

IGEMA GmbH
Measuring and control systems

Mounting and operating instructions

Magnetic level gauge

- NA7-50 / 52



IGEMA GmbH

Zieglerstr. 11 A
D-52078 Aachen
Tel.: +49(0)241 56 87-0
Fax: +49(0)241 56 87-300
info@igema.com
www.igema.com



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Safety instructions



General health and safety instructions

1. Avoidance of danger for persons and property

- Only use unit for intended purpose.
- No additional mountings and modifications on the unit without our approval.
- Adhere to the standards for prevention of accidents and to the plant specific safety regulations.
- Read and observe installation and operating instructions.

2. Application limits

Only use this unit according to these operating instructions and to the parameters agreed upon in the delivery contract (see identification plate) including the agreed operating conditions.

3. Avoidance of danger and damages

- Distribute these mounting and operating instructions to appropriate department "arrival of goods, works transport, mounting, commissioning and maintenance".
- When passing the unit to a third party, these mounting and operating instructions must be enclosed in the national language of this third party.
- Only skilled and qualified personnel with special work order may work on the unit, which must be free of pipeline stress!
- Carefully read, observe and preserve these mounting and operating instructions.
- **Observe and adhere to the precautions marked in bold characters in the sections of these mounting and operating instructions!**
- Avoid shocks and impacts during transport, which could damage the unit.
- In case of intermediate storage take care for a dry and appropriate place where the unit cannot be damaged.

4. Marking

In these mounting and operating instructions, the safety instructions are specially marked with the following symbols:



Danger

means danger to life and/or serious property damage in case of non-observance. Never ignore!



Attention

means that you must pay special attention to the technical relationships.

Unit-specific safety instructions

- ⇒ The fitting is under pressure during operation!
If flange connections, screw plugs or stuffing boxes are unfixed, hot water and steam will escape.
- ⇒ Carry out assembly and maintenance works only if plant is completely pressureless!
- ⇒ The fitting is hot during operation!
Severe burns on hands and arms are possible.
Wait until the unit has cooled before carrying out assembly and maintenance works!
- ⇒ Severe burns and scaldings on the whole body are possible!
- ⇒ Wait until the unit has cooled. In case of opening and disassembling the unit, residual medium can escape. Further evaporation is also possible on pressureless plant.
- ⇒ Sharp-edged interior parts can cause cutting damages on the hands!
Always wear work gloves when exchanging packing, valve seat and valve cone!

Exclusion of liability

The IGEMA GmbH Mess- und Regelsysteme does not accept liability when a/m regulations, instructions and warning indications are not observed and adhered to. The operator is responsible for modifications on a unit of IGEMA (if they are not explicitly specified in the mounting and operating instructions). The magnetic switch may not be opened. Each warranty claim expires if the test seal is damaged.



2. Important information

2.1 Intended use

Magnetic level gauge NA7-50 / 52:

The magnetic level gauge is a liquid level gauge which can be used for steam boilers and containers.

The indication is made via a float operated magnetic system.

The product corresponding to the PED Directive 97/23/EEC has the CE-mark no. 0035 of the notified body.

Applied rules as per TRD/AD2000 or ASME-Boiler.

3. Explanations

3.1 Scope of supply

- Standpipe with indicating ledge
- Float and new gasket are packed on the outside of the unit
- Setting magnet is enclosed

Additional equipment (also possible for existing devices):

- Magnetic switch
- Primary element MRK-...
- Drain valve

3.2 System description

The level gauge indicates the level in the boiler indirectly.

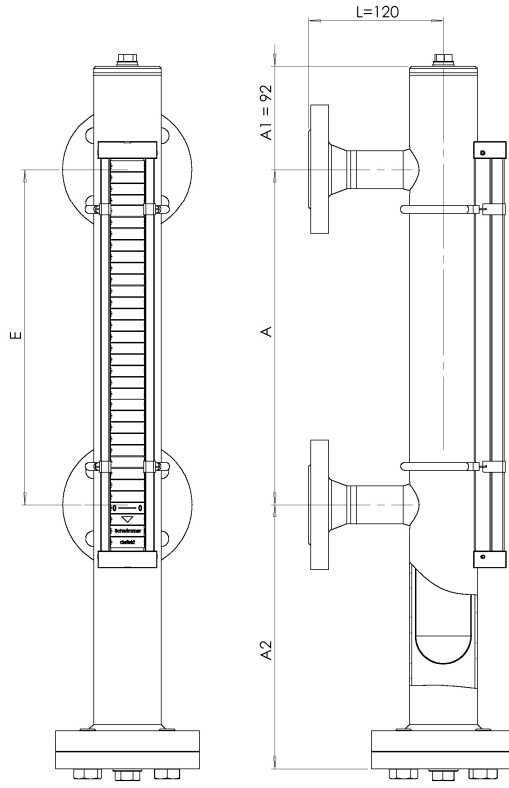
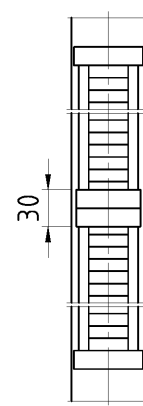
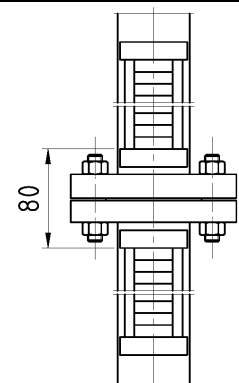
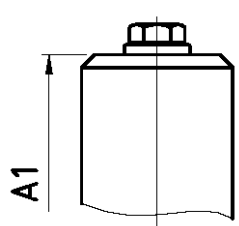
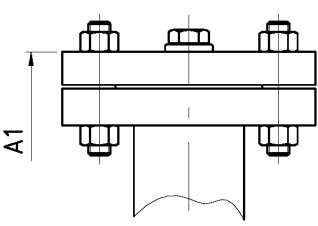
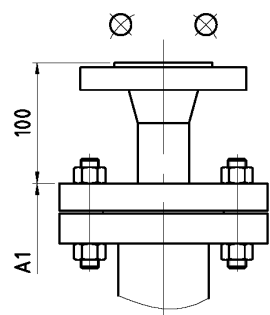
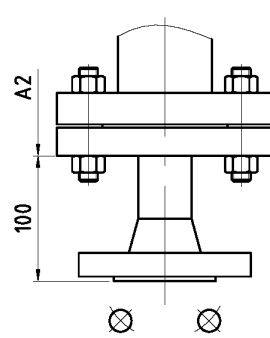
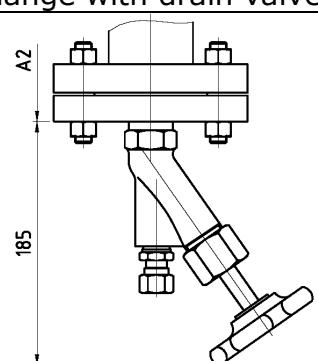
3.3 Function

The unit works according to the physical law of the communicating tubes. The liquid level in the standpipe (2) is the same as the one in the boiler. The liquid level is transmitted to the indicating ledge on the outside of the standpipe via a float with inner magnetic system located inside of the standpipe. The magnetic system actuates simultaneously additionally mounted switches (4) on the standpipe and/or a sensor (5) for remote liquid level transmission.

Design sketch see chapter 5

4. Technical data

4.1 Versions

NA7 (version flange/ventilation cone))		> 2,6m
		
		> 6m
		
Possible vent connections		
Ventilation Cone	Flange	Flange with vent flange
		
Possible drain connections		
Flange with drain flange		Flange with drain valve
		

- To indicate a range > 2,6 m it is necessary to use 2 or more superposed indicating ledges.

- For level gauges longer than 6 m, the unit will be delivered in divided version with intermediate flanges.

Product designation: e.g. NA7-50 / 52 flange/ventilation cone

NA7	-50 / 52	Flange /	Ventilation Cone
Device	Float diameter	Drain	Ventilation

4.2 Type of connection

Standard : flanges according to DIN or ASME

On request : welding end or Socket Welding according to DIN or ASME

4.3 Materials

- Fluid side in stainless steel according to DIN or ASME.
- Float made of stainless steel; for low medium density the float is made of titan

4.4 Application limits


Max. all. pressure PS	[bar]	20	50
Max. all. temperature TS	[°C]	214	265

4.5 Corrosion resistance

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

4.6 Identification plate / Marking

The following data are indicated on the identification plate according to EN 19:

 IGEMA GmbH Mess- und Regelsysteme Zieglerstraße 10-16 Germany - 52078 Aachen made by LECOS GmbH a company of the IGEMA group See installation instructions	Built A		Type B
	PS C	bar	TS D °C
	PN E	DN F	

- A** Date of manufacture
- B** Type of unit
- C** Max. all. pressure
- D** Max. all. temperature
- E** Nominal pressure (not listed)
- F** Nominal diameter

5. Construction

NA7	Legend
	<p>(1) Connection studs (2) Standpipe (2.1) Float (2.2) Sealing (2.3) Cover flange (3) Flap indicator (3.1) Bolt spring (3.2) Stop clamp (4) Magnetic switch (optional) (5) Primary element MRK-... (optional) (6) Plug (A) Drain valve (optional) (D) Upper shutoff valve (W) Lower shutoff valve</p>

6. Assembly



Take care that connection of shutoff valves (W+D) is made with a horizontally orientated spindle. The arrow on the valve indicates the flow direction and must point towards the standpipe (2).

Check mating dimensions between instrument nozzle and boiler nozzle.

Make sure that there are no magnetic materials or magnetic field generators in close proximity of the standpipe (within 100 mm).

6.1 Version with flange

- Respect installation position!
- Remove protection caps from connection flanges. Caps only serve as transport protection.
- Ensure that sealing surfaces are clean and undamaged.
- Use sealing material as per EN1514 and screws as per DIN2510 or DIN974 (material 1.7709).
- Mount magnetic level gauge.

6.2 Version with welding end

- Respect installation position!
- Remove protection caps from connection flanges. Caps only serve as transport protection.
- Assembly only by using welding process 111 (manual arc welding) and 141 (tungsten inert gas welding).

6.3 Heat treatment of weldseams

Supplementary temper tests of weldseams are not required.

6.4 Flap indicator

- The centre of the lower process connection is the reference point for the zero mark of the flap indicator (3).
- The flap indicator fixed by bolt springs (3.1) with stop clamp (3.2) to the standpipe (factory-made) can be turned into desired position.
Also turn stop clamp !

6.5 Float installation

- The float (2.1) with inner magnetic system and the new gasket (2.2) are packed and fixed outside of the standpipe (2) when the unit is supplied.
- Open cover flange (2.3)
- Carefully remove float packing
- Insert float with top-heavy side upwards into standpipe (top-heavy side with colour marking)
- Tighten cover flange (2.3) and associated gaskets (2.2) with standpipe using successively opposite diagonal tightening (see chapter 9.2)



Remove float before carrying out pressure test of boiler!

Float may remain in standpipe if there are valve between boiler and standpipe which are closed during the test.

6.6 Drain piping

- Check bolting drain valve (A) / standpipe (2) and retighten if necessary.
- Mount drain piping on drain valve (A) (to be provided by the customer).



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

- Close valves.

6.7 Assembly of additional equipment *(for retrofitting, otherwise already pre-installed)*

- Remove indicating ledge before assembly of additional equipment
- Magnetic switches and/or primary element are fixed without obscuring the indication by means of integrated pipe saddle



Assembly of magnetic switches or sensor may only be carried out in a maximum angle of 90° to the centre of the flap indicator.

Never insulate additional equipment.

- The magnetic switch is continuously adjustable in the whole indication area "E". (see special data sheet)
- The centre of the lower process connection is the reference point for the zero mark of the sensor (marked in red).
(see special data sheet and operating instruction for primary element MRK-..)

7. Electrical connection



Only skilled and qualified personnel may carry out the electrical connection according to the wiring diagram!

Respect the instructions of the VDE (Association for Electrical, Electronic & Information Technologies) and of the local network operators for the installation to be provided by the customer!

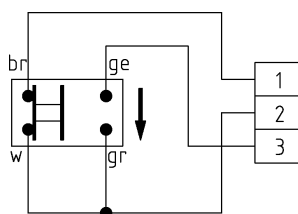
Only use cables that are suitable for the operating range!

Observe the switching time of the magnetic switch when designing a safety circuit. Adhere to basic and reliable safety principles as per DIN EN ISO 13849 for electrical components.

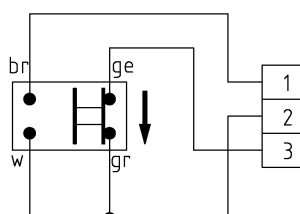
7.1 Magnetic switch

Contact position and wiring diagram:

Float above the switch



Float below the switch



We recommend to use customary RC combinations or a suitable Varistor (e.g. 0,1 μ F/100 Ω) as inductive consumer to extend the contact life of the magnetic switch. Resistance value (Ω) and power rating (W) depend on customer indications.

We suggest to use silicon cables free of acetic acid for the further connection cable in the area "connecting housing inside".

7.2 Primary element

see special data sheet and operating instruction for primary element MRK-...)

8. Commissioning



Unit may be hot during commissioning and during operation.
Attention danger of life!
Customer can possibly provide safety device.

8.1 Adjustment of indicating flaps

Pass setting magnet (bottom-up) 3 times along the glass plate. The flaps above the zero mark are white and the flaps below the zero mark are red.
(see figure in chapter 8.4)

8.2 Commissioning of unit together with the boiler

Check specifications of material, pressure and temperature!

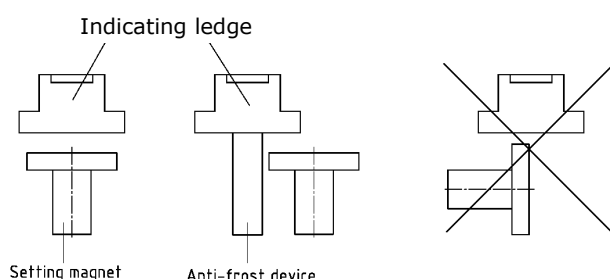
- Close drain valve (A) / plug (6) (see sketch chapter 5).
- Open shutoff valves W+D.
- Check position of magnetic switch (2) in operating condition and adjust the height if necessary

8.3 Commissioning of unit if boiler is already in operating condition

- Close drain valve (A) / plug (6) (see sketch chapter 5).
- Open slowly shutoff valve W and then shutoff valve D
- Check position of magnetic switch (2) in operating condition and adjust the height if necessary.

8.4 Anti-frost device

Insulated units which are used in the area of temperatures below 0°C must be provided with a flap indicator with anti-frost device. Pass setting magnet bottom-up laterally of the anti-frost device to adjust the flaps.



9. Maintenance

When using viscous or crystallizing media, clean standpipe (2) and float (2.1) inside in regular intervals and during boiler revision.



Unit may be hot during commissioning and during operation.
Attention danger of life!
Customer can possibly provide safety device.

9.1 Cleaning of standpipe (2) and float (2.1)

Purging of connection pipework including case:

- Close shutoff valves (W+D).
- Slowly open drain valve (A) / plug (6) and drain medium
- Slightly open valve D and close after approx. 2 seconds.
- Slightly open valve W and close after approx. 2 seconds.
- Close drain valve (A) / plug (6).
- Close drain valve (A) / plug (6)
- Fully open valves W+D after filling of standpipe

If this cleaning was not sufficient, dismount bottom/cover flange (2.3) and remove float (2.1).



Plant must be pressureless for disassembly works!
Wait until unit has cooled!

- Close shutoff valves (W+D).
- Open drain valve (A) / plug (6); unit is drained.
- Caution! When dismounting, residual medium may escape and further evaporation is also possible.
- Remove cover flange (2.3).
- Remove float and clean standpipe and float.
- Insert float with top-heavy side upwards into standpipe (top-heavy side with colour marking).
- Always use new gaskets (2.2) when assembling the unit. Tighten bolts of cover flange / standpipe in several steps using successively opposite diagonal tightening (see table in chapter 9.2) until reaching tightening torque $M_{d\max}$.



Close shutoff valves before carrying out preservation works or chemical cleaning of the boiler. Or even better: interrupt passage on flange connection of boiler nozzles by placing blind flanges.

For commissioning see chapter 8.

Design sketch see chapter 5.

9.2 Tightening torques

all. pressure PS [bar]	Tightening torque Md → Md_{max} [Nm]					
	in steps					
	1	2	3	4	5	6
32	35	50	65	75	-	-
50	50	75	100	125	150	165

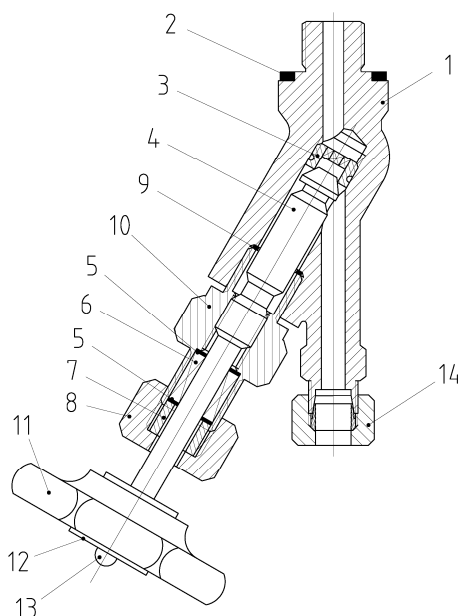
Tightening torques of screw plug (6) Md= **150 Nm**

10. Drain valve

10.1 Construction

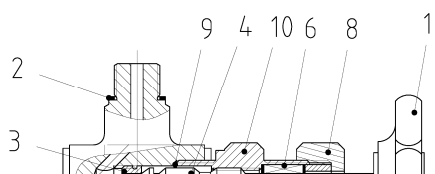
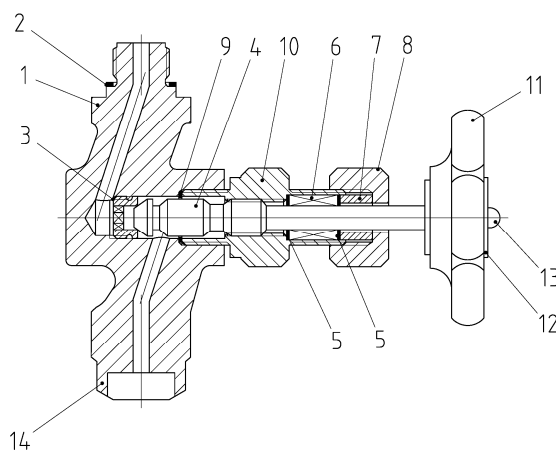
AV500, AV520

- Male thread G $\frac{1}{2}$ on input side
- Output side with cutting ring connection \varnothing 12 as per DIN 2353 – DS12



AV540, AV550

- Male thread G $\frac{1}{2}$ on input side
- Output side with welding end
- On request other connections possible



AV56x, AV57x

- Male thread G½ on input side
- Output side with cutting ring connection ø12 as per DIN 2353 – DS12
- On request other connections possible

- | | |
|-----------------------------|-------------------------------|
| (1) Valve housing | (8) Screw cap |
| (2) Sealing ring | (9) Sealing ring |
| (3) Seat | (10) Upper part of valve |
| (4) Valve spindle with cone | (11) Handwheel |
| (5) Scraper rings | (12) Plate OPEN-CLOSED AUF-ZU |
| (6) Gland packing | (13) Cap nut |
| (7) Stuffing box | (14) Drain connection |

10.2 Assembly



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

- Firmly screw on drain valve with sealing ring (2) on existing unit.
- Cutting ring connection: Assemble drain piping (tube ø 12x1 material St 35.8) on provided drain connection (14) as per DIN 2353 (SW24) (on the part of the builder).

Welding end:

weld on

Flange:

screw on

10.3 Commissioning

Rust, sand or similar impurities inside of the medium or during first flushing can cause leakage if they remain in the area of the seat.

Purging of valve:

- Fully open valve for purging. The pre-pressed gland packing can lose its denseness due to a longer storage (see chapter 10.4)
- Close valve.

10.4 Maintenance



Before carrying out maintenance works on drain valve, unit has to be pressureless and empty!
Severe burns and scaldings on the whole body are possible!

Re-tightening of gland packing:

- If a valve is leaky, tighten screw cap (8) with open-end wrench (SW27) clockwise until valve is tight. Spindle (4) has to stay movable.
- Replace gland packing if re-tightening of packing was not successful.

Replacement of packing:

- Screw off cap nut (13) and remove handwheel (11).
- Unscrew upper part of valve (10).
- Remove screw cap (8) and stuffing box (7).
- Remove spindle with cone (4) upwards.
- Push out gland packing (6) with scraper rings (5) from top and clean packing space.

Assembly:

- Grease spindle thread, insert from top and firmly tighten screws.
- Place new greased packing with scraper rings (5).
- Insert stuffing box (7).
- Tighten screw cap (8).
- Insert new sealing ring (9).
- Grease thread of upper part of valve (10), screw in and tighten with tightening torque **$M_d = 220 \text{ Nm}$** .
- Place handwheel (11) and tighten cap nut (13).

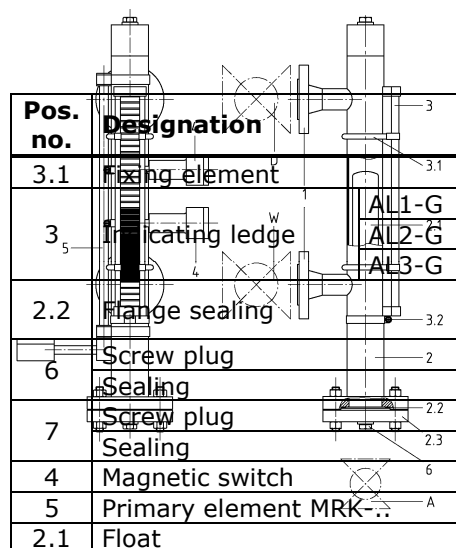
Replacement of complete upper part:

- For dismounting of component parts see "Replacement of packing"
- Unscrew seat (3) with hexagon socket wrench SW11.
- Grease seat thread, screw in and tighten with tightening torque **$M_d = 55 \text{ Nm}$** .
- Replace complete upper part.
- Place new spindle.
- For assembly of component parts see above.

11. Spare parts

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

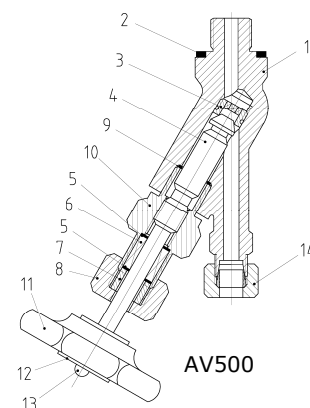
11.1 Magnetic level gauge



Pos. no.	Designation	Article no.	
		steel	stainless st.
3.1	Fixing element	15-00250	-
3 ₅	Indicating ledge	AL1-G	10-130070
		AL2-G	10-130072
		AL3-G	10-130074
2.2	Flange sealing	-	depending on the order
6	Screw plug	-	40-00330
	Sealing	-	40-00128
7	Screw plug	-	40-03794
	Sealing	-	40-00127
4	Magnetic switch	15-03037	
5	Primary element MRK-..	depending on the order	
2.1	Float	depending on the order	

11.2 Drain valve

Pos. no.	Designation	Allowable pressure PS [bar]	Article no.	
			AV500, AV520	AV540, AV550, AV56x, AV57x
-	Complete valve	32	40-01803	On request
-	Complete valve	80-200	40-01845	On request
3	Seat	-	40-01864	40-01953
9	Sealing ring	-		
4	Spindle with rolled cone	-	40-01866	40-04135
5	Scraper rings	-	40-01867	
6	Gland packing	-		
7	Stuffing box	-		
9	Sealing ring	-	40-01873	
2	Sealing ring	-	40-00099	



12. Decommissioning



Severe burns and scaldings on the whole body are possible!

Before detaching flange connections, screws of stuffing box cover screws or screw plugs, all connected lines must be pressureless (0 bar) and cooled off to ambient temperature (20°C)!

12.1 Disposal

Dismount unit and separate waste products.

When disposing the unit, observe legal regulations for waste disposal.

13. Supplement

Warranty

We accord a warranty period of 24 month on our products. A condition for that is the appropriate treatment according to these mounting and operating instructions. The warranty for wear and spare parts is restricted to material defects and construction faults.

The magnetic switches are wear parts and are **not** included in the warranty. The sealings/gland packing installed in the valves are **not** included in the warranty.

Declaration of Conformity

Declaration of Conformity in accordance with the PED Directive 97/23/EEC, annex VII

We, the company:

IGEMA GmbH
LECOS GmbH
J.G. Merckens Mess- und
Regelsysteme GmbH & Co. KG
Zieglerstraße 10-16
52078 Aachen
Deutschland

declare as IGEMA group that the products "magnetic level gauges"
as pressure holding parts

type of product:

NA7-50 / 52

comply with the PED Directive 97/23/EEC
and that the following Conformity Assurance System was used:

Category II, Module D1

Applicable standards:
TRD, AD2000, ASME-Boilers

Notified body for the modules:

TÜV Rheinland Industrieservice GmbH
Am Grauen Stein
51105 Köln
Germany

Aachen, 14.02.2011



E.H. Kilchert
(Managing director)



A. Scholl
(QM representative)



J. Riechelmann
(Development)



This high quality IGEMA product has been developed, manufactured and inspected in accordance with a quality management system according to DIN EN ISO 9001:2000.

If on receipt of this unit you notice damage in transit or another cause for complaint despite our final quality inspection, please contact immediately our customer service, phone no. +49 (0) 241-56 87-0.

Created: Düsseldorf

Authorized:

Date: 27.05.2010
