

Instruction Manual

Type Retraction tool UT NG Version 2

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Elster GmbH

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Table of contents

1	Preface	3
1.1	Introduction.....	3
1.2	Warranty	3
1.3	Storage	4
1.4	Warning messages	4
2	General information.....	5
2.1	Characteristics.....	5
2.2	Tools and items supplied with retraction tool.....	5
2.3	Extra tools necessary for retraction	6
2.4	Spare UT NG transducer.....	7
2.5	Safety and health.....	7
3	Preparation	9
3.1	Pre-inspection on retraction tool.....	9
3.2	Preparation flowmeter.....	11
4	Retracting UT NG transducer	12
5	Inserting UT NG transducer.....	19
6	Finalising replacement.....	26
	Appendix I. Declaration according PED	27

1 Preface

1.1 Introduction

This manual describes the procedure for inserting and retracting a retractable Ultrasonic Transducer (UT) model NG-n by using the Retraction Tool UT NG.

This manual contains information for proper operation of this product. It also contains important instructions to prevent accidents and serious damage during operation, and to ensure trouble-free operation in the safest possible way. Before using the product read this manual carefully, familiarize yourself with the operation of the product, and strictly follow the instructions. Also attached as Appendix I you can find the "declaration according PED".

If you have any questions or need further details of specific matters concerning this product, please do not hesitate to contact one of our staff.

This manual is based on the latest information. It is provided subject to alterations. We reserve the right to change the construction and/or configuration of our products at any time without being obliged to update earlier supplies.

1.2 Warranty

The warranty provisions stipulated in the manufacturer's **Terms of Delivery** are applicable to the product. Manufacturer shall have no obligation in the event that:

- Repair or replacement of equipment or parts has been required through normal wear and tear or necessitated in whole or part by catastrophe or the fault or negligence of the purchaser;
- The equipment or parts have been maintained or repaired by other than an authorized representative of the manufacturer, or have been modified in any manner without prior express written permission of the manufacturer;
- Non-original parts are used;
- Equipment is used improperly, incorrectly, carelessly or not in line with its nature and/or purpose;
- Use of this product with unauthorized equipment or peripherals, including but not necessarily limited to cables, testing equipment, computers, voltage, etc.

Manufacturer is not responsible for the incidental or consequential damages resulting from the breach of any express or implied warranties, including damage to property, and the extent permitted by law, damage for personal injury.

1.3 Storage

The retraction tool is delivered with a suitable box, containing the tool itself and extra spare/user tools. Ensure that all parts remain in the closed box during storage.

Some of the spare parts are O-rings and require extra attention during storage:

- Ensure they remain packed in a closed plastic bag, as they have been delivered.
- Keep the storage temperature between 15 and 25 °C.
- Be aware that all O-rings have an expiry date and its validity also depends on the way it is stored.

1.4 Warning messages



Warning!

A warning signifies hazards or unsafe practices which could result in severe personal injury or loss of life.



Caution!

A caution signifies hazards or unsafe practices, which could result in minor personal injury or product or property damage.

A caution is also used to indicate operations or practices which may cause the product to operate in an undefined or unexpected way, or to produce off-spec results.

2 General information

2.1 Characteristics

Product:	Retraction tool UT NG Version 2 (SAP code 73024209)
Type:	Single block and bleed.
Purpose:	Retraction UT NG-1, NG-2 & NG-3 Transducers under pressure. Different types of the UT NG transducer: UT NG-n (where n stands for differences in size, material, etc.), should be verified upfront with Elster or its local agent, if it is allowed to retract it under pressure.
Application range:	Maximum pressure is limited to 70 barg. Temperature range is limited to -20 / +75°C
Suitable mediums:	Natural gas / Acetylene / Argon / Butane / Ethylene / Carbon dioxide / Carbon monoxide / Air / Methane / Pentane / Propane / Nitrogen



Warning!

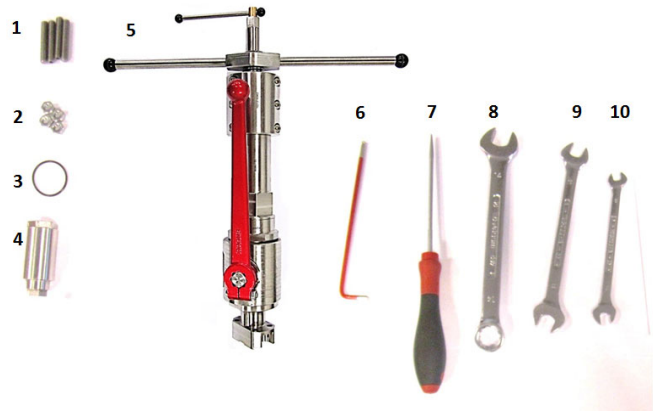
These mediums are suitable for the retraction tool UT NG Version 2, but not necessarily for the transducer. In doubt check your user manual or contact Elster or your local representative.

2.2 Tools and items supplied with retraction tool

All tools described below should be located in the box containing the retraction tool. If parts are missing please contact Elster-Instromet or your local agent.

Nr	Item	SAP code	Amount needed
1.	M6x35 hex socket set screw	903-203-020-001	4
2.	M6 hexnut	903-203-021-001	4
3.	O-ring 25.12 x 1.78 NBR	903-203-016-001	1
4.	UT NG torque wrench socket	903-101-001-035	1
5.	Retraction tool UT NG	73024207	1
6.	Allen key (3mm) DIN 911*	903-203-026-001	1
7.	Flat screwdriver *	903-203-030-001	1
8.	Screw wrench 14 mm *	903-203-029-001	1
9.	Screw wrench 10 mm *	903-101-028-001	1
10.	Screw wrench 6 mm *	903-203-027-001	1
11.	Screw wrench 8 mm	73026500	1

* Picture shows example



2.3 Extra tools necessary for retraction

The table below describes the extra tools needed for retraction. These are NOT delivered with the retraction tool.

Nr.	Item	Amount needed
1.	Torque wrench capable of 12 Nm (20 mm key)*	1
2.	Adjustable wrench (up to 40 mm)*	1
3.	Grease for O-rings (e.g. OKS 469)	1
4.	Gas detector	1

* Picture shows example

1



2



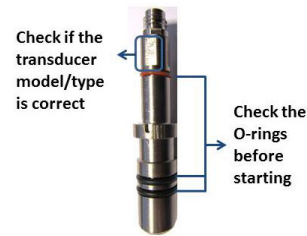
2.4 Spare UT NG transducer

UT NG transducer may exist in different types: UT NG-n (where n stands for differences in size, material, etc.). The transducer may only be replaced with the exact same model and type. Only with explicit authorization from Elster a different model/type can be exchanged. One (or more) spare UT NG-n transducers are necessary when exchanging the transducers.



Warning!

Always check the transducers O-rings before starting the procedure. They should be clean and undamaged. A bit of grease can be applied, to protect the O-rings during insertion of the transducer. Also verify if the model/type is correct.



2.5 Safety and health

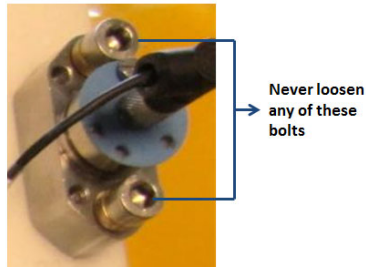


Warning!

Before starting, read this manual carefully, make sure you understand everything completely. If there still are things unclear, do not hesitate to contact Elster or your local representative.

- Conduct a risk assessment and eliminate or reduce hazards to an acceptable level.
- Observe all site Health and Safety Rules in particular Permit to Work and Hot Work procedures.
- When applying O-rings ensure these are not passed their expire date (see chapter 1.3).
- Wear all necessary Personal Protective Equipment.
- **Risk of expelled parts:** Never stay behind the retraction tool, but aside so the flow meter is on your left or right
- Never remove or maintain the retraction tool or parts thereof without de-pressurizing to ensure that no trapped pressure exists within cavities.
- Never handle the retraction tool when it has been used on harmful substances unless it has been completely decontaminated and certified safe to handle.
- Never use an retraction tool on a duty, which exceeds its prescribed operating parameters.
- Never modify or alter the retraction tool or parts thereof unless the manufacturer has been consulted and/or recommends such changes.
- The retraction tool ball valve lever is designed only for use in operating the valve and must not be used for carrying. Failure to observe this warning may result in operator injury.
- Before starting, turn the power off the meter and ensure proper grounding of the spool piece.
- NEVER leave a mounted retraction tool unattended on a pressurized spool piece.
- Restrict the use of the retraction tool to retracting a transducer. Don't leave it pressurized on the spool piece longer than necessary.

- NEVER remove any of the bolts, securing the transducer plate on the spool piece, when the line is pressurized, see below



3 Preparation

3.1 Pre-inspection on retraction tool

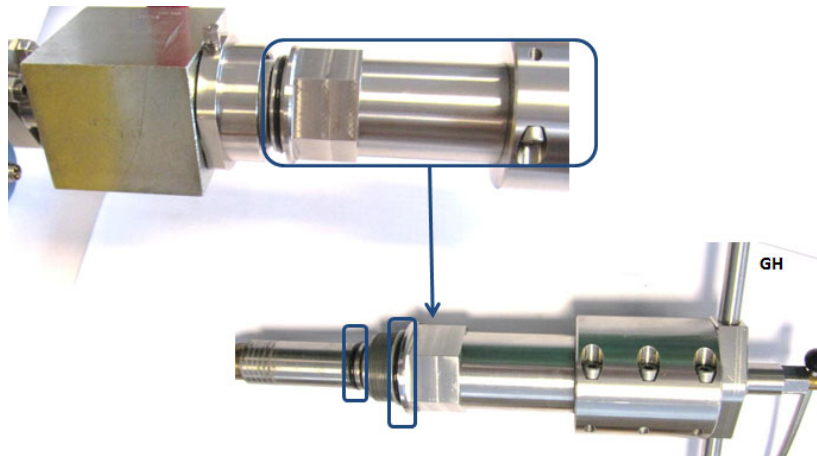
A thorough pre-inspection of the retraction tool UT NG is highly recommended every time the tool will be used. The instruction below can be used as guideline for this:

- 1) Check the overall status of the tool. It should be in perfect condition. No signs of corrosion or wear. If there are doubts Elster or its local representative should be contacted and do not continue with the operation.
- 2) O-rings need to be checked and shall not show any sign of wear and tear.
2 o-rings can be exposed by unwinding the top part of the tool from the ball valve and winding the **Gear Handle** completely inward.
A third o-ring is situated inside the tool, whereby it is sheltered from outside environment. Together with the grease it ensures that this o-ring will not show any sign of wear before the other o-rings. Therefore it is not necessary to verify this o-ring before operation.

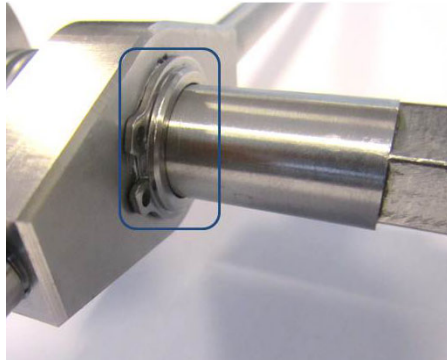


Warning!

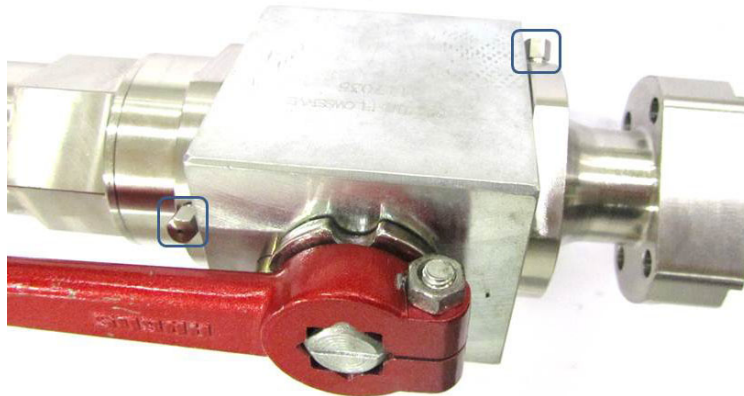
If one of the o-rings show any sign of wear, **all three o-rings** should be replaced before continuing with the operation. Elster or its local representative need to be contacted for assistance with this replacement.



- 3) At the end of the retraction tool ensure the 'retaining ring' is still fitted correctly on the tool.

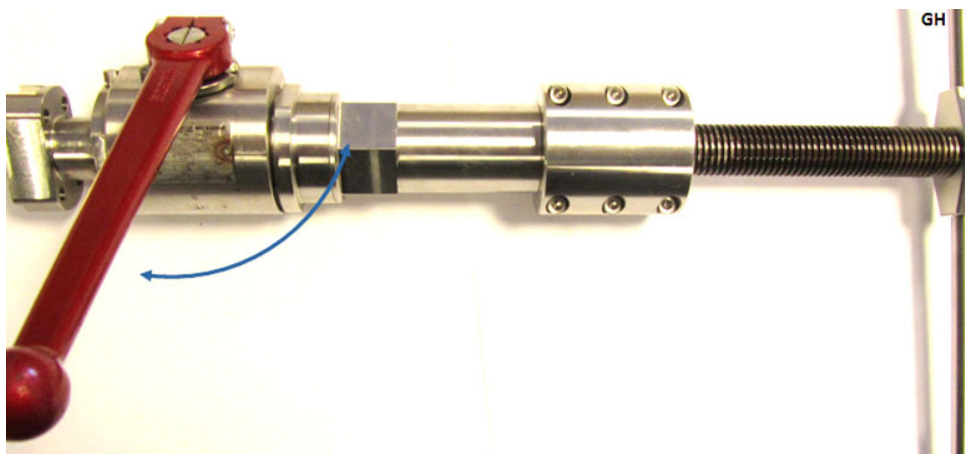


- 4) Verify the two bleeders around the valve can be opened and closed smoothly. Close the bleeders afterwards (a bit of force can be used).



- 5) Verify if the ball valve can be opened and closed. Turn the **Gear Handle** completely away from the ball valve. Once at the end try to open and close the valve, using the handle of the valve. Preferred is to secure the retraction tool in a vise when testing the ball valve.

When done, open the valve (handle parallel with the tool) and rewind the **Gear Handle** towards the ball valve.



3.2 Preparation flowmeter

- 1) Shut down the power supply of the flowmeter.
- 2) Enable gas detector for safe use. Do not continue when gas is detected.
- 3) The Ultrasonic Flowmeter Series 6 has a front- and a back-cover behind which the transducers are located. The covers are mounted with hexagon flange bolts. The bolt specification and the amount of bolts fitted depend on the flow meter size and the application. Remove these bolts and the covers to expose the transducers.



Caution!

In some cases the covers may be sealed. Please verify upfront if it is allowed to break the seals. If necessary consult Elster or our local agent. NEVER break any seal without explicit approval.



- 4) Through consultation with Elster or our local agent, find the correct transducer which needs to be exchanged. It's preferred that this has been done in advance.

4 Retracting UT NG transducer

- 1) Disconnect the cable. Turn the metal knurl counterclockwise to release the connector and pull it straight from the transducer. Be careful to not unscrew the plastic knurl. Verify if the connector and connected cable are not damaged.

If necessary, also other cables of transducers can be disconnected, if they obstruct easy and safe handling. To ensure the cables will be reconnected correctly at the end of the procedure, make a note where which cable has been removed.



Caution!

Each transducer is mounted in a particular position that shall not be changed. Therefore, before removing the transducer, write down (or take pictures of) the position of:

- the alignment disk (position of holes A and B)
- the position of the pins in the connector of the mounted transducer.

This information is required to position the new transducer



- a. Alignment disk
- b. Three connectors in transducer

- 2) Remove the screw and the Alignment disk (together with its o - ring). Hold on to these items as they need to be re-assembled at the end of the replacement.



Alignment disk
with o-ring

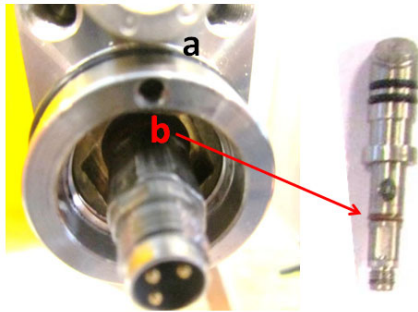


- 3) Remove the valve with a screw wrench:



- 4) Applying and checking the O-rings
 - a. Apply O-ring 25.12 x 1.78 mm (see chapter 2.2) around the transducer housing (position a. in figure below). Use grease (e.g. OKS 469) when applying the O-ring.
 - b. Verify if the transducer has an O-ring (size 8 x 1.25 mm) on it shaft (position b. in figure below). If this is not the case or it is not as new, spares are foreseen in the retraction tool

box. Ensure to use grease (e.g. OKS 469) for applying the O-ring. If no new O-ring can be found, abort the procedure and contact Elster or your local agent.
Ensure both O-rings are free from dirt and don't show any sign of wear.



Use the UT NG torque wrench socket, to loosen the torque on the 'Inner lock nut'.



Warning!

Half a turn is enough to loosen the torque on the 'inner lock nut', DO NOT unscrew further- **Risk of expelled parts!**



- 5) Screw on the transducer housing the 4 M6x35 hex socket set screws. Hand tight is enough.



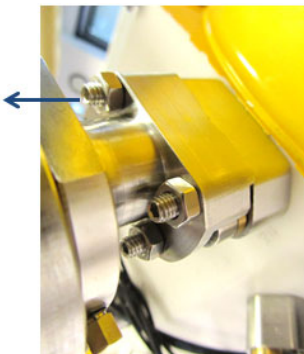
- 6) Place the retraction tool on the transducer housing and fasten it with the 4 hexagonal nuts. Hand tight is enough.



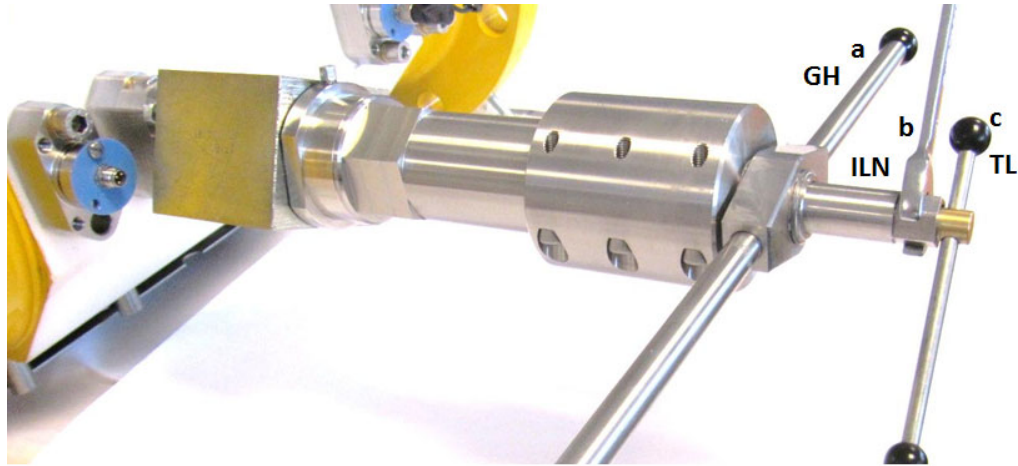
Caution!

Ensure the retraction tool is placed in such a way, that it is possible to rotate the ball valve handle 90° degrees. Also verify if both bleeders are reachable.

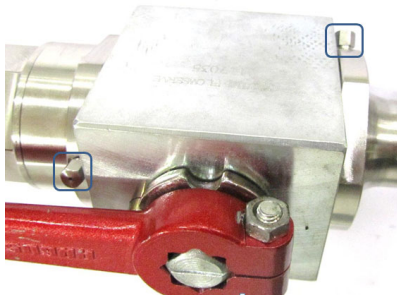
Use the 4 nuts
to lock the
retraction tool



- 7) Grabbing the transducer with the retraction tool:
- Use the **Gear Handle** and wind it completely to the meter.
 - Use the spanner (14) to wind the **Inner Lock Nut** entirely to the meter. Form a certain point; it is possible to simply push the bar to the meter.
 - Screw the **Transducer Lock** to the meter. At a certain point it is possible to keep turning, but you feel resistance. From that point the transducers is 'grabbed' and you can stop turning.



- 8) Before retracting the transducer, ensure the two bleeders (SW 6mm) are closed and screwed to the retraction tool.

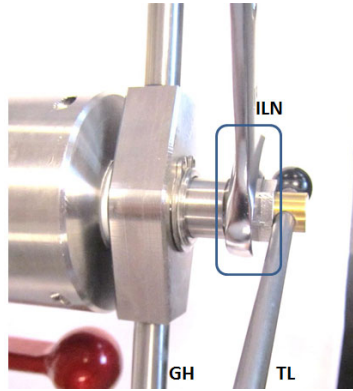


- 9) Retracting the transducers starts with the retraction of the **Inner Lock Nut**. Unscrew it, by turning it away from the meter.

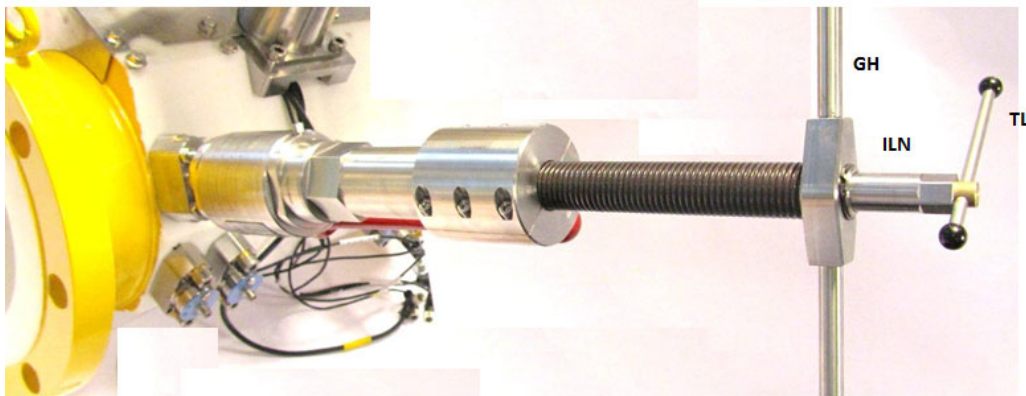


Caution!

At a certain point (when the bar is about 1 cm unscrewed) you will feel some resistance. Now rotate the **Gear Handle** while carefully unscrewing the **Inner Lock Nut**. At some point the resistance is gone at the **Inner Lock Nut**. Leave the **Gear Handle** at that position and continue with the unscrewing of the **Inner Lock Nut**. Be aware, unwinding the **Inner Lock Nut** with resistance will lead to permanent damage of the retraction tool or transducer housing.



- 10) When the **Inner Lock Nut** is completely unscrewed, start unwinding the **Gear Handle** completely away from the meter. The transducer is retracted beyond the ball valve.

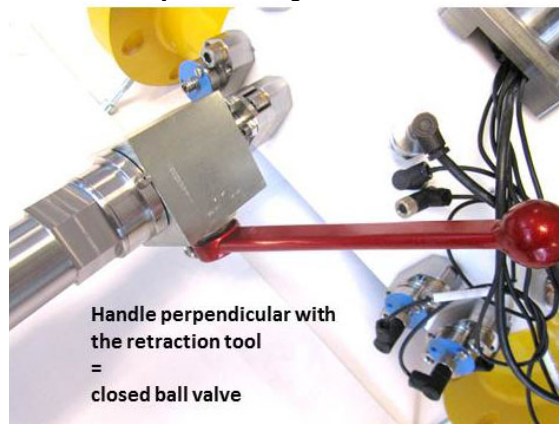


- 11) Use the handle to close the ball valve



Warning!

If turning the handle doesn't go smooth, stop immediately. Leave the handle parallel with the retraction tool and restart from step 7 "Grabbing the transducer with the retraction tool". When problem rises again, immediately contact Elster or your local agent for assistance.

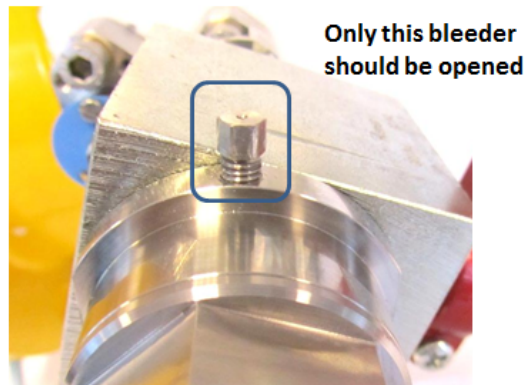


- 12) Once the ball valve is closed, use the bleeder ABOVE the ball valve (i.e. the one furthest from the meter) to remove the gas beyond the valve. This is done by rotating the bleeder away from the retraction tool until gas escapes.



Caution!

Ensure the other bleeder underneath the ball valve (closest to the meter) remains closed.

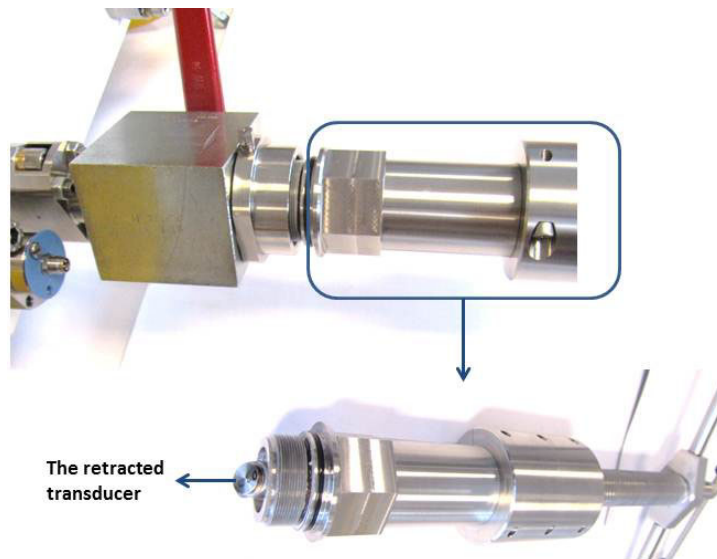


Caution!

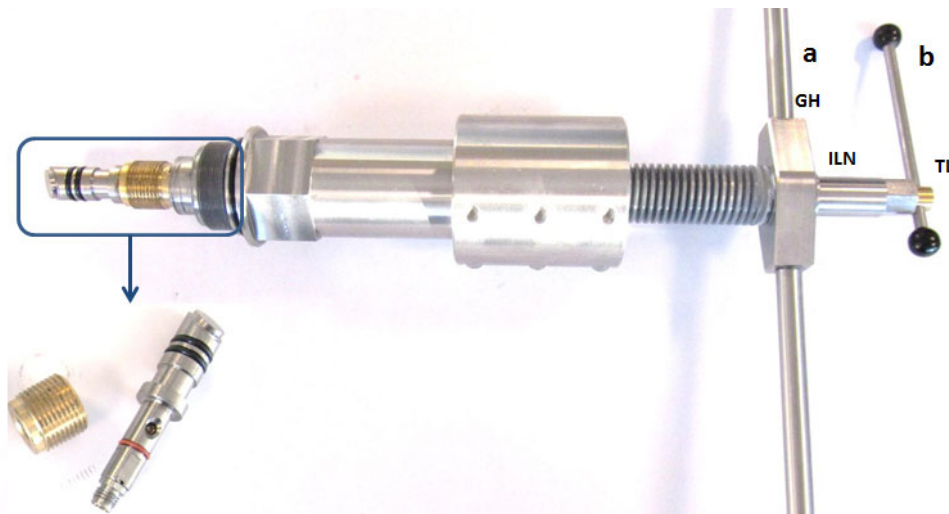
To verify if the retraction tool and the ball valve are completely leakage free, Elster recommends to perform a quick 'bleed – test':

When all gas is removed through the bleeder, close the bleeder again. Wait one minute and then open the bleeder again. If there is gas removed again from the bleeder, it indicates a leak. Abort the operation and re-insert the transducer (close the bleeder, re-open the ball valve and proceed from chapter 5 step 6) and contact Elster or its local agent.

- 13) With a closed ball valve and when the gas beyond the valve is 'bled', the retraction tool can be opened. This is done by unscrewing the upper part of the retraction by hand. If needed a screw-wrench can be used. The part of the retraction tool with the ball valve remains on the meter.



- 14) The transducer can be removed from the retraction tool using the handles:
- Rewind the **Gear Handle** until the transducer and the brass inner nut are exposed.
 - Hold the transducer in place by hand and unwind the **Transducer Lock**. The transducer will be disconnected.



Warning!

At the moment part of the retraction tool is still mounted on the meter housing and pressurized. This tool is intended to remain under constant pressure. Therefore immediately continue with chapter 5.

5 Inserting UT NG transducer

First the original transducer needs to be removed; this should be done according to chapter 4. So the starting point of this part of the procedure is, that one part of the retraction tool is mounted on the meter, the other part will be used for insertion of the spare transducer.

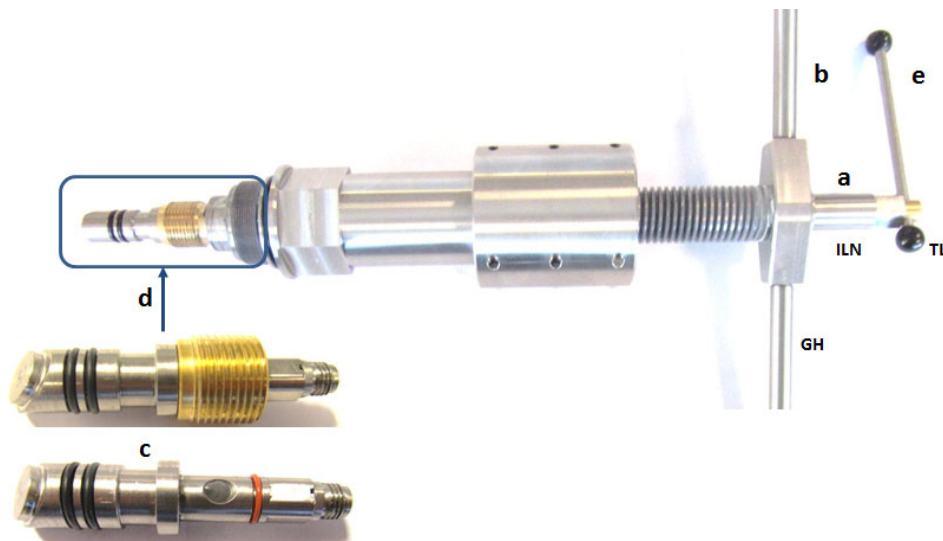
1) Placing the spare transducer on the retraction tool.

Prepare the tool (normally this is already done by removing the original transducer).

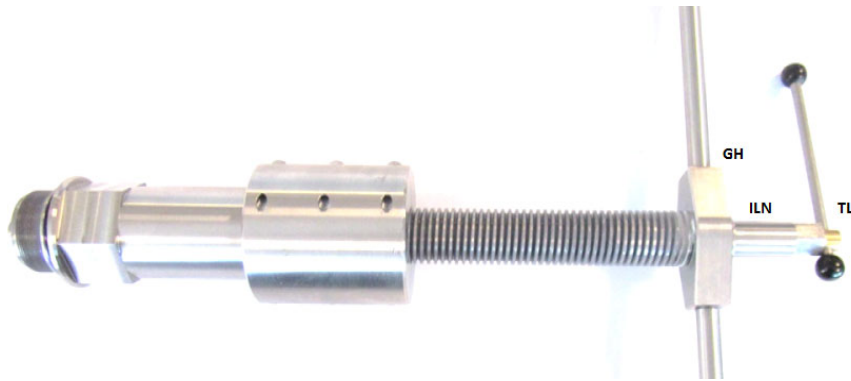
- a. The **Inner Lock Nut** should be completely unscrewed (turned away from the retraction tool).
- b. The **Gear Handle** should be rewind, so the new transducer can easily be mounted. Refer to chapter 4 step 14).

Mounting of the spare transducer into the retraction tool

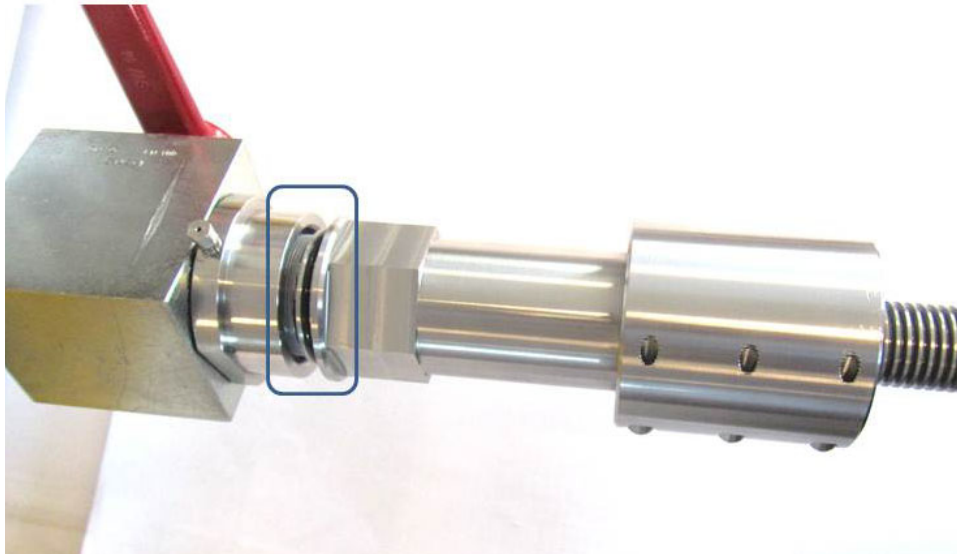
- c. Check the general condition of the spare transducer and also verify if the o-rings are in place and do not show any signs of wear or damage (see chapter 2.4).
- d. Place the brass inner nut on the transducer as visualized in the picture below. Then place the assembly in the retraction tool.
- e. Hold the transducer with one hand and use the other to wind the **Transducer Lock**, whereby it grabs the transducer. Once the transducer is fully grabbed you'll feel that it is no longer possible to rotate the **Transducer Lock** without rotating the transducer.



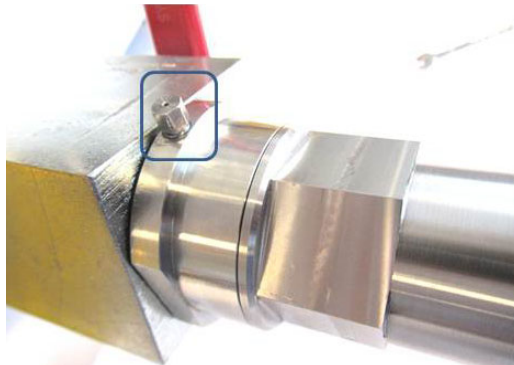
- 2) Unwind the **Gear Handle** completely, so the transducer is inside the retraction tool.



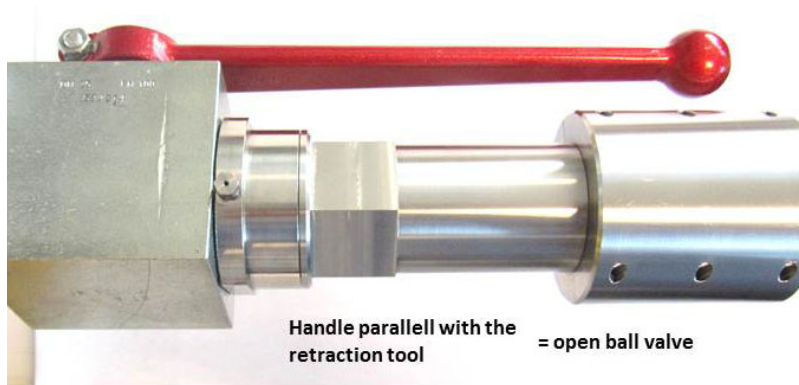
- 3) Turn the part of the retraction tool holding the spare transducer on the part that mounted on the meter (ball valve has to be closed). Hand tight is enough, but ensure



- 4) Once both parts are mounted on each other close the bleeder above the ball valve (bleeder below the valve and closest to the meter shall still remain closed).



- 5) Slowly open the ball valve. Check if there are no leaks.



- 6) Insertion of the transducer in the housing:
- Wind the **Gear Handle** towards the meter (leave the last few winds open).
 - Wind the **Inner Lock Nut** towards the meter.

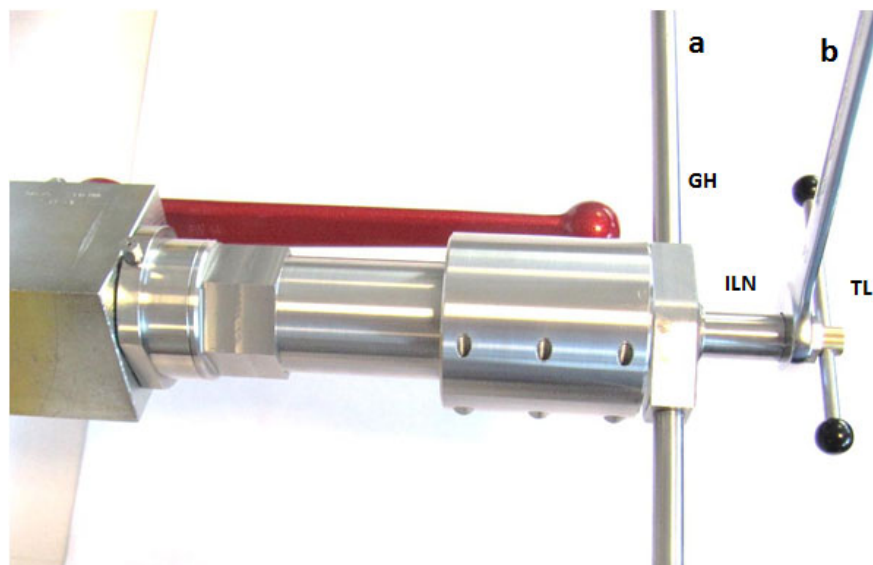


Caution!

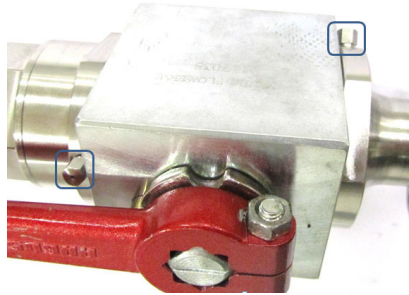
At a certain point (when about 2 cm still needs to be wind) you will start feeling some resistance. Now wind the **Gear Handle** towards the meter while carefully winding the **Inner Lock Nut**, at some point the resistance is gone at the **Inner Lock Nut**. Leave the **Gear Handle** at that position and continue with the winding of the **Inner Lock Nut**.

Be aware, unwinding the **Inner Lock Nut** with resistance will lead to permanent damage of the retraction tool.

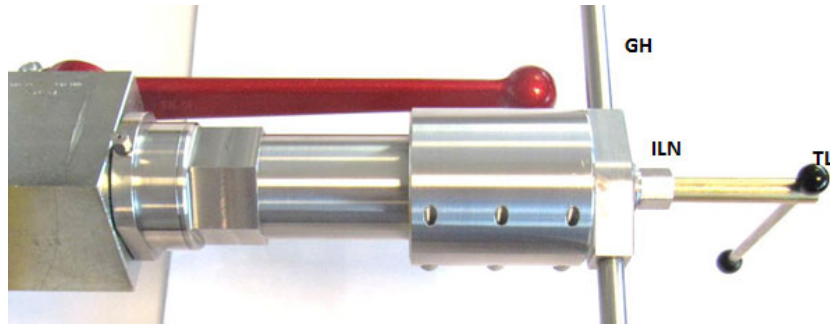
- Now the **Gear Handle** can be wind completely towards the meter. Hand tight is enough.



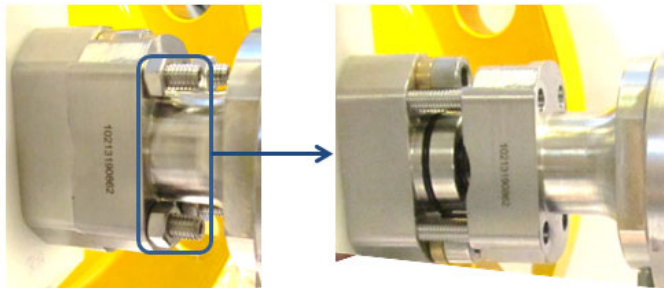
- 7) Open the bleeders to vent the gas trapped in the retraction tool.



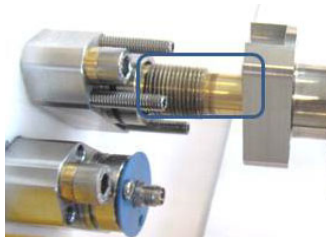
- 8) When the **Gear Handle** and the **Inner Lock Nut** are winded completely to the meter, the **Transducer Lock** can be unscrewed (releasing the transducer). When this is done, the **Transducer Lock** is loose in the retraction tool.



- 9) The 4 hexagonal nuts can be removed at the transducer mounting plate and the entire retraction tool can be removed from the meter.



During the retraction of the tool, it is possible that the **Inner Lock Nut** is a bit 'stuck' on the transducer housing. It can be pulled off gently.

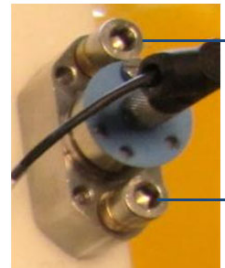


10) Remove the 4 screws from the transducer housing

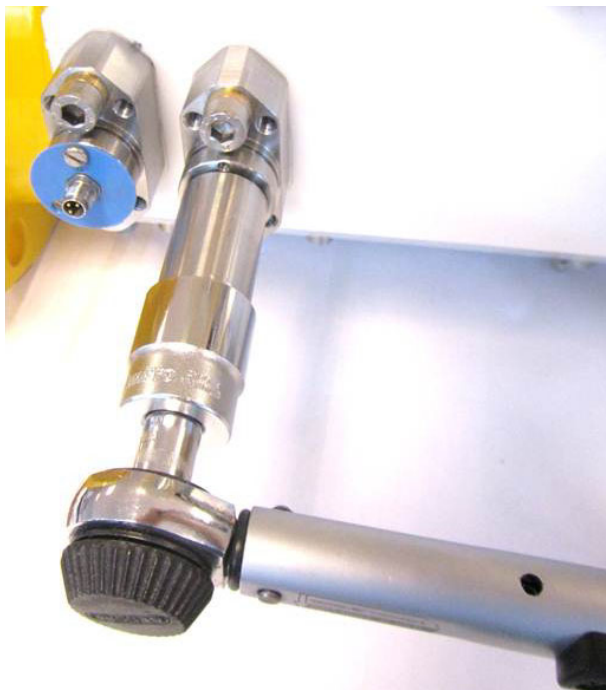


Warning!

NEVER remove any of the bolts, securing the transducer plate on the spool piece, when the line is pressurized.



11) The transducer inner nut has to be fastened with **12 Nm** torque. The UT NG torque wrench socket must be used as key.



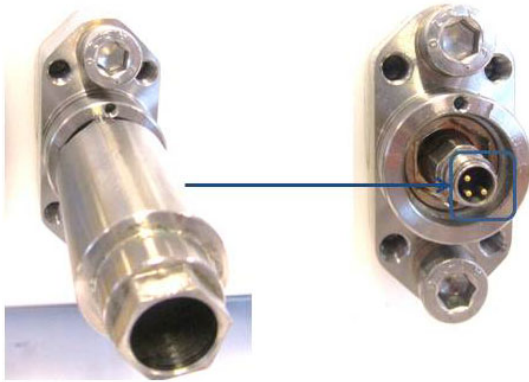
- 12) Remove the O-ring from the transducer housing.



- 13) Align the transducer connection in the correct position; for now this shouldn't be very accurate, the fine tuning will happen later.

The exact position of the transducer connection should have been documented in the beginning, use that as reference (the picture is just an example).

Use the UT NG torque wrench socket for the alignment; ensure you hold this as stated in the picture below.



- 14) The valve at the bracket has to be mounted.

Attention: Only use the threaded hole were a **through-hole** is in place!



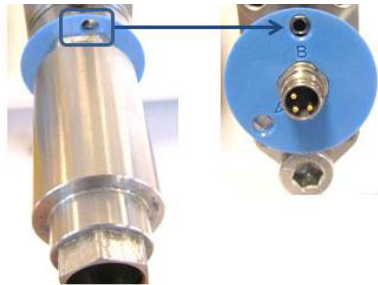
- 15) Verify if the o-ring of the alignment disk and ensure it is in proper condition. If not, it should be replaced. Use a small amount of grease (e.g. OKS 469) on the o-ring. Place the alignment disk on the transducer. The exact position of the alignment disk should have been documented in the beginning, use that as reference (the picture is just an example).



Alignment disk
with o-ring



- 16) Use the UT NG torque wrench socket for exact alignment of the transducer. When alignment is correct fasten the alignment disk with the screw. Hand-tight is enough.



- 17) Connect the wire on the transducer. If others have been removed reconnect those as well. Ensure the plastic knurl is not unscrewed.



6 Finalising replacement

- 1) Replace other transducers (if this is required): proceed again from chapter 4 to 5.
- 2) Verify if there are no leaks at the re-assembled transducers (other parts like Pm and other transducers can be checked as well).
- 3) Power the meter.
- 4) Verify if everything is working correctly, by connecting with SonicExplorer and checking the measurement of each path. Preferably a logfile and Multiple Pulse Collection is taken and sent to Elster for verification.
- 5) When everything is found correct, replace the covers back on the meter. The protective caps can be re-sealed, if required.

Appendix I. Declaration according PED:

Declaration according to PED

Herstellererklärung zu PED

Manufacturer: Elster GmbH
Hersteller: Steinern Straße 19-21
55252 Mainz - Kastel
Germany

Product: Retraction tool UT NG- Version 2
Produkt:

We hereby declares the above product complies with:

Hiermit erklären wir, dass das oben genannte Produkt der folgenden Richtlinie entspricht:

**-According to Pressure Equipment Directive (PED) 2014/68/EU - article 4 paragraph 3
"sound engineering practice"**

- Gemäß Druckgeräterichtlinie (PED) 2014/68/EU - Artikel 4 Absatz 3 "gute Ingenieurpraxis"

Design conditions:

Auslegungsbedingungen:

- **Operating pressure: 0- 70 barg**
Einsatzdruck
- **Operating temperatur: -20°C - +75°C**
Einsatztemperatur

Caution: Read instruction manual before operating device!

Achtung: Vor Verwendung des Gerätes die mitgelieferte Gebrauchsanweisung lesen!

Mainz- Kastel, 24.05.2017



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