Steam trap

E-STM100

Edition 04/2021

D-12-B-51245-EN-00

INSTALLATION AND OPERATING INSTRUCTION

Product philosophy

Thank you for placing your trust in IGEMA and deciding in favour of one of our high-quality products.

For more than 100 years, measuring and control systems have been developed, produced and sold worldwide under the IGEMA brand name.

“Steam is our passion” and we offer you the entire programme for the safe and economic operation of your plants, especially in the steam and condensate sector.

Please read the installation and operating instructions carefully to ensure a safe and reliable operation.

In addition to the information on installation and operation, you will also find important information on maintenance, care, safety and value retention of your measuring and control system.

Table of contents

Table of contents

Table of contents

1. Important safety instructions

KEEP THESE INSTALLATION AND OPERATING INSTRUCTIONS IN A SAFE PLACE!

Commissioning as well as maintenance and repair work may only be carried out by qualified persons in compliance with the installation instructions given in this operating manual. The correct installation, commissioning, maintenance and operation of the device presupposes that the person in charge is familiar with measurement and control systems and complies with the general installation and safety instructions. In addition, the correct and intended use of tools and the handling of safety devices must be ensured. Unqualified persons must not be assigned the above tasks!

IGEMA GmbH accepts no liability for damage to property or personal injury caused by unqualified persons or by failure to observe these installation and operating instructions. If no sufficiently qualified person can be found, IGEMA GmbH can be commissioned with the installation/maintenance.

1.1 Symbols used in these instructions

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

 Danger	This symbol and signal word refer to a potentially hazardous situation which could result in death or injuries if ignored.
 Caution electrical voltage	This symbol and signal word indicate live parts with an immediate danger of death from electric shock.
 Caution hot	This symbol with a signal word indicates a potentially hazardous situation that can result in severe burns and scalds all over the body.

 Caution	This symbol and signal word refer to a potentially hazardous situation which could result in personal injury, property and environmental damage if ignored.
 Caution	This symbol and signal word refer to a potentially hazardous situation which could result in damage to the equipment if ignored.
 Info	This symbol indicates useful information and recommendations as well as measures that will prolong the value of your measuring and control system.

1.2 Intended use of the device


Caution

Use these installation and operating instructions, the identification on the rating plate (see 5.6) and the technical data sheet to check whether the device is suitable for the intended use/application. The device complies with the requirements of the European Pressure Equipment Directive 2014/68/EU.

The device may only be used to indicate fill levels on containers.

The maximum values of the pressure and temperature range of the device must be checked before installation. If the maximum allowable operating values of the device are lower than those of the system on which it is to be installed, protective instruments for the device, such as pressure reducers or similar, must be provided to avoid limit situations. The device may only be used in accordance with the information in these installation and operating instructions or for the parameters and applications agreed in the supply contract. (see rating plate, 5.6) The operator of the direct water level indicator is obliged to familiarise himself on the compatibility of the medium and the device. In case of doubt, contact the relevant installation manager or site manager.

The correct installation position, alignment and flow direction of the device must be observed! Before installing the IGEMA product on boilers or containers, it is essential to remove all protective covers and, if necessary, the protective film from rating plates and sight glasses.

1.3 Safety at work

Danger

Before installation or carrying out maintenance work on the device, safe access must be ensured and a secure working area with sufficient lighting must be defined and marked out. Always use lifting equipment for heavy loads!

Before starting any work, carefully check which liquids or gases are or have been in the pipeline. (flammable substances, irritating substances, substances hazardous to health) When opening or dismantling the device, residues of the medium can escape. Subsequent fumes are also possible in unpressurized and cold systems. Use designated PPE such as safety goggles and respiratory protection!

Special attention must be paid to the condition of the environment around the installation or maintenance site. Be aware of e.g.: potentially explosive atmospheres, lack of oxygen in tanks and pits, dangerous gases/liquids, extreme temperatures, hot surfaces, fire hazard (e.g. during welding) and moving machine and system components. Protect yourself from excessive noise by taking the required protective measures.

For all maintenance work or new installations, on new or existing boilers or vessels, it is imperative to check that the boiler or vessel has been depressurised and that the pressure has been safely reduced to atmospheric pressure. In principle, no system should be regarded as unpressurized even if indicated by pressure measuring devices such as pressure gauges or sensors. When releasing the pressure, make sure that no persons are in the release area. Carefully check whether you and/or other persons in the vicinity need PPE to protect yourself from external influences such as high and low temperatures, radiation, noise, danger to eyes, loose objects that can fall down or chemicals.

There is always a risk of injury when handling large and/or heavy equipment. Observe the load handling regulation as a minimum requirement for working with loads. Avoid handling the device with your own physical force, e.g. by lifting, pulling, carrying, pushing or supporting it, especially to prevent back injuries. Use lifting equipment to move heavy and bulky equipment in accordance with Article 1, Section 2 of the German Load Handling Regulation (LasthandhabV).

Caution hot!

Under normal operating conditions the surface of the device can become very hot! Under the maximum operating conditions, the surface temperature can exceed 350°C. After shutting off or, if necessary, shutting down the boiler, wait until the temperature has normalized to room level. To avoid the risk of burns and scalds, always use PPE including safety goggles!

1.4 Safety instructions for this device

These installation and operating instructions are an integral part of the device and must be forwarded to the responsible departments "Goods inward, Transport, Installation, Commissioning and Maintenance". They must be kept in such a way that the technical staff have access to these documents at all times. If the device is passed on to a third party, these installation and operating instructions must also be included in the national language of the third party.

Avoid shocks and hard contact during transport, as this can lead to damage. During intermediate storage, the device must be kept dry and secured against damage.

When servicing the unit, make sure to use sharp-edged internal parts and avoid shards of broken glass. There is a risk of cutting hands and arms! Always wear work gloves when changing packing, valve seat and valve plug.

For units with a dead weight of 30 kg or more, the customer must provide adequate support (e.g. via a spring suspension device, etc.). This can be attached to the holding strap/eyelet on the device.

When returning goods to IGEMA GmbH, the applicable safety and environmental laws according to GGVSEB [German ordinance on the national and international carriage of dangerous goods by road, rail, and inland waterways] must always be observed. If there are any risks to health or the environment due to residues or the device has a mechanical defect this must be indicated when returning the device and the necessary precautionary measures must be taken. If the returned goods are devices that have come into contact with or contain hazardous substances, a safety data sheet must be enclosed, and the goods must be clearly marked. In addition, the hazardous substance must be reported to the logistics service provider.

1.5 Exclusion of liability

IGEMA GmbH Mess- und Regelsysteme will assume no liability if the above regulations, instructions and safety precautions are not observed and followed. If they are not expressly listed in the installation and operating instructions, changes to an IGEMA device are carried out at the risk of the user.

2. Scope of supply

1. The device is supplied as a complete unit.
2. Installation and operating instruction

3. Important information

3.1 Use in compliance with regulations

Steam trap for engines:

Use in pipelines for draining off steam condensate within the permissible pressure and temperature ranges taking into account the chemical and corrosive influences on the pressure device.


Caution

Only use the steam trap for drainage of condensates and liquids!

4. Explanations

4.1 System description

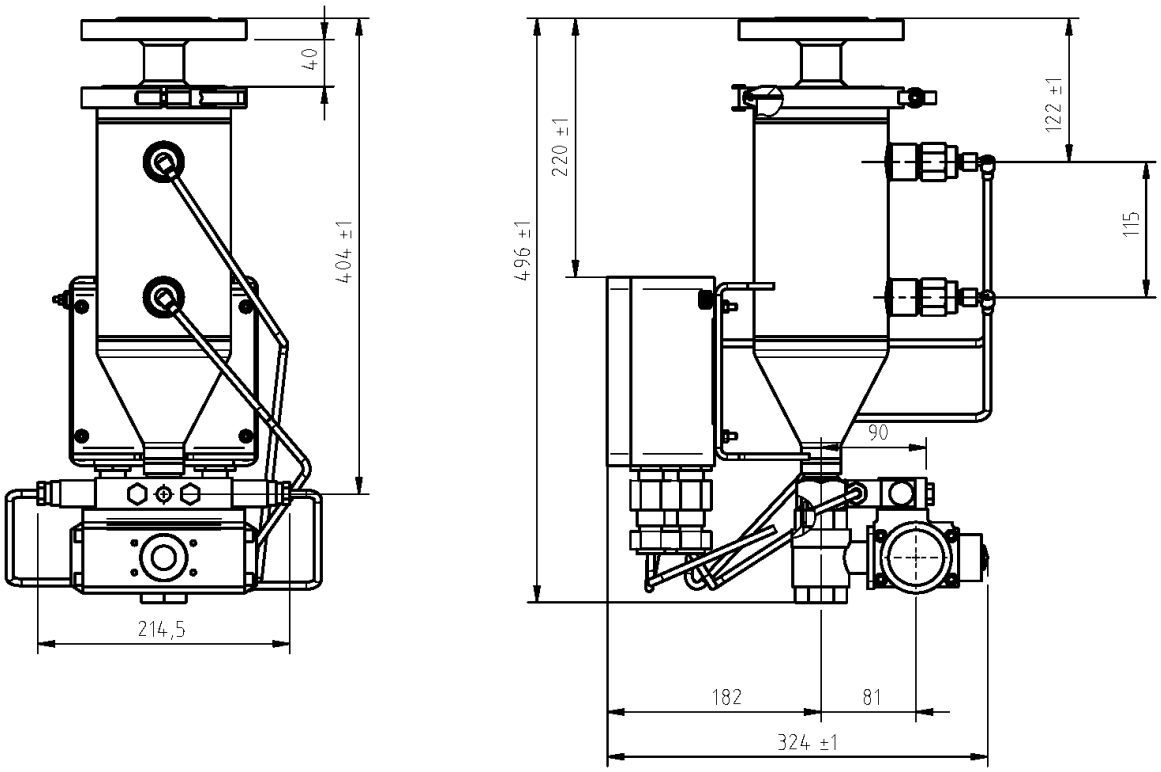
The steam trap is for draining the charge air of engines

4.2 Function

The liquid level to be measured is discontinuously measured by two probes.
When the upper switch point is reached, the pneumatic solenoid valve opens. When the lower switch point is reached, it closes again.

5. Technical data

5.1 Device versions



Nominal pressure	[bar]	16
Max. all. pressure **PS**	[bar]	8
Max. all. temperature **TS**	[°C]	100

5.2 Connector type

Standard : DIN or ASME flanges

On request : weld-on end or socket welding
according to DIN or ASME

5.3 Materials

Parts in contact with the medium or pressure holding parts from DIN 1.4571 / 1.4404.

5.4 Limitations of use

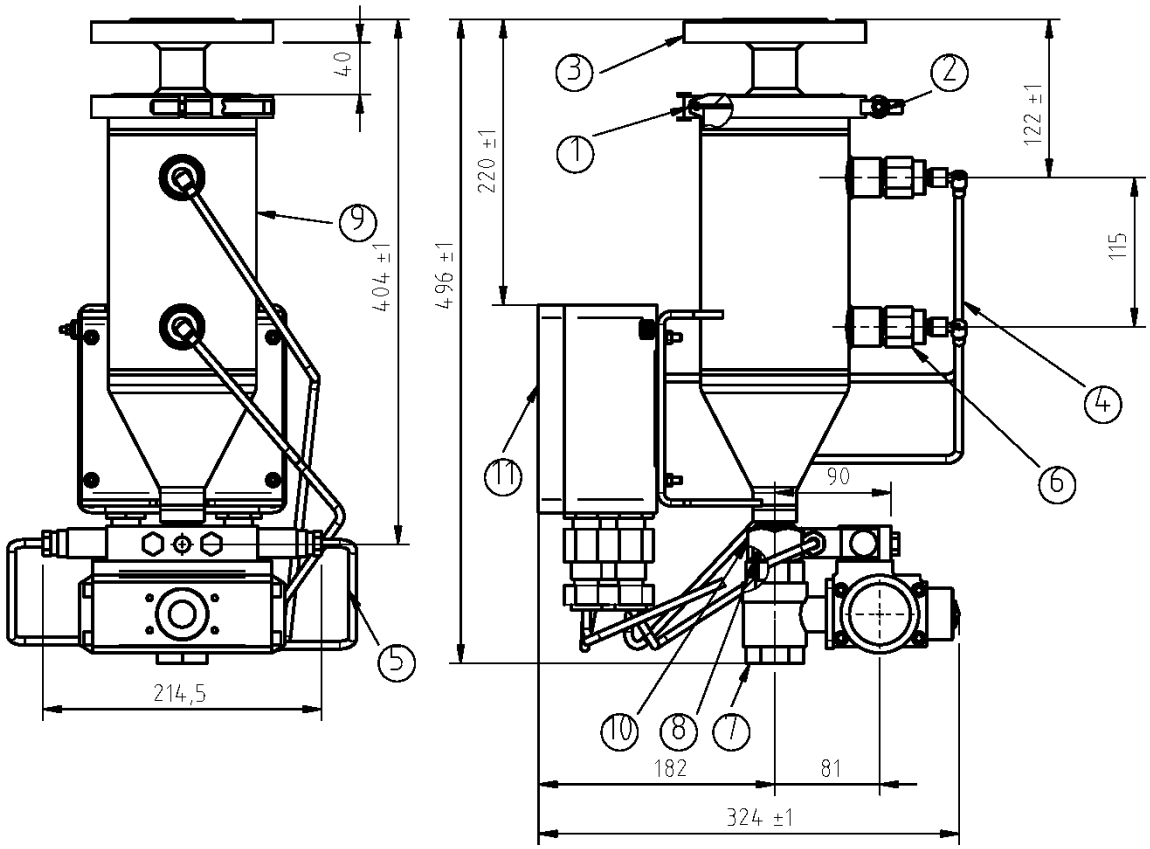
Temperature and pressure must not fall below the values given under 4.1.

5.5 Corrosion resistance

The safety of the unit is not influenced by corrosion if it is used as intended.

6 Design

Steam trap



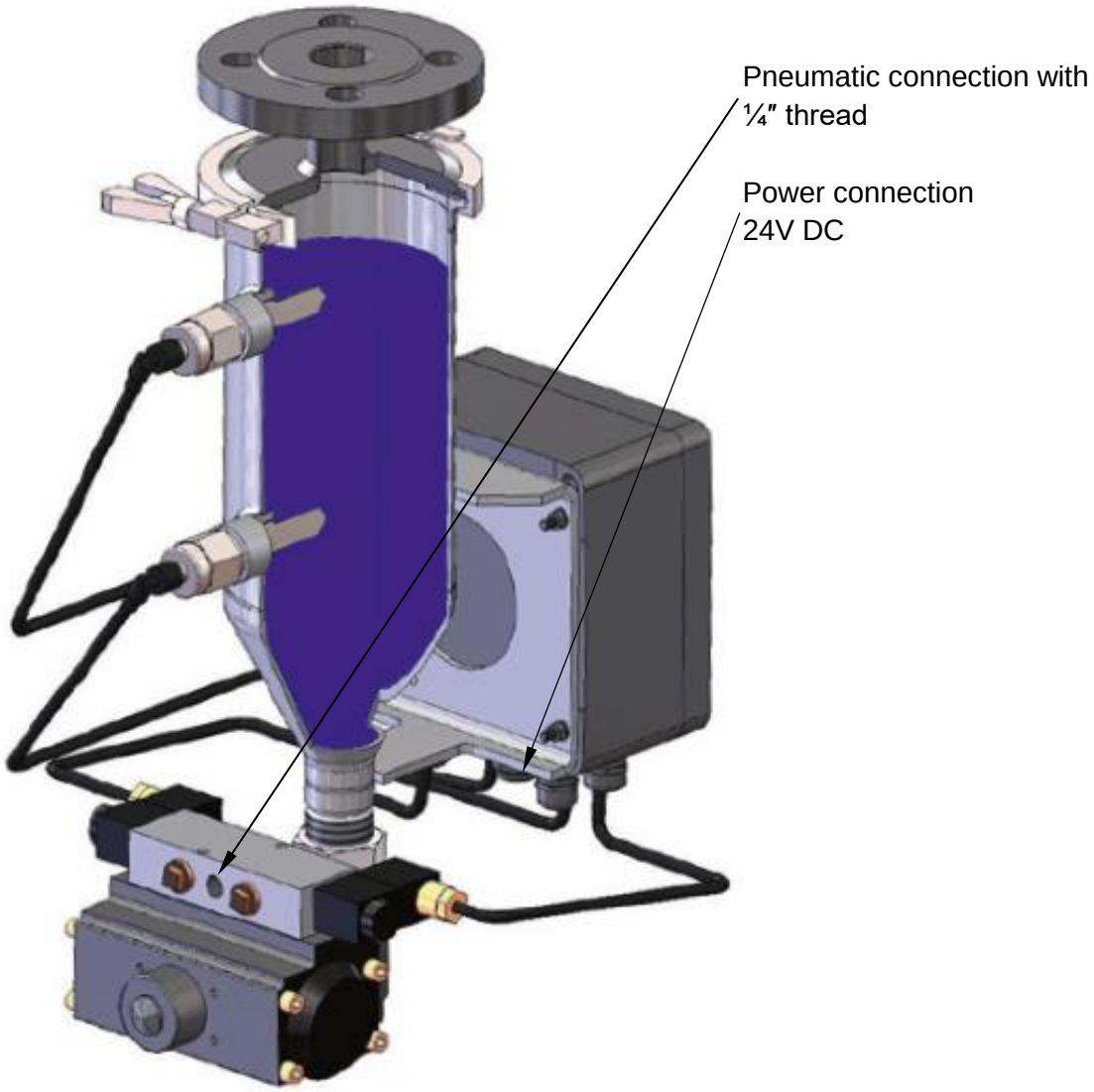
Key

(1) Housing seal
(2) Clamp bracket
(3) Housing upper section
(4) Connection line
(5) Connection line
(6) Sensor
(7) Solenoid valve
(8) Assembly glue
(9) Mounting housing
(10) Hexagonal nut G 1″
(11) Switch box

7 Montage

Caution

The unit must not be placed on the solenoid valve



7.1 Version with flange

- Respect installation position!
- Remove protection caps from connection flanges. The protection caps are *only* intended as locking for transport.
- Ensure that sealing surfaces are clean and undamaged.
- Use EN1514 sealing material and DIN2510 or DIN974 screws (material 1.7709).

7.2 Version with weld-on ends

- Respect installation position!
- Remove protection caps. The protection caps are *only* intended as locking for transport.
- Assembly only by using welding process 111 (metal-arc welding with covered electrode) or 141 (inert-gas tungsten-arc welding).

7.3 Heat treatment of weld seams

Supplementary heat treatments of weld seams is not required.

7.4 Drain piping

- Check screw connection is secure, tighten if necessary.
- Mount drain piping on pneumatic solenoid valve (7) (to be provided by the customer).

Ensure that drain piping has free outlet to atmosphere and is protected from pressure peaks!

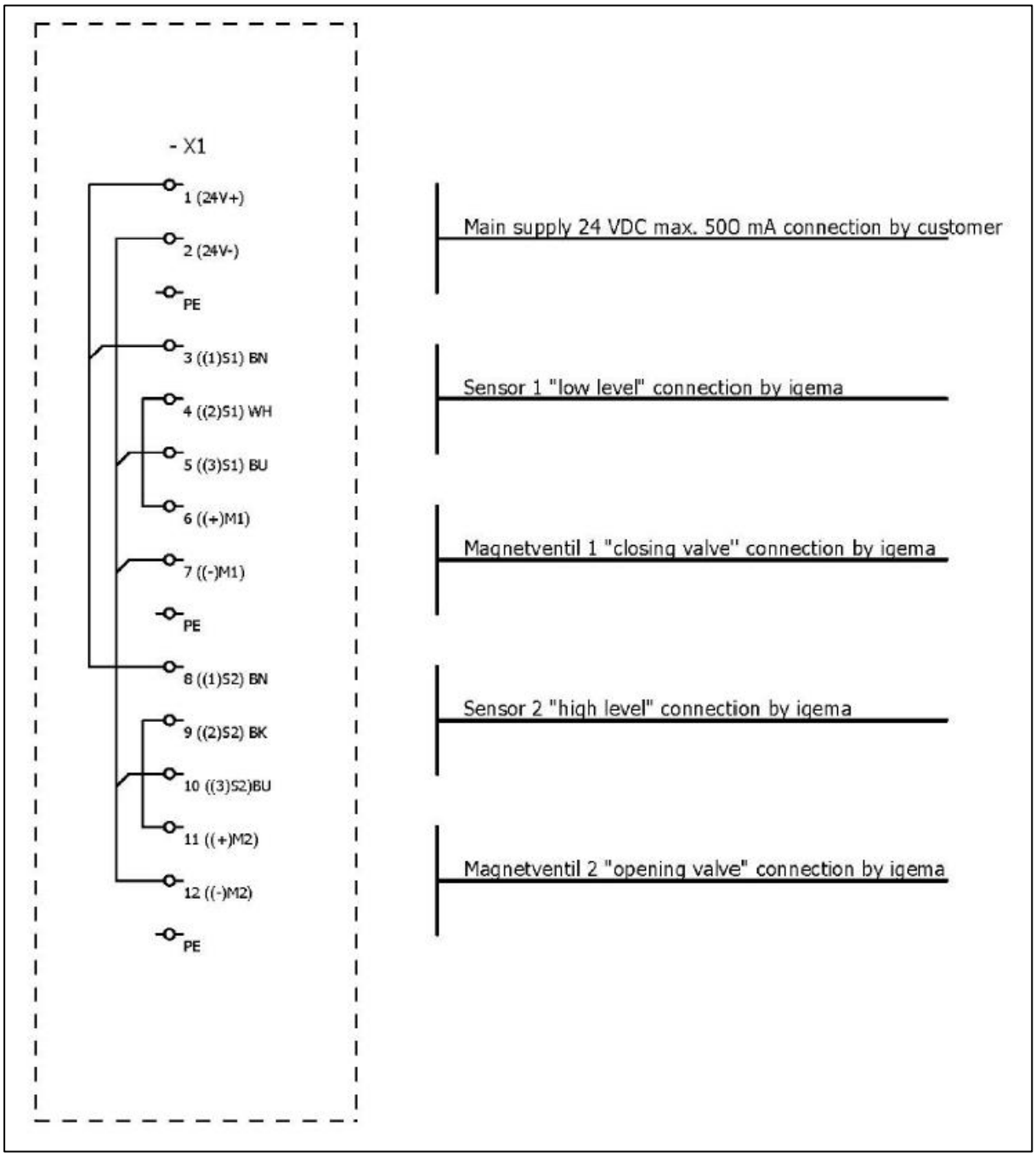
8. Power connection

Connection must only be carried out by qualified staff according to wiring diagram!

Comply with the VDE regulations and those of the local grid operator for the installation on site!

Only use cable suitable for the area of use!

8.1 Wiring diagram



9. Commissioning

9.1 Commissioning of the unit

Check specifications of material, pressure and temperature!

- Fitting the device to the process and drain piping
- Connecting the pneumatic control air
- Connecting the line to the main voltage with 24 V

9.2 Functional test

After the installation of the device a functional test of the steam trap is necessary.

10. Maintenance

During conservation work or chemical cleaning of the steam trap the system is to be depressurised and the steam trap emptied manually

10.1 Opening the mounting housing

For dismantling, the system must be depressurised!

Wait for the device to cool down!

- Open solenoid valve (7); device is drained
- When dismantling beware of the release of fumes and residual hot water.
- Release clamp bracket (2).
- Lift up the upper part of the device (3).

10.2 Closing mounting housing

- Checked that the sealing surfaces of the device flange are in perfect condition.
- Fit the upper part of the device using a new seal (1). Tighten clamp bracket (2).
- Carry out commissioning (see chapter 8).

10.3 Tightening torques

For flange connection:	The clamp connection bracket should be tightened by hand with approx. 5-7 Nm. If leaks occur, increase the torque slowly and carefully until the device is tight.
For Sensor Capcont L	max. 50 Nm

11. Sensor Capcont L

11.1 Function

The Capcont L fill level indicator is fitted into the tank or piping wall.
This is a capacitively acting sensor for recording limit values.
Electrode rod, medium and tank wall form an electric capacitor. Covering the electrode rod with the medium causes a capacity change that is evaluated by the electronics and transformed into a corresponding switching command. If the limiting level is exceeded or fallen below, a control signal is output on the PNP switch output. This enables relays, fuses, solenoid valves and PLC inputs to be actuated. A yellow LED displays an active PNP switch output.
A switchover option for minimum/maximum safety is integrated.
Setting the responsiveness is carried out with a potentiometer.

11.2 Safety instructions

Anyone charged with putting into operation or operating this device must have read and understood these operating instructions and in particular the safety instructions.

Installation, electric connection, putting into service and operation must be performed by a qualified skilled technician in accordance with the details in these technical instructions and the applicable standards and rules.

The device must only be used within the permissible operating limits given in these technical instructions. Any use outside these intended limits may lead to significant risks.

The device meets article 3 (3) of the EU directive 97/23EC (Pressure Equipment Directive) and is designed and manufactured in accordance with good engineering practice.

11.3 Assembly instructions

Before assembling or dismantling the device, the system must be unpressurised.
Tightening the process connection may only be carried out on the hexagon using a suitable wrench. Das maximum torque for this is 50Nm. Tightening the process connection using the connection housing is not acceptable.
The correct functioning of the device within the specified technical data can only be ensured if the allowable temperature in the area of the connection housing of -30°C to +100°C (with LED) / +125°C (without LED) is not exceeded.

11.4 Maintenance

The sensor is maintenance-free

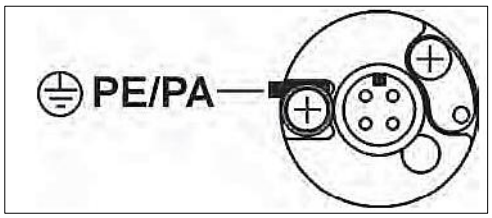
11.5 Repair

Repair may only be carried out by the manufacturer.
If the sensor has to be sent in for repair, a short description of the fault is to be enclosed.
Before the device is sent back, it is to be cleaned of all of the medium.

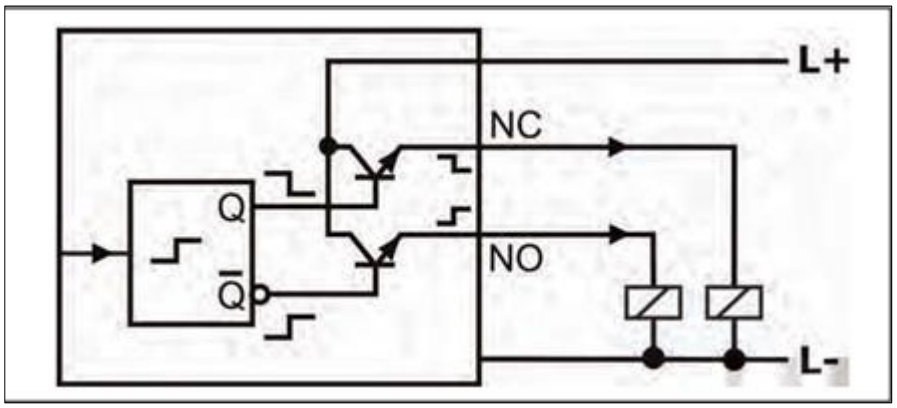
11.6 Electrical connection

The electrical connection of the sensor must be carried out in accordance with the standards specific to the country. Incorrect assembly may cause application-related risks.

For connection only use suitable cables that meets the requirements regarding temperature, resistance or installation at the fitting position.
For putting into operation it is recommended that all connected control equipment is switched off to avoid undesired control procedures.
The device must be earthed. Earthing the device may be carried out via the PE/PA clamp screw or the metal process connection.



The voltage at the connection contacts must not exceed 30V to avoid damaging the electronics. All connections are polarity reversing protected.
Inductive loads at the PNP switch output are only to be operated with bypass-diode or RC circuit to avoid voltage spikes.

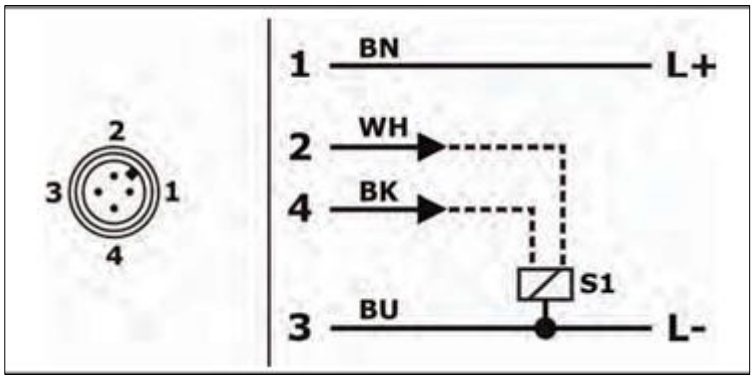


The load connected at the PNP switch output is connected contactless and thus bounce-free via a semiconductor switch with the +L contact of the supply voltage contact 1). In activated switching status on the output there is a positive signal close to the supply voltage. In deactivated switching status and on supply voltage failure the semiconductor switch locks.
The PNP switch output is current-limited to 0.5 A and is overload and short-circuit protected.

	SP-LED	S1
U_s = 0V	●	1/2 1/4
	●	1 2 1/4
	☼ YE	1/2 1 4

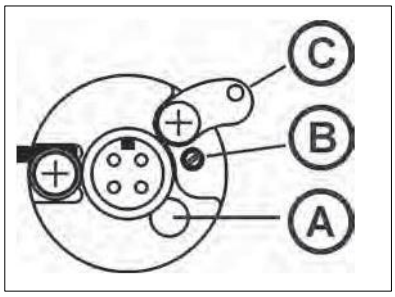
The device is suitable for antivalence operation. When both outputs are connected the NO and NC outputs have opposing states in error-free operation.
In the event of a fault or a cable breakage both electronic switches are opened.
By means of a two-channel evaluation function-dependent monitoring of the sensors can hereby also be carried out alongside the fill level monitoring.

Connection diagram:



Strand colours standard connection cable M12:
BN = brown, WH = white, BU = blue, BK = black

11.7 Control and display elements



A - LED-display
Display of the switching function - yellow

B - Adjustment trimmer
Adjustment of the response sensitivity

C - Cover plate
Protective cover for adjustment trimmer

Adjustment
The adjustment trimmer is positioned under the swivelling cover plate.
To swivel the cover plate out the fixing screw is to be slightly loosened.

Adjustment of the response sensitivity
Turning left Medium identification at higher DK value
Turning right Medium identification at lower DK value

Procedure when adjusting

- Medium must completely cover electrode rod
- Turn adjustment trimmer left (anticlockwise) until output falls
- Turn adjustment trimmer right (clockwise) until output switches on.
- Continue to turn adjustment trimmer half a turn right

After the adjustment, the cover plate is to be swivelled back and the fixing screw tightened. This is the only way to ensure secure sealing.

12. Spare parts

Always indicate article no. and serial no. (indicated on the identification plate) in case of spare parts order!

Item No.	Designation	Article no.	Number
6	Sensor Capcont L	40-10405	2
2	Clamp bracket	40-10401	1
1	Seal clamp connection	40-10400	1
7	Pneumatic solenoid valve	40-10406	1
	Namur electrical solenoid valve	40-10407	
8	Thread lock	40-10322	1

13. Decommissioning

Severe burns and scalds may be sustained over the whole body!

Before detaching flange connections etc., all connected lines must be pressureless (0 bar) and cooled off to ambient temperature (20°C)!

13.1 Disposal

Dismantle the unit and separate the waste materials.
When disposing of the unit, the legal regulations for waste disposal must be observed.

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 control, please contact our SERVICE department on telephone *+49 2501 92424-0* by return.

IGEMA GmbH

Antwerpener Str. 1
48163 Münster
Deutschland

Fon.: +49 2501 92424-0
Fax.: +49 2501 92424-99
info@igema.com

www.igema.com