracket assembly should be able to move in and out ±0.5mm. Ensure that the mounting bracket is not stuck by pushing and pulling the mounting bracket by hand as shown in Figure 26.

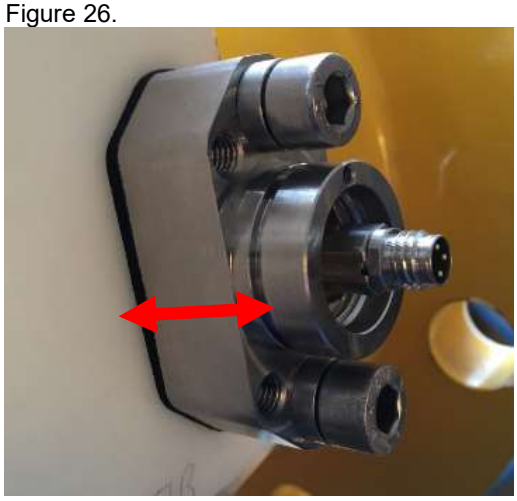


Figure 26: pull and push the mounting bracket to ensure it's free to move a bit

11. After the correct torque has been applied to the brass lock inner nut and the movement of the mounting bracket assembly has been checked, reinstall the alignment disc including the red O-ring see (Figure 27). Use the flat-blade screwdriver to tighten the bolt that secures the alignment disc by turning clockwise until hand tight.

Figure 27: reinstalling the alignment disc and bolt

12. Reconnect the cable to the transducer by right hand turning the screw cap of the connector. Make sure that the connector is aligned properly with the transducer: the cable should point in the same way as the transducer. See Figure 28. This is the last step of the upgrade procedure. Repeat all the above steps for the other transducers to complete the upgrade procedure for the whole meter.

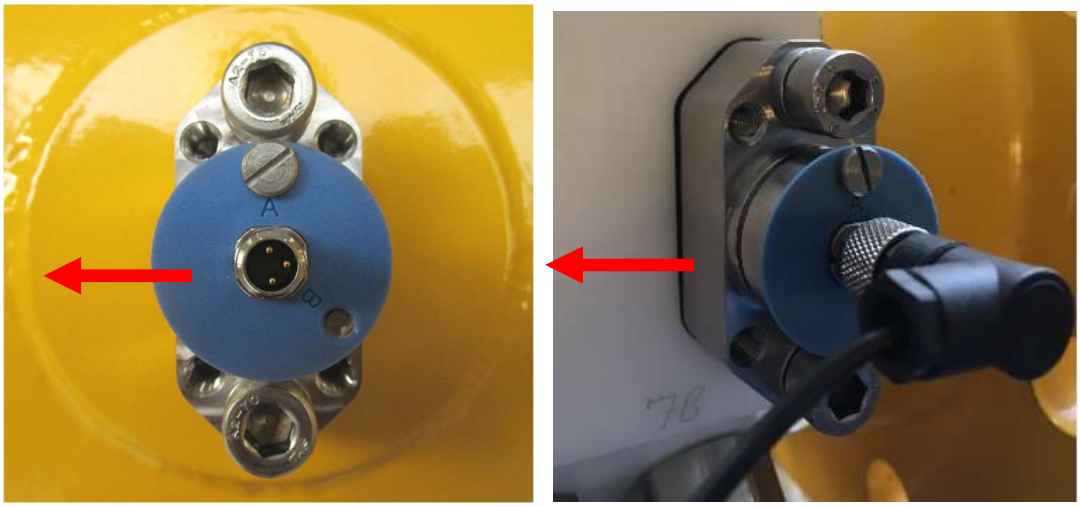


Figure 28: aligning and reconnecting the cable

3.6 Completion of work

When you are finished with replacing the brackts it is obligatory to perform a leak test before the meter is put into operation again. Please see chapter 6 for details.

Figure 29: Flap to identify the *Moisture Protection Gasket*

4 Exchanging the cable connector

In case you need to exchange the cable connector of one of the transducers please follow the steps given below.

4.1 Contents of the spare parts kit

The spare parts kit consist of two parts:

- The cable connector:

- An additional sealing kit:

4.2 Using the correct parts:

From the new cable connector please remove:

- Pressure nut (item 1 below)
- Clamping cage (item 2 below)
- Cable seal (item 3 below)

Replace them with the parts with the additional sealing kit.

4.3 Assembly of the new cable connector

For assembly of the new cable connector please follow the steps given in the original part suppliers manual. The manual can be downloaded from the internet using this link:

https://www.phoenixcontact.com/online/portal/us?uri=pxc-oc-itemdetail:pid=1529399&library=usen&tab=1

If the link is not working you can also visit www.phoenixcontact.com and search for the product code **1529399**.

5 Procedures of USM rust removal and cleaning

Water shall not be used for the cleaning process!
Any damage / scratches to the inside of the meter must be avoided.

1. Take brackets and transducers out of meter body
2. Apply WD-40 on holes inside and outside (Figure 30)
3. Completely remove rusty layer using heavy duty sponge scourer/scrubber pads (Figure 31)
4. Using brush/fleece to clean through-hole thoroughly (Figure 32)
5. Remove dirt and residuals using print cleaning or 97% alcohol and sponge inside and outside of meter holes careful cleaning of rims (Figure 33)
6. Let surface get dry completely before putting new brackets on (Figure 34)

Figure 30 WD-40

Figure 31 heavy duty sponge scourer pads, scrubber

Figure 32 Non-woven abrasive fleece cleaning stars

Figure 33 Dirt cleaning agents

Before cleaning

After cleaning

After cleaning these areas must be free from rust.

Figure 34 Cleaning

Reference website to order cleaning tools:

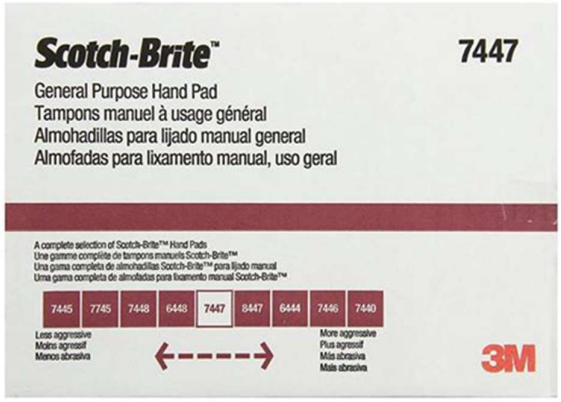
https://www.hoffmann-group.com/BE/en/goeddesprl/Grinding-and-cutting/Abrasive-media/Fleece-abrasive-star-%E2%8C%80-25-mm/p/555912-180#

Necessary adapter for the tool.

https://www.hoffmann-group.com/BE/en/goeddesprl/Grinding-and-cutting/Abrasive-media/Clamping-pin/p/555920-120#

https://www.hoffmann-group.com/BE/en/goeddesprl/Grinding-and-cutting/Abrasive-media/Roll-of-abrasive-fleece-115-mm-%C3%97-10-m/p/556100#

About Scotch-Brite 7447 PRO Hand Pad:



Scotch-Brite 7447 PRO Hand Pad combines flexibility with effective cutting action and precise hand control to help you accomplish tough cleaning jobs or produce fine finishing results, use after use. The tightly graded abrasive particles in this new pad provide a consistent, uniform scratch throughout life of the hand pad.

Multi-Purpose Pad Can Be Used on a Variety of Substrates

The very fine grade aluminum oxide abrasives cut fast and fine, leaving a smooth, finished surface. Suitable for use on a wide variety of materials such as wood, metal, plastics, ceramics, porcelain, glass, rubber, or composites, and for many different tasks, the performance of this pad is comparable to steel wool grade 0. However, unlike steel wool, Scotch-Brite 7447 PRO Hand Pads won't rust after use, or create fine metal splinters. The non-woven, open-web material resists loading and can be used dry, with water, or some solvents. You can use this multipurpose 6 x 9 inch pad by hand for precise control, with a hand pad block for uniform finishing, or on an in-line sander to cover large areas.

5.1 Requirements on cleaning of extreme rust case

Thickness of painting surface area in red rectangular line in Figure 35 where *Moisture Protection Gasket* and bracket are mounted should be between 0.25mm and 0.5mm. In case there is damage near the area, repainting is required to make sure no bare carbon steel is visible except chamfers, while painting must comply with requirements and tolerances (0.25 mm+0.25).
It should be noted that painting on chamfers is prohibited to avoid damage of O-rings on brackets and back-coupling.

Figure 36 below shows massive damage of mounting area. The new *Moisture Protection Gasket* shall not be mounted onto damaged area after cleaning. The damage to the paint might get worse over years and it is not sure that the rust has been stopped.

Meters with damaged paint need professional refurbishment in the repair shop.
Please contact: PMT-Reparatur@Honeywell.com.

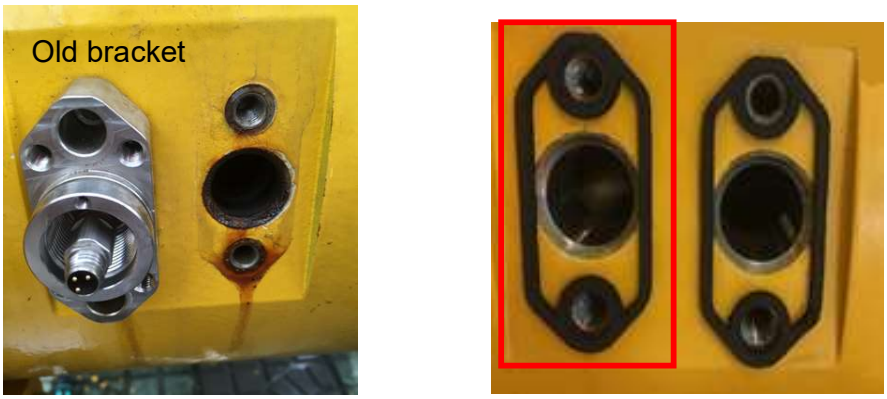


Figure 35. Thickness of paints should comply with tolerance and specification 0.25mm+0.25

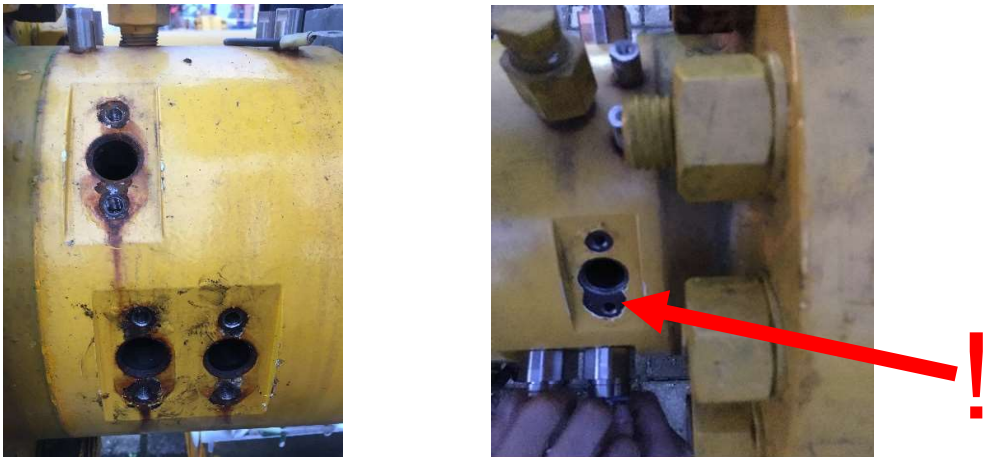


Figure 36. Extreme rust damage on paints requires repainting (renovate damaged area)

6 Gas Leak Detection Method after exchange of *Moisture Protection Gasket*

Do not use soap water spaying on USM meter and transducers. For leak detection on USM, use professional test agent such as described below.

Preferably a Gas leak detector with pump is used to detected around the brackets and transducer mounting area. Also Honeywell provides a variety of high sensitive gas detectors. For more information please visit:
http://www.honeywellanalytics.com/~/media/honeywell-analytics/documents/english/12629_habwfs_prod-range_v11_0315_emea.pdf

Figure 37 example of gas leak detector with pump

Only when such gas leak detection device is not available you may, at your own risk, use liquid gas leak detection agents as described below.

Leak Detector

Finds leaks in compressed air and gas systems.

- **DVGW-approved.**
- Easy and timesaving way of finding leaks while the system is still working.
- Suspect areas should be covered with a thin layer of Leak Detector. Leaks will be indicated by the formation of foam.
- Suitable for pneumatic brake systems, tyres, hoses, valves, compressed air cylinders and compressor systems.
- Also suitable for fittings containing gas as the Leak Detector is non-combustible.

Technical Data

Application temperature:
+ 5 °C to + 50 °C.
Freezes at 0 °C.

Note: Will not be damaged by frost.
May be used after de-frosting.

Figure 38. Gas leak detection agent

Figure 39. Aerosol detection agent made by Griffon

(http://www.griffon.eu/en/products/872-leak-detection-agents/product/959-gas-leak-detector/)