



Water level controller and limiter

- RBA 25
- RBA 35

IGEMA GmbH

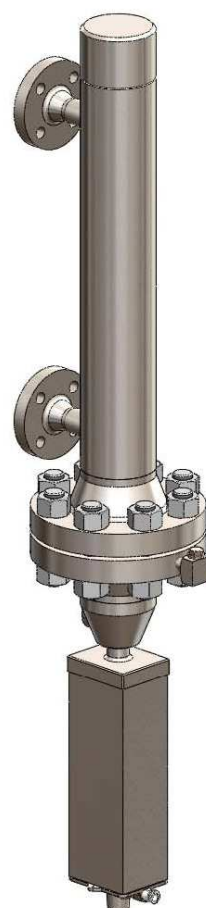
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D-07-B-16634-EN-0
Edition 10/09



IGEMA GmbH
Measuring and control systems

Mounting and operating instructions



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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!

Pay attention that the magnetization of the permanent magnets in the unit is not changed! Avoid magnetic fields close to the units!

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

Float switch RBA25/35:

The float switch type RBA25/35 can be used as two-point water level controller or limiter without special design for steam generators according to TRD 401, 402 or 602.



The float switches contain mercury. Therefore they are not suitable for use on steam boiler plants where the steam comes directly in contact to food or similar or where the steam is used for air humidification of air conditioning systems.

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

Applied rules as per TRD/AD2000 or ASME Boiler.

Type	Component mark	EG-component test
RBA 25,35	WRB-04-311	CE0035-BN0106

3. Explanations

3.1 Scope of supply

The unit is delivered as complete unit.

3.2 System description

The float switch (different versions) is used to control or to limit the level of containers and steam generators.

3.3 Function

The unit works according to the physical law of the communicating tubes.

The water level controller or limiter is a float actuated unit where the transmitter magnet connected with the float via the float rod actuates the magnetic switches located inside of the switch housing without direct contact.

The float device is equipped with additional displacement elements to facilitate the buoyancy. These displacement elements move in a mercury filling together with the transmitter magnet.

4. Technical data

4.1 Versions

RBA 25 IP54/65	RBA 35 IP54	RBA 35 IP65

Switch ranges:

Range of adjustment	W [mm]							
RBA 25	100	150						
RBA 35			250	350	450	550	650	750

Dimensions A, Z:

PN	Dim. Z [mm]	Dim. G [mm]	Dim. A1 [mm]	Dim. A2 [mm]
160	W + D + 685	W + 375	152	140
250	W + D + 755	W + 390	177	140
320	W + D + 865	W + 430	213	140

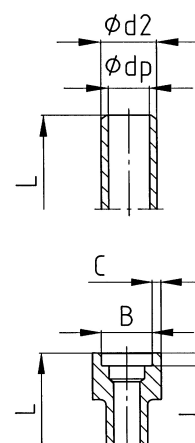
Valves:

Valve	Type
Drain valve	AV520, AV585

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

Components in contact with the medium and pressure-holding components are made of C steel according to DIN or ASME.


4.4 Application limits

Nominal pressure		160	250	320
Max. allowable pressure PS	[bar]	100	160	200
Max. allowable temperature TS	[°C]	312	348	367

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

 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. allowable pressure
- D** Max. allowable temperature
- E** Nominal pressure
- F** Nominal diameter

5. Construction

RBA 25		Legend
IP54	IP65	
<p>Technical drawings of the RBA 25 switch housing. The IP54 view (left) shows a front elevation with components labeled 1 through 22. The IP65 view (right) shows a side elevation with components labeled X, Y, 23, and 24, and a detail view (A) showing component 20.</p>		<p>(1) Switch housing (2) Magnetic switch (3) Float (4) Float rod (5) Transmitter magnet (6) Transmitter tube (7) Transmitter tube cap (8) Drain screw (9) Connection stud (10) Sealing ring (11) Standpipe (12) Lower part of unit (13) Filling stud (14) Screw plug (15) Sealing ring (16) Hexagon nut (17) Bolt (18) Red adhesive foil (19) Instruction plate (20) O-ring (23) O-ring (24) O-ring</p>
RBA 35		
IP54	IP65	
<p>Technical drawings of the RBA 35 switch housing. The IP54 view (left) shows a front elevation with components labeled 1 through 19. The IP65 view (right) shows a side elevation with components labeled 1, 20, 18, 19, and 8.</p>		<p>(A) Drain valve (D/W) Shutoff valve</p>

6. Assembly



Connect shutoff valves (W+D) only with horizontally orientated spindle; the flow direction "→" on the valves (W+D) has to point into the direction of the standpipe (11)!

Connect unit free of tension with switch housing (1) turned downwards to the boiler studs equipped with shutoff valves.

Pay attention that the height of the LWL mark on the standpipe of the unit corresponds to the one of the boiler!

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 float switch.

6.2 Version with welding end

- Respect installation position!
- Remove protection caps. Caps only serve as transport protection.
- Assembly only with 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 Drain piping

- Check connection drain valve (A) / standpipe (11) and re-tighten if necessary.
- Mount drain piping on drain valve (A).



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

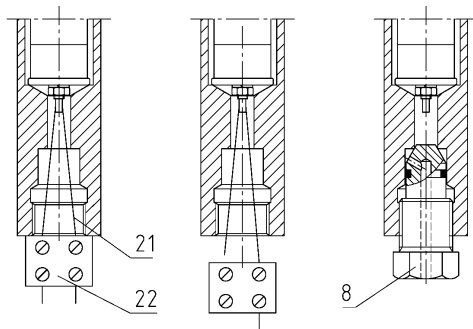
- Close valves.

6.5 Removing of transport protection

The transport protection (22) protects the float rod during the transport from shocks and resulting damages.

- Open switch housing (1):
 - For version IP 54: unfasten wing screws
 - For version IP 65: unfasten bolting of switch housing (6 screws, M8)
- Take enclosed drain screw (8)
- Unfasten terminal (22) on one side

- Pull out lock wire (21) by means of the terminal (22)
- Screw in drain screw (8) and tighten



(21) lock wire
(22) terminal

6.6 Filling of unit with mercury

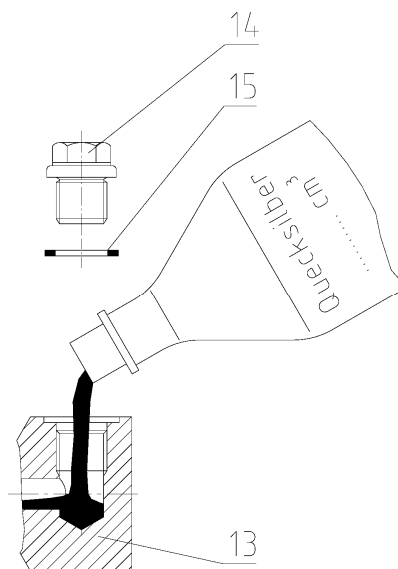


The mercury is supplied in a separate bottle.
The quantity of mercury is precisely matched to the unit.



Observe the safety instructions according to the **safety data sheet**!

- Remove red adhesive foil (18) of switch housing (1).
The instruction plate (19) then exposed indicates the precise mercury filling quantity which must be respected.
- Unfasten screw plug (14) and remove together with the sealing ring (15).
- Fill in the mercury slowly and carefully.
- Re-insert sealing ring (15), screw in and tighten screw plug (14).



Measures to be taken by the customer:



Insulating of unit.
Take precaution measures to avoid burns.
Protect the shutoff valves against unauthorized actuation.

7. Electrical connection



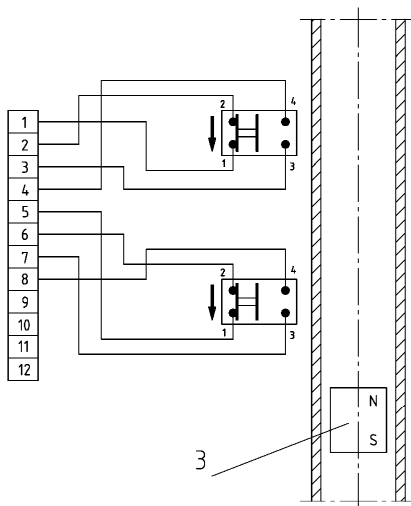
Only skilled and qualified personnel may carry out the electrical connection according to the wiring diagram!

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!

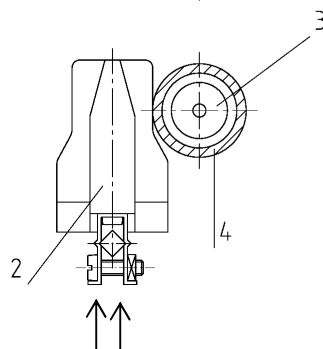
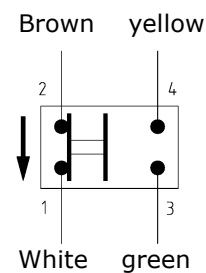
Only use cables that are suitable for the operating range!

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 Wiring diagram



Connection wires:



Identification arrow

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 Connection magnetic switch

- Open switch housing (1) and remove foam cushions between transmitter tube (6) and magnetic switch(es) (2).
- The magnetic switches are already rigidly mounted inside of the switch housing and electrically connected to the terminals.
The magnetic switch can be connected optionally as breaker, maker or change-over contact. Switch base is marked with an arrow.
- If the switch is correctly mounted, the arrow should point downwards.
- Carry out electrical connection.
- Finally ensure that no cable gets in contact with hot elements.

7.3 Technical data magnetic switch

Kind of contact	bistable
Contacts	1 breaker / 1 maker
Connection wire	1 x 0,5 mm ² (16 x \varnothing 0,2) – Cu tinned / PTFE
Wire length L	200 mm
All. ambient temperature	-70°C up to +120°C
Protection	IP68

Type	Switching voltage U	Switching current I	Max. power UxI
M130-KG	\leq 250 VAC	\leq 1 A	\leq 150 VA
	\geq 24 VAC/DC	\geq 0,065 A	\geq 1,5 VA
	\leq 24 VDC	\leq 0,008 A	\leq 0,12 VA

Type	Article-No.	Contact material
M130-KG	15-01122	Silver-Palladium AgPd 70/30 massiv, hard-gold plated AuCo 4-6 μ m

8. Commissioning



Unit is hot during commissioning and during operation. Caution!
Danger of burning!

8.1 Commissioning of unit together with the boiler

Check specifications of material, pressure and temperature!

- Close drain valve (A).
- Fully open shutoff valves (W+D).
- Check position of magnetic switch (2) in operating condition and adjust the height if necessary.
- The magnetic switch (2) must be correspondingly affixed onto the transmitter tube (6).
- Close switch housing (1)

8.2 Commissioning of unit if boiler is already in operating condition

- Close drain valve (A).
- Slowly open shutoff valve (W) followed by shutoff valve (D).
- Check position of magnetic switch (2) in operating condition and adjust the height if necessary.
- The magnetic switch (2) must be correspondingly affixed onto the transmitter tube (6).
- Close switch housing (1)

9. Operation monitoring



A separate purging of the connection lines including standpipe is demanded according to TRD 601, par. 3.2.5 and 3.2.6 for float switches.

9.1 Purging of connection lines

- Close shutoff valves (W+D).
- Slowly open drain valve (A) and drain water of standpipe (11).
- Slightly open shutoff valve D and close after approx. 2 seconds.
- Slightly open shutoff valve W and close after approx. 2 seconds.
- Close drain valve (A).
- Slightly open shutoff valves W+D (standpipe is filled now).
- Fully open shutoff valves W+D after the standpipe is filled.

9.2 Function test



A function test is prescribed for float switches. Test extend and delays must be specified between operator, boiler manufacturer and local expert (TRD 601, par. 7).

- Close shutoff valves (W+D).
- Slowly open drain valve (A) and drain water.
- The float device sinks now under LWL and the magnetic switch is actuated. The prescribed function test is finished.
- Close drain valve (A).
- Slightly open shutoff valves W+D (standpipe is filled now).
- Fully open shutoff valves W+D after the standpipe is filled.

10. Maintenance



Before carrying out maintenance works or a chemical cleaning of the boiler, close shutoff valves of the unit.

Ideally insert blind flanges on the flange connection of the boiler studs. Check state of the unit during boiler revision, especially float (3), float rod (4) with transmitter magnet (5), magnetic switch (2) and corresponding shutoff devices.

A deformed float rod impairs the function.

10.1 Opening of standpipe



For disassembling, the plant must be pressureless!

Wait until the unit has cooled!

Residual medium may escape when opening and disassembling the unit. Further evaporation is also possible on plants with atmospheric pressure.

- Close valves (W+D).
- Open drain valve (A); unit is drained



Observe the safety data sheet UO 319 when draining the mercury from transmitter tube!

See instruction plate (19) for indication of mercury quantity.

- Place a container under the drain screw (8).
- Unscrew drain screw (8) by a half turn. Mercury is drained through centre drill of drain screw.
- Firmly re-tighten drain screw (8).
- Unfix drain piping on valve (A).
- Unfasten bolting (16,17) and lower part of unit (12) until float (3) comes out of standpipe (11).

When lowering, observe that float rod (4) is not deformed!

10.2 Closing of standpipe

- Check sealing surfaces of flange connection.
- Install lower part of unit (12) with new flange sealing ring (10) on standpipe (11). **Observe that float rod (4) is not deformed during installation!**
- Tighten bolting (16,17) in several steps using successively opposite diagonal tightening until the tightening torque Md_{max} indicated in the table of chapter 10.4 is reached.
- Connect drain piping on valve (A).
- Close drain valve (A) and check if drain screw (8) is firmly tightened.
- Refill collected mercury together with the small quantities of attracted water as described in chapter 6.6. For indication of mercury quantity see instruction plate (19).
- Carry out commissioning (see chapter 8).

•

10.3 Exchange of float device

- Open standpipe (see chapter 10.1).
- Unfasten transmitter tube cap (7) and remove float rod (4) with float (3) from transmitter tube (6).
- **Observe safety data sheet UO 319** before removing the adhering mercury.
- Check float rod (4) and float (3) and replace deformed or corroded parts.
- Insert irreproachable float device (3,4) into transmitter tube (6).
- Screw in transmitter tube cap (7) and tighten.
- Close standpipe (see chapter 10.2). **Take care that float rod (4) is not deformed!**

10.4 Tightening torques

Allowable pressure PS [bar]	Tightening torque $Md \rightarrow Md_{max}$ [Nm]					
	in steps					
	1	2	3	4	5	6
100	80	110	140	170	195	210
160	120	160	200	240	280	320
200	150	200	250	300	350	400

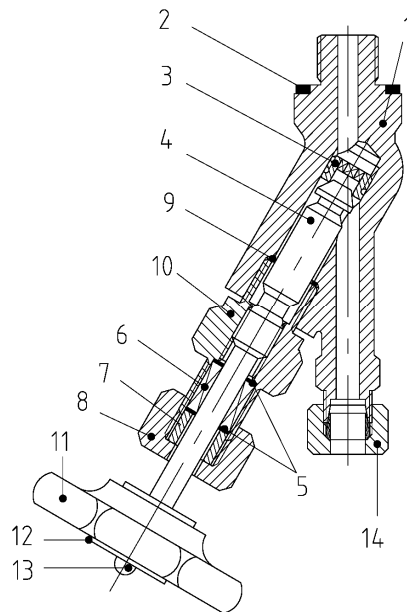
- 1) see identification plate
- 2) version square flange

11. Drain valve

11.1 Construction

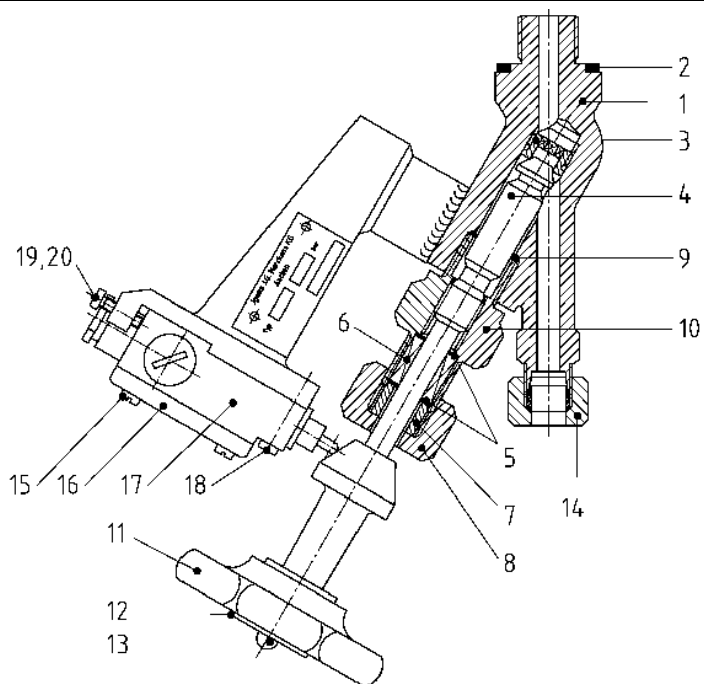
AV 500, AV 520

- Male thread G1/2 on input side
- Output side with cutting ring connection $\varnothing 12$ as per DIN 2353 - DS12
- Other drain connections on request



AV 580, AV 585

- Male thread G1/2 on input side
- Output side with cutting ring connection $\varnothing 12$ as per DIN 2353 - DS12
- With limit switch to register the blow-down process
- Other drain connections on request



- (1) Valve housing
- (2) Sealing ring
- (3) Seat
- (4) Valve spindle with cone
- (5) Scraper rings
- (6) Gland packing
- (7) Stuffing box
- (8) Screw cap
- (9) Sealing ring
- (10) Upper part of valve

- (11) Handwheel
- (12) Plate OPEN-CLOSED
- (13) Cap nut
- (14) Drain connection
- (15) Screw
- (16) Switch housing cover
- (17) Limit switch
- (18) Fixing screw
- (19) Counter nut
- (20) Adjusting screw

11.2 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 \varnothing 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
- Limit switch (15) is already adjusted (factory-made).
- Carry out electrical connection of limit switch.
Connection cable BIHF 3 x 0,75 or 4 x 0,75.

11.3 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 packing can lose its denseness due to a longer storage (see chapter 11.4)
- Close valve.

11.4 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.
- Change 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.

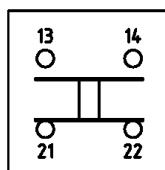
Replacement of limit switch (17)



Switch off mains voltage for limit switch (17)!

- Unfix screws (15) and remove switch housing cover (16).
- Disconnect electrical connection from limit switch. Unfasten fixing terminals and unscrew sealing ring of cable gland.
- Unfix counter nut (19) and turn back adjusting screw (20).
- Unfasten fixing screws (18).
- Replace limit switch and fasten again.
- Carry out electrical connection and close housing again.
- Close drain valve.
- Quick action contact of limit switch must react after approx. 2 turns of the handwheel (open valve). Contact position (13, 14-breaker) changes to (21,22-maker) (see fig. "contact position").
Readjustment with adjusting screw (20).
- Tighten counter nut (19) and fixing screws (18) after adjustment.
- Close drain valve!

Contact position (open):



13. Spare parts

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

13.1 Float switch

Pos. no.	Article no.			Designation
	PN 160	PN 250	PN 320	
3	40-01579	40-00922		Float
16	40-00738	40-02326	40-01408	Hexagon nut
17	40-04012	40-02325	40-00450	Thread bolt
10	40-00200	40-00199	40-00198	Sealing ring
14		40-00316		Screw plug G 1/4
15		40-00114		Sealing ring
-		25-00487		Mercury
2		15-01122		Magnetic switch
8		40-00304		O-ring
		25-00292		Drain screw
20		40-00309		O-ring
23		40-00301		O-ring
24		40-00300		O-ring
25		15-01120		Float device

(look at chapter 5)

13.2 Drain valve

Pos. no.	Designation	Article no.	
		AV 520	AV 580
2	Sealing ring (threaded pipe G1/2)	40-00099	
9	Sealing ring	40-02008	
5	Scraper rings		
6	Gland packing		
3	Seat	40-01864	40-01864
9	Sealing ring		
4	Spindle with rolled cone	40-02034	40-02006
9	Sealing ring		
10	Upper part of valve		
5	Scraper rings		
6	Gland packing		
7	Stuffing box		
8	Screw cap		
11	Handwheel	40-02037	40-02037
12	OPEN/CLOSE plate		
13	Cap nut		

(look at chapter 11)

14. Decommissioning



Severe burns and scaldings on the whole body are possible!

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

14.1 Disposal

Dismount unit and separate waste products.

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

15. 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 installed in the float 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.

CE-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 „float switches“
with the function LWL limiters / 2-point-controllers
as pressure holding parts

type of product:

RBA 24/25/28/34/35/38
BA 14/18
RBJ 54/58/64/68
BJ 44/48
NA7-45 D

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

Category IV, module B+D

Applicable standards:
TRD, AD2000, ASME-Boilers

Notified body for the modules:

TÜV Rheinland Industrieservice GmbH
Am Grauen Stein
51105 Köln
Germany

Aachen, 07.11.2006



E.H. Kilchert
(Managing director)



A. Scholl
(QM representative)



P. Barth
(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: 10/09
