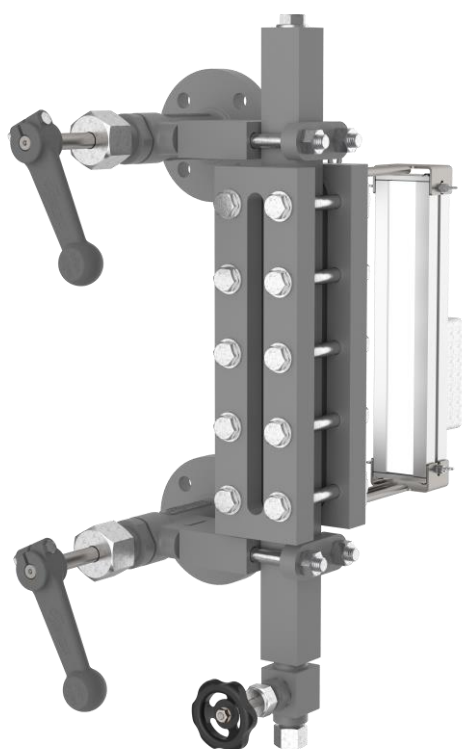




Transparent level gauge

TG40 / TG120



Version 05/2024

D-03-B-50371-EN-02

Installation and operating instructions

(English translation)

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1 About this document

1.1 Introduction

The Installation and operating instructions are part of the Transparent level gauge TG40 / TG120. 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 Transparent level gauge is not possible without precise knowledge of the individual components.



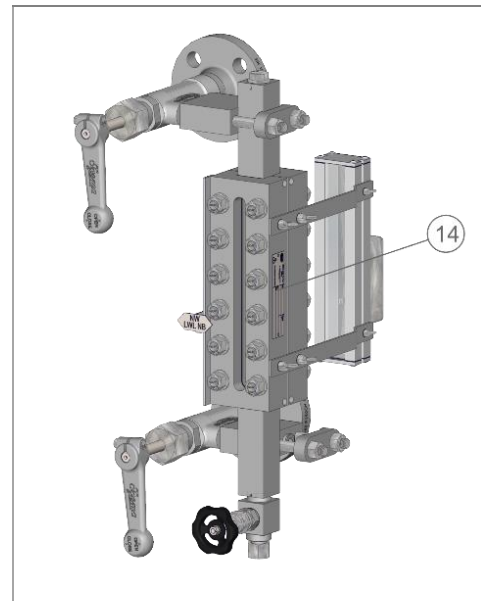
- Note Installation and operating instructions.
- Familiarise yourself with all relevant documents.

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

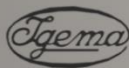
If the Installation and operating instructions or the accompanying documents are partially not available or have become unusable, a new operating instructions for the gauge can be obtained by specifying the document. It is also possible to download the operating instructions after scanning the QR code 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 Transparent level gauge. The Installation and operating instructions belongs to the Transparent level gauge of the type **TG40 / TG120**. This Installation and operating instructions are valid for the above-mentioned type of gauge, irrespective of the size mentioned on the name plate. (e.g. 5/3ü).



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

 IGEMA GmbH Mess- und Regelsysteme Antwerpener Straße 1 Germany - 48163 Münster	S/N	A	Type	B	
	PS	C	TS	D	
	Conn. Type	PN	E	DN	F
	G				
 See installation instructions					

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 Installation and operating instructions, the operating instructions for the attached valves and lighting equipment must be observed.

Product	Document number/ Link	QR-Code
Shutoff valve	62826 www.igema.com/document/62826	
Drain valves	62825 www.igema.com/document/62825	
LED Secure Slim lighting system	54945 www.igema.com/document/54945	
Lighting system LED Secure Ex SOL W	51196 www.igema.com/document/51196	

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	SYMBOL(S)
Consequences of non-compliance	
Instructions for action to avoid the danger	

	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

This Installation and operating instructions contains texts and drawings that may not be reproduced, distributed or otherwise communicated in whole or in part without the express permission of the manufacturer.

The copyright of the operating instructions remains with:

Igema GmbH

Antwerpener Str. 1

48163 Münster

Germany

Violations oblige you to pay compensation.

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 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.

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.



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 TG40 / TG120 The Transparent level gauge will be delivered as a pre-assembled unit, unless otherwise contractually agreed:

- Gauge
- Upper shutoff valve
- Lower shutoff valve
- Drain valve

2. Installation and operating instructions

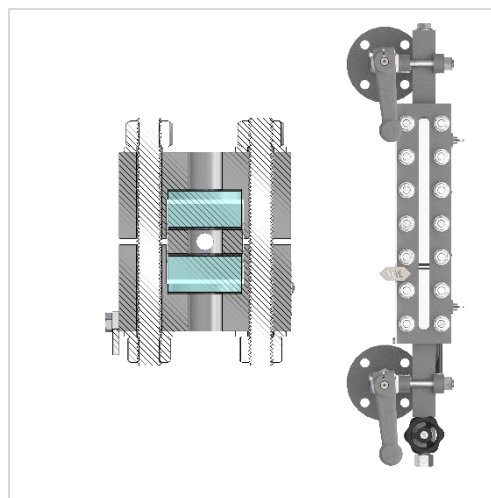
3.2 Optional versions

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

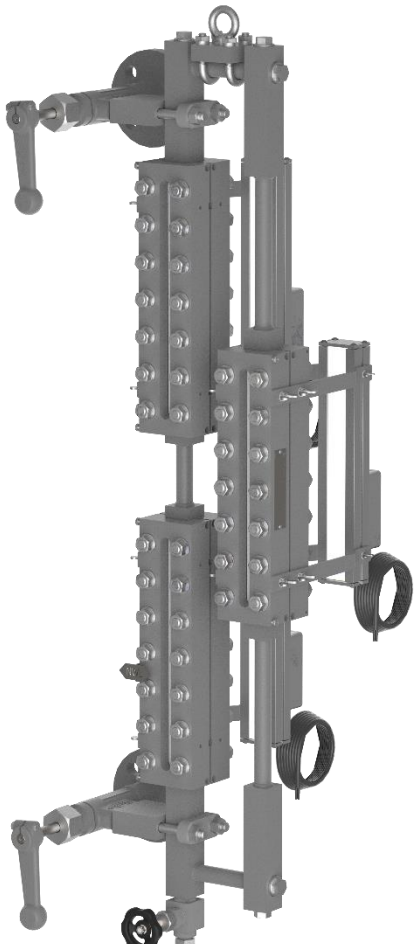
4 System Description

4.1 Function

The transparent indicator is a direct water level gauge with an illumination device that is primarily used on pressurised tanks. Thanks to the brilliant LED backlighting, the fill level is clearly visible at all times.

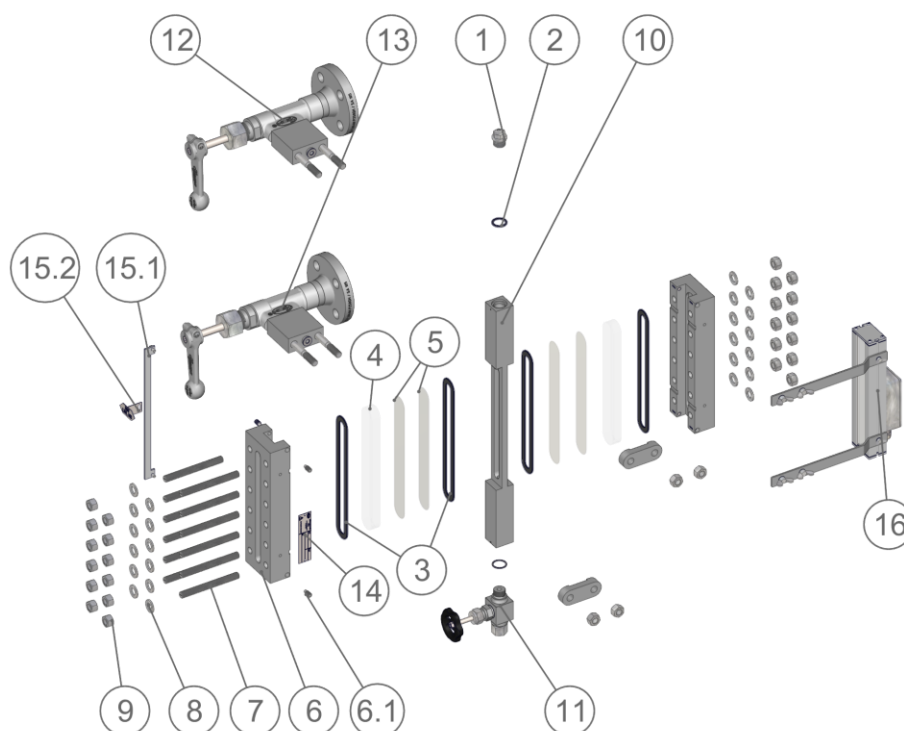


4.2 Different variants

Single sight length	Staggered multiple sight lengths
 A 3D rendering of the TG120 single sight length variant. It shows a vertical assembly with a single sight glass, a handle on the left, and a valve at the bottom.	 A 3D rendering of the TG120 staggered multiple sight lengths variant. It shows a more complex vertical assembly with multiple sight glasses, a handle on the left, and a valve at the bottom.

Two variants of the TG120 are shown as examples.

5 Construction



1	Screw plug	9	Hexagon nut
2	Sealing ring	10	Display body
3	Graphite seals	11	Drain valve
4	Glass	12	Upper shutoff valve
5*	Mica disc	13	Lower shutoff valve
6	Cover rail	14	Rating plate
6.1	Set screw <i>(only for TG120)</i>	15.1	Holder for water level mark with screws
7	Threaded bolt	15.2	Water level mark with screws
8	Washer	16	Lighting equipment

**for TG40 - 1 piece per side, for TG120 - 2 pieces per side, a TG120 is shown as an example*

6 Technical data

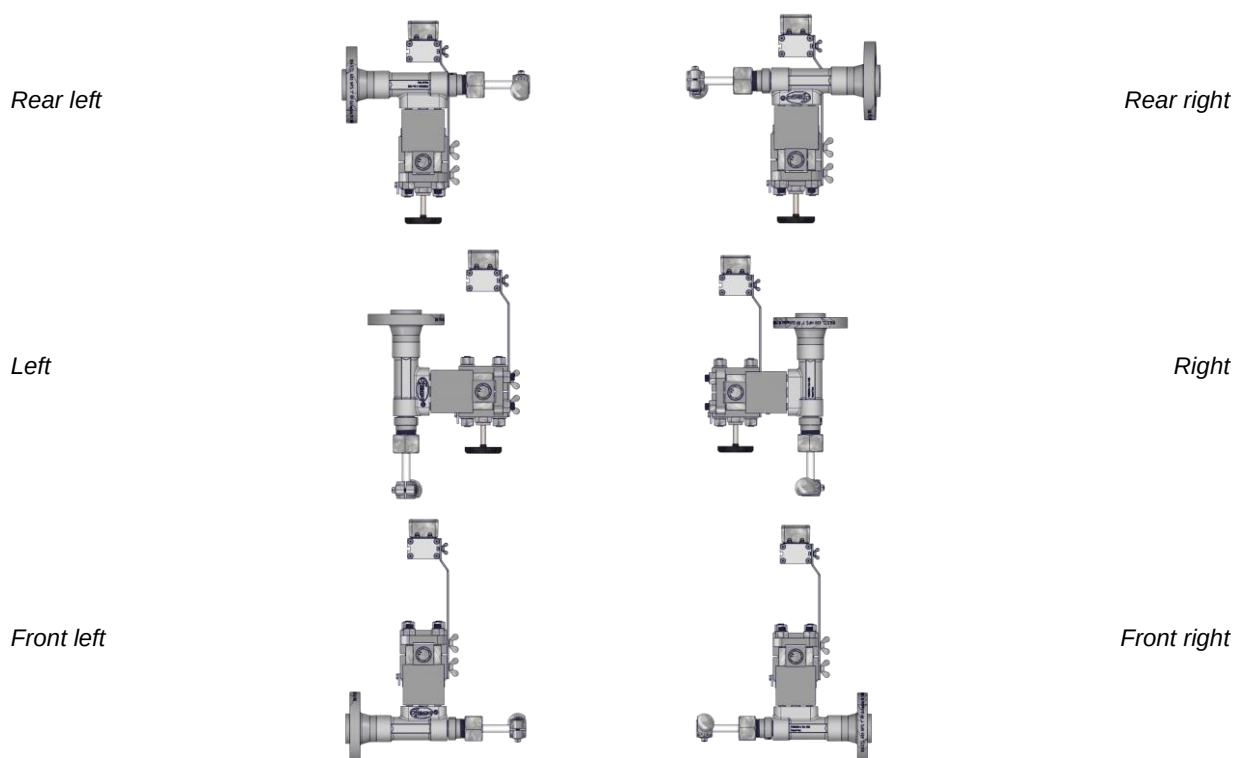
6.1 Limitations of use

Limitations of use TG40	all. Pressure [PS]	all. Temperature [TS]
Media with glass attack (e.g. water vapour)	32 bar 464 psig	239 °C 458 °F
Media without glass attack (e.g. nitrogen)	40 bar psig	50 °C 122°F
	28 bar psig	280 °C 536°F

Limitations of use TG120	all. Pressure [PS]	all. Temperature [TS]
Media with glass attack (e.g. steam)	120 bar 1740 psig	326°C 618°F
Media without glass attack (e.g. nitrogen)	160bar 2320 psig	-10 to 50 °C 14 to 122 °F
	120 bar 1740 psig	326°C 618°F

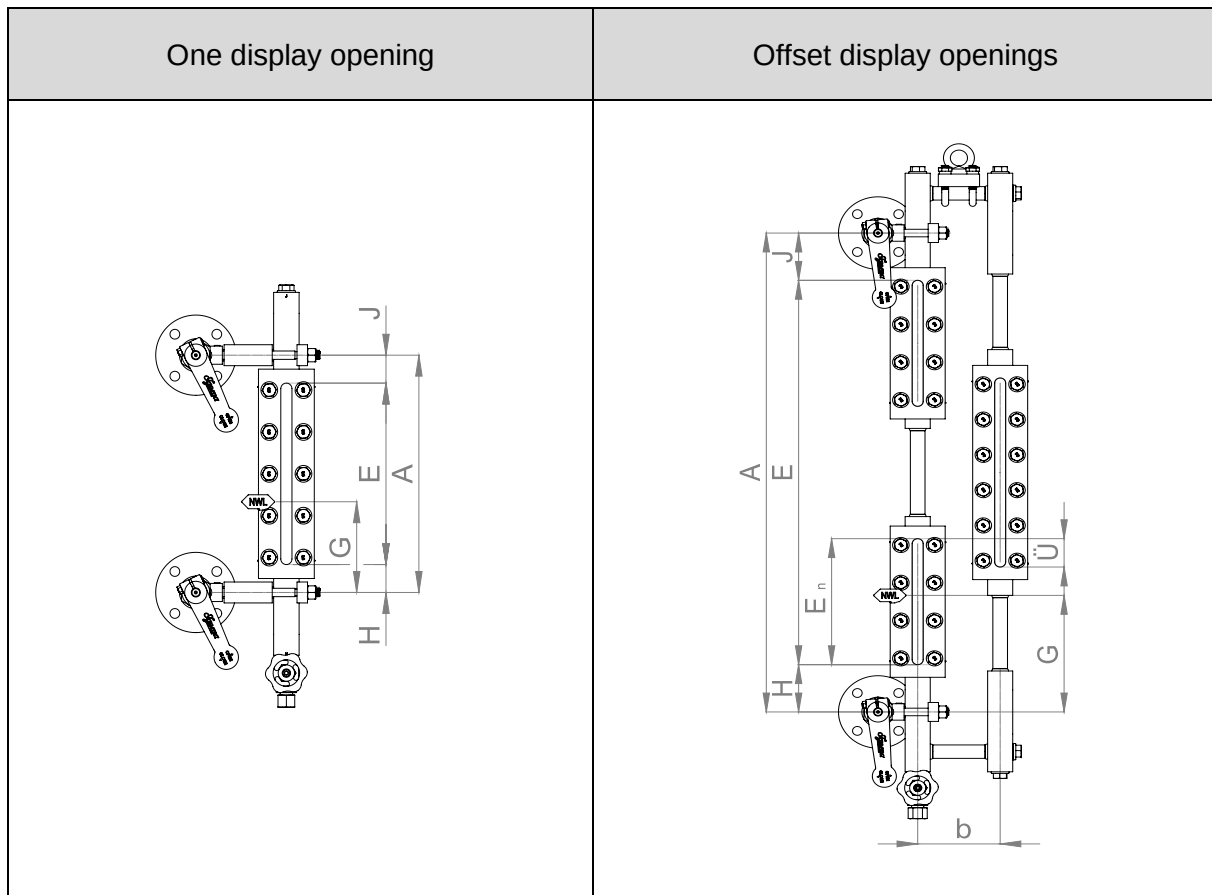
The maximum permissible operating pressure of the Transparent level gauge is determined by the lowest permissible pressure of the attached component.

6.2 Possible display orientations



The display orientations on a TG120 are shown as an example.

6.3 Dimensions



The gauges shown are shown as a left-hand model of type TG40.

The dimensions H and J are to be specified individually.

The A-measurement is calculated using the sight length-E and the H and J dimensions.

		min.		max.			
				Single display opening		Display opening offset from one another	
		[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
Upper blind space	[J]	40	1 ⁴ / ₇	100	4	110	4 ¹ / ₃
Lower blind space	[H]	40	1 ⁴ / ₇	100	4	110	4 ¹ / ₃
Overlap	[Ü]	min. 25mm / 1"					
Width	[b]	120mm / 4 ⁵ / ₇ "					



NOTE

Property damage due to weight loading

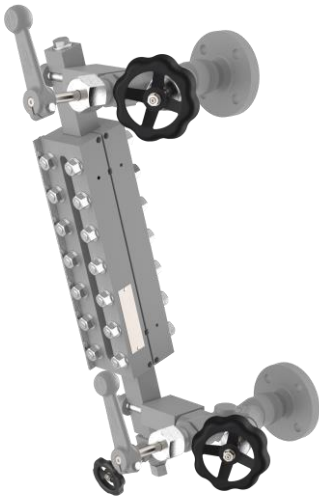
If the total weight of the gauge > 30kg the connecting elements are subjected to excessive loads.

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

6.4 Optional versions

In addition to customer-specific drain and shutoff valves, the Transparent level gauge can also be customized with other features. These Installation and operating instructions also apply to these versions.

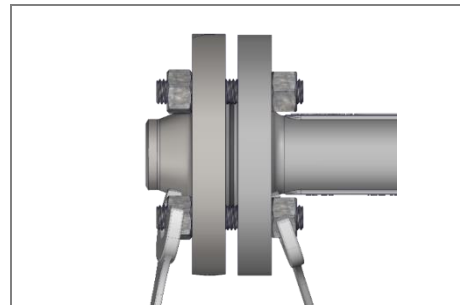
For versions with other shut-off and drain valves and lighting devices, the documents for the installed valves must also be observed.

Examples of optional versions		
Double shutoff valves	Double drain valve	Inclined design
		
Example: A210-CS	Example: AV251	Example: TG120 inclined 15°

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

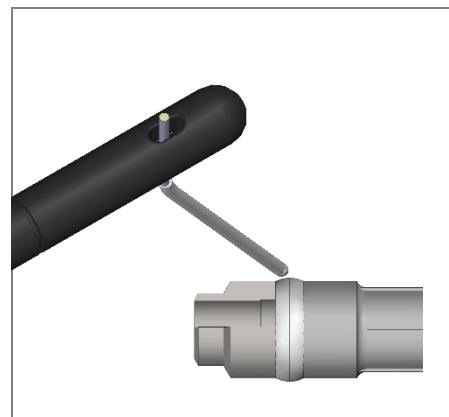
Eye damage due to lack of personal protective equipment



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

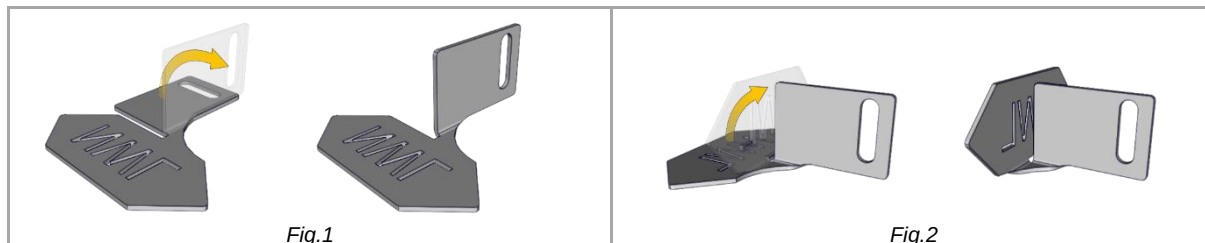


Figure 1

- 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, stainless 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

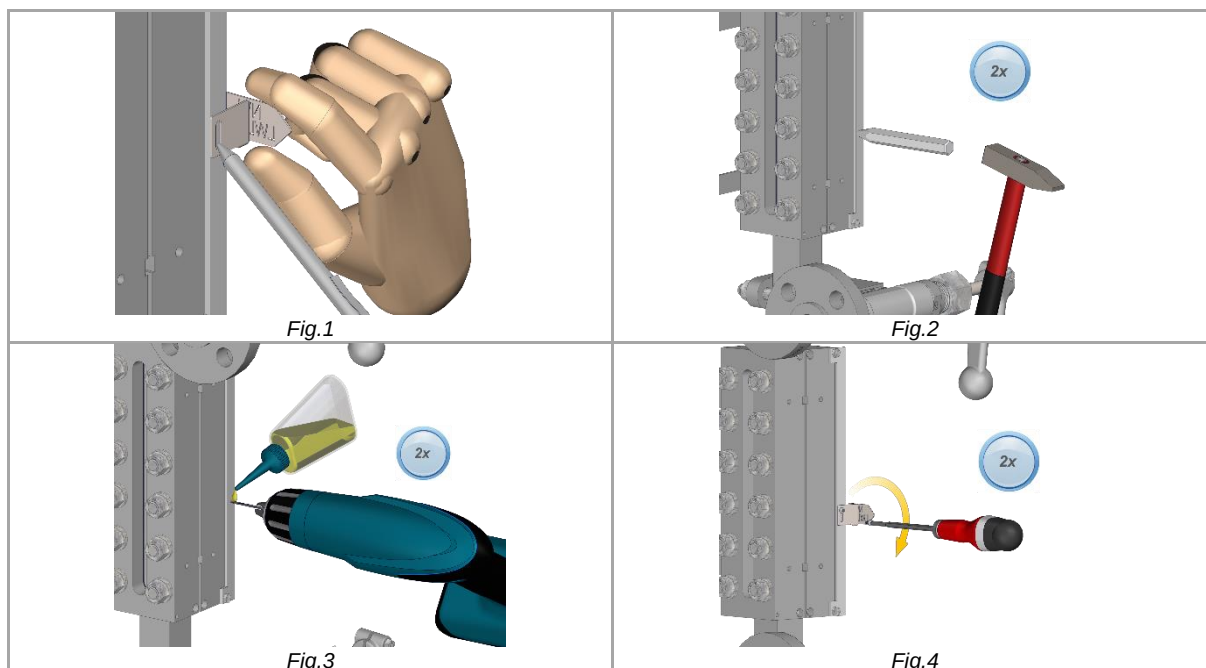


Figure 1

- 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.

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

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 tightening the screws, ensure the following tightening sequence on the cover rails. Tighten the screw connection to the tightening torque in the prescribed sequence and in the prescribed steps.

Screw rows	
Uneven number	Even number
11   14 7   10 3   6 1   2 5   4 9   8 13   12	13   16 9   12 5   8 3   2 1   4 7   6 11   10 15   14

	Tightening torque $M_d \rightarrow M_{d\max}$ [Nm] in increments		
	1	2	3
TG40	15	30	50
TG120	20	40	65

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.

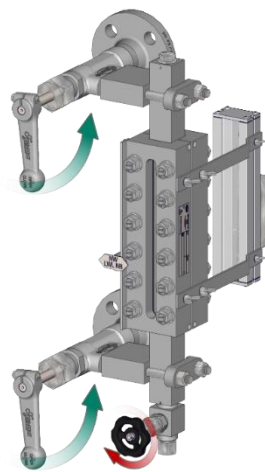


Fig.1

Figure 1:

- Close drain valve
- Fully open 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

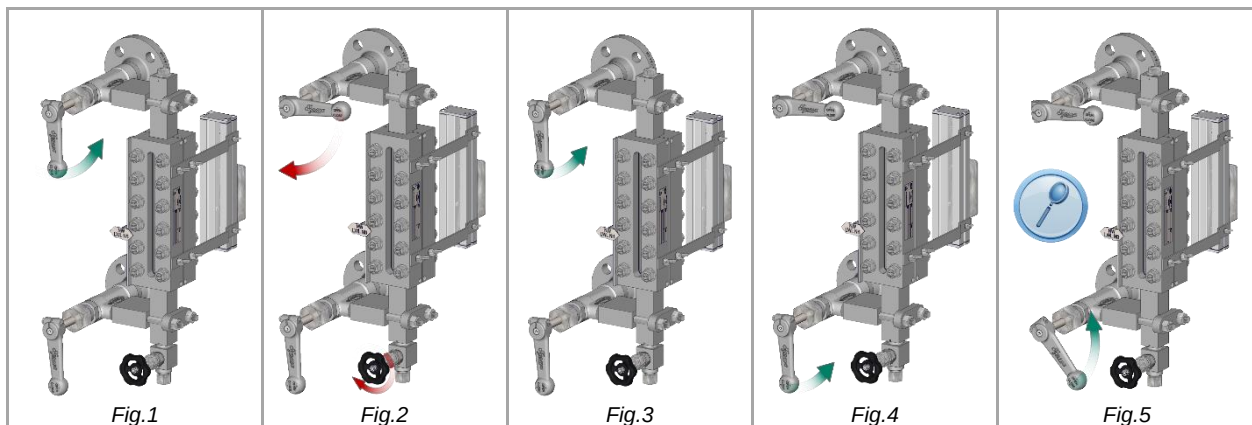


Figure 1:

- 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 shutoff valve.
 - Close the drain valve.

Figure 3:

- Open the upper shutoff valve slowly.

Figure 4:

- Slightly open the lower shutoff valve.
(*lever in approx. 5 min. position*)

The pressure equalisation now takes place.

Figure 5

- The pressure must be equalized completely.
 - 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.5.

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

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.

NOTE

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.

9.2 Cleaning the gauge / depressurising

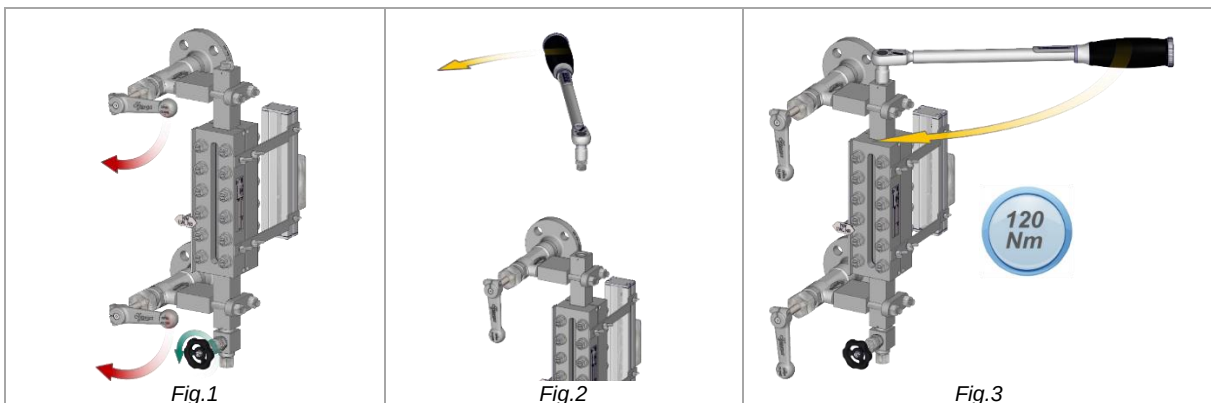


Figure 1

- Close the shutoff valves (pos. 12, 13).
- Open the drain valve (pos. 11).

The gauge is partially emptying.

Figure 2:

- Unscrew the screw plug.

The gauge is emptying completely.

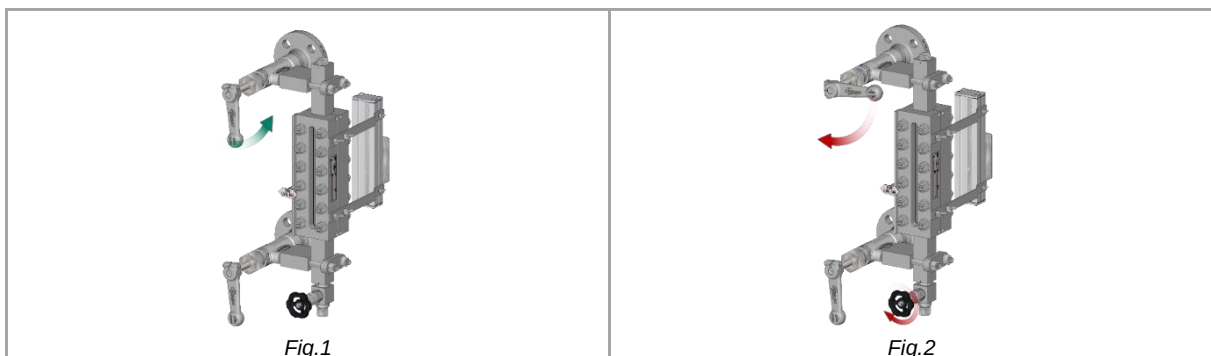
The cleaning has now been completed.

Figure 3:

- Screw in the screw plug (pos. 1) with the specified torque $M_d = 120 \text{ Nm}$.

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

9.3 Blowing through the gauge for further cleaning



- The gauge must be depressurised

Figure 1:

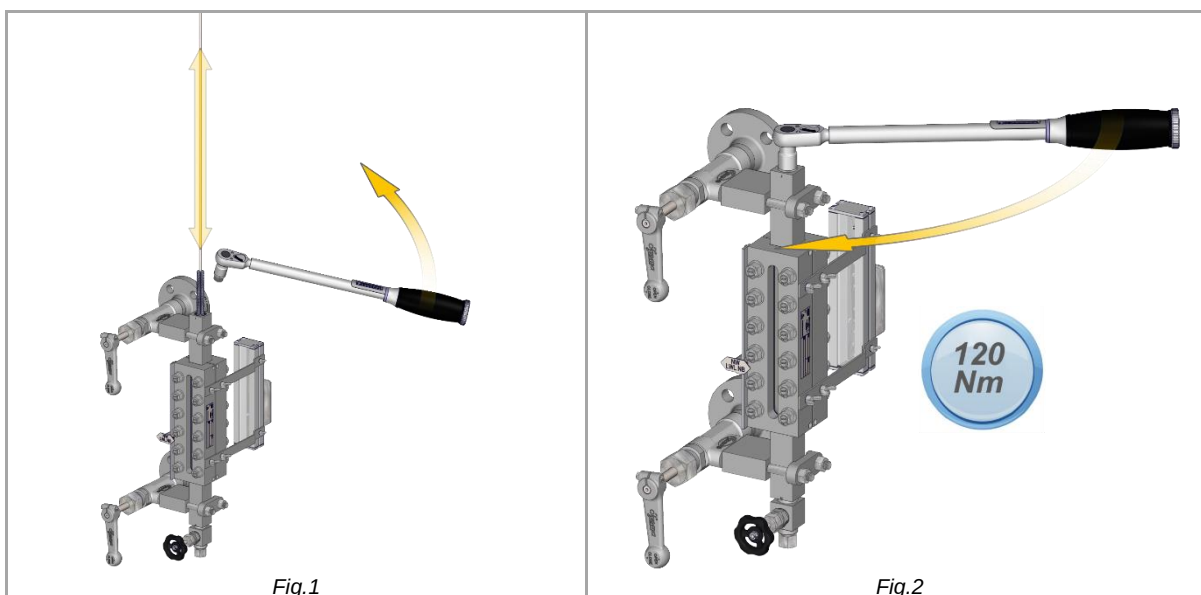
- Open the upper shutoff valve slowly.
- The steam flowing through cleans the mica.

Figure 2:

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

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

9.4 Cleaning the mica shields


Figure 1:

- The gauge must be depressurised.
 - 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 and new mica must be installed. (For spare parts packages and article numbers, see chap.11.1)

Mica shields are a natural product and slight streaking and inclusions may occur. These have no influence on the function and safety of the gauge.

9.5 Glass/mica replacement

NOTE

Property damage caused by damaged components

Components that appear to be intact can be damaged and lead to damage to the gauge when reinstalled or reused.

- Replace glasses, mica and seals annually.
- After loosening the cover rails, install completely new seals.
- Create optimal operating conditions for the durability of the glasses and seals.

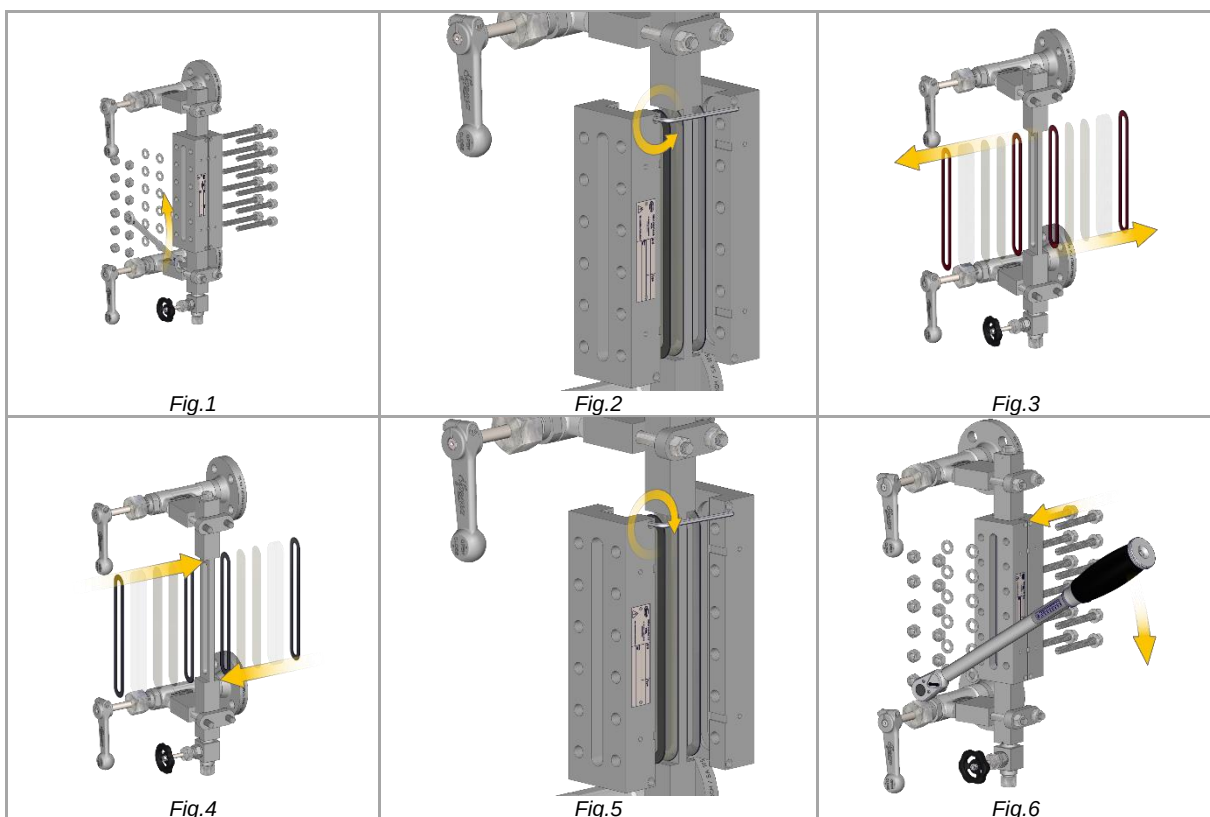


Figure 1:

- The gauge must be depressurised and the lighting device and the water level mark must be removed from the gauge.
 - Loosen the nuts on one side of the bolts and remove together with the washers
 - Pull out the bolt together with the remaining nut and washer.

Figure 2:

- Loosen side set screws (*only for TG120*)
- Remove the cover rails.



TIP

The cover rail can be loosened by engaging it at the side with a slotted screwdriver using lever movements.

Figure 3:

- Remove the seals, glasses and mica shields on both sides of the gauge.
- Remove any sealing residue from the sealing surface of the display body and the contact surface of the cover rail, clean and check for damage.

Figure 4:

- Place the new seal, glass, mica disc(s) and further seal on the display body in the order stated and hold in place.



TIP

The side of the mica labelled "water side" must be installed on the medium side!

Figure 5:

- Carefully attach the cover rail to the display body.
- Tighten the set screws on the sides to clamp the cover rail onto the display body.
(only for TG120)

Carry out steps 4 and 5 on both sides of the display body.

Figure 6:

- Push the previously removed bolts with nuts and washers through the holes in both cover rails.
- Slide on the washers and screw on the nuts.
- Slightly loosen the set screws on the side. (only for TG120)
- Tighten the nuts to Md_{max} in the prescribed sequence and in the prescribed steps.
(chap. 8.1)
- Tighten the side set screws again. (only for TG120)

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

10 Case of damage

Fault	Possible cause	Remediation
Leakage on the glass holder between the body and the graphite gasket	Wear and tear	Tighten the screws on the cover rail (chap.10.1)
Leakage between sealing ring and shutoff valve	Wear and tear	Tighten hexagon nuts / replace sealing ring (chap.10.2)
Leakage between the screw plug and the display body	Wear and tear	Tighten the screw plug/replace the seal (chap.10.3)
Water level not visible	Deposits on the mica	Clean mica (chap.9.4)
Water level not visible after cleaning	Heavy deposits on the mica	Replace mica (chap.9.5)

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

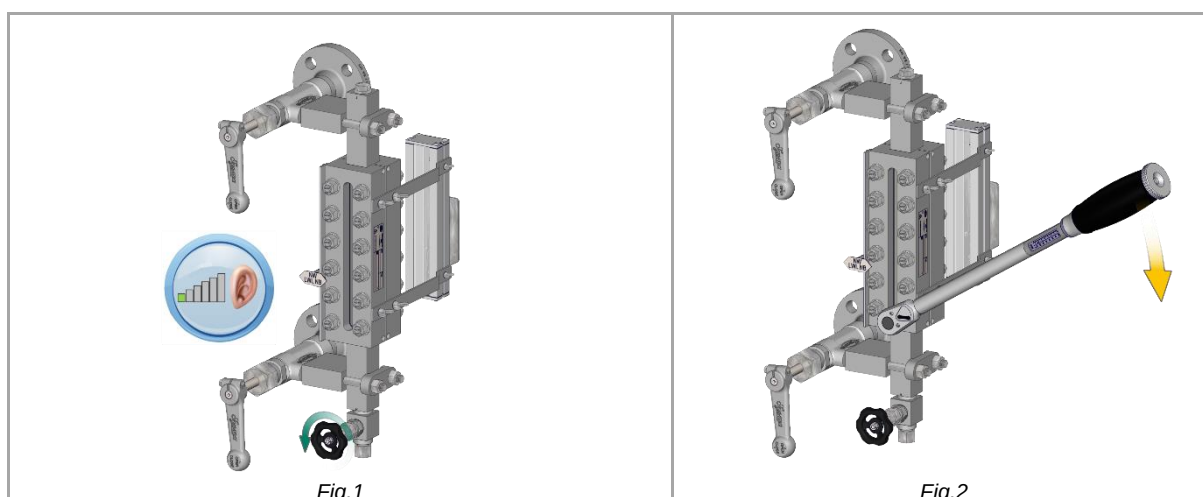


Figure 1

- The gauge must be depressurised.
 - When the noise level drops, open the drain valve completely

Figure 2

- Tighten the nuts in the prescribed sequence in several steps to the tightening torque $Md_{max}=45Nm$.

NOTE

Error does not rectify after correction

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

- Change the glass/mica (chap.9.5).

10.2 Leakage between sealing ring and shutoff valve

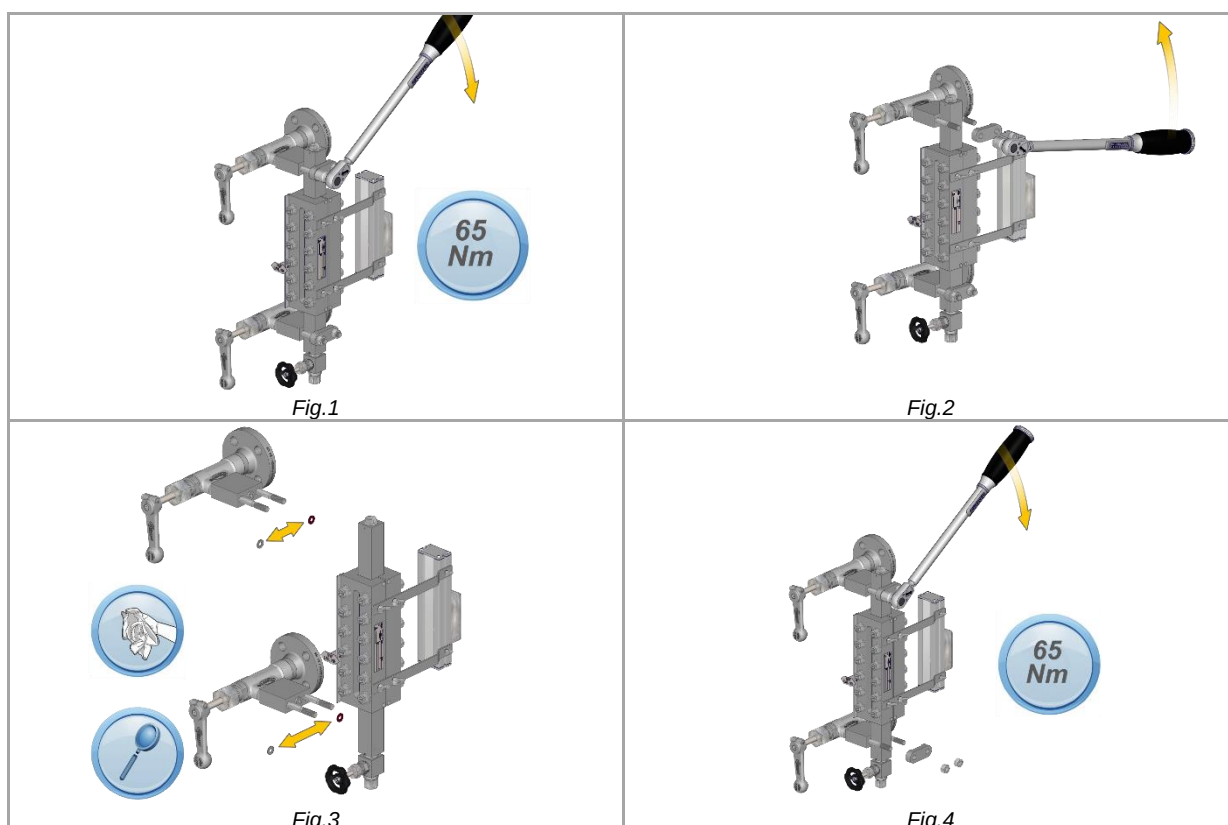


Figure 1:

- Retighten hexagon nuts with $Md_{max}=65Nm$.

Figure 2:

- If there is no improvement, take the following steps after relieving pressure:
 - Loosen the hexagon nuts of the valves.
 - Unscrew the hexagon nuts and remove them together with the clamping brackets.

NOTE

Property damage due to impacts

When handling the gauge, it may be damaged by impacts.

- Secure the display body against falling.

Figure 3:

- Remove the display body from the valves.
- Clean the sealing surfaces and check for damage.
- Replace sealing ring between valves and body.

Figure 4:

- Fit the clamping bracket and hexagon nut and tighten to $Md_{max}=65Nm$ in the specified steps.

10.3 Leakage between the screw plug and the display body

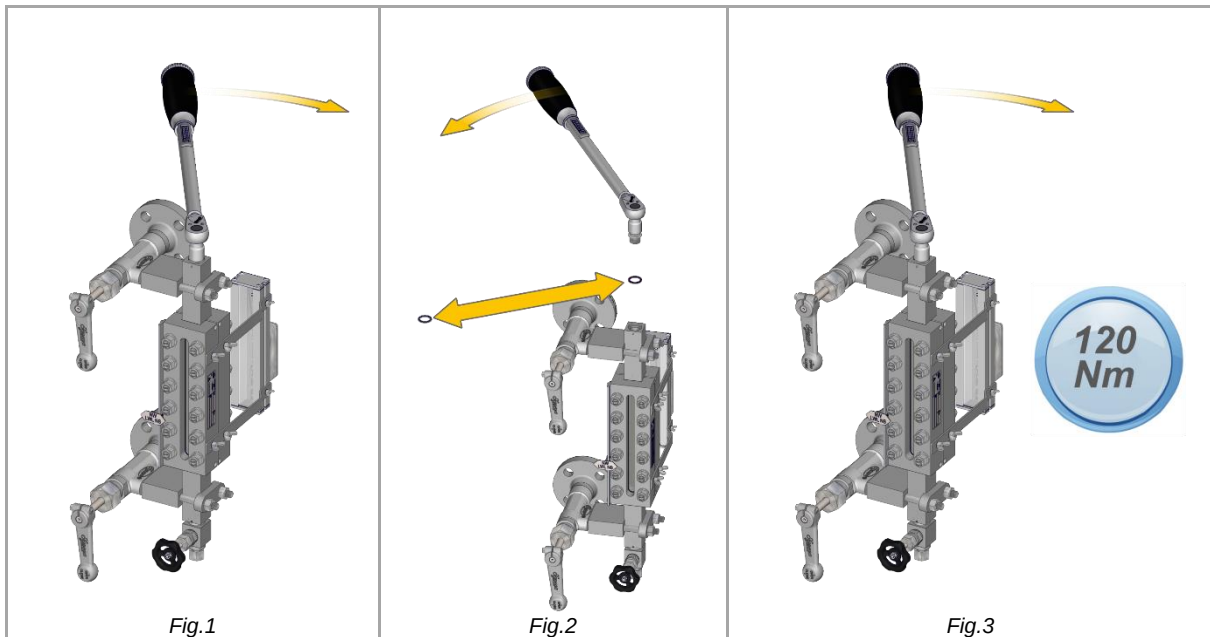


Figure 1:

- Tighten the torque of the screw plug

Figure 2:

- If there is no improvement:
 - Unscrew the screw plug
 - Replace the gasket.
 - Check the sealing surface for contamination and damage.

Figure 3:

- Screw in screw plug with prescribed torque **Md_{max}=120Nm**

11 Spare parts and technical accessories

11.1 Spare parts

Pos.	Designation	Size	Item no.		Quantity
			TG40	TG120	
1	Screw plug	G 1/2"	40-00329	40-10481	1 ¹⁾
2	Sealing ring	21 x 26 x 1.5mm	40-00099		1 ¹⁾
3,4,5	Spare parts package	5	15-13557	15-13067	n x 1
		6	15-13558	15-13068	n x 1
		7	15-13559	15-13069	n x 1
		8	15-13560	15-13070	n x 1
		9	15-13561	15-13071	n x 1
		10	15-13566	15-13072	n x 1
		11	15-13567	15-15458	n x 1

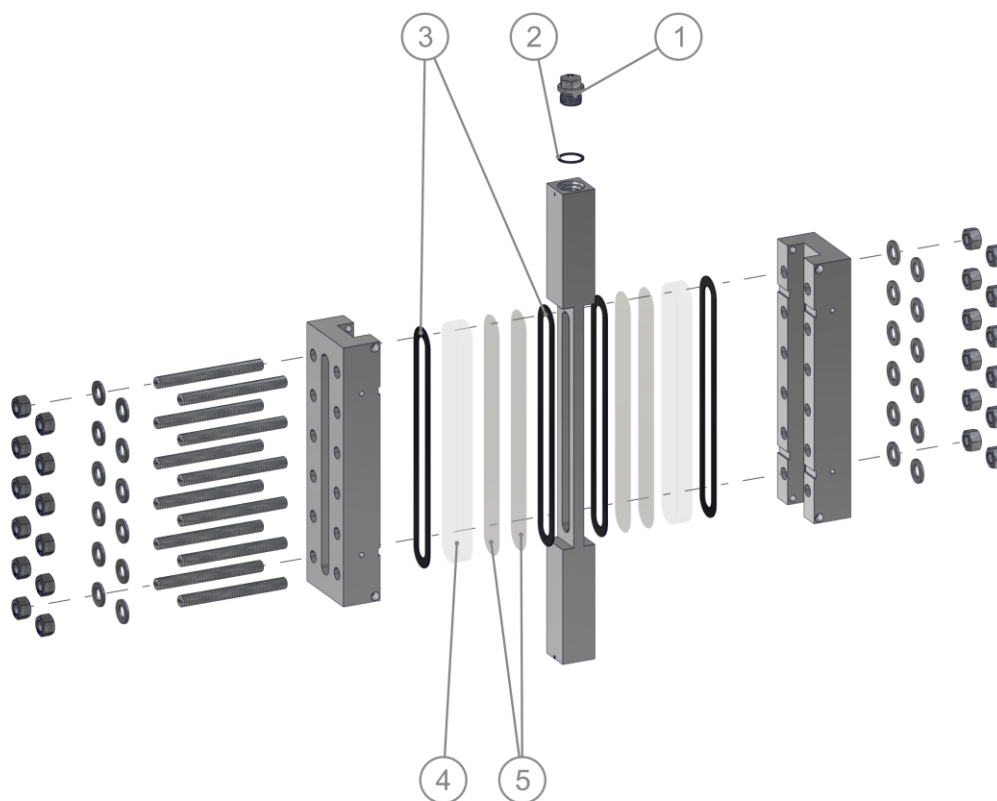
n = number of sight openings.

¹⁾For offset banner displays, pos. no.: 1&2 must be ordered 5 times in total.

Spare parts package 3,4,5 consisting of:

for TG40 4x seal, 2x transparent glass and 2x mica shields

for TG120 4x seal, 2x transparent glass and 4x mica shields



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: 40-11121.



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 Dismantling the display body

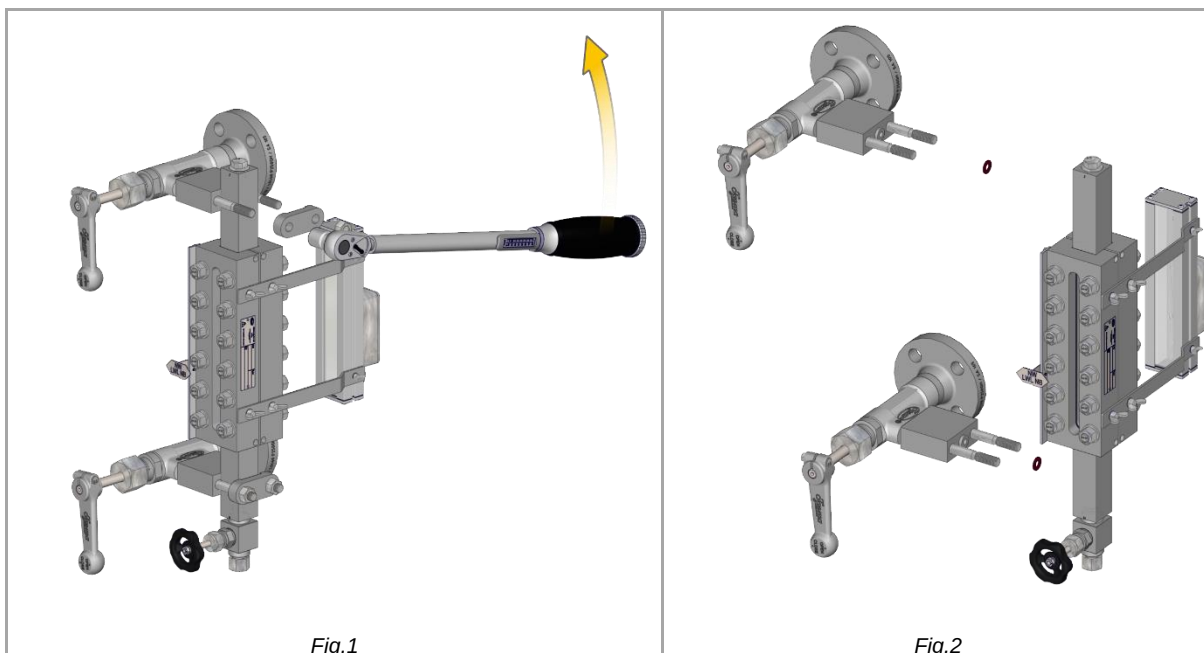


Figure 1:

- The gauge must be depressurised
 - Loosen the hexagon nuts of the valves, unscrew and remove together with the clamping brackets.
 - The display hangs freely after this step and must be secured against falling.



NOTE

Property damage due to impacts

When handling the gauge, it may be damaged by impacts.

- Secure the display body against falling.

Figure 2:

- Remove the display body from the valves.
- Secure sealing ring between valves and body against loss.

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.



Direct Download



Product page on the Internet

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