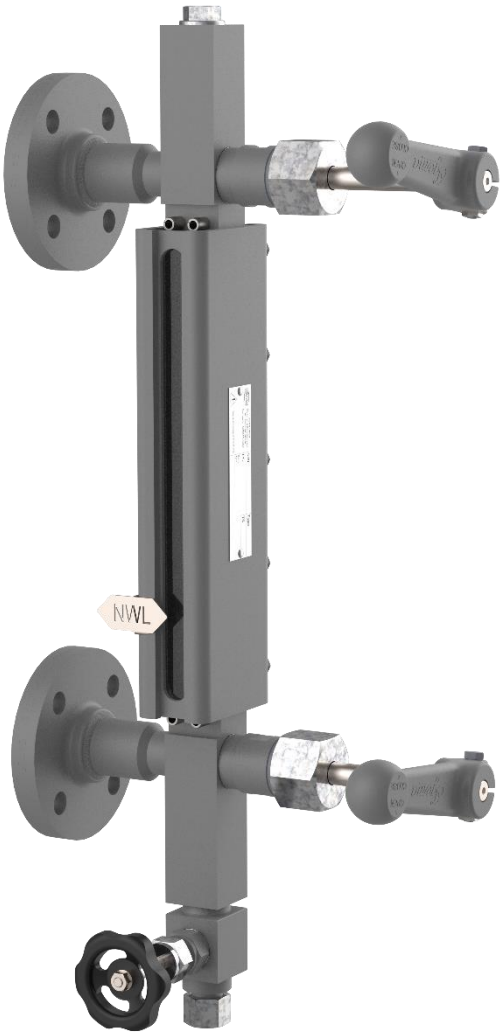
Reflex level gauge

LGI-CS



Version 09/2025

D-02-B-62376-EN-01

Installation and Operating instructions

(English translation)

Table of Contents

1 About this document

1.1 Introduction

The Installation and Operating instructions are part of the Reflex level gauge LGI-CS. It must be made available to the responsible departments "Incoming goods, transport, assembly, commissioning and maintenance". The Installation and Operating instructions must be stored in such a way that the specialist personnel has access to them at all times. If the gauge is passed on to a third party, these Installation and Operating instructions must also be included in the national language of the third party.

NOTE

Safe and trouble-free operation of the Igema GmbH Reflex level gauge is not possible without precise knowledge of the individual components.

- Installation and Operating instructions Note installation and operating instructions.
- Familiarise yourself with all relevant documents.

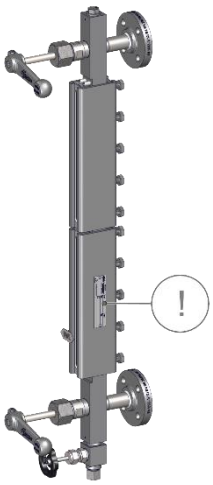
The Installation and Operating instructions contains important information for the proper use and safe operation of the Reflex level gauge. Please also note important information on the repair, maintenance, care, safety and value retention of your measurement and control system.

If the Installation and Operating instructions or the accompanying documents are partially not available or have become unusable, a replacement operating instructions for the gauge can be obtained by specifying the document number on the cover page. It is also possible to download the operating instructions after scanning the QR code shown on the back.

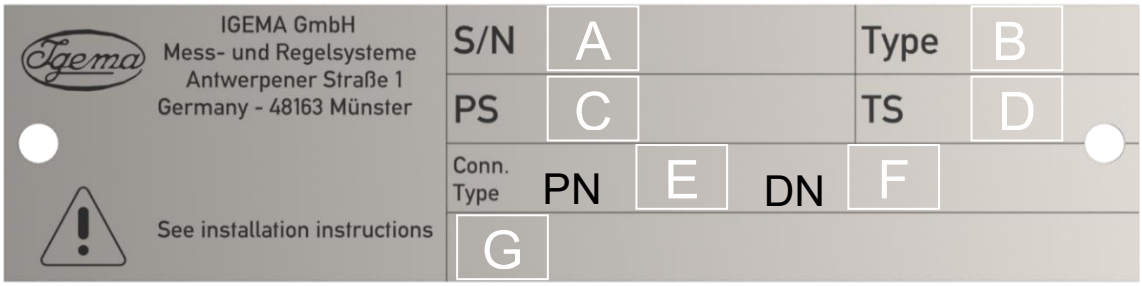
1.2 Product identification and rating plate

On the basis of the rating plate, the Installation and Operating instructions can be assigned to the corresponding Reflex level gauge. The Installation and Operating instructions belongs to the Reflex level gauge of the type **LGI-CS**.

Additions that are entered after the designation and describe the design of the Reflex level gauge *(e.g. 5/3ü)* do not release these Installation and Operating instructions from belonging to the Reflex level gauge.



According to DIN EN19 the following are marked on the rating plate:



A	Year of manufacture and order number	E	Pressure level
B	Type designation	F	Nominal width
C	maximum permissible pressure	G	TAG No. (optional)
D	maximum permissible temperature		

1.3 Related documents

In addition to these operating instructions, the operating instructions of the drain valves must be observed.

Product	Operating instruction number/ Link	QR-Code
Drain valves	62825 www.igema.com/document/62825	

1.4 Marking of safety precautions

In the following installation and operating instructions, safety instructions are marked with the following symbols:

 **SIGNAL WORD**	
Nature and source of danger Consequences of non-compliance Instructions for action to avoid the danger	**SYMBOL(S)**

	This symbol with the signal word DANGER and a background warning colour indicates a danger that will result in death or serious injury if not avoided.
	This symbol with the signal word WARNING and a background warning colour indicates a danger that can lead to death or serious injury if not avoided.
	This symbol with the signal word CAUTION and a background warning colour indicates a danger that can lead to injuries if not avoided.
	This symbol with the signal word NOTICE and a background colour indicates a danger that can lead to property damage if not avoided.
	This symbol with the signal word ENVIRONMENT and a background colour indicates a danger that can lead to environmental pollution if not avoided.
	This symbol with the signal word TIP and a background colour indicates a user tip that provides additional and useful tips.

1.5 Copyright

2 Safety Instructions

2.1 Requirements for personnel

NOTE

Property damage caused by incorrect installation, commissioning, maintenance and operation

Only qualified persons who are familiar with the measurement and control systems are allowed to carry out work

Igema GmbH can be commissioned for the installation and maintenance.

CAUTION

Risk of injury due to external influences

External influences can lead to injuries in the absence of protective equipment

- Put on personal protective equipment according to category Ⅱ

2.2 Safety at work

DANGER

Explosion hazard due to ignition sources

Working in potentially explosive atmospheres during assembly, commissioning, maintenance and disassembly can lead to explosions.

- Ventilate the environment
- Switch off the system
- Allow explosive gases to escape.
- Carry out a gas value measurement before starting work.

WARNING

Risk of injury due to corrosive liquids

Corrosive liquids can cause serious injuries in case of skin contact

- Check the danger of the medium.
- Wear protective clothing including safety glasses.

Risk of injury due to leaking medium

Inflammatory, irritating and harmful substances can escape from the gauge and lead to skin injuries and burns. This danger is also to be expected in the case of an unpressurised cooled system.

- Wear protective clothing including safety glasses.
- Check the danger posed by the medium and, if necessary, wear respiratory protection or support.
- Observe the order of work.
- Perform work only when the gauge is depressurised and emptied.
- In principle, do not consider any system to be depressurised.

Risk of injury due to high temperatures

Surfaces of the gauges and areas near the gauges heat up to the maximum permissible temperature and can cause severe burns if touched.

- Check the danger of the medium.
- Wear protective clothing including safety glasses.
- Before carrying out maintenance and dismantling work, wait until the system is adjusted to the atmospheric conditions.

Danger of suffocation due to dangerous gases

Escaping gases can lead to suffocation.

- Check the danger of the medium.
- Wear protective clothing including safety glasses and respiratory protection.
- Before carrying out maintenance and dismantling work, wait until the system is adjusted to the atmospheric conditions.

CAUTION

Risk of injury due to unsecured working area

An unsecured working area can endanger working and bystanders.

- Ensure safe access.
- Delimit and mark the secured working area.
- Sufficiently illuminate the working area.

Risk of injury due to heavy loads

There is a risk of injury when handling large and/or heavy gauges.

- Observe the load handling regulation.
- Use lifting equipment to move heavy and bulky appliances.

Risk of health damage due to noise

Noise leads to damage to the health of the hearing.

- Wear hearing protection.
- Avoid or limit noise if possible.

2.3 Intended use of the gauge

NOTE

Property damage caused by irregular use

- Use gauges exclusively as a gauge of filling levels on containers.
- Maintain maximum pressure and temperature ranges of all components.
- Ensure the suitability of the gauge for the planned use/application.
- Ensure the compatibility of the gauge and the medium.
- Observe the correct orientation and flow direction of the gauge.

2.4 Damage to the product

NOTE

Property damage caused by incorrect storage and transport

Incorrect transport and storage can cause damage to the gauge.

- Avoid bumps and hard setdown.
- Store the gauge protected from environmental influences and in a dry place.
- Secure the gauge against damage.

3 Contents of the packaging

3.1 Included

1 LGI-CS The Reflex level gauge will be delivered as a pre-assembled unit, unless otherwise contractually agreed:

- Gauge with built-in shut-off valves
- Drain valve

2. Installation and operating instructions

3.2 Optional versions

These operating instructions apply to the gauge in standard as well as in customer-specific design. The applicable documents must be additionally observed especially if the gauge is equipped with customer-specific shut-off or drain valves.

4 System Description

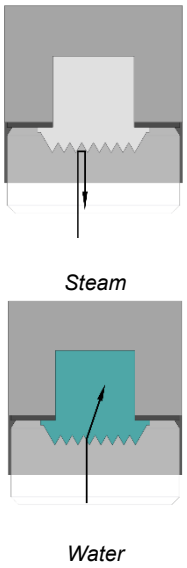
4.1 Function

Reflex level gauges in different versions are used to detect the water level of steam generators or tanks.

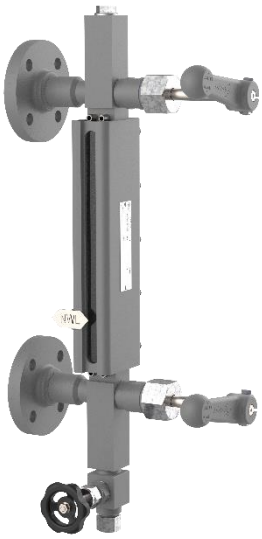
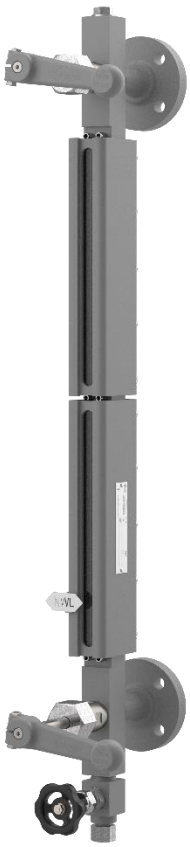
The gauge works on the principle of communicating tubes.

It is equipped with an elongated, flat glass, which has prismatic grooves on the medium-side surface.

Due to different reflection (refraction) of the light, the water space appears dark and the steam space bright.

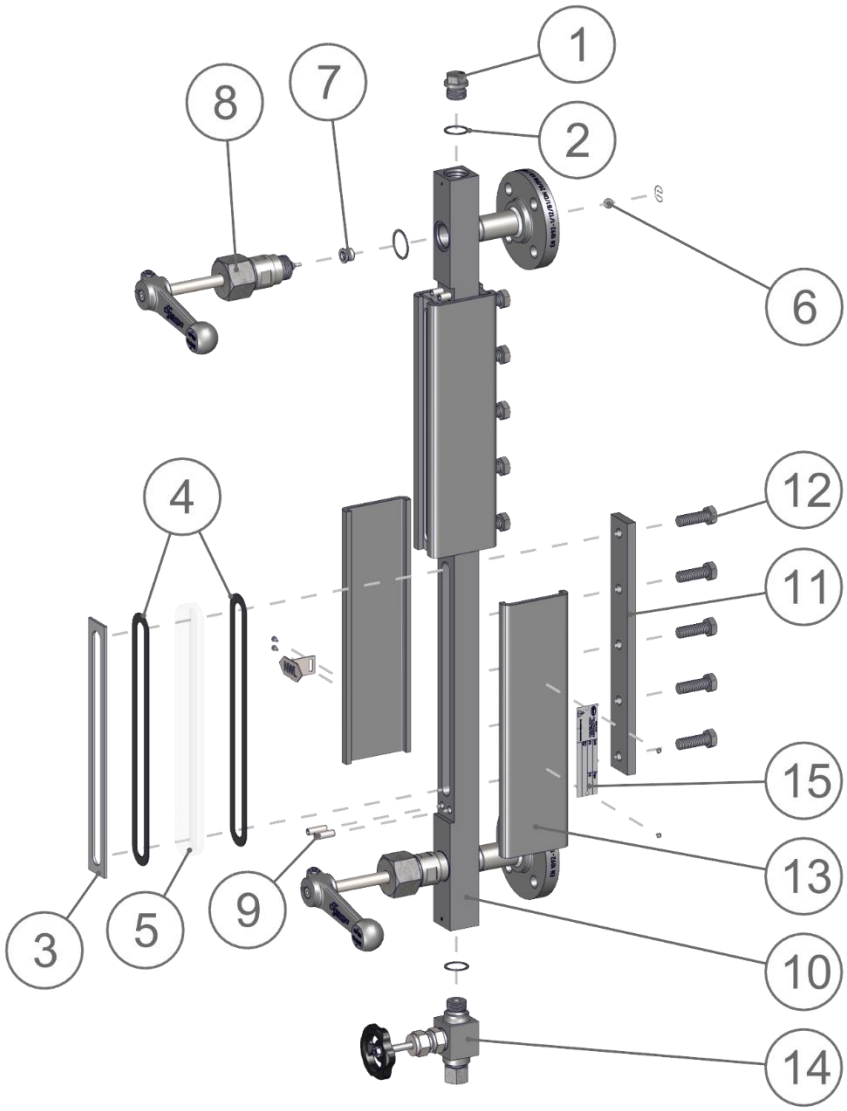


4.2 Different variants

One display opening	Multiple display openings
	

5 Construction

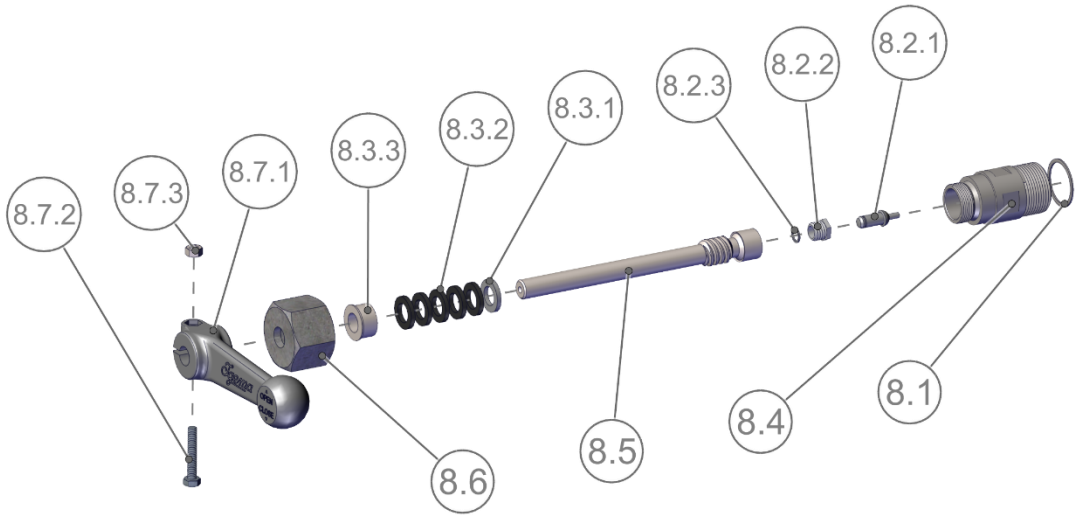
5.1 Gauge



Example.: single display opening

1	Screw plug G $^1/_2$"	9	Clamping pins
2	Sealing ring	10	Display body
3	Pressure plate	11	Screw Holders
4	Graphite Gaskets	12	Hexagon screw
5	Reflective glass	13	Clamping lug
6	Ball	14	Drain valve
7	Valve seat	15	Rating plate *(chap. 1.2)*
8	Valve upper part	16	Water level mark *(chap. 11.2)*

5.2 Valve upper part



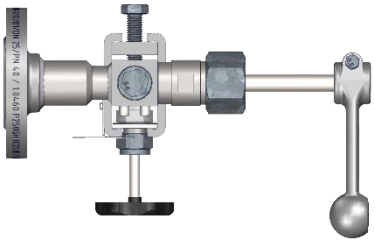
8.1	Sealing ring	8.4	Valve upper part
8.2.1	Valve cones	8.5	Spindle
8.2.2	Threaded bushing	8.6	Cap nut
8.2.3	Explosive ring	8.7.1	Handwheel
8.3.1	Base ring	8.7.2	Washer
8.3.2	Packing rings	8.7.3	Hexagon nut
8.3.3	Stuffing box		

6 Technical data

6.1 Limitations of use

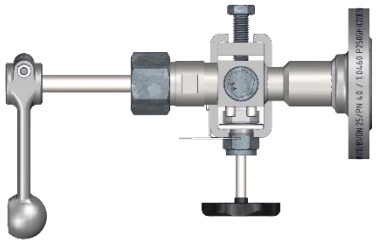
Application limits LGI-CS	Perm. Pressure **[PS]**	Perm. Temperature **[TS]**
Media with glass attack (e.g. water vapour)	32 bar 464 psig	-20 to 239 °C -4 to 462°F
Media without glass attack (e.g. nitrogen)	100 bar 1450 psig	-20 to 40 °C -4 to 462°F
	20 bar 290 psig	-20 to 300 °C -4 to 527°F

6.2 Possible display orientations



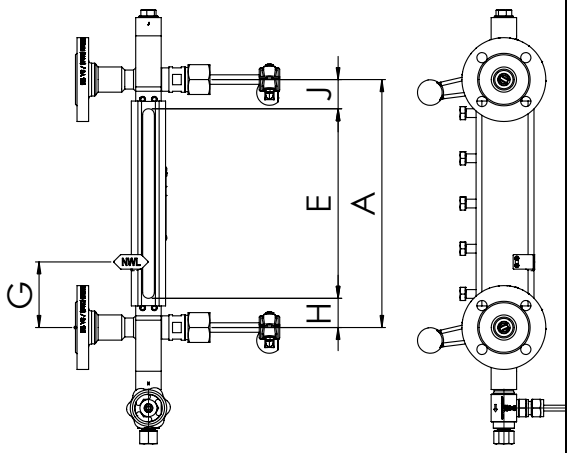
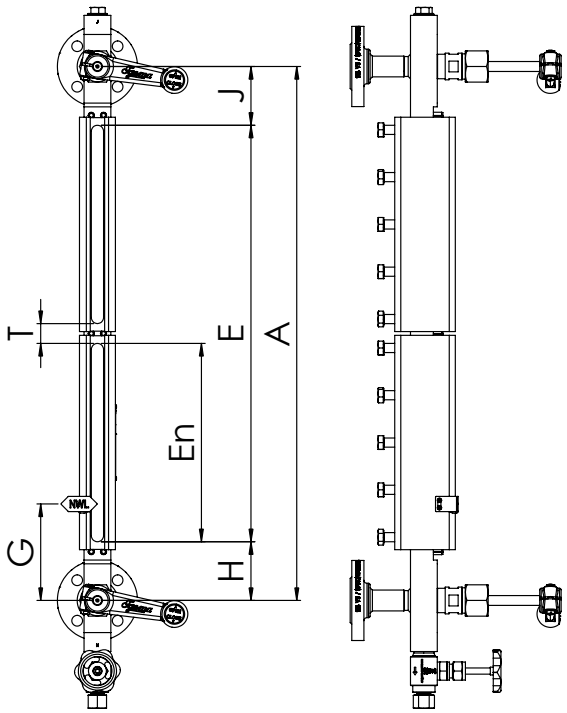
Left

Rear



Right

6.3 Dimensions

Single display opening	Multiple display openings
	

The displayed gauges are shown as a left-hand model.
The dimensions H, J and A are to be specified individually.

		Min.	
		[mm]	**[inch]**
Upper blind space	**[J]**	40	1 4/7
Lower blind space	**[H]**	40	1 4/7
Blind space	**[T]**	26mm/1"	

NOTE

Property damage due to weight loading

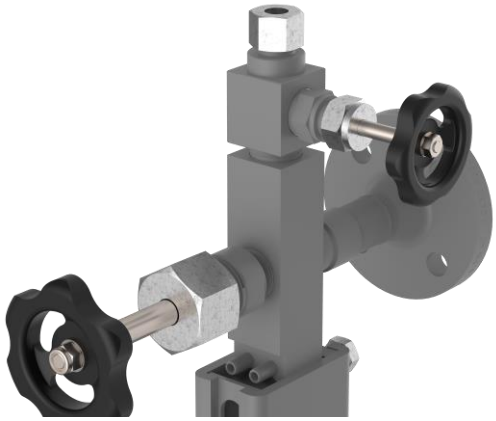
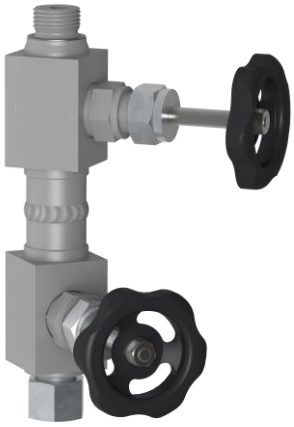
If the total weight of the gauge > 30kg the connecting elements are subjected to excessive loads.

- Provide sufficient support. (e.g. by spring hanger)

6.4 Optional versions

In addition to customer-specific drain valves, the gauge can also be designed in a customer-specific manner via other properties. These operating instructions also apply to these versions.

For versions with other drain or venting valves, the documents for the installed valves must also be observed.

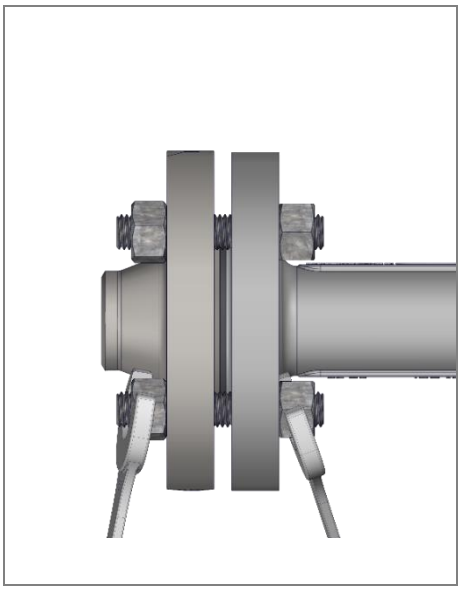
Examples of optional versions	
Venting valve	Double drain valve
 *Example AV250*	 *Example AV251*

Type	Data sheet	Item number
Venting valve AV250 Cutting ring screw DS12	D-09-D-50437-EN	15-16613
Double drain valve AV251 Cutting ring screw DS12	D-09-D-59264-EN	15-14733

7 Assembly

7.1 Version with flange

- Observe the orientation of the gauge.
- Check sealing surfaces for cleanliness
- Install the flange connection between the gauge and the boiler/pressure vessel according to the applicable standard



7.2 Version with welding end

WARNING

Eye damage due to lack of personal protective equipment

Lack of eye protection during welding leads to eye damage in working and bystanders.

- Secure the working area.
- Wear a welding protective mask.

- Observe the orientation of the gauge.
- Remove protection caps. (locking for transport)
- Assembly only by using welding process
  111 (metal-arc welding with covered electrode)
  or
  141 (inert-gas tungsten-arc welding).
- Check on an application-specific basis whether a subsequent heat treatment of the weld seams is required.

7.3 Bending and mounting the water level mark

If the water level mark is not already mounted but is included with the gauge including screws, it must be bent as described below and mounted on the clamping tabs at the specified height.

Bending the water level mark

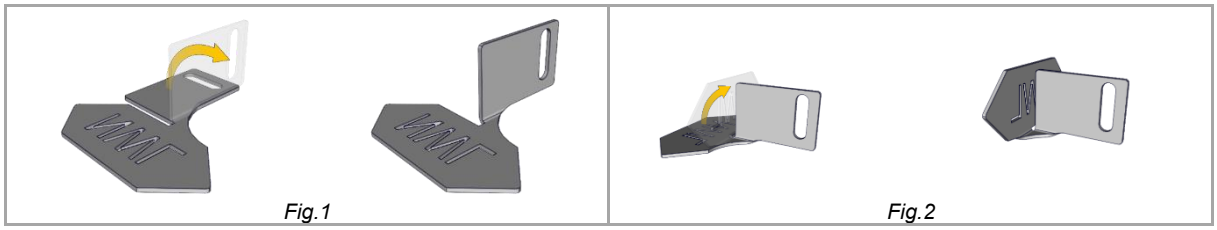


Figure 1

- Place the flat water level mark on the back
- Bend up the mounting bracket up by 90° to the right.

Figure 2

- Bend the text field upwards by 90°

Mounting the water level mark

Components

Designation	Figure	Quantity
Water level mark bent by hand		1
Thread-forming screw M3 x 6, case-hardened steel		2

Tools

Designation	Figure	Recommended size
Marker		0.6 mm linewidth
Grain		4mm lace width
Fitter's hammer		500g
HSS Twist Drills		Ø 2,8 mm
Hand Deburring		Ø 12.4 mm
Screwdriver		TX10

Work steps

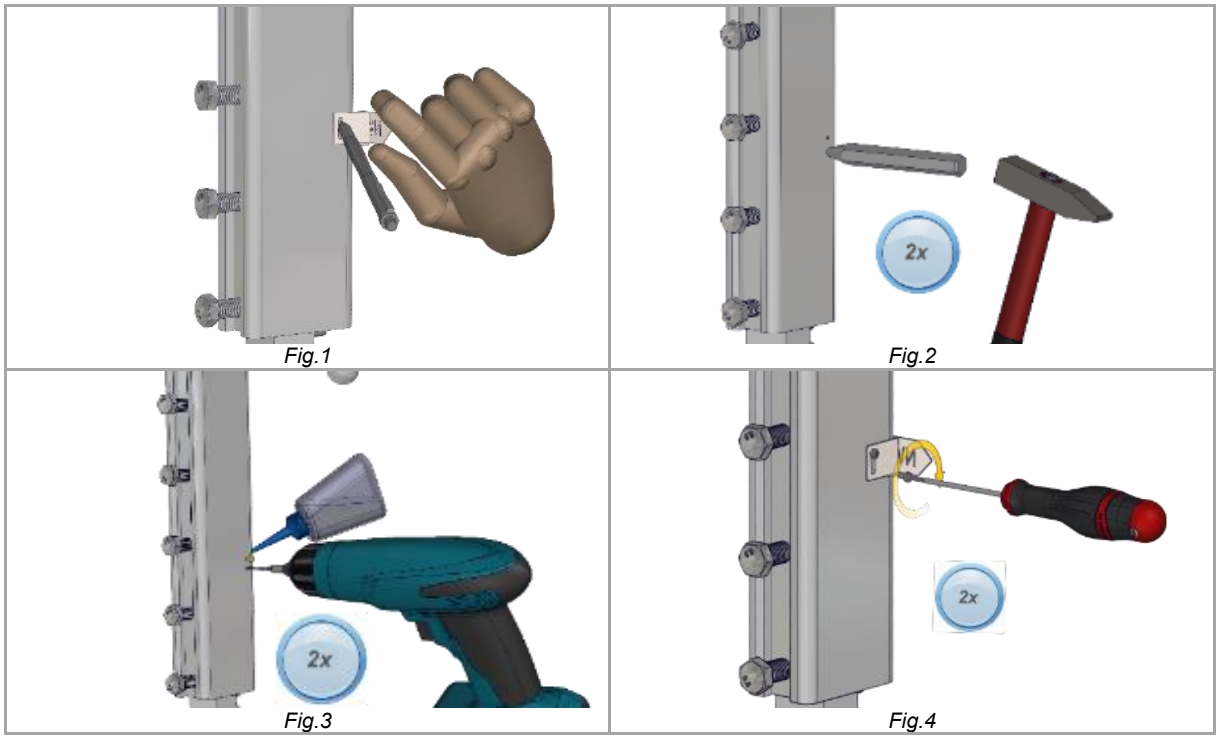


Fig.1 *Fig.2* *Fig.3* *Fig.4*

Figure 1

- Stop the water level mark at the desired position and trace the oblong hole with a marker.

Figure 2

- Punch holes to be drilled at a suitable distance from each other with a light hammer blow.

Figure 3

- Drill the anchorages to a depth of 5.5mm with the HSS drill Ø2.8mm.
- Countersink the hole with a hand deburrer.

If the clamping tab has been drilled through, this does not represent a functional impairment as long as no other components have been damaged as a result.

Figure 4

- Screw on the water level mark with self-tapping screws *(max.1.8Nm).*

Screw with moderate hand torque!

8 Commissioning

8.1 Before commissioning

Torque

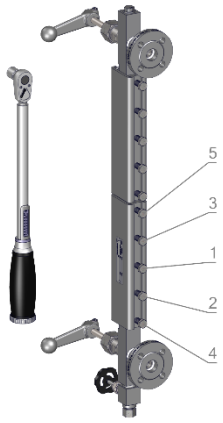
All liquid level gauges are subjected to a pressure test before delivery. In individual cases, material placement may occur due to transport, storage or during assembly.

NOTE

Leaks due to insufficient torques

- Check screw connections for appropriate torque and a tight fit.
- 24 hours after commissioning, check all screw connections again for the correct torque and possibly retighten.
- Check for leaks in the first few days after commissioning

When retightening the screws, the following tightening sequence and tightening to the maximum tightening torque in the specified steps must be ensured.



Tightening torque Md → **Md max** [Nm]		
in steps		
1	2	3
30	45	**60**

Condition of the boiler water

NOTE

Property damage caused by contaminated medium

Impurities in the medium can cause leaks during commissioning and possible subsequent flushing.

- Ensuring the cleanliness of the medium in the best possible way

TIP

The pH value of the medium has a strong effect on the removal of the reflective glass.

8.2 Commissioning at the same time as the boiler

TIP

This type of commissioning is recommended by Igema GmbH due to the lower stress on the components.

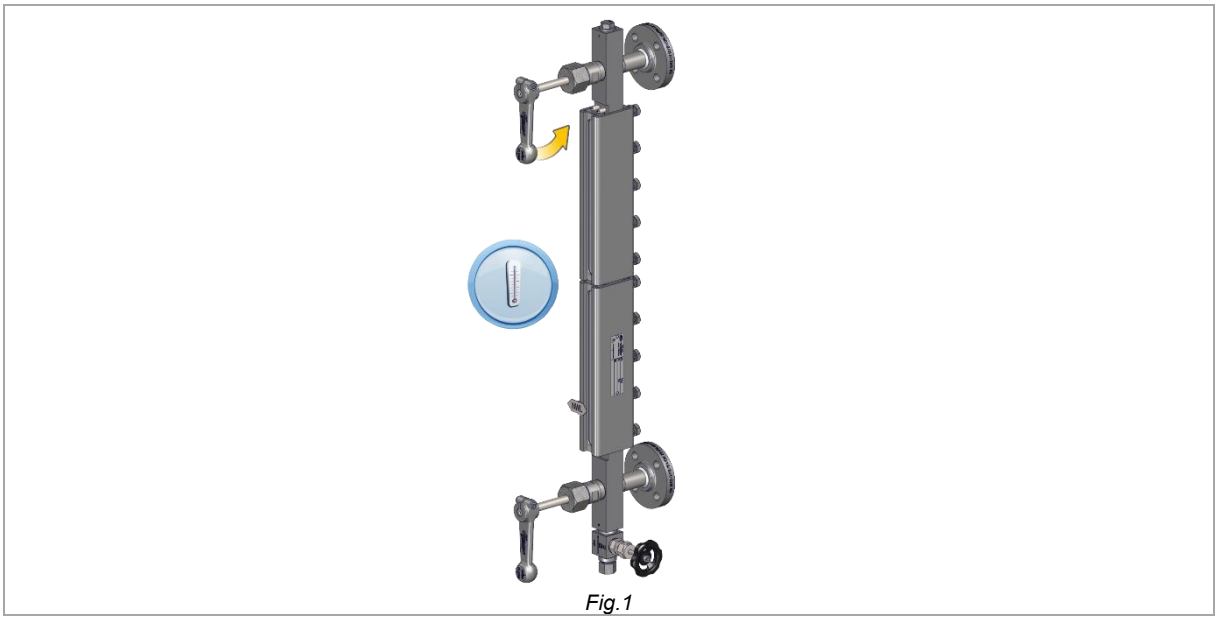


Fig.1

Figure 1:

- Close the drain valve.
- Fully open the shutoff valves

The commissioning of the pressure vessel / boiler with the gauge can now be carried out.

8.3 Commissioning under pressure and temperature loads

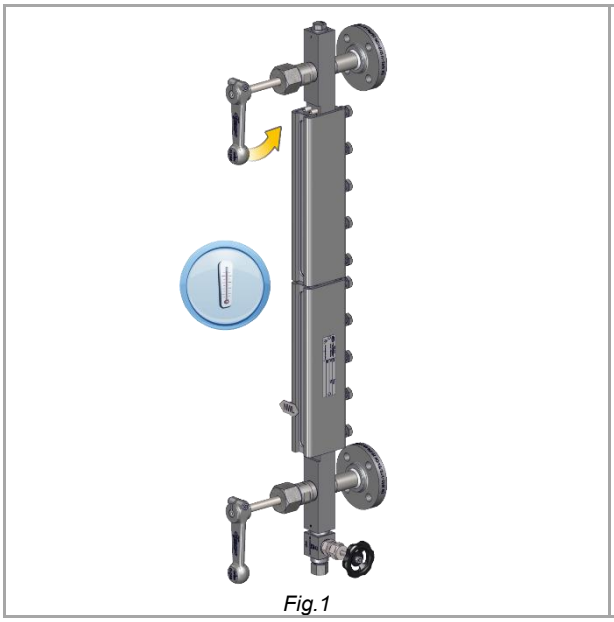


Fig.1

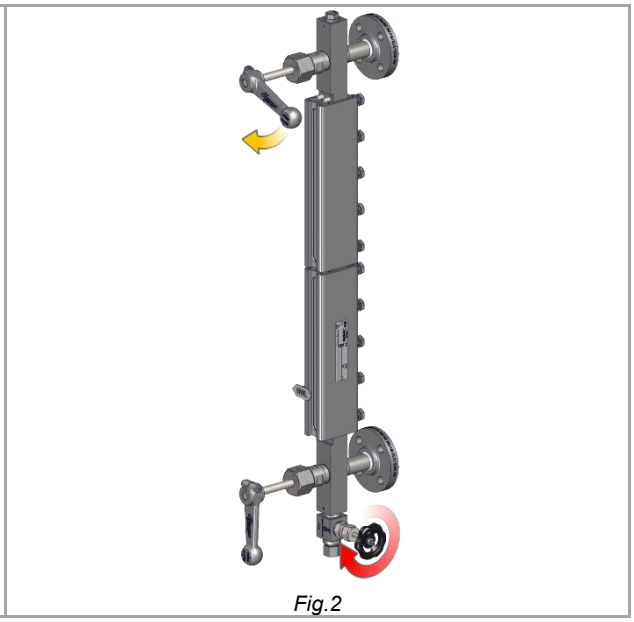


Fig.2

Figure 1:

- The gauge must be depressurised *(chap.9.2)*
  - Open the upper shutoff valve slowly.

The gauge is heated to operating temperature by the steam flowing through it within 5-10min.

Figure 2:

- The operating temperature must be reached
  - Close the upper shut-off valve.

Close the drain valve.

Fig.3

Fig.4

Fig.5

Figure 3:

- Open the upper shutoff valve slowly.

Figure 4:

- Slightly open the lower shutoff valve.

The pressure equalisation now takes place.

Figure 5:

- The pressure equalisation must be fully completed
  - Open the lower shutoff valve completely.

The filling level is adjusted.

- Check the gauges for leaks.

TIP

If the level of the medium does not become visible, this may be related to the safety function of the self-closing ball in the valve.

- Close the lower shutoff valve.
- Repeat commissioning under pressure and temperature loading from *Fig.4*.

9 Servicing

NOTE

Property damage caused by incorrect spare parts

Replaced spare parts that do not correspond to the characteristics of the original spare parts may cause damage to the gauge.

- Only use original parts from Igema GmbH for replacement.

CAUTION

Cuts caused by sharp objects

During the maintenance of the device, sharp-edged parts may cause injuries.

- Always expect sharp-edged parts and shards due to glass breakage.
- Wear work gloves.

9.1 Preventive maintenance

Proper cleaning and maintenance of level gauges is essential for optimal level indication and service life.

NOTE

Leaks due to defective seal

Seals that appear to be in perfect condition may have hardened.

- Always replace gaskets during maintenance work.

Unrecognisable fill level due to contaminated glasses

It is necessary to make sure that the visible fill level coincides with the actual one.

- Keeping glasses clean

Creation of a maintenance plan

The operator must determine a maintenance plan suitable for the specific application after evaluating his own operating experience. It should be noted that shorter maintenance intervals extend the service life of the level gauge.

TIP

In order to ensure a trouble-free process, Igema GmbH recommends an annual replacement of the glass and the seals. Shorter maintenance intervals are recommended in extreme operating conditions.

9.2 Cleaning the gauge / depressurising

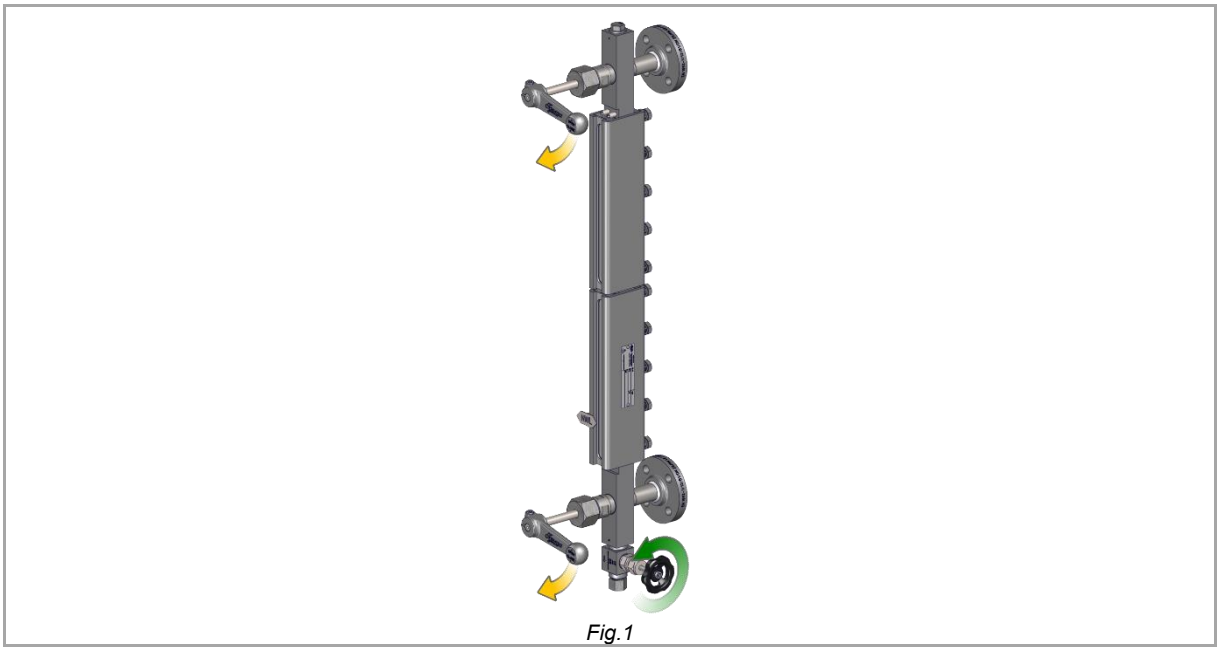


Fig.1

Figure 1

- Close shutoff valves.
- Open the drain valve.

The gauge is partially emptying.

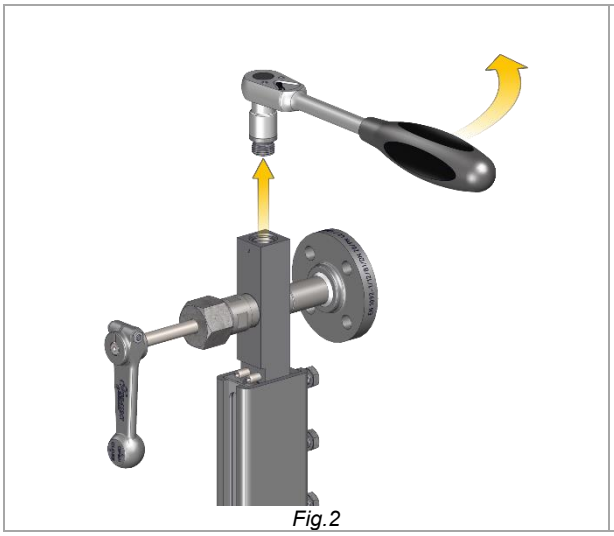


Fig.2

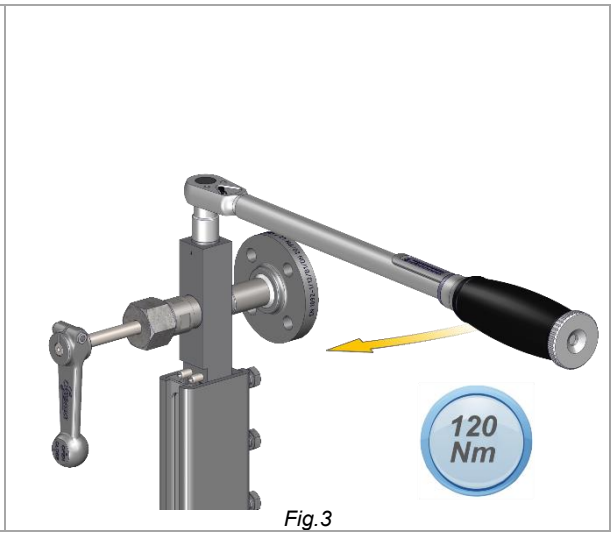


Fig.3

Figure 2:

- Open the screw plug.

The gauge is emptying completely.

Figure 3:

- Screw in the screw plug with the specified torque.

The cleaning has now been completed. The gauge can be put back into operation. (Ch.8)

9.3 Blowing through the gauge for further cleaning

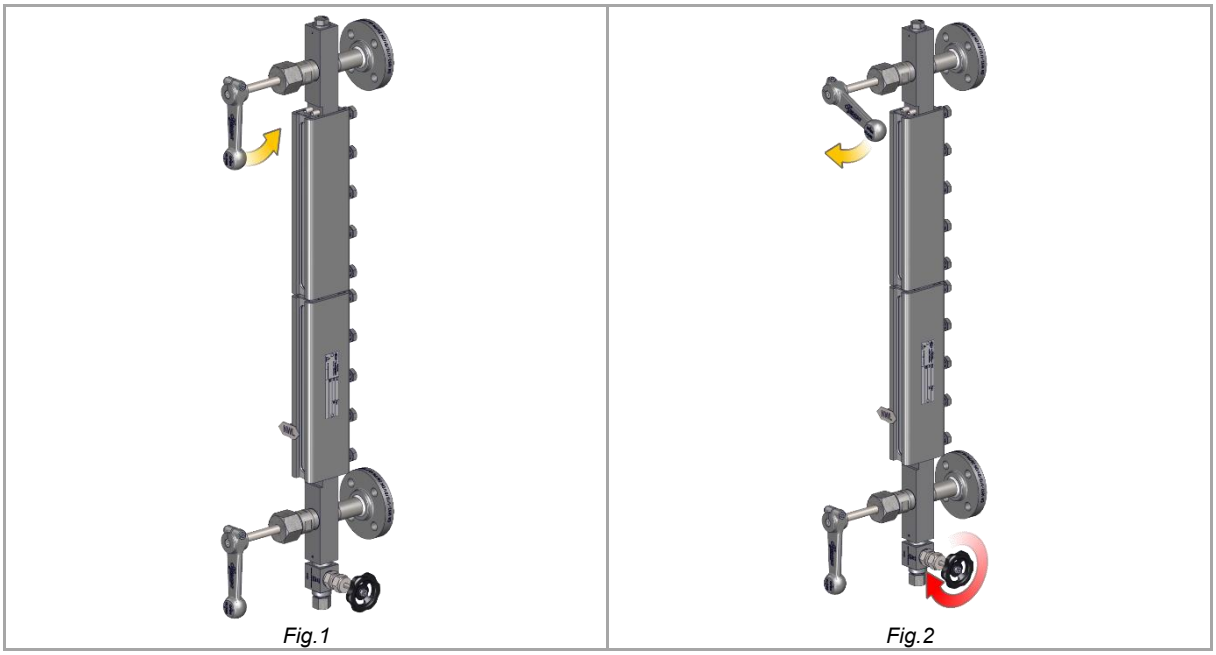


Fig.1 *Fig.2*

Figure 1:

- The gauge must be depressurised *(chap.9.2)*
  - Open the upper shutoff valve slowly.

The steam flowing through cleans the glasses.

Figure 2:

- Close the upper shutoff valve
- Close the drain valve.

The gauge can be put back into operation. (Ch.8)

9.4 Cleaning the glasses

During first commissioning or re-commissioning of a boiler, oil and grease residues can deposit on the inside of the glass.

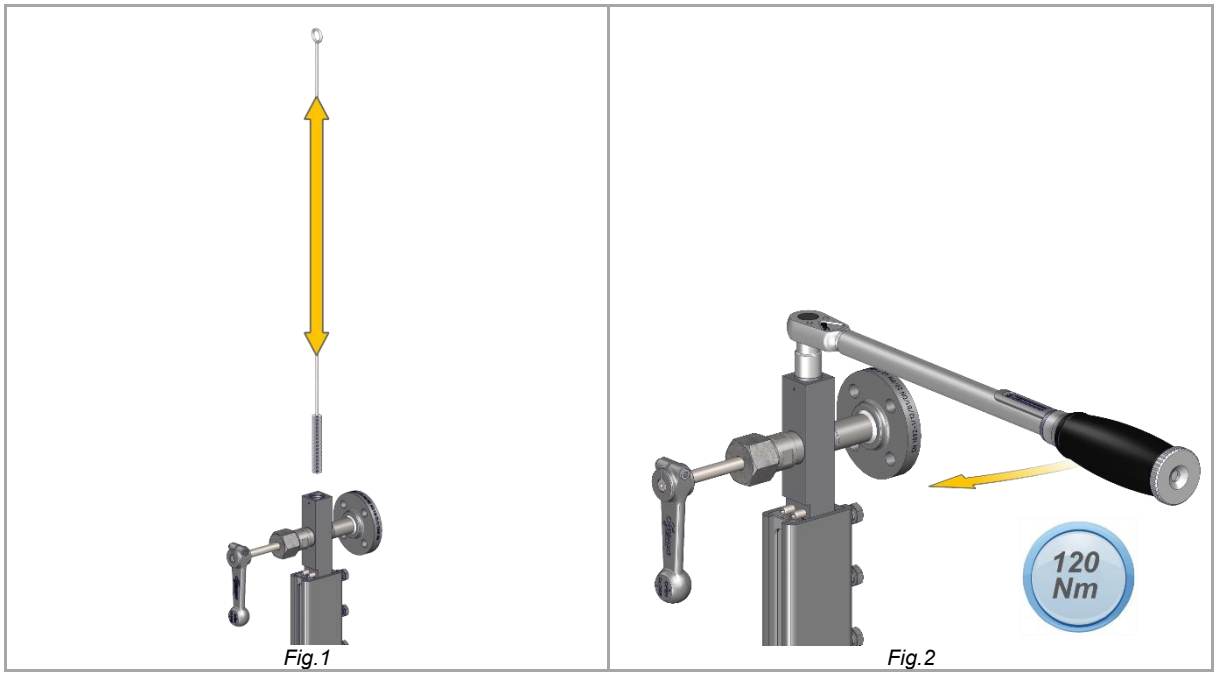


Fig.1 *Fig.2*

Figure 1:

- The gauge must be depressurised *(chap.9.2)*
  - Unscrew the screw plug.
  - Clean glasses and channel in the display body with a round brush *(Article number 40-00775)*.

Figure 2:

- Screw in screw plug with torque **Md=120Nm**.

TIP

If this cleaning is not sufficient, a new glass must be installed. *(For spare parts packages and item numbers, see Chap. 11.1)*

9.5 Glass replacement

NOTE

Property damage caused by damaged components

Apparently intact components can be damaged and lead to damage to the device when reinstalled or reused.

- Replace glasses and gaskets annually.
- After loosening the clamping tabs, install completely new seals.
- Create optimal operating conditions for the durability of the glasses and seals.

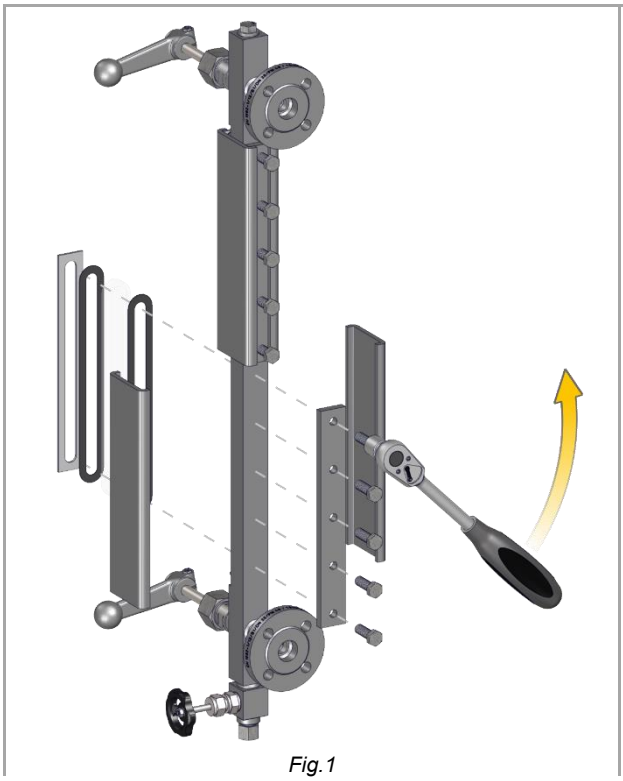


Fig.1

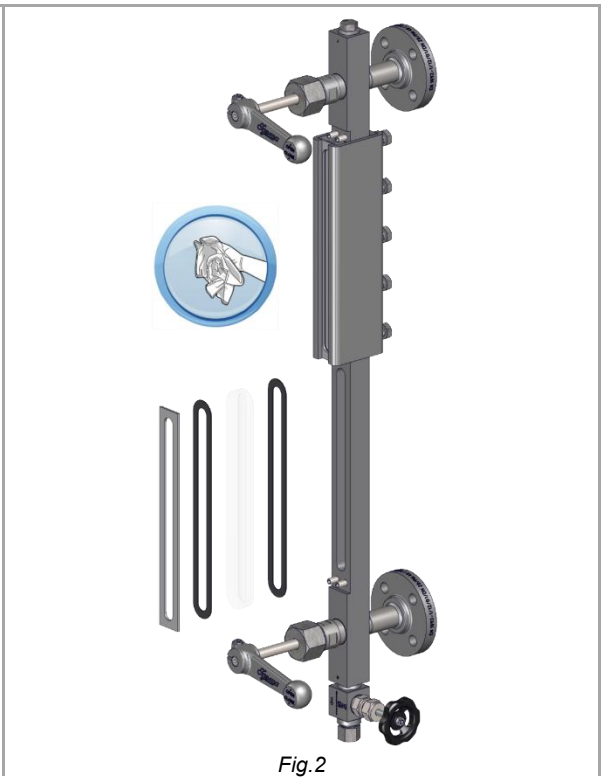


Fig.2

Figure 1:

- The gauge must be depressurised.
  - Loosen and remove the pressure screws.

  The individual components come loose.
  - Remove clamping tabs, pressure plate, glass, seals and screw holders.
  - Completely remove sealing residues.
    - Clean the sealing and contact surface surfaces of the display body with non-woven fabric and check for damage.

Figure 2:

- Insert new seals, new reflective glass and pressure plate.

NOTE

Property damage due to incorrect installation

Incorrect installation of gaskets, reflective glass and pressure plate leads to leaks.

- Use clamping pins as a positioning aid.
- Install glass with the grooves on the medium side.

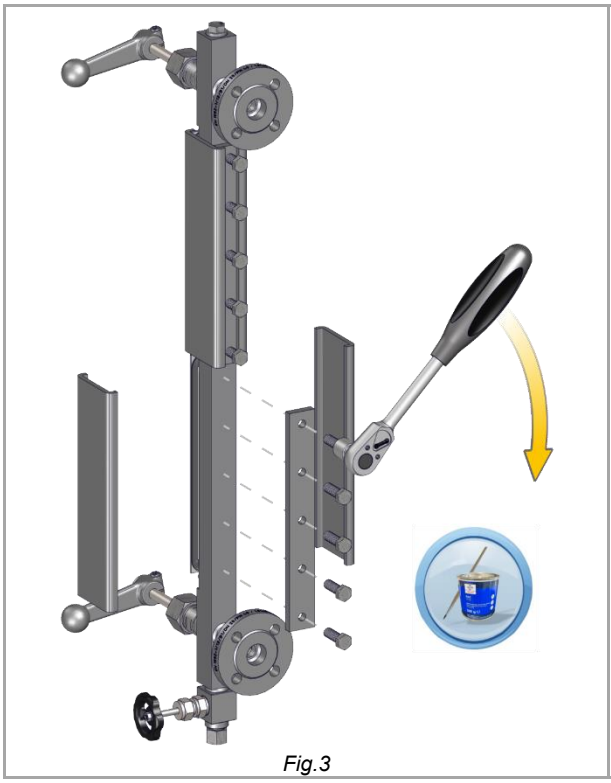


Fig.3

Fig.4

Figure 3:

- Grease hexagon head screws with suitable lubricant (e.g. Fuchs Lubritech PBC 1574).
- Screw into the screw holder.
- Insert the screw holder.
- Attach clamping tabs.

Figure 4:

- Tighten the pressure screws firmly by hand.
- Tighten the pressure screws starting from the centre - alternately - from top to bottom in several steps according to the table to the tightening torque **Md $_{max}$**. (chap. 8.1)

Following the glass change, the gauge can be put back into operation. (chap.8)

9.6 Change valve seat

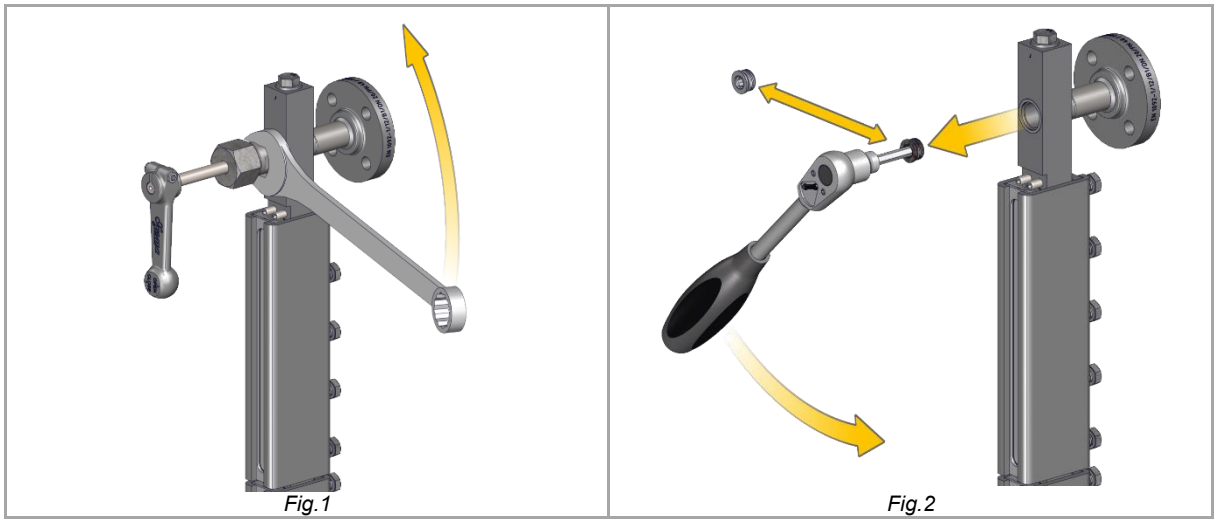


Fig.1 *Fig.2*

Figure 1:

- Unscrew the valve upper part from the display body.

Figure 2:

Unscrew and change seat with hexagonal wrench *(SW10)*.

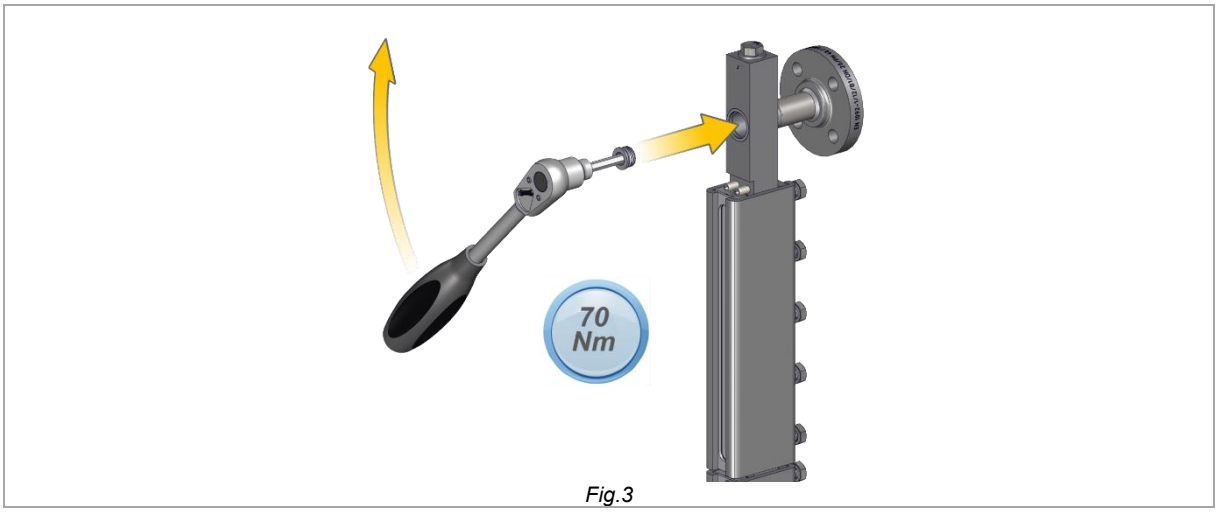


Fig.3

Figure 3:

- Grease the new seat on the thread
- Screw in seat with a torque of **70Nm**.

The valve upper part can be reinstalled. ***(Chap. 9.7 - from Fig. 2)***

9.7 Replacing the valve upper part

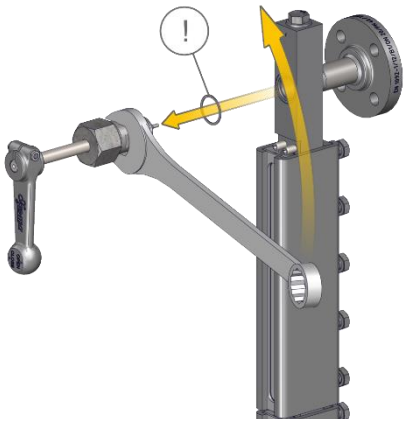


Fig.1

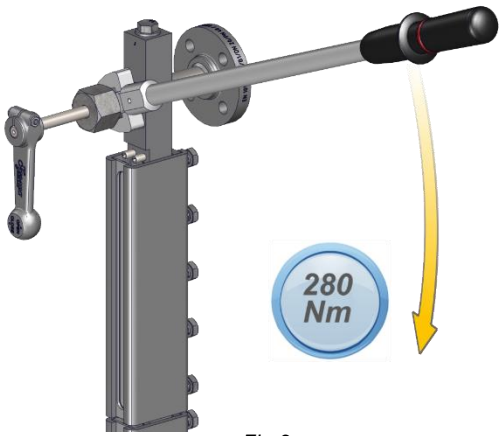


Fig.2

Figure 1:

- Unscrew the valve upper part from the display body.
- Secure sealing ring against loss

TIP

If the valve seat is to be replaced, this can be done now. *(Chap. 9.6)*

Figure 2:

- Screw the pre-assembled valve upper part into the valve body.

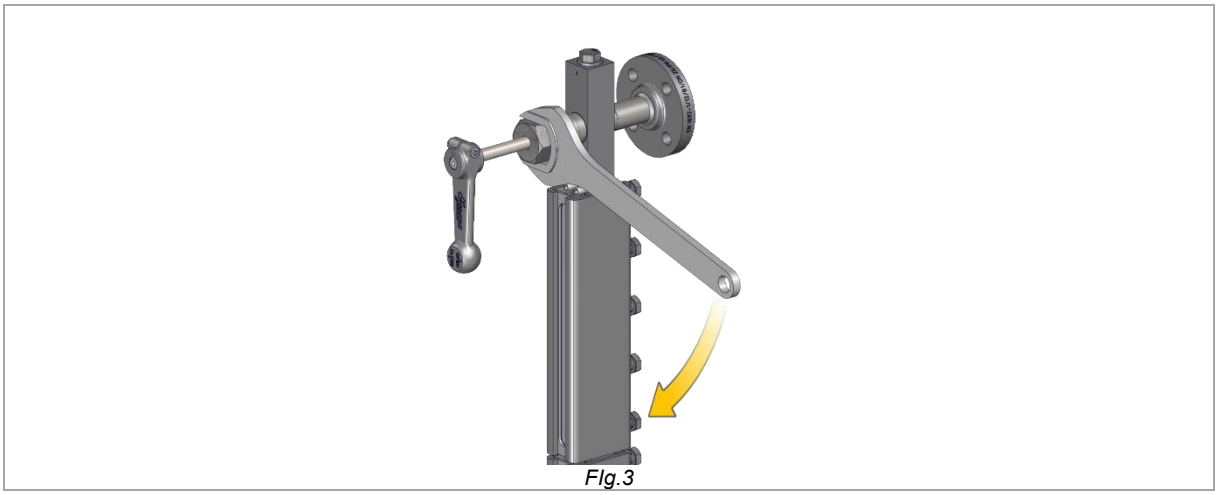
Ensure that a new sealing ring is fitted between the valve upper part and the valve body.

- Tighten with a torque of ***280Nm***.

HINWEIS

Property damage due to incorrect installation

The valve spindle must be installed in the open position to prevent damage to the valve seat.



Flg.3

Figure 3:

- Tighten the union nut so far that the hand lever/ handwheel can still be rotated.

10 Case of damage

Fault	Cause	Remediation
Leakage on the glass holder between the body and the graphite gasket	Wear and tear	Carry out repair *(Chapter 10.2)*
Leakage between the plug screw and the display body	Wear and tear	Carry out repair *(Chapter 0)*
Water level not visible	Grease deposits on the glass	Cleaning glasses *(Chap. 0)*
Water level not visible after cleaning	Heavy deposits on the glass	Changing the glass *(Chapter 0)*
Leakages on the spindle	Material loosening	Tighten the cap nut *(Chapter 10.1)*

10.1 Spindle / gland packing leaks

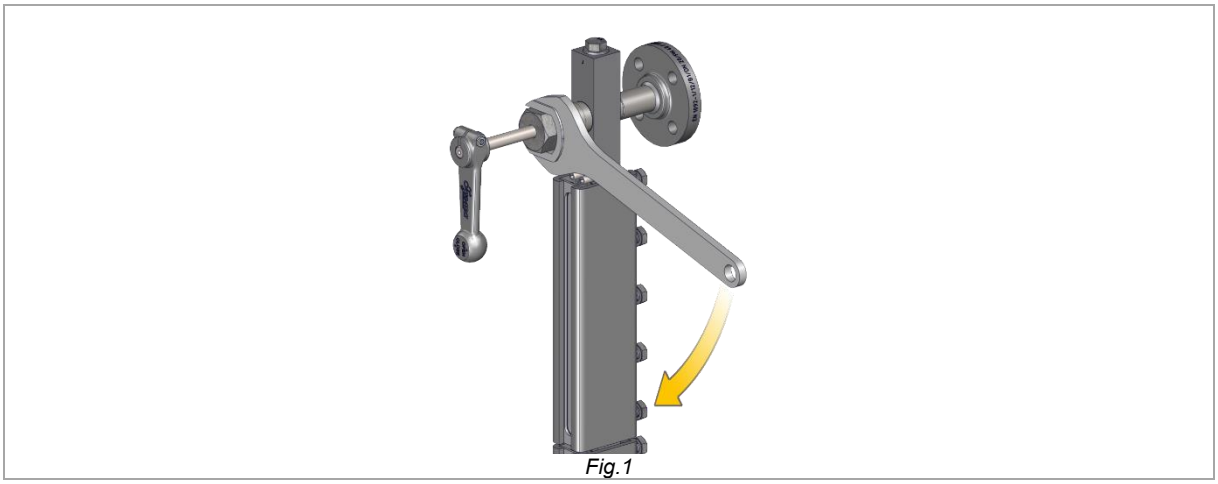


Fig.1

Figure 1:

- Tighten the union nut on the appropriate spindle

NOTE

Error does not rectify after correction

If the error does not rectify after the correction, the valve upper part must be replaced. *(Chap. 9.7)*

10.2 Leakage on the glass holder between the body and the graphite gasket

Fig.1

Figure 1:

- The gauge must be depressurised.
  - Tighten the pressure screws starting from the center - alternately - from top to bottom in several steps to the tightening torque **Md max** .

NOTE

Error does not rectify after correction

If the error does not rectify after the correction, the glass must be replaced.

- Change Glas *(Chap. 9.5)*

10.3 Leakage between the screw plug and the display body

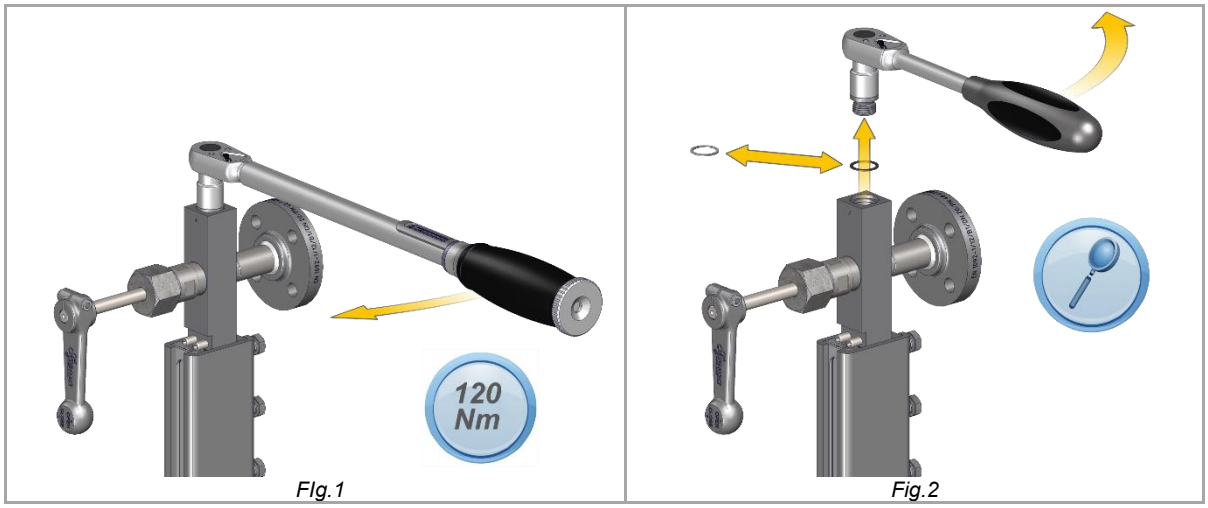


FIg.1 *Fig.2*

Figure 1:

- Tighten the torque of the screw plug

Figure 2:

- If there is no improvement:
  - Unscrew the locking screw.
  - Replace the gasket.

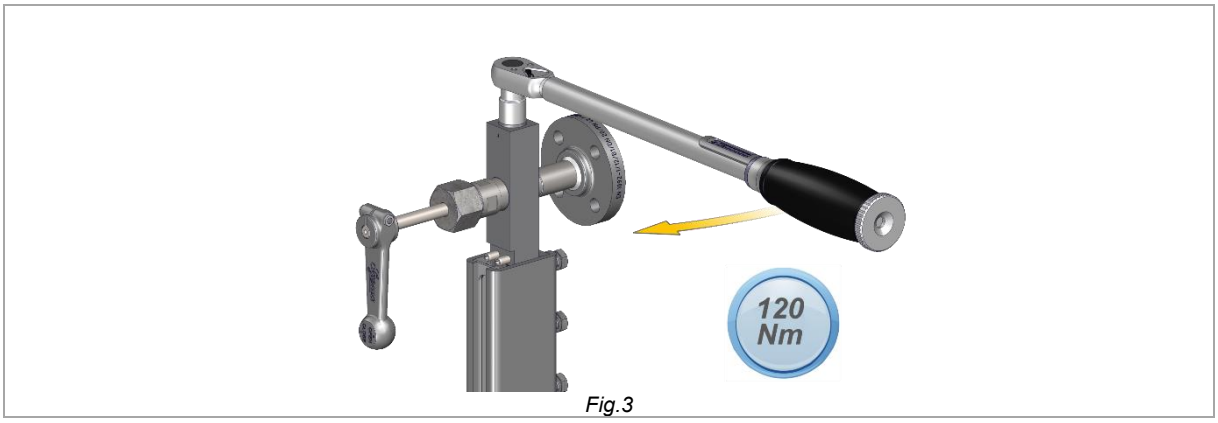


Fig.3

Figure 3:

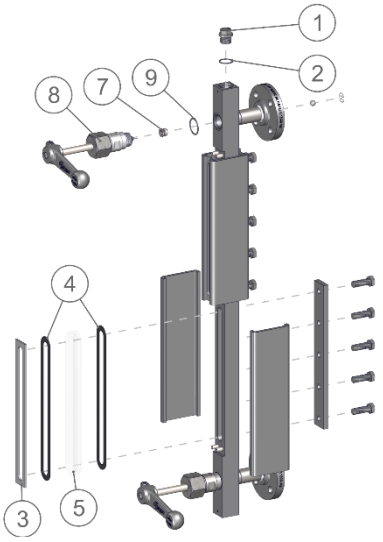
- Screw in screw plug with prescribed torque **Md =120Nm**.
- Check the sealing surface for contamination and damage.

11 Spare parts and technical accessories

11.1 Spare parts

pos.	Designation	Size	Item no.	Quantity
1	Screw plug	G $^1/_2$"	40-00329	1
2	Sealing ring	21 x 26 x 1.5 mm	40-00099	1
3	Pressure plate	2	40-00422	n x 1
		3	40-00423	
		4	40-00424	
		5	40-00425	
		6	40-00426	
		7	40-00427	
		8	40-00428	
		9	40-00429	
		10	40-00430	
4-5	Spare parts package	2	15-13051	n x 1
		3	15-13058	
		4	15-13059	
		5	15-13060	
		6	15-13061	
		7	15-13062	
		8	15-13063	
		9	15-13064	
		10	15-13065	
7	Valve seat	-	25-17358	1
8	Valve upper part	-	15-20106	1
9	Sealing ring	27 x 32 x 1.5 mm	40-00188	1

Spare parts package consisting of 2x gaskets and 1x reflective glass
n = quantity of display openings



11.2 Accessories

Designation	Label	Item no.
Water level mark	NW-LWL-NB	25-13645
	HHWL	25-13717
	HWL	25-13716
	NWL	25-13698
	LWL	25-13718
	LLWL	25-13719

Two thread-forming screws are required for each water level mark for fixing; Article number: 40-11047.

Water Level Mark-NWL

NOTE

Property damage caused by incorrect spare parts

Replaced spare parts that do not correspond to the characteristics of the original spare parts may cause damage to the gauge.

- Only use original parts from Igema GmbH for replacement.

12 Decommissioning and disposal

12.1 Dismantle gauge

During the following work, the individual components hang freely and must be secured against falling.

- Loosen nuts on flange connections.
- Removing bolts from flanges
- Secure the seal between the flanges against falling off

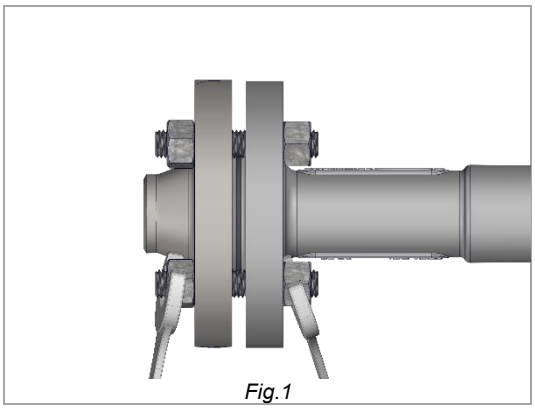


Fig.1

Gauges that are firmly connected to each other (e.g. welded joints) must be separated from each other at the connection points. For this purpose, the appropriate tool must be selected according to the application and environment.

12.2 Disposal

ENVIRONMENT

Risk to the environment due to residues

Residues on the gauge can pose a danger to the environment.

- For returns, observe the applicable safety and environmental laws according to GGVSEB [The Dangerous Goods Ordinance on Roads, Railways and Inland Waterways].
- Indicate possible dangers and take precautionary measures.
- Label possible residues and enclose the safety data sheet.
- Register hazardous substance with the logistics service provider.

Danger to the environment from waste materials

Incorrectly disposed waste materials cause damage to the environment.

- Separating waste materials.
- Comply with local and legal regulations for waste disposal.

CAUTION

Health hazard due to dangerous residues

Residues of hazardous substances pose a health hazard.

- Indicate possible dangers and take precautionary measures.

This high-quality IGEMA product was designed, manufactured and tested with the application of the QM System guidelines in accordance with DIN EN ISO 9001:2015.

If the device supplied indicates transport damage or gives cause for complaint in spite of our final quality check, please contact our SERVICE department on telephone *+49 2501 92424-0* immediately.

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Product page on the Internet

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