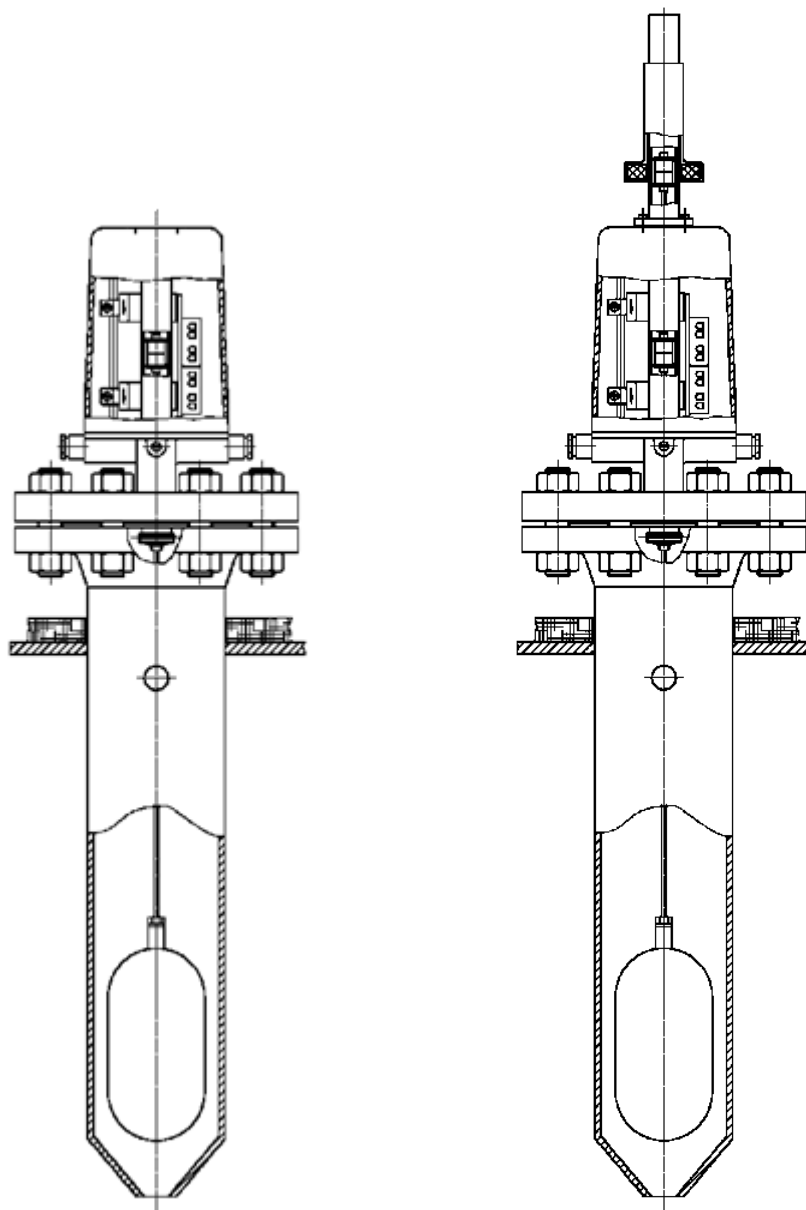




# Water level controller and limiter

RJ22 / RBJ54 / RBJ64



Edition 09/2020

D-07-B-51524-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.

We take care of the modernisation of steam boilers equipped with sophisticated mechanical technology as well as new plants operated with innovative and future-oriented electronic solutions.

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.



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# 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.

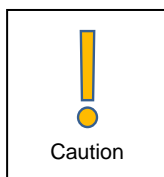
## 1.1 Symbols used in these instructions

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



Use these installation and operating instructions, the identification on the rating plate (see 2.3) 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 is specially designed for use with steam, condensate and/or water and may only be used to indicate the fill levels of containers. Although it can be used with other media, in this case IGEMA GmbH should be contacted beforehand to ensure that the device is suitable and designed for the desired application and medium.

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, 2.3) 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



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.

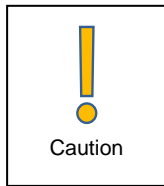
For all maintenance work or new installations, on new or existing boilers or vessels, it is imperative to check that the boiler or vessel has been depressurised and that the pressure has been safely reduced to atmospheric pressure. In principle, no system should be regarded as unpressurized even if indicated 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).



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

The unit is delivered as complete unit.



### 3. Important information

#### 3.1 Intended use

##### Float switch RJ22 und RBJ 54/64:

The float switch type RJ22 and RBA54/64 can be used as two-point water level controller or limiter.

The product corresponding to the EU 2014/68/EU.

Applied standards for RJ22 as per DIN EN 13445.

RBJ54/64 as per applied standards EN 12952 / EN 12953. Considered regulations AD2000 and ASME.

<i>Type</i>	<i>EG-component test</i>
RBJ 54/64	20140804-32636-1890765210-100-421411-EP-RBJ54-64

### 4. Explanations

#### 4.1 System description

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

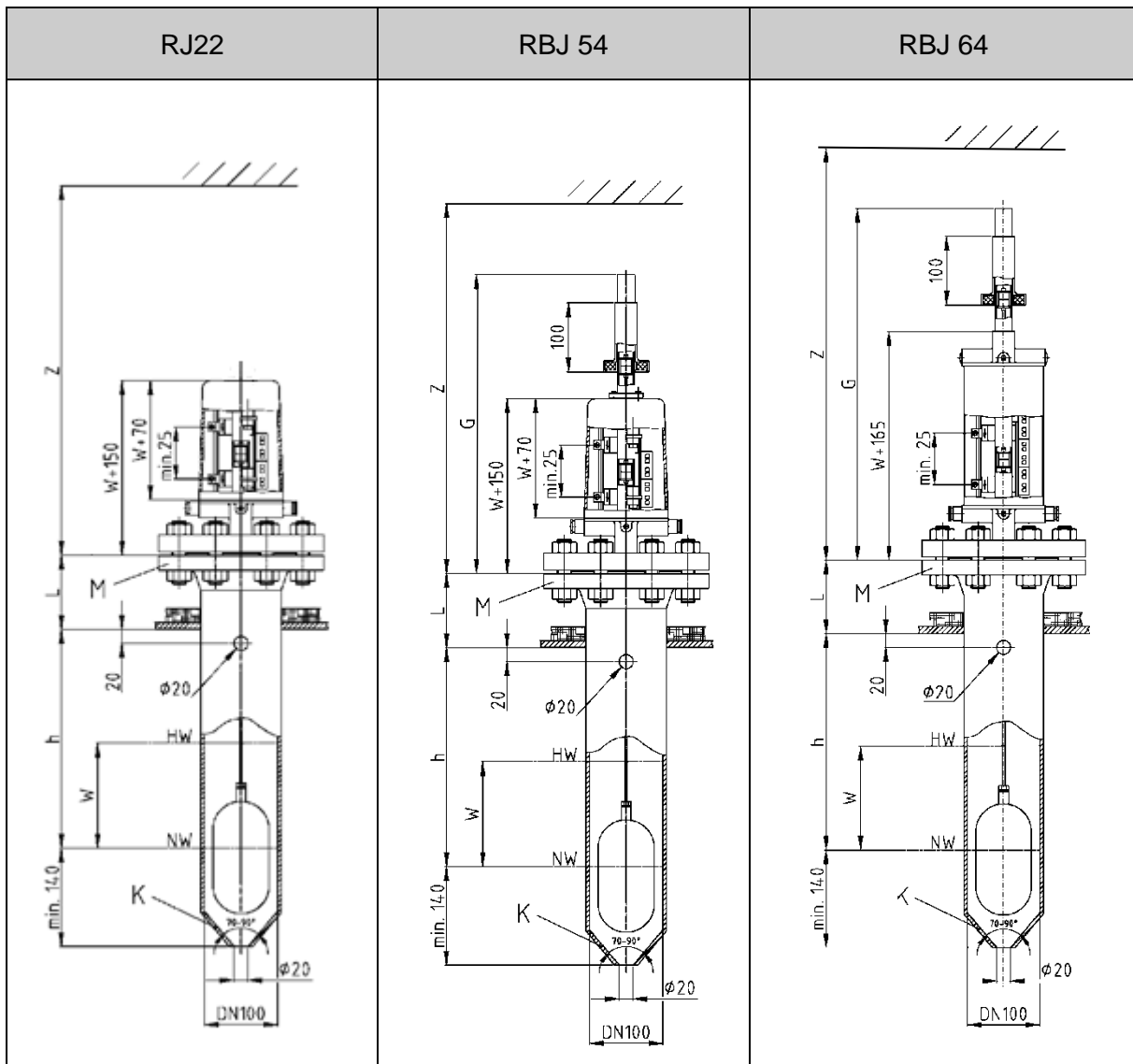
#### 4.2 Function

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.

## 5. Technical data

### 5.1 Versions



#### Switch ranges:

Range of adjustment	W [mm]	
RL22	100	150
RBJ 54	100	150
RBJ 64		250

#### Dimensions A, Z:

Type	Dim. Z [mm]	Dim. G [mm]
RJ22	W + 750	
RBJ54, W=100	L + h + 410	440
RBJ54, W=150	L + h + 460	550
RBJ64	L + h + 575	780

(L + h max. 800)

## 5.2 Type of connection

Flanges DN100 according to DIN

## 5.3 Materials

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

## 5.4 Application limits




	RJ22, RBJ54, RBJ64	RJ22, RBJ54, RBJ64	RBJ54, RBJ64	RBJ54, RBJ64
Nominal pressure	16	40	63	100
Max. allowable pressure <b>PS</b> [bar]	13	32	50	80
Max. allowable temperature <b>TS</b> [°C]	195	239	265	296

## 5.5 Corrosion resistance

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

## 5.6 Identification plate / Marking

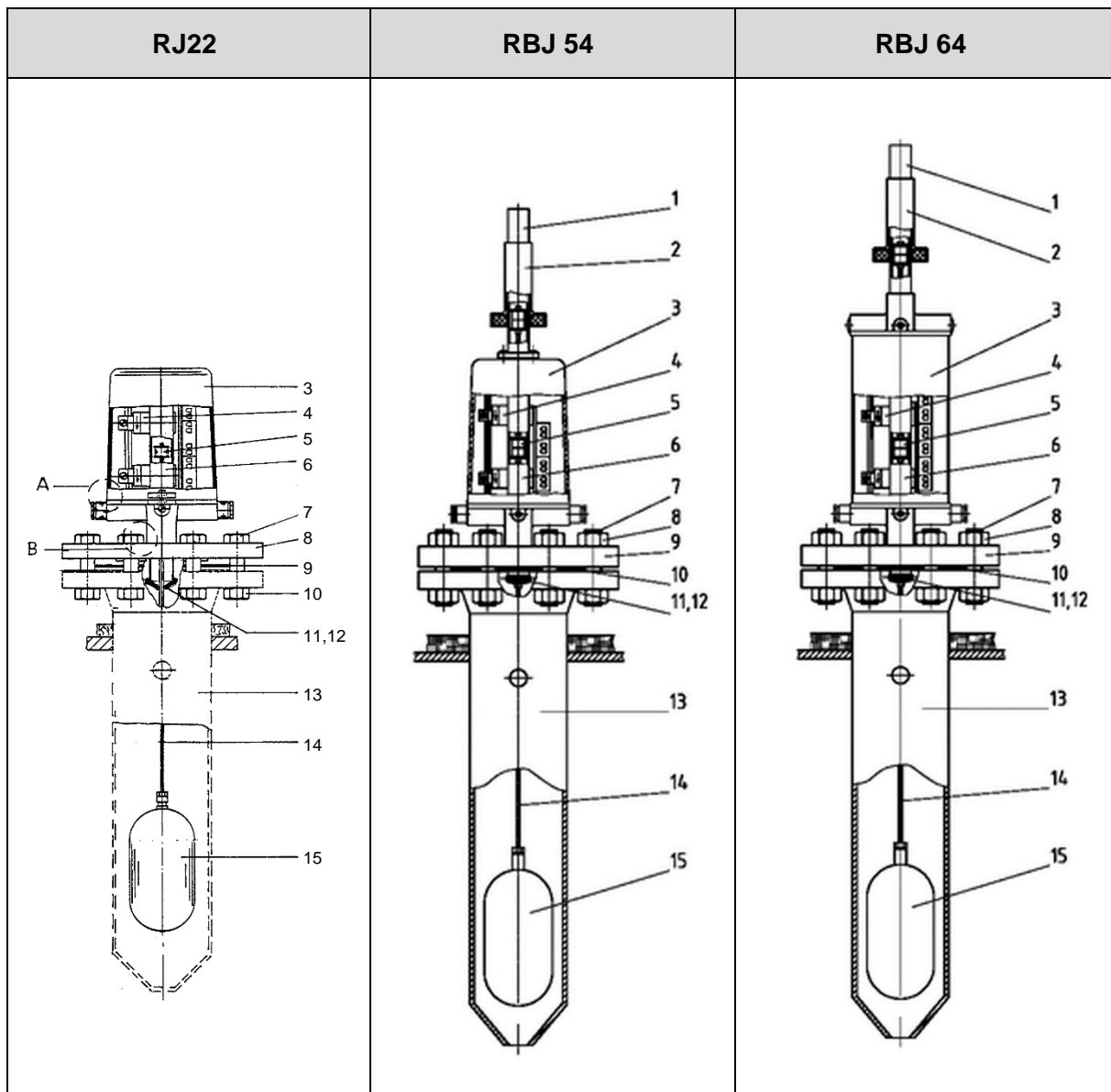
On the identification plate are marked:

 <p>IGEMA GmbH Mess-und Regelsysteme Antwerpenerstraße 1 Germany - 48163 Münster</p>  <p>See installation instructions</p> 	Built	<b>A</b>	Type	<b>B</b>	
	PS	<b>C</b>	bar	TS <b>D</b> °C	
	Conn. Type	PN <b>E</b>	DN <b>F</b>		

\* Marking depending on the version

- A Date of manufacture + Order number
- B Type of unit
- C Max. allowable pressure
- D Max. allowable temperature
- E Nominal pressure (without specification)
- F Nominal diameter

## 6. Construction



### Caption

- |                                |                           |
|--------------------------------|---------------------------|
| (1) Transmitter tube extension | (11) Transmitter tube cap |
| (2) Testing magnet             | (12) Spring clamp         |
| (3) Switch housing             | (13) Boiler nozzle        |
| (4) Magnetic switch            | (14) Float rod            |
| (5) Transmitter magnet         | (15) Float                |
| (6) Transmitter tube           |                           |
| (7) Stud                       |                           |
| (8) Nut                        |                           |
| (9) Flange                     |                           |
| (10) Gasket                    |                           |

## 7. Assembly



**For assembling, the plant must be pressureless!**



**Float rod (14) may not be deformed, otherwise danger of malfunction!**

- Check correspondence of mating dimensions between flange (9) and vertically welded boiler nozzle (13).
- Ensure that sealing surfaces are clean and undamaged.
- Use sealing material as per EN1514 and screws as per DIN2510 or DIN974 (material 1.7709).
- Carefully remove packing of enclosed float rod (14).
- Insert float rod (14) into transmitter tube (6) and fix by means of transmitter tube cap (11) and spring clamp (12) on transmitter tube.
- Insert device from top into boiler nozzle (13) and screw them together free of tension.
- Tighten up bolts in several Steps using successively opposite diagonal tightening until the tightening torque **MD<sub>max</sub>** indicated in the table of chapter 11.3 is reached.

## 8. Electrical connection

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

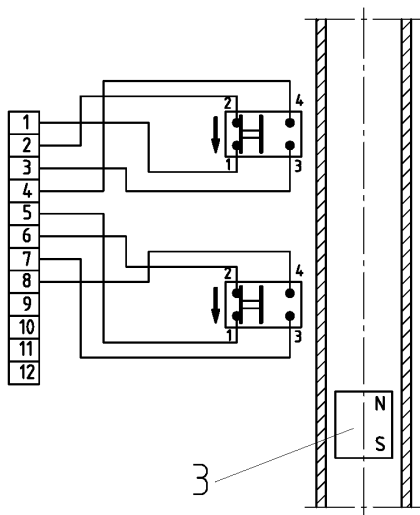


Respect the instructions of the VDE (Association for Electrical, Electronic & Information Technologies) and of the local network operators for the installation to be provided by the customer!

Only use cables that are suitable for the operating range!

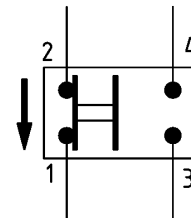
Observe the switching time of the magnetic switch when designing a safety circuit. Adhere to basic and reliable safety principles as per DIN EN ISO 13849 for electrical components.

### 8.1 Wiring diagram

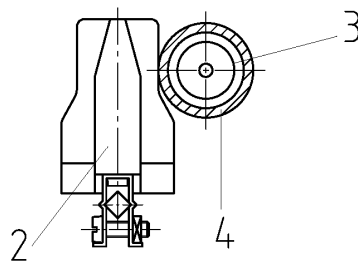


Connection wires:

brown yellow



white green



Identification arrow

We recommend to use customary RC combinations or a suitable varistor (e.g.  $0,1 \mu\text{F}/100\Omega$ ) as inductive consumer to extend the contact life of the magnetic switch. Resistance value ( $\Omega$ ) 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“.

## 8.2 Connection magnetic switch

- Open switch housing (3) and remove foam cushions between transmitter tube (4) and magnetic switch(es) (2).
- The magnetic switches are already rigidly mounted inside of the switch housing and electrically connected to the terminals (see Fig.2). The magnetic switch can be connected optionally as breaker, maker or change-over contact. The 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.

## 8.3 Technical data magnetic switch

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

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

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

## 9. Commissioning



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

- After having reached the operating condition, refill boiler to adjust magnetic switches (4) on corresponding switch height. (see sketch chapter 5)
- The magnetic switch (4) must be correspondingly affixed onto transmitter tube (6).
- Close switch housing (3).

## 10. Operation monitoring

### 10.1 Function test



**A function test is prescribed for float switches. Test extend and delays must be specified between operator, boiler manufacturer and local expert.**

The functional test is made by lowering the float device (14,15) below LWL / HWL and by actuating the magnetic switch (4). The prescribed functional test is finished.

- Slowly push down testing magnet (2) over transmitter tube extension (1) protruding of switch housing (3).
- Thus float device (14,15) sinks below LWL / HWL and magnetic switch is actuated (without draining the boiler water). The prescribed functional test is finished.



**Remove testing magnet (2) after functional test. Otherwise the instrument continuously announces a water shortage.**



## 11. Maintenance



Check state of the unit during boiler revision, especially float device (Fig.1, pos. 14,15).

Special care must be taken here in order to avoid deforming of the float rod.

### 11.1 Exchange of float device



For disassembling, the plant must be pressureless!

Wait until the unit has cooled!

- Unfix screw connection (7, 8) (see sketch at chapter 6)
- Lift upper part upwards until float (15) is visible.
- Release transmitter tube cap (11) via spring clamp (12) and remove float device (14) with float (15) out of transmitter tube (6)
- Corroded or deformed parts must be replaced.

### 11.2 Assembly

- Place transmitter tube cap (11) on transmitter tube (6) and secure with spring clamp (12).
- Check sealing surfaces of flange connection (9) and tighten screw connection (7, 8) by using a new flange gasket (10).
- Tighten up bolts in several steps using successively opposite diagonal tightening until the tightening torque  $M_d \max$  indicated in the table of chapter 11.3 is reached.
- Commissioning see chapter 9

### 11.3 Tightening torques

	Nominal pressure <b>PN<sup>1)</sup></b>	Allowable pressure <b>PS</b> [bar]	Tightening torques $M_d \rightarrow M_{d \max}$ [Nm]					
			in steps					
			1	2	3	4	5	6
Flange DIN	40	32	40	65	90	115	<b>145</b>	-
	63	50	40	65	90	120	150	<b>185</b>
	100	80	80	110	140	170	195	<b>210</b>
Flange 140 square	63	50	40	60	80	105	<b>130</b>	-

1) see identification plate

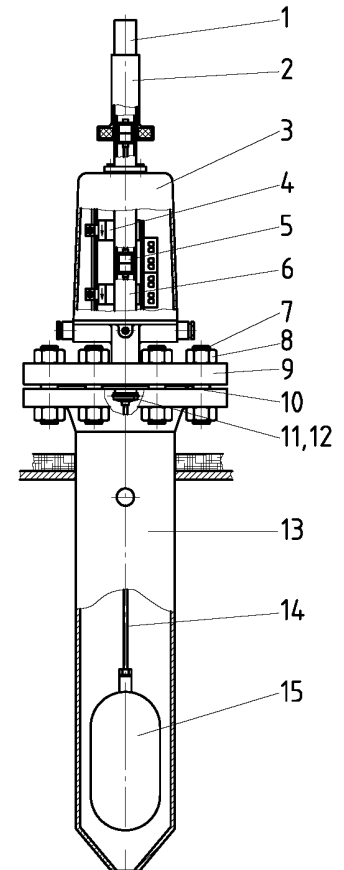
## 12. Spare parts

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

### 12.1 Float switch

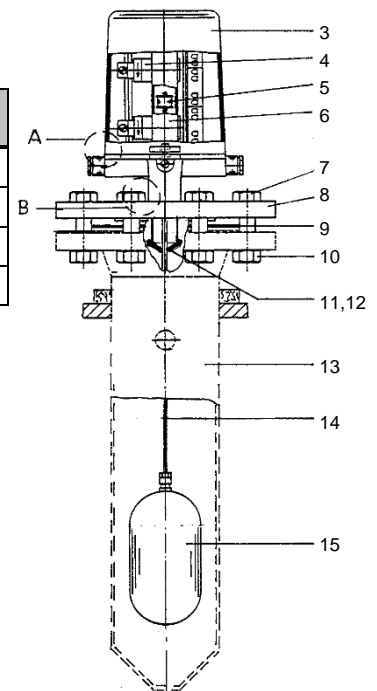
#### RBJ545 / RBJ64

Pos.-no.	Designation	PN	Article- no.	Quantity
4	Magnetic switch	40-100	15-01122	At order
14	Float rod		15-01128	1
15	Float		40-00918	1
7	Stud	16	40-00377	8
10	Gasket		40-00192	1
8	Nut	40	40-00723	16
7	Stud		40-01501	8
10	Gasket		40-00193	1
8	Nut	63	40-01500	16
7	Stud		40-00409	8
10	Gasket		40-01309	1
8	Nut	100	40-00734	16
7	Thread bolt		40-00414	8
10	Sealing ring		40-00200	1
8	Nut		40-00737	16



#### RJ22

Pos.-no.	Designation	PN	Article- no.	Quantity
4	Magnetic switch	40	15-01122	At order
14	Float rod		15-000002	1
15	Float		40-00915	1
9	Gasket		40-00187	1



## 13. Decommissioning



### **Severe burns and scalding's on the whole body are possible!**

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

## 13.1 Disposal

Dismount unit and separate waste products.

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

## 14. Warranty

We accord a warranty period of 24 months 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 reflex glasses and sealings installed in the reflex level gauge are wear parts and are **not** included in the warranty.

The sealings / gland packing installed in the valves are **not** included in the warranty.



This high-quality IGEMA product was designed, manufactured and tested with the application of the QM System guidelines in accordance with DIN EN ISO 9001:2000.

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.

## 15. Declaration of conformity



### EU-Konformitätserklärung EU-Declaration of Conformity

#### Konformitätserklärung gemäß EU-Richtlinie 2014/68/EU

Die Firma:  
IGEMA GmbH  
Antwerpener Str. 1  
48163 Münster, Deutschland

erklärt, dass die  
Schwimmerschalter

RBA 24/25/26 34/35/36  
BA14  
RBJ 54/64

mit der Funktion NW-Begrenzer / 2-  
Punkt-Regler als Ausrüstungsteil mit  
Sicherheitsfunktion bzw. druckhaltende  
Ausrüstungsteile,

mit der Richtlinie übereinstimmen und  
folgendem Konformitätsbewertungs-  
verfahren unterzogen wurden :

Kategorie IV, Module B + D

Angewandte Normen:

EN 12952-11 :2007  
EN 12953-9 :2007

Notifizierte Stelle für die Module:

Modul D  
TÜV Rheinland Industrieservice GmbH  
Am Grauen Stein, 51105 Köln  
Kenn-Nr. 0035

Modul B  
DEKRA Automobil GmbH  
Handwerkstraße 15, 70585  
Stuttgart  
Kenn-Nr. 2266

Münster, 18.03.2020

  
E.H. Kilchert  
(Geschäftsführer)  
(Managing Director)

#### Declaration of Conformity as per EU-Directive 2014/68/EU

The company:  
IGEMA GmbH  
Antwerpener Str. 1  
48163 Münster, Germany

declares that the  
Float Switches

RBA 24/25/26 34/35/36  
BA14  
RBJ 54/64

with the function as LW-Limiter / 2-  
point-controller as safety or pressure  
accessories

comply with the directive and that the  
following conformity assessment was  
used:

category IV, Module B + D


Applied standards:

EN 12952-11 :2007  
EN 12953-9 :2007

Notified body for the modules:

Module D  
TÜV Rheinland Industrieservice GmbH  
Am Grauen Stein, 51105 Köln  
Identification no. 0035

Module B  
DEKRA Automobil GmbH  
Handwerkstraße 15, 70585  
Stuttgart  
Identification no. 2266

  
C. Möllers  
(Leitung Konstruktion)  
(Head of construction)

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**BOILER MONITORING HEAT & STEAM TECHNOLOGY**









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