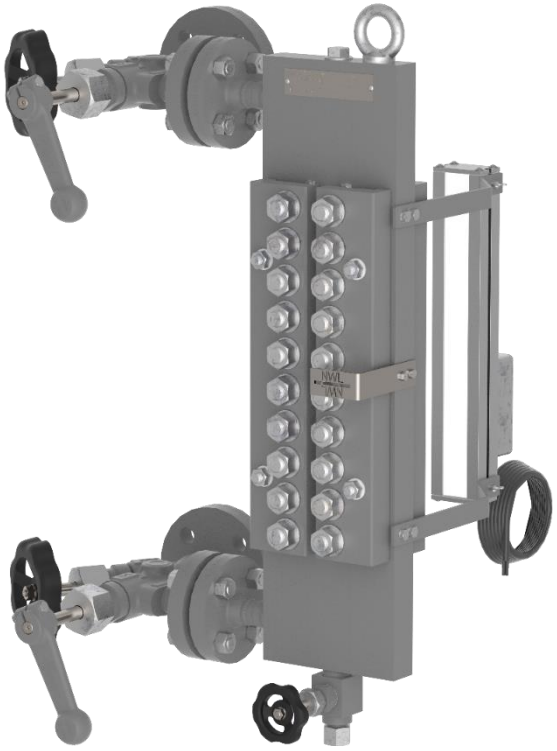
Transparent gauge

TG200 - lateral



Version 05/2024

D-03-B-51284-EN-03

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 Transparent gauge TG200 - lateral. 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 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.

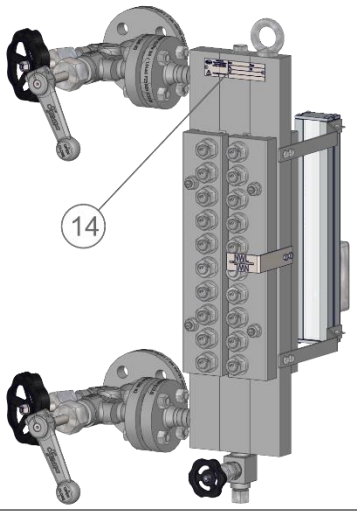
The Installation and operating instructions contains important information for the proper use and safe operation of the Transparent gauge. Please also note important information on the repair, maintenance, care, safety and value retention of your measurement and control system.

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.

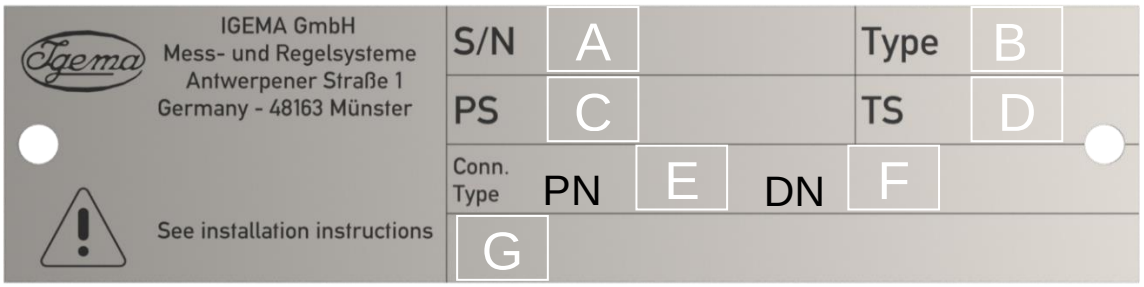
1.2 Product identification and rating plate

On the basis of the rating plate, the Installation and operating instructions can be assigned to the corresponding Transparent gauge. The Installation and operating instructions belongs to the Transparent gauge of the type **TG200 - lateral**.

Additions that are entered after the designation and describe the design of the Transparent gauge *(e.g. 5/3ü)* do not release these Installation and operating instructions from belonging to the Transparent 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 Installation and operating instructions, the operating instructions of the shut-off and drain valves as well as the lighting system must be observed.

Product	Operating instruction number/ Link	QR-Code
Shutoff valve	62826 www.igema.com/document/62826	
Drain valves	62825 www.igema.com/document/62825	
LED Secure Slim	54945 www.igema.com/document/54945	
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 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

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 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 TG200 - lateralThe Transparent gauge will be delivered as two pre-assembled units, unless otherwise contractually agreed:

Unit A

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

Unit B

- Lighting device(s)

2. Installation and operating instructions

3.2 Optional versions

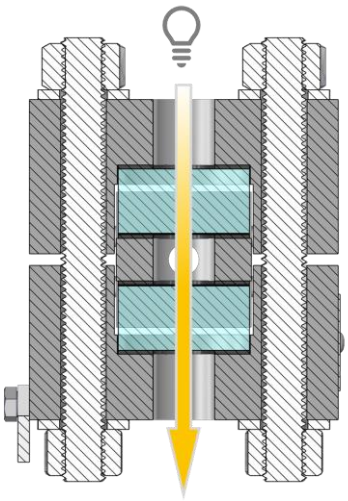
These Installation and operating instructions apply to the Transparent gauge in standard as well as in customer-specific design. The applicable documents must be additionally observed especially if the Transparent gauge is equipped with customer-specific shutoff or drain valves.

4 System Description

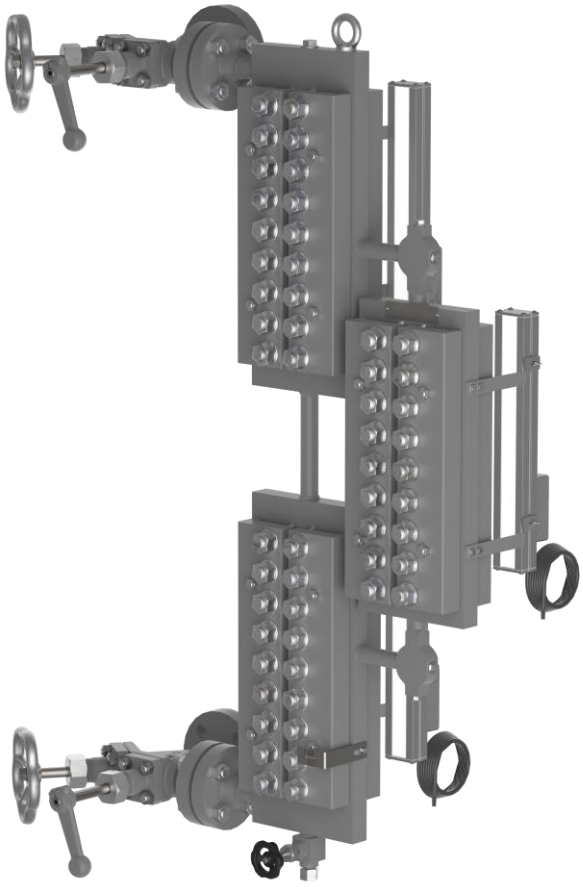
4.1 Function

The transparent indicator is a direct water level gauge with an illumination device that is primarily used on pressurised tanks.

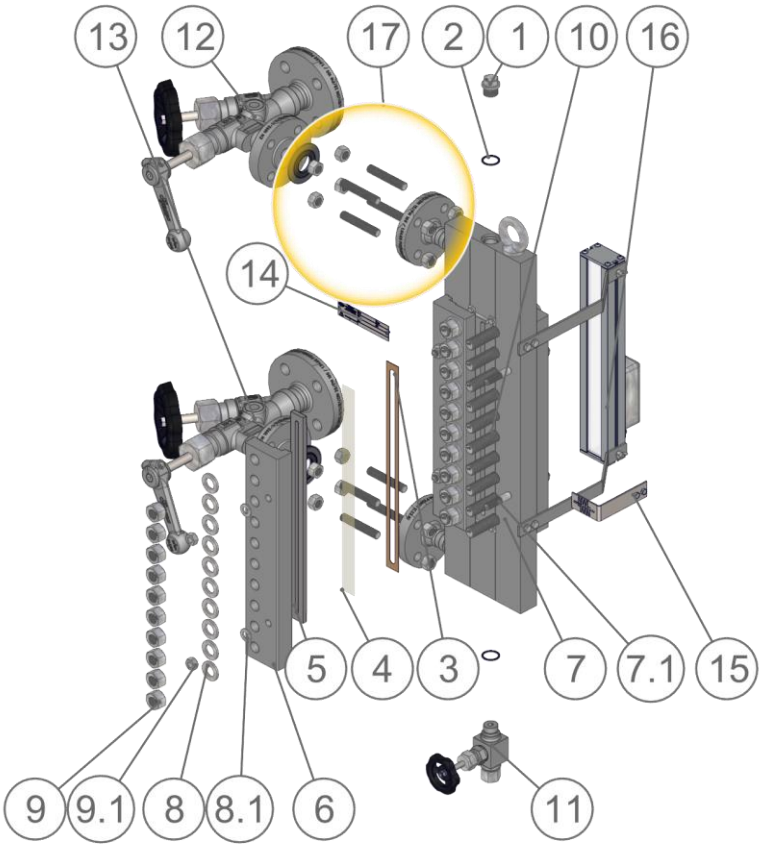
The gauge works on the physics law of communicating tubes. The level can be clearly read on the sight glass of the gauge thanks to the backlighting.



4.2 Different variants

Single sight length	Sight lengths that are offset from one another
	

5 Construction



1	Screw plug	9	Hexagon nut M16
2	Sealing ring	9.1	Hexagon nut M10
3	Copper gasket	10	Display body
4	Mica packet	11	Drain valve
5	Pressure plate	12	Upper shutoff valve
6	Cover rail	13	*Lower shutoff valve*
7	Threaded bolt M16	14	Rating plate
7.1	Threaded bolt M10	15	Water level mark
8	Washer M16	16	Lighting equipment
8.1	Washer M10	17*	SMD package for flange connection

**Consisting of 4x threaded bolts, 8x hexagon nuts and 1x gasket per flange connection*

6 Technical data

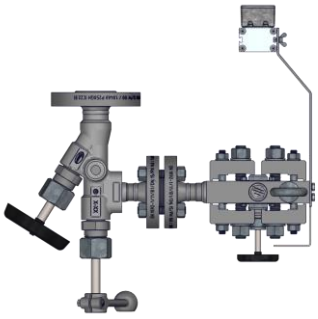
6.1 Limitations of use

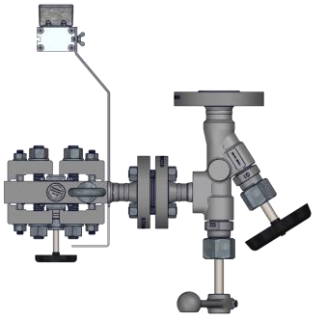
Limitations of use TG200 - lateral	all. Pressure **[PS]**	all. Temperature **[TS]**
	200 bar 2900 psig	367°C 692°F

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

6.2 Possible display orientations

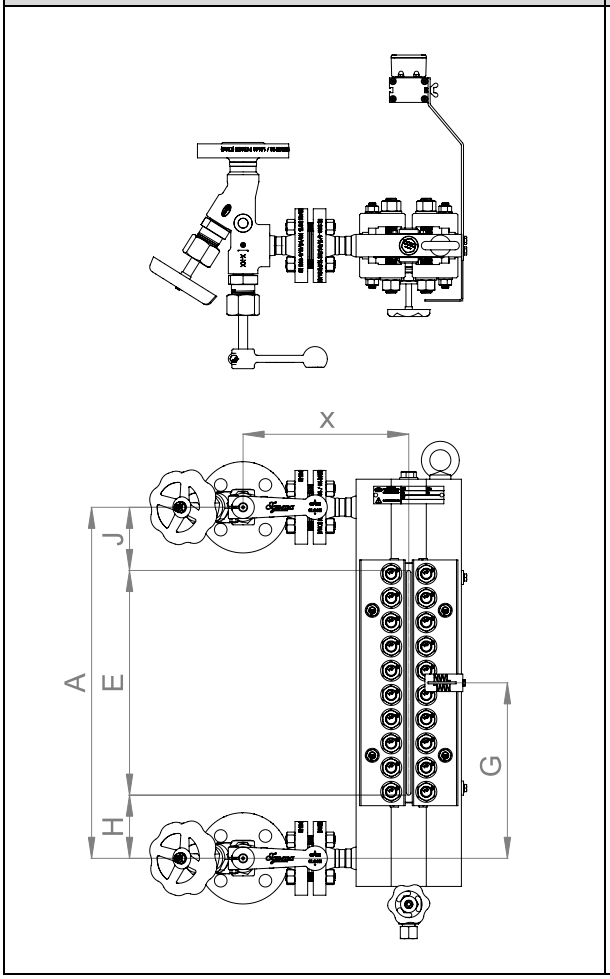
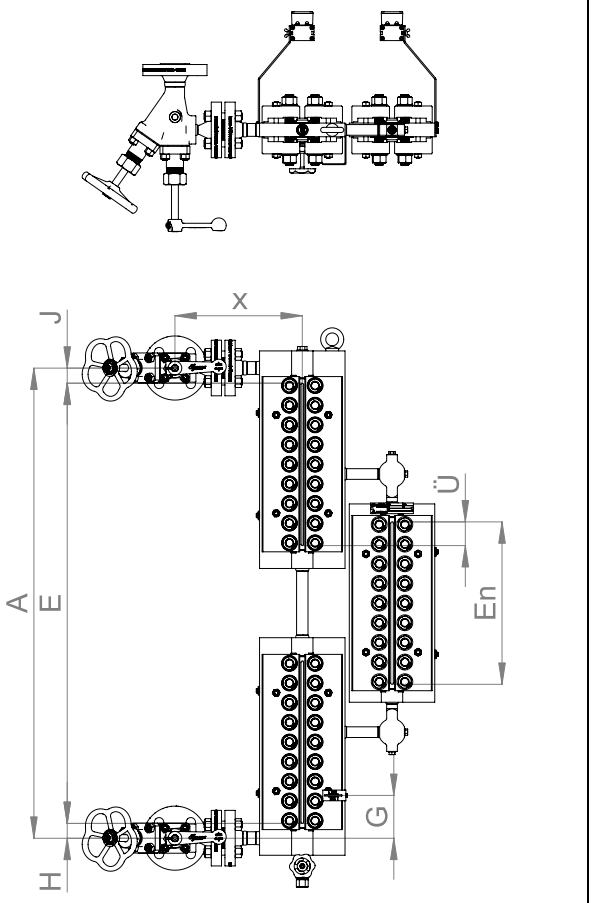
Left





Right

6.3 Dimensions

One display opening	Display openings offset next to each other
	

Both models are shown as left-hand models

		minimum	
		[mm]	**[inch]**
Upper blind space	**[H]**	25	1
Lower blind space	**[J]**	25	1
Protrusion	**[Ü]**	25	1

NOTE

Property damage due to weight loading

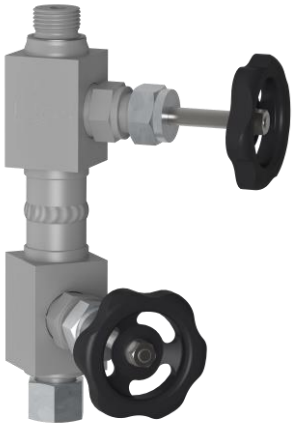
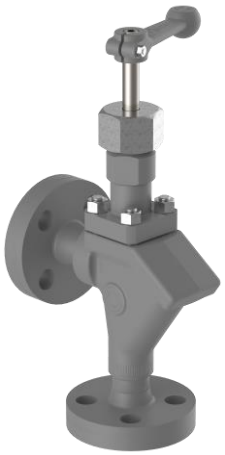
If the total weight of the gauge > 30kg the connecting elements are subjected to excessive loads.

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

6.4 Optional versions

In addition to customer-specific drain and shutoff valves, the Transparent 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, the documents for the installed valves must also be observed.

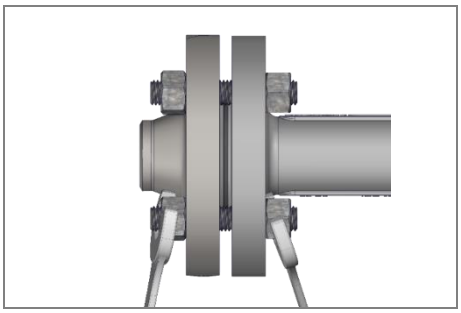
Examples of optional versions		
Angle seat drain valve	Double drain valve	Single shut-off valve
 *Example: AV520*	 *Example: AV251*	 *Example: A190-LL*

Type	Data sheet	Item no.
AV520 Cutting ring screw DS12	D-09-D-50513-DE	40-01845
AV251 Cutting ring screw DS12	D-09-D-59264-EN	15-14733
Single shut-off valve A190 with Live-Load Packing	D-09-D-50581-DE	see data sheet

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

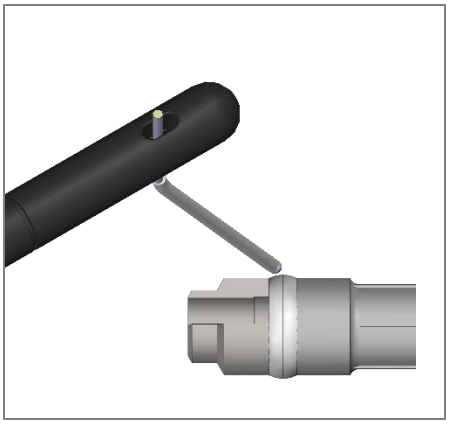
WARNING

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 Installing the lighting system

TIP

Only install the lighting device after the device has been heated up once and then cooled down again.

NOTE

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

Only trained electricians may install and connect lighting equipment.

Igema GmbH can be commissioned for the installation and maintenance.

NOTE

Property damage caused by irregular use

- Use the applicable documents to check whether the lighting device is intended for the planned use.

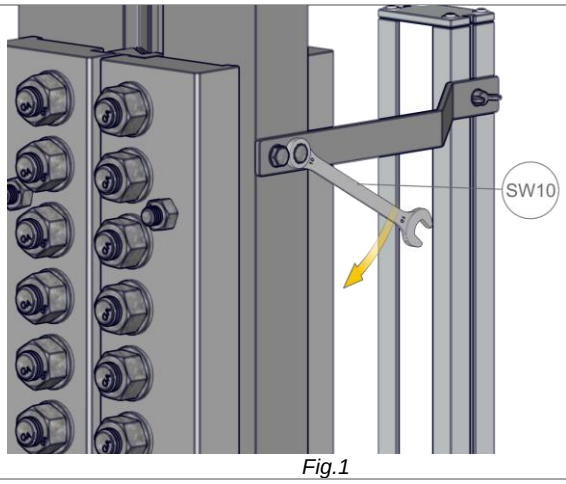


Fig.1

- Attach the lighting device to the gauge using the enclosed M5x8 hexagon head screws.

Tighten the screws with moderate manual torque.

- Align the height of the light to the display body.
- Tighten the wing screws for connecting the holding bracket and light by hand.

7.4 Fitting the water level mark

Components

Designation	Figure	Quantity
Water level mark		1
M5 x 10 self-tapping screw, 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 4,6 mm
Hand Deburring		Ø 12.4 mm
Screwdriver		TX25

Work steps

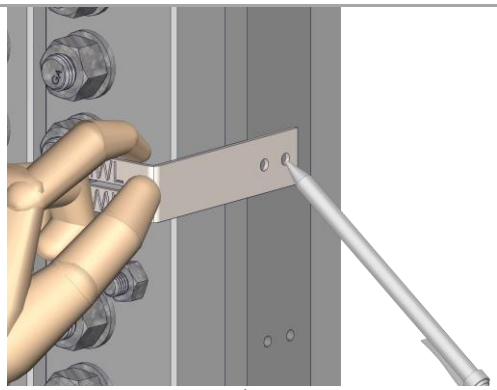


Fig.1

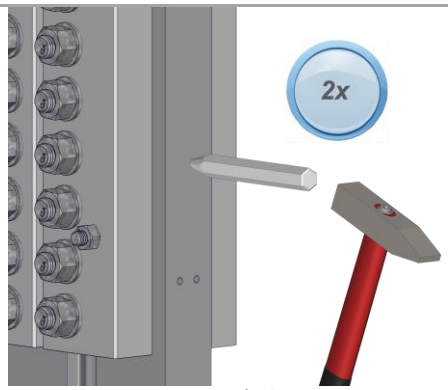


Fig.2

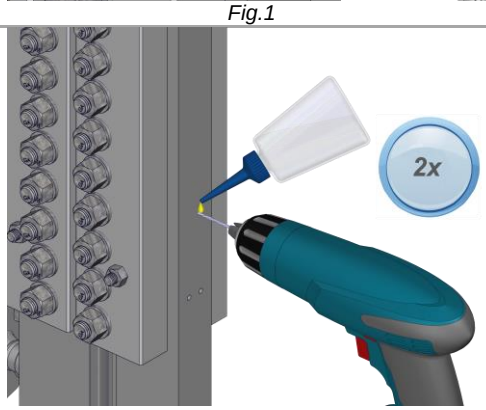


Fig.3

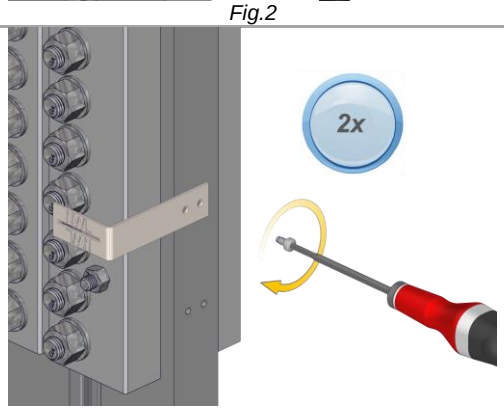


Fig.4

Figure 1

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

  Mark the drill holes as centrally as possible on the display body.

Figure 2

- Mark the markings with a light hammer blow.

Figure 3

- Drill the anchorages to a depth of 12mm with the HSS drill Ø4.6mm.
- Countersink the hole with a hand deburrer.

Figure 4

- Screw on the water level mark with self-tapping screws.

  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.

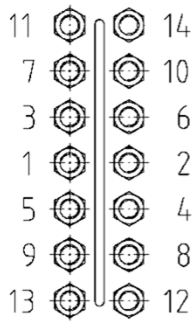
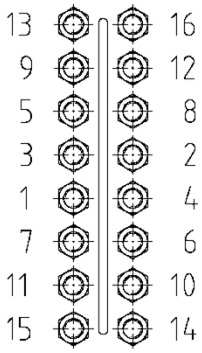
NOTE

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 tightening the screws, ensure the following tightening sequence on the cover rails.

- Tighten the screw connection to the tightening torque **Md** $_{max}$ according to the table.

Screw rows	
Uneven number	Even number
	

all. pressure ***PS*** [bar]	Thread size [mm]	Tightening torque Md → **Md** $_{max}$ [Nm] in steps					
		1	2	3	4	5	6
100	M16	50	80	110	140	160	**180**
200	M20	70	110	160	200	240	**280**

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.

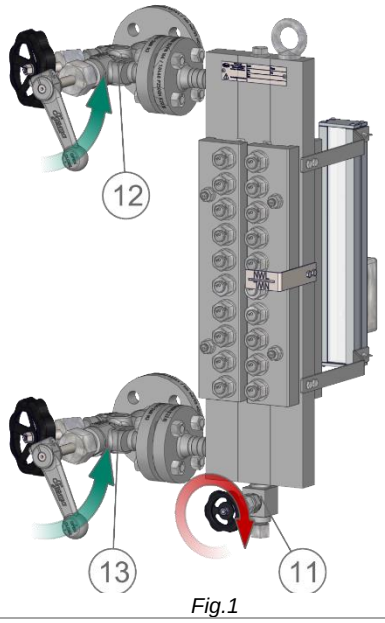


Fig.1

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

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

- Check the gauges for leaks.

8.3 Commissioning under pressure and temperature loads

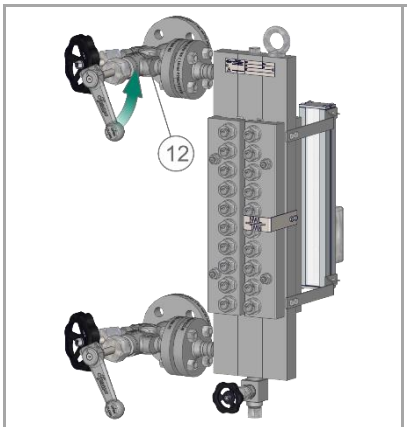


Fig.1

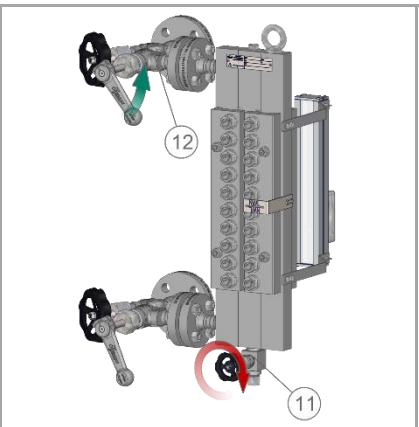


Fig.2

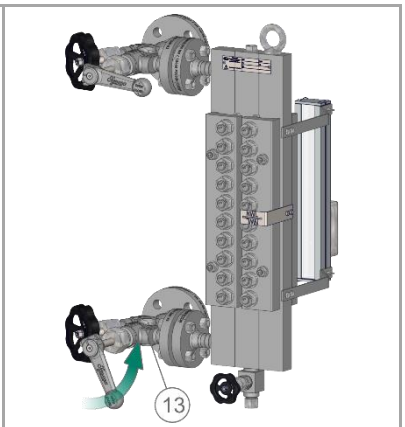


Fig.3

- The gauge must be depressurised *(chap.9.2)*

Figure 1:

- Slowly open the upper shut-off valve *(pos. 12)*
  (hand lever in approx. 5 min. position)
- The gauge is heated to operating temperature by the steam flowing through it within 5-10min.

NOTE

Material fatigue due to steam shocks

Excessive amounts of steam penetrating the display body can cause shocks that lead to material fatigue.

- Slowly open valves

Figure 2:

- The operating temperature must be reached.
  - Close the drain valve *(Pos.11)*.
  - Completely open the upper shutoff valve *(pos. 12)* slowly.

Figure 3:

- Pressure must have stabilised.
  - Slowly open the lower shut-off valve *(pos. 13)* slightly.

The pressure equalisation now takes place.

- Slowly open the lower shut-off valve *(pos. 13)* completely

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 *(pos. 13)*.
- 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

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

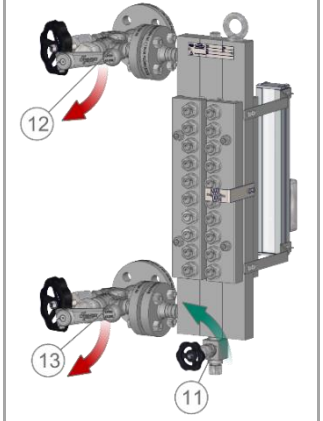


Fig.1

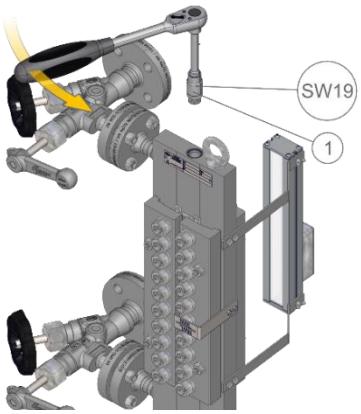


Fig.2

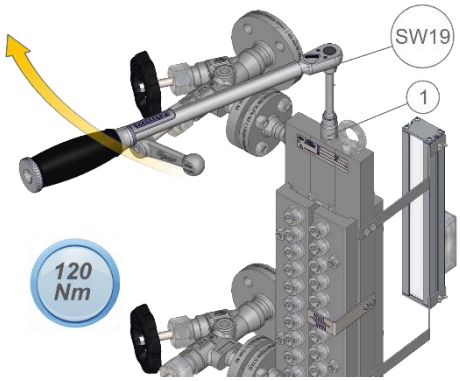


Fig.3

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 $\mathbf{M_d}$ **= 120 Nm**.

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

9.3 Blowing through the gauge for further cleaning

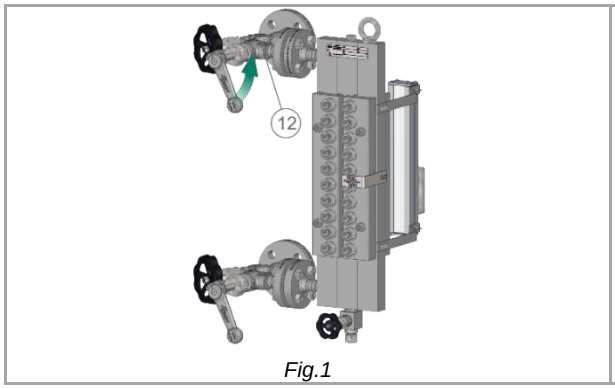


Fig.1

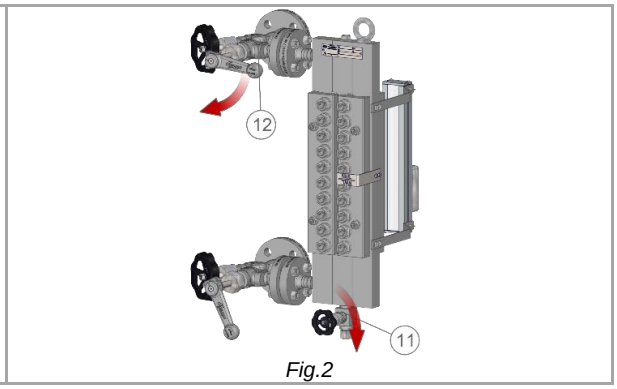


Fig.2

- The gauge must be depressurised *(chap.9.2)*

Figure 1

- Open the upper shutoff valve slowly *(pos. 12)*.

The steam flowing through cleans the glasses.

Figure 2

- Close the upper shutoff valve *(pos. 12)*
- Close the drain valve *(pos.11)*.

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

9.4 Cleaning the mica

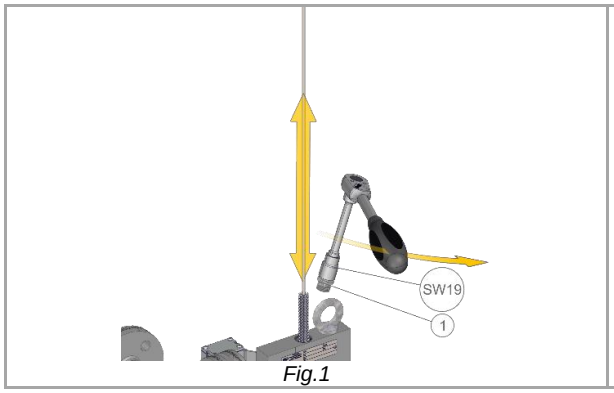


Fig.1

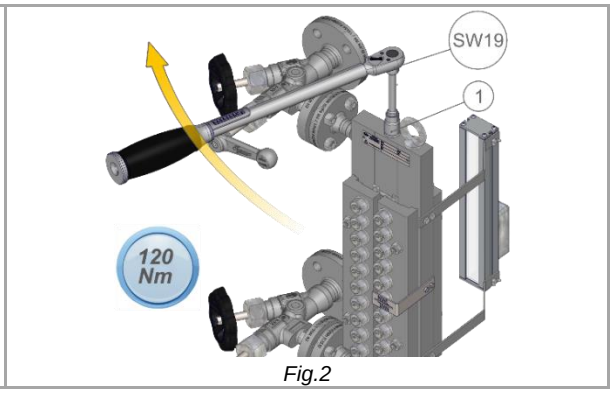


Fig.2

Figure 1

- The gauge must be depressurised *(chap.9.2)*
  - Unscrew the screw plug *(pos. 1)*.
  - Clean glasses and channel in the display body with a round brush *(Article number 40-00775)*.

Figure 2

- Screw in the screw plug *(pos.1)* with torque **Md=120Nm**.

TIP

If this cleaning is not sufficient, a new mica *(pos.5)* must be installed. *(For spare parts packages and article numbers, see chap.11.1)*

9.5 Changing the mica

TIP

Dismantling the water level marker and lighting device beforehand provides more space and therefore makes the subsequent work easier.

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

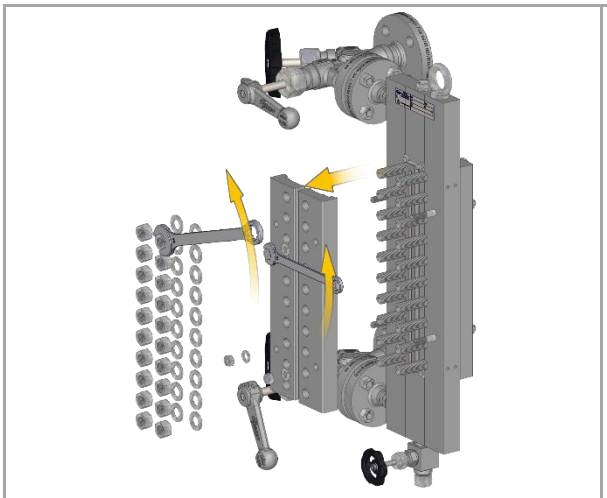


Fig.1

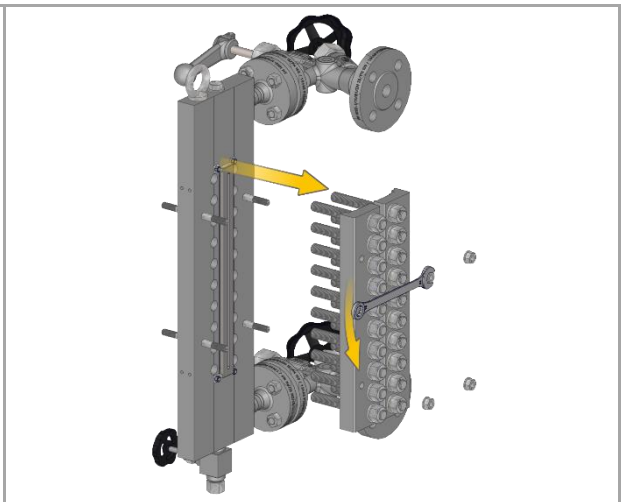


Fig.2

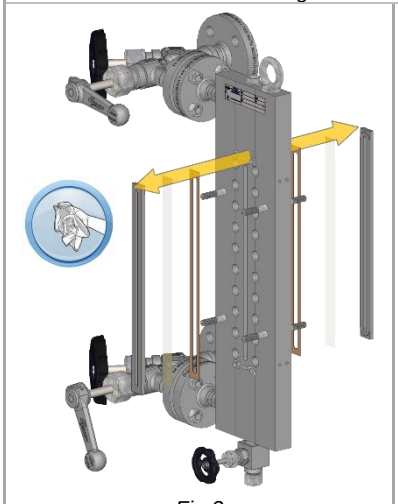


Fig.3

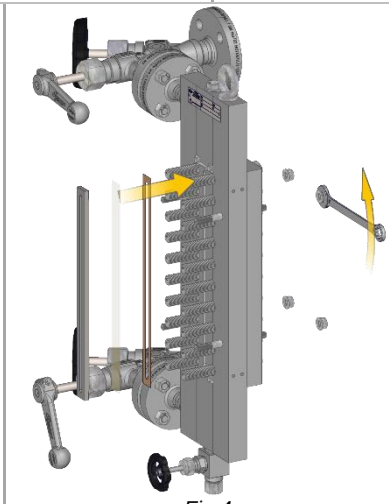


Fig.4

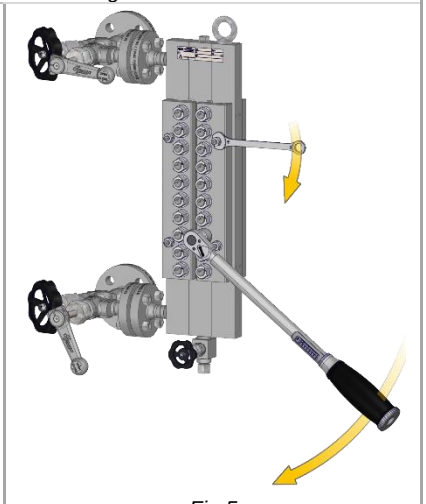


Fig.5

Figure 1:

- The gauge must be depressurised.
  - Loosen the nuts on the cover and retaining screws and remove them together with the washer.
  - Remove the cover rails.

Figure 2:

- Loosen the retaining screws on the back and remove together with the washer.
- Remove the cover rail on the back together with the threaded bolts.

Figure 3:

- Remove the pressure plate, mica discs and seal on both sides
- Completely remove sealing residues.
- Clean the sealing surfaces and check for damage.

Figure 4:

- Insert the new seal, new mica and pressure plate into the indicator body between the retaining plates in the above order and hold in place.
- Fit the cover rails on the back.
- Screw on the nuts of the retaining screws and tighten lightly.
- Push the threaded bolt through the holes in the cover rail and display body.

Figure 5:

- Fit the cover rails on the front.
- Screw on the nuts of the retaining screws and tighten lightly.
- Screw on the nuts of the retaining and cover screws and tighten to the maximum tightening torque in the prescribed sequence and steps.

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	Material settlements, wear	Tighten the screws to the specified torque *(chap. 10.1)*
Leakage at flange connection	Wear, stresses	Carry out work on flange connections *(chap. 10.2)*
Leakage at screw plug	Wear and tear	Tighten the screw, replace the seal *(chap. 10.3)*
Unrecognisable fill level	Deposits on the mica	Clean gauge *(chap.9.2)*.
Unrecognisable fill level after cleaning	Heavy deposits on the mica	Change the mica *(chap.9.5)*.

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

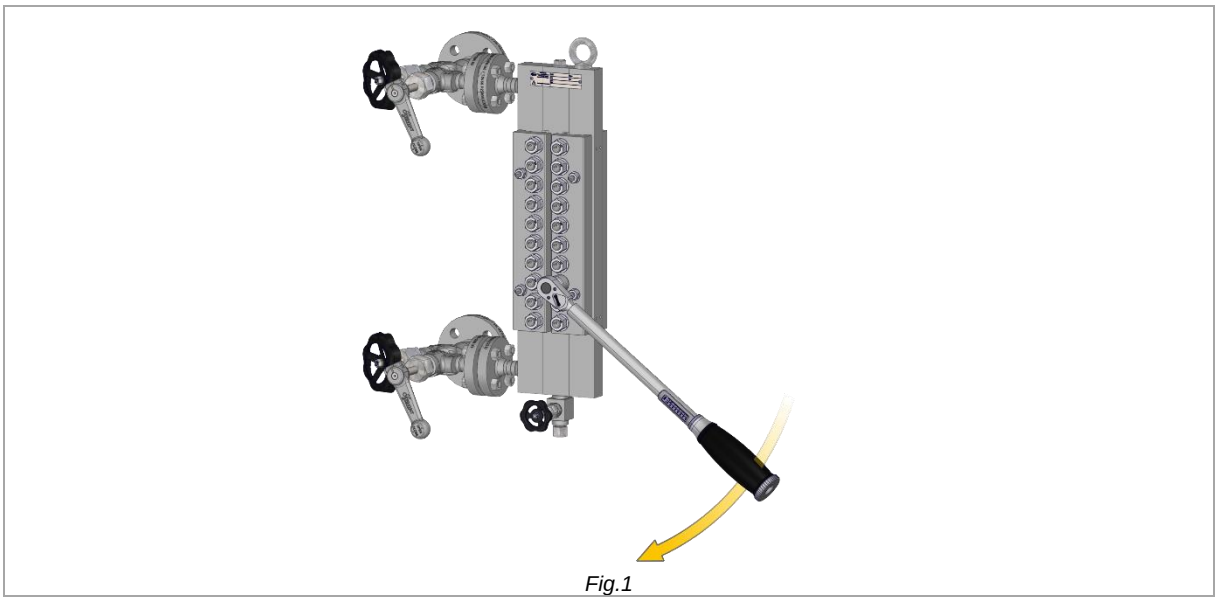


Fig.1

Figure 1:

- The gauge must be depressurised.
  - Tighten the hexagon nuts to the maximum tightening torque in the prescribed sequence.

NOTE

Error does not rectify after correction

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

- Change the mica *(chap. 9.5)*

10.2 Leakage at flange connection

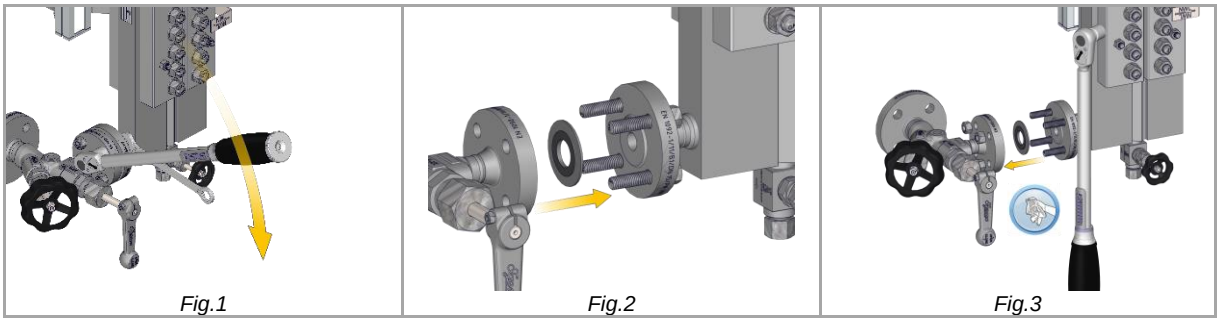


Fig.1 *Fig.2* *Fig.3*

Figure 1

- Tighten hexagon nuts to maximum torque in accordance with the prescribed standard.

Figure 2:

If there is no improvement:

NOTE

Property damage due to impacts

The gauge hangs freely after the work in the following step.

- Secure the display body against falling.

- Loosen and unscrew the hexagon nuts of the threaded bolts of both valves on one side.
- Remove display body from shutoff valves.
- Secure the sealing ring and threaded bolt against falling.

Figure 3:

- Clean the sealing surface and check for damage, replace the sealing ring.
- Place the flanges of the display body on the flanges of the shutoff valves
- Connect flanges with threaded bolts and install according to the prescribed standard.

10.3 Leakage between the screw plug and the display body

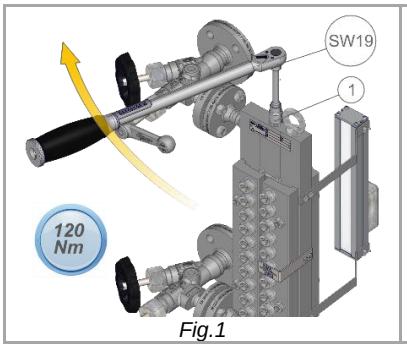


Fig.1

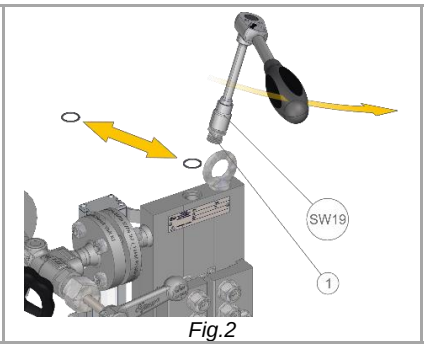


Fig.2

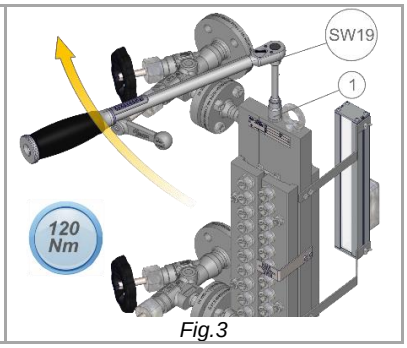


Fig.3

Figure 1:

- Tighten the torque of the screw plug

Figure 2:

If there is no improvement:

- Unscrew the locking screw.
- Replace the gasket.
- Check the sealing surface for contamination and damage.

Figure 3:

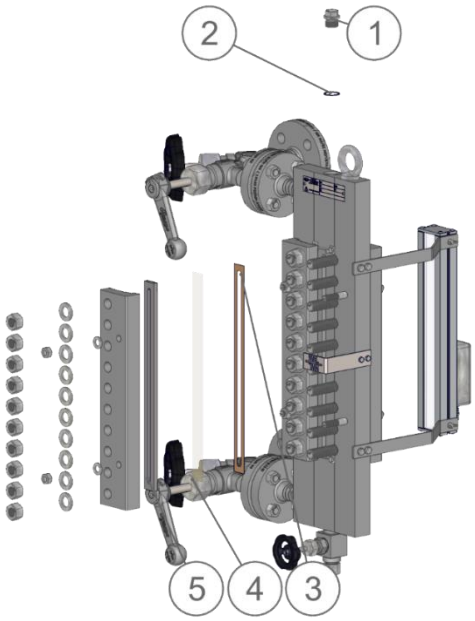
- Screw in the screw plug with the specified torque.

11 Spare parts and technical accessories

11.1 Spare parts

pos.	Designation	Size	Item no.	Quantity
1	Screw plug	G $^1/_2$"	40-10481	1
2	Sealing ring	21x26x1.5mm	40-00099	1
3-4	Spare parts package	5	15-13096	1
		6	15-13097	1
		7	15-13098	1
		8	15-13099	1
		9	15-13100	1
		10	15-13101	1
		11	15-13102	1
5	Pressure plate	5	25-00077	n x 2
		6	25-00078	n x 2
		7	25-00079	n x 2
		8	25-00080	n x 2
		9	25-00081	n x 2
		10	25-00082	n x 2
		11	25-00083	n x 2
6	Screw plug (n.d.)	G $^1/_4$"	40-03794	4[*1]
7	Sealing ring (n.d.)	13.5x19x1.5mm	40-00114	4[*1]

n = number of sight openings.
Spare parts package 1-2 consisting of 2x seals and 2x mica packages.
*[*1] only necessary for stacked display openings*



11.2 Accessories

Designation	Label	Item no.
Water level mark	HHWL	40-04497
	HWL	40-04496
	NWL	40-04495
	LWL	40-04494
	LLWL	40-04493

If the water level mark is not pre-assembled, 2 pieces are required for assembly. M5x10 self-tapping screws included. (article no. 40-11364)

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 unit

Before dismantling the display body, disconnect the display unit from the power supply and remove it from the display body. To do this, loosen the fastening screws of the holding bracket and remove the lighting device.

12.2 Dismantling the display body

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 loose components against falling

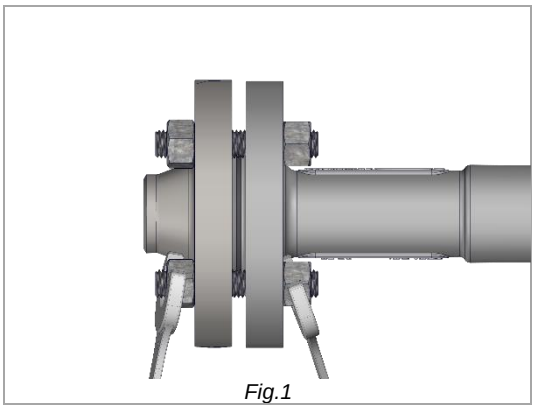


Fig.1

Valves and gauges that are firmly connected to each other (e.g. welded connections) 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.

12.3 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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