



Blow down valve

Type: KAV 1+2 R1-N

KAV1 R1-N with Slide Hand Lever

KAV2 R1-N with diaphragm actuator



Edition 07/2020

D-01-B-51004-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.



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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:

 <p>Danger</p>	This symbol and signal word refer to a potentially hazardous situation which could result in death or injuries if ignored.
 <p>Caution electrical voltage</p>	This symbol and signal word indicate live parts with an immediate danger of death from electric shock.

 <p>Caution hot</p>	<p>This symbol with a signal word indicates a potentially hazardous situation that can result in severe burns and scalds all over the body.</p>
 <p>Caution</p>	<p>This symbol and signal word refer to a potentially hazardous situation which could result in personal injury, property and environmental damage if ignored.</p>
 <p>Caution</p>	<p>This symbol and signal word refer to a potentially hazardous situation which could result in damage to the equipment if ignored.</p>
 <p>Info</p>	<p>This symbol indicates useful information and recommendations as well as measures that will prolong the value of your measuring and control system.</p>

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. 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. Contents of packing

1. KAV1/2 R1-N
 - blow-down valve
 - hand lever
- 2 mounting and operating instructions

3. Important information

3.1 Intended use

KAV1 R1-N, KAV2 R1-N:

Only use the blow-down valves to drain muddy boiler water with non-metallic solids from steam generators within the admissible pressure and temperature limits.

Only use compressed air (room temperature) or press water (room temperature) as control medium for the IGEMA diaphragm actuator according to the fixed application limits.

3.2 Classification according to article 9 directive 2014/68/EU

Type	KAV1 R1-N				KAV2 R1-N			
	Gas, steam		Liquid		Gas, steam		Liquid	
Fluid group	1	2	1	2	1	2	1	2
Use	no	yes	no	yes	no	yes	no	yes

	PN	Nominal diameter DN	
		Exception as per art. 3.3	Category II, Module D1
Type KAV1	40	20,25,32	40,50
	63	25	40,50
Type KAV2	40	20,25,32	40,50
	63	25	40,50
<i>CE-marking</i>		<i>no</i>	<i>CE 0035</i>

4. Explanations

4.1 System description

Blow-down valve for manual or automatic programme-controlled blowing down of land and ship steam generators especially for operation without permanent supervision as per TRD 604. The mud that deposits on the boiler end due to a precipitation from the boiler water during operation of steam generators is removed by the valves with short opening intervals.

- *KAV1 R1-N* are dimensioned for manual operation (diaphragm actuator retrofittable)
- *KAV2 R1-N* have a diaphragm actuator for compressed air and press water

4.2 Function

The blow-down valve type ***KAV1 R1-N*** is opened by means of a hand lever. The valve cone prestressed with elastic force is pressed out of the valve seat. A big opening is released and precipitated mud can escape through it outwards or into a mixing cooler. The valve must be fully opened by the hand lever for a short time (about 2 seconds) to reach the optimum blowing-down effect.

The blow-down valve type ***KAV2 R1-N*** is opened by means of a diaphragm actuator. The valve cone prestressed with elastic force is pressed out of the valve seat by the guide bolt of the diaphragm actuator. A big opening is released and precipitated mud can escape though it outwards or into a mixing cooler. Use compressed air (room temperature) or press water (room temperature) as control medium for the IGEMA diaphragm actuator according to the fixed application limits (see diagram page 11).

The blowing-down impulse duration, i.e. the time where the valve is opened, should be about 2 seconds. The interval time, i.e. the time where the valve is closed, must be fixed depending on size and capacity of the steam generator. We recommend draining about 10 per cent of the total boiler water quantity to be discharged with the blow-down valve.

The duration of the blowing-down impulses and intervals must be fixed individually by the operator depending on boiler water quality, size of steam generator and plant utilization.

5. Technical data

5.1 Type of connection

Standard : Flanges as per DIN EN 1092-1

On request : Flanges as per ASME Class 150, 300, 400 and DIN EN 1759-1
Welding ends as per DIN or ASME

5.2 Pressure stages

PN 40, 63
Class 150, 300, 400

5.3 Materials

Denomination	<i>DIN EN</i>	<i>DIN</i>	<i>ASTM</i>
Case	P250GH (1.0460)	C22.8 (1.0460)	A105
Stuffing box	CuZn40Pb2	CuZn40Pb2	-
Thrust ring	X5CrNi18-10 (1.4301)	X5CrNi18-10 (1.4301)	-
Guide ring	CuZn40Pb2	CuZn40Pb2	-
Seat	X2CrNiMoN22-5-3 (1.4462)	X2CrNiMoN22-5-3 (1.4462)	-
Valve spindle (hardened cone)	X20Cr13 (1.4021)	X20Cr13 (1.4021)	-
Pressure spring	67SiCr5 (1.7103)	67SiCr5 (1.7103)	-
Diaphragm actuator	GK-AISI12		-
Packing	Graphite (with Barium-Molybdat-Inhibitor)		
Control diaphragm	EPDM		

5.4 Application limits

Nominal pressure	40	63
Max. all. pressure PS	32bar	50bar
Max. all. temperature TS	239°C	265°C

5.5 Corrosion resistance

If used as intended, the safety of the valve is unaffected by corrosion

5.6 Construction

The case is not construed for swelling load. Dimensioning and corrosion allowance are construed in accordance with the state of the art.

5.7 Identification plate / Marking

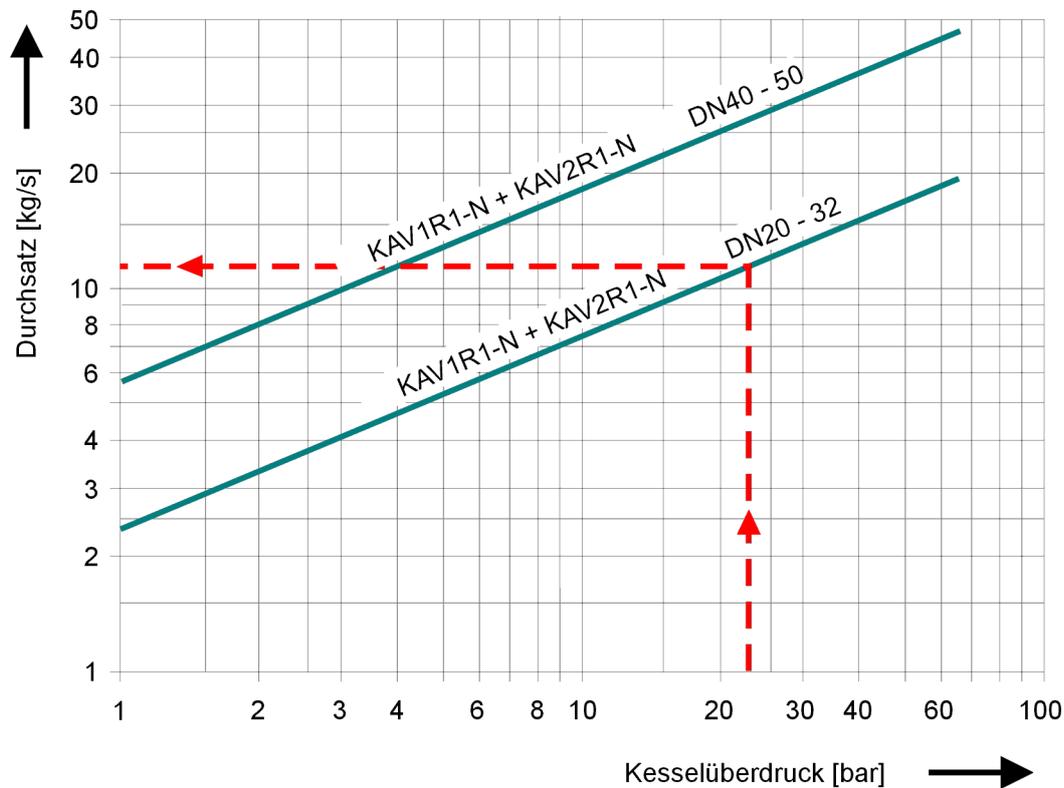
The following data are indicated on the identification plate according to EN 19:

 <p>IGEMA GmbH Mess-und Regelsysteme Antwepenerstraße 1 Germany - 48163 Münster</p>   0035 * See installation instructions	Built	A	Type	B	
	PS	C	bar	TS D °C	
	Conn. Type	PN E	DN F		

* marking depending on the realization

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

5.8 Flow diagram



Reading example: boiler pressure: 25 bar, nominal diameter of valve: DN 32
Result: capacity about 12 kg/s

Calculation of boiler water quantity to be drained:

Formula 1.0:
$$A = \frac{Q \cdot S}{K - S}$$

Conductivity of feed water:	S [μS/cm]
All. conductivity of boiler water:	K [μS/cm]
Boiler capacity:	Q [kg/h]
Boiler water quantity to be drained:	A [kg/h]

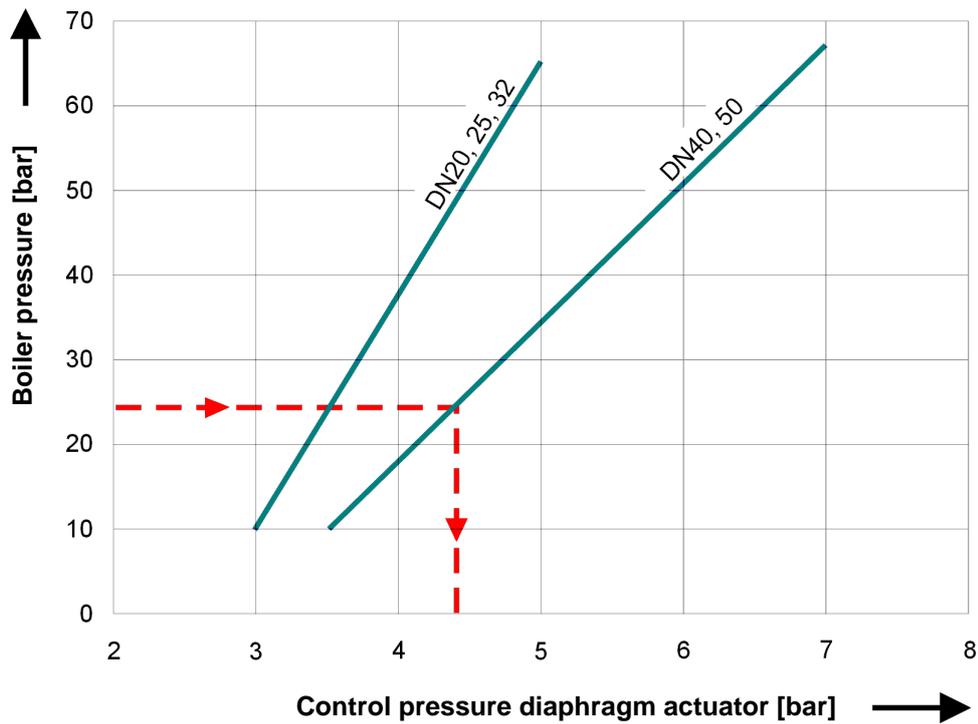
Calculation example:

S = 20 μS/cm
 K = 4.000 μS/cm
 Q = 9.500 kg/h

Result as per formula 1.0:

Boiler water quantity to be drained: about 48 kg/h

5.9 Control pressure diagram of diaphragm actuator



Reading example: Boiler pressure: 25 bar
Nominal diameter of valve: DN 40

Result: control pressure 4,3 bar

The determined control pressure may be exceeded by max. 10%.

Note:

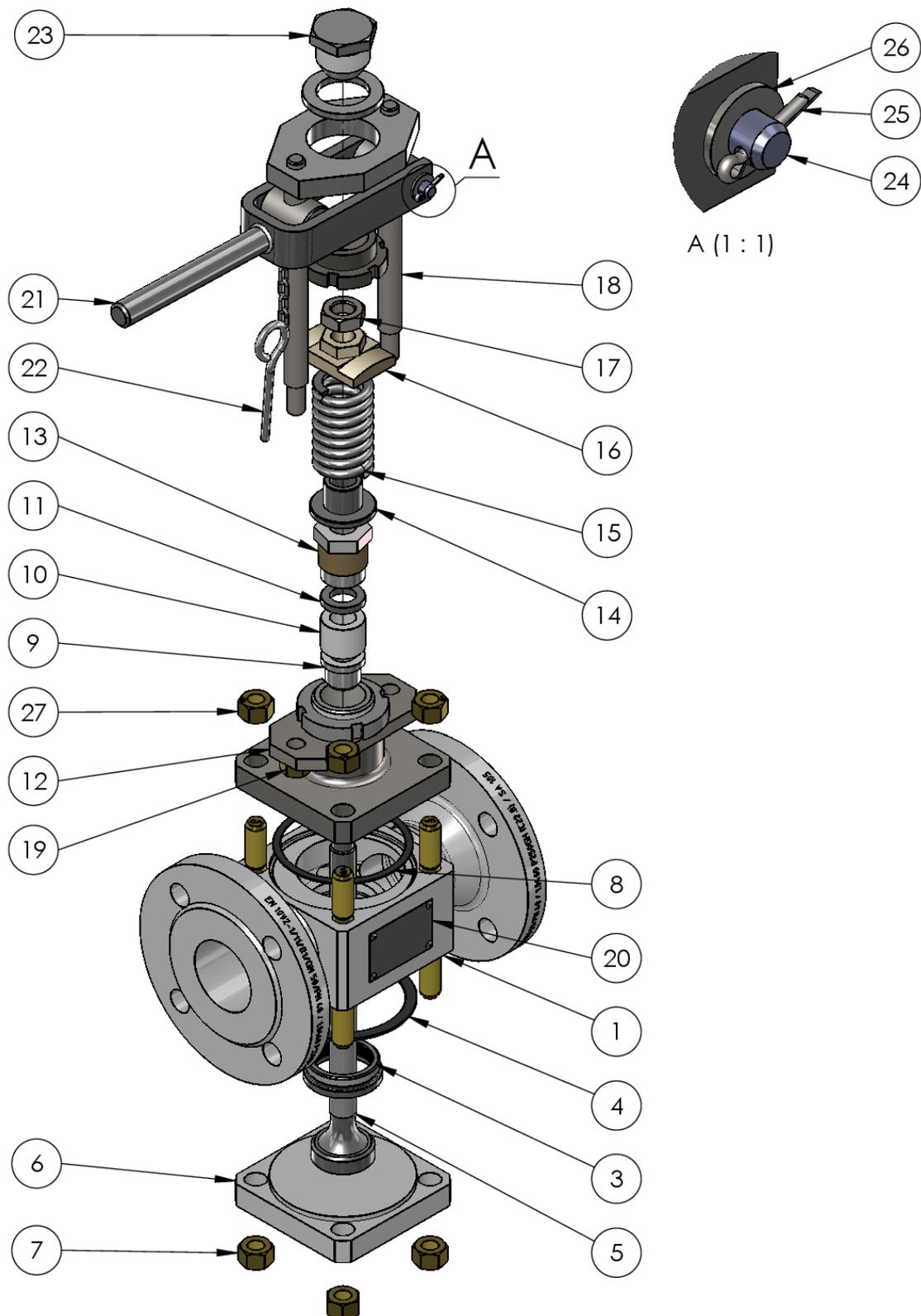
The filling volume of the diaphragm actuator amounts to 0,55 l per blowing-down process.



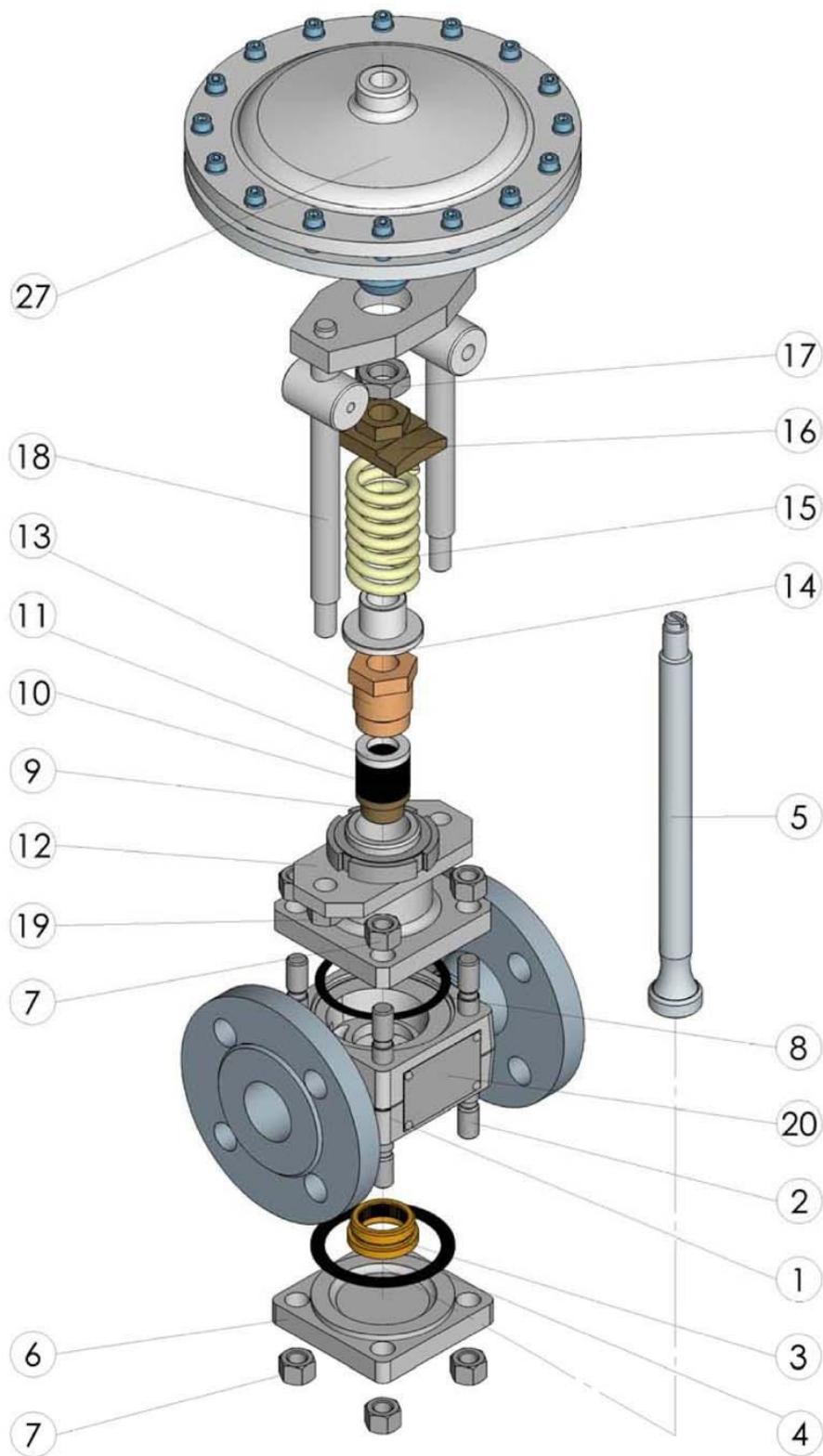
The diaphragm actuator may only be operated with a control pressure of max. 7 bar to exclude a destruction of the actuator or the diaphragm.

6. Construction

6.1 KAV1 R1-N



6.2 KAV2 R1-N



6.3 Legend

- (1) Valve housing
- (2) Stud
- (3) Valve seat
- (4) Lower sealing ring
- (5) Valve spindle
- (6) Valve cover
- (7) Hex nut
- (8) Upper sealing ring
- (9) Guide socket
- (10) Packing ring
- (11) Thrust ring
- (12) Upper part of valve
- (13) Stuffing box
- (14) Spring cage
- (15) Pressure spring
- (16) Clamping nut
- (17) Plain nut
- (18) Lantern
- (19) Hex nut
- (20) Identification plate
- (21) Hand lever
- (22) Safety pin
- (23) Screw plug
- (24) Bolt
- (25) Splint
- (26) Disk
- (27) Diaphragm actuator

For positions of the individual parts, see drawing in chapter 11.9

- (27.1) Screw-in piece
- (27.2) Lower part of diaphragm case
- (27.3) Stem
- (27.4) Diaphragm disk
- (27.5) Rubber diaphragm
- (27.6) Upper part of diaphragm case
- (27.7) Hexagon socket screw
- (27.8) Disk

7. Assembly



Severe injuries, death and destruction through explosion of ignitable mixtures are possible!
Static electricity can build up in case of electrically insulated installation between pipe flanges!
Take measures (grounding) to conduct static electricity if the valves are used in explosion-hazardous areas!

7.1 KAV1/2 R1-N

The blow-down valve can be installed in a horizontal or vertical piping. Hand lever of KAV1 R1-N and hand lever for emergency actuation of KAV2 R1-N must be movable.



We recommend assembling a sloping piping behind the blow-down valve to avoid water hammers or to drain the piping before the blow-down process!
The drain piping must correspond at least to the nominal diameter of the KAV and must be protected from pressure peaks.
Ensure that drain piping has free outlet to atmosphere.
The piping between steam generator and blow-down valve may not exceed 2 meters.

7.2 Version with flange

- Respect installation position!
- Hand lever (21) must stay movable!
- Observe flow direction (see arrow on valve housing).
- Respect service measure. If blow-down valve is firmly mounted a free size of at least 150 mm is required for disassembly or subsequent mounting of actuator!
- Remove plastic sealing plugs on flanges. They only serve as transport protection for the flanges.
- Clean sealing surfaces on both flanges.
- Install blow-down valve.

7.3 Version with welding end

- Respect installation position!
- Hand lever (21) must stay movable!
- Observe flow direction (see arrow on valve housing).
- Respect service measure. If blow-down valve is firmly mounted a free size of at least 150 mm is required for disassembly or subsequent mounting of actuator!
- Remove plastic sealing plugs on welding end. They only serve as transport protection for the welding ends.
- Assembly only with:
 - a. Manual arc welding (welding process 11 and 141 according to ISO 4063)
 - b. Gas welding (welding process 3 according to ISO 4063)



Only welders with a test certificate according to EN 287-1 may carry out the welding of blow-down valves into pressure-holding piping's.

7.4 Heat treatment of welding seams

A subsequent heat treatment of the welding seams is not necessary.

7.5 Assembly of hand lever

- Slide hand lever (21) over lantern (18), fix with bolts (24) and secure with disk (26) and splint (25).

8. Commissioning

8.1 KAV1/2 R1-N

The flange connections on the KAV must be firmly screwed and tight.

Fully actuate the blow-down valve once after starting up the steam generator or pressure vessel. The valve must automatically close tightly!

The stuffing box must be tight! Check if medium escapes at stuffing box.

In new and unflushed plants, we recommend shortening the intervals between the blow-down processes a little in the beginning.

9. Operation

9.1 Blowing down duration and interval

Lye solution is drained for a short time when opening an IGEMA blow-down valve. With the first suction the mud is removed from the steam generator. The blowing down duration (aperture time of KAV) is about 2 seconds. The exact time between the single blow-down intervals depends on the operating data of the plant.

1. With the formula of chapter 5.8 is calculated how much boiler water in *kg/h* must be drained to avoid that the allowable value of the boiler water conductivity is exceeded, e.g. **48 kg/h**
 2. The capacity in *kg/s* is determined by means of the flow diagram (chapter 5.8) for the existing valve or the valve selected according to the nominal diameter of the boiler nozzle, e.g. **12 kg/s**
 3. With the partial results of 1st and 2nd a blowing down duration of **4 seconds** every hour is calculated.
- ⇒ With an aperture time of only 2 seconds/process i.e. **2 processes/hour**. So, the blowing down interval (pause time) is **30 minutes**.

The control of the KAV2 R1-N is made by the program-controlled magnetic valve type PGM1 and PGM2 (see operating instructions for PGM1 and PGM2).

10. Emergency operation KAV2 R1-N



Severe injuries on the whole body are possible!

The piping for the control medium of the diaphragm actuator must be pressure less (0 bar) and shut off during emergency operation of the KAV2 R1-N! Shortly insert hand lever only for emergency operation of the valve and take off directly after actuation.

10.1 Utilization of hand lever for emergency actuation

1. Insert hand lever (21) and secure with bolt (24), disk (26) and splint (25).
2. Take off hand lever (21) directly after actuation.

11. Maintenance

IGEMA blow-down valves are basically maintenance-free!

Fully actuate the blow-down valve once after starting up the steam generator or pressure vessel.

The valve must automatically close tightly!

The stuffing box (13) must be tight! Check if medium escapes at stuffing box (13).



Severe burnings and scalding's on the whole body are possible!

All connected lines including the control pressure line (diaphragm actuator KAV2 R1-N) must be pressure less (0 bar) and cooled to room temperature (20°C) before carrying out maintenance works at the valve or before detaching flange connections, stuffing box screwing or screw plugs!

11.1 Re-tightening of stuffing box

1. Re-tighten stuffing box (13) if medium escapes there!
2. Actuate valve once. Valve must automatically close tightly!



Change packing rings (10) if stuffing box cannot be readjusted further! Slightly unfasten stuffing box (13) if the valve does not close automatically due to the elastic force. Change packing rings (10) if medium escapes at stuffing box (13).

11.2 Exchange of stuffing box KAV1 R1-N

1. Pull out splint (25) from bolt (24), remove bolt (24) and take off hand lever (21).
2. Unfasten hex nuts (19) and remove lantern (18) upwards.
3. Unscrew plain nut (17), hold clamping nut (16) with open-end wrench and carefully screw out valve spindle (3) with screwdriver.
4. Remove pressure spring (15) and spring cage (14) and screw off stuffing box (13) with open-end wrench SW 34.
5. Unfix hex nuts (7) and remove valve cover (6).
6. Pull out valve spindle (5) downwards.
7. Unfasten hex nuts (7) and take off upper part of valve (12).
8. Remove inner parts of stuffing box (9, 10, 11).
9. Clean stuffing box (13), guide socket (9), thrust ring (11), valve housing (1), valve seat (3) and valve spindle (5).
10. Grease thread of stuffing box with temperature-resistant lubricant.
11. Insert inner parts of stuffing box in the following order into upper part of valve (12): guide socket (9), 4 x packing ring (10) and thrust ring (11) and slightly screw in stuffing box (13).
12. Insert upper part of valve (12) with new sealing ring (8) into valve housing and tighten with hex nuts (7) with 65 Nm using successively opposite diagonal tightening.
13. Insert valve spindle (3) from below.
14. Slide spring cage (14) and pressure spring (15) on valve spindle (3).
15. Screw clamping nut (16) on valve spindle (3) and hold with open-end wrench. Screw valve spindle (3) with screwdriver in the position that the pressure spring is compressed by about 15 mm. Then lock clamping nut (16) with plain nut (17).
16. Re-tighten stuffing box (13) sturdily.
17. Insert valve cover (6) with new sealing ring (4) into valve housing and tighten with hex nuts (7) with 65 Nm using successively opposite diagonal tightening.
18. Insert lantern (18) into upper part of valve (12) and fix with hex nuts (19).
19. Push in hand lever (21) and secure with bolt (24), disk (26) and splint (25).
20. Actuate valve once (fully open up to the stop).

11.3 Exchange of stuffing box, valve seat and spindle KAV1 R1-N

1. Remove splint (25) from bolt (24). Pull out bolt (24) and take off hand lever (21).
2. Unfasten hex nuts (19) and remove lantern (18) upwards.
3. Screw off plain nut (17), hold clamping nut (16) with open-end wrench and carefully screw out valve spindle (3) with screwdriver.
4. Remove pressure spring (15) and spring cage (14) and screw off stuffing box (13) with open-end wrench SW 34.
5. Unfix hex nuts (7) and remove valve cover (6).
6. Pull out valve spindle (5) downwards.
7. Unfasten hex nuts (7) and remove upper part of valve (12).

8. Remove inner parts of stuffing box (9, 10, 11).
9. Screw out valve seat (3) with seat wrench (optional accessory).
10. Clean guide socket (9), thrust ring (11) and valve housing.
11. Screw in new valve seat (3) with seat wrench and tighten with 135 Nm.
12. Grease thread of stuffing box with temperature-resistant lubricant.
13. Insert inner parts of stuffing box into upper part of valve (12) in the following order: guide socket (9), 4 x packing ring (10) and thrust ring (11) and slightly screw in new stuffing box (13).
14. Insert upper part of valve (12) with new sealing ring (8) into valve housing and tighten with hex nuts (7) with 65 Nm using successively opposite diagonal tightening.
15. Insert new valve spindle (3) from below.
16. Slide spring cage (14) and pressure spring (15) on valve spindle (3).
17. Screw clamping nut (16) on valve spindle (3) and hold with open-end wrench. Screw valve spindle (3) with screwdriver in the position that the pressure spring is compressed by about 15 mm. Then lock clamping nut (16) with plain nut (17).
18. Re-tighten stuffing box (13) sturdily.
19. Insert valve cover (6) with new sealing ring (4) into valve housing and tighten with hex nuts (7) with 65 Nm using successively opposite diagonal tightening.
20. Insert lantern (18) into upper part of valve (12) and fix with hex nuts (19).
21. Push in hand lever (21) and secure with bolt (24), disk (26) and splint (25).
22. Actuate valve once (fully open up to the stop).

11.4 Exchange of stuffing box KAV2 R1-N

1. Detach pressure line for the control of the diaphragm actuator (27) from splice.
2. Unscrew diaphragm actuator (27) (external screw part SW 41) and pull out from the lantern (18) upwards.
3. Unfasten hex nuts (19) and remove lantern (18) upwards.
4. Screw off plain nut (17), hold clamping nut (16) with open-end wrench and carefully screw out valve spindle (3) with screwdriver.
5. Remove pressure spring (15) and spring cage (14) and screw off stuffing box (13) with open-end wrench SW 34.
6. Unfasten hex nuts (7) and remove upper part of valve (6).
7. Pull out valve spindle (5) downwards.
8. Unfasten hex nuts (7) and remove upper part of valve (12).
9. Take out inner parts of stuffing box (9, 10, 11).
10. Clean stuffing box (13), guide socket (9), thrust ring (11), valve housing (1), valve seat (3) and valve spindle (5).
11. Grease thread of stuffing box with heat-resistant lubricant.
12. Insert inner parts of stuffing box into upper part of valve (12) in the following order: guide socket (9), 4 x packing ring (10) and thrust ring (11) and slightly screw in new stuffing box (13).
13. Insert upper part of valve (12) with new sealing ring (8) into valve housing and tighten with hex nuts (7) with 65 Nm using successively opposite diagonal tightening.

14. Insert valve spindle (3) from below.
15. Slide spring cage (14) and pressure spring (15) on valve spindle (3).
16. Screw clamping nut (16) on valve spindle (3) and hold with open-end wrench. Screw valve spindle (3) with screwdriver in the position that the pressure spring is compressed by about 15 mm. Then lock clamping nut (16) with plain nut (17).
17. Re-tighten stuffing box (13) sturdily.
18. Insert valve cover (6) with new sealing ring (4) into valve housing and tighten with hex nuts (7) with 65 Nm using successively opposite diagonal tightening.
19. Insert lantern (18) into upper part of valve (12) and fix with hex nuts (19).
20. Actuate valve once (fully open up to the stop).

11.5 Exchange of stuffing box, valve seat and spindle KAV2 R1-N

1. Detach pressure line for the control of the diaphragm actuator (27) from splice.
2. Unscrew diaphragm actuator (27) (external screw part SW 41) and pull out from the lantern (18) upwards.
3. Unfasten hex nuts (19) and remove lantern (18) upwards.
4. Screw off plain nut (17), hold clamping nut (16) with open-end wrench and carefully screw out valve spindle (3) with screwdriver.
5. Remove pressure spring (15) and spring cage (14) and screw off stuffing box (13) with open-end wrench SW 34.
6. Unfasten hex nuts (7) and remove valve cover (6).
7. Pull out valve spindle (5) downwards.
8. Unfasten hex nuts (7) and remove upper part of valve (12).
9. Take out inner parts of stuffing box (9, 10, 11).
10. Screw out valve seat (3) with seat wrench (optional accessory).
11. Clean guide socket (9), thrust ring (11) and valve housing.
12. Screw in new valve seat (3) with seat wrench and tighten with 135 Nm.
13. Grease thread of stuffing box with temperature-resistant lubricant.
14. Insert inner parts of stuffing box into upper part of valve (12) in the following order: guide socket (9), 4 x packing ring (10) and thrust ring (11) and slightly screw in new stuffing box (13).
15. Insert upper part of valve (12) with new sealing ring (8) into valve housing and tighten with hex nuts (7) with 65 Nm using successively opposite diagonal tightening.
16. Insert new valve spindle (3) from below.
17. Slide spring cage (14) and pressure spring (15) on valve spindle (3).
18. Screw clamping nut (16) on valve spindle (3) and hold with open-end wrench. Screw valve spindle (3) with screwdriver in the position that the pressure spring is compressed by about 15 mm. Then lock clamping nut (16) with plain nut (17).
19. Re-tighten stuffing box (13) sturdily.
20. Insert valve cover (6) with new sealing ring (4) into valve housing and tighten with hex nuts (7) with 65 Nm using successively opposite diagonal tightening.
21. Insert lantern (18) into upper part of valve (12) and fix with hex nuts (19).
22. Actuate valve once (fully open up to the stop).

11.6 Exchange of rubber diaphragm in diaphragm actuator

1. Detach pressure line for the control of the diaphragm actuator (27) from splice.
2. Unfasten hexagon socket screws (27.7) and remove together with disks (27.8).
3. Take off upper part of diaphragm case (27.6) and remove rubber diaphragm (27.5).
4. Clean upper and lower diaphragm case (27.6) (27.2) as well as diaphragm disk (27.4).
5. Insert new rubber diaphragm (27.5).
6. Place upper part of diaphragm case (27.6), screw in hexagon socket screws (27.7) with disks (27.8) and tighten in several steps with 5 Nm using successively opposite diagonal tightening.

Attention! The screw ends terminate with the plan surface of the case.



The hexagon socket screws (27.7) may only be tightened with 5 Nm at most. The rubber diaphragm can be damaged with higher tightening torques!

11.7 Tightening torques

Part	Tightening torque Nm
3	135
7	65
27.7	5

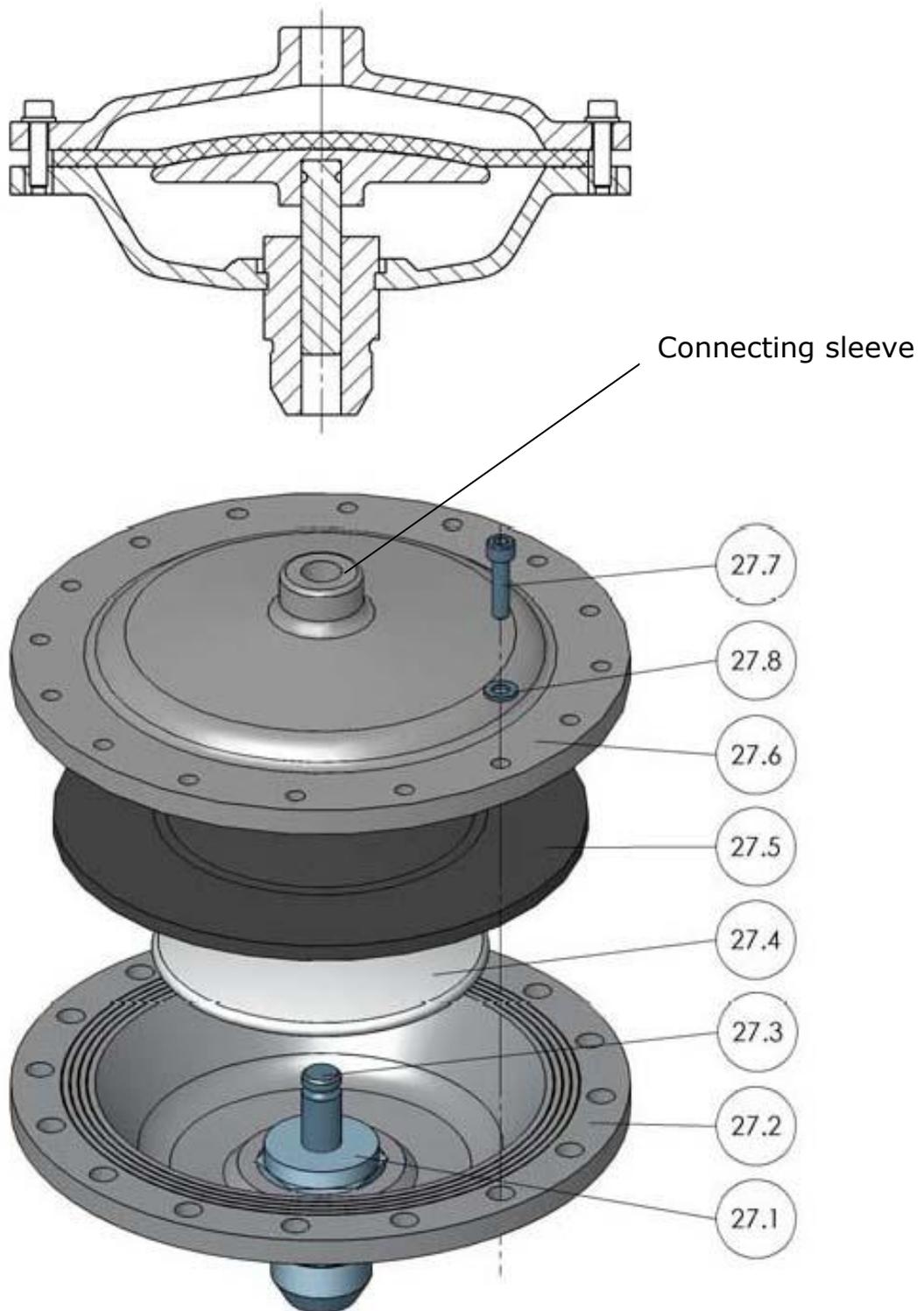
Only for KAV2

All tightening torques refer to ambient temperature 20°C.

11.8 Tools

- Combination wrench AF18
- Combination wrench AF22
- Combination wrench AF27
- Combination wrench AF34
- Socket wrench AF5 (for hexagon socket screws)
- Torque wrench 1-12 Nm
- Torque wrench 20-120 Nm
- Torque wrench 80-400 Nm
- Seat wrench (optional for DN20-32)
- Seat wrench (optional for DN40-50)
- Slot screwdriver (broad blade)

11.9 Disassembly / Assembly rubber diaphragm



12. Retrofitting

The KAV1 R1-N can be equipped subsequently with a diaphragm actuator!



Severe burnings and scalding's on the whole body are possible!
All connected lines must be pressure less (0 bar) and cooled to ambient temperature (20°C) before carrying out conversion works at the valve or before detaching flange connections, stuffing box screws or screw plugs!

Mount hand lever for emergency operation temporarily for the actuation of the valve and then remove directly!

12.1 Assembly of diaphragm actuator

1. Unfasten screw plug (23) and remove.
2. Pull out splint (25) from bolt (24), then pull out bolt (24) and remove hand lever (21).
3. Grease thread of diaphragm actuator with temperature-resistant lubricant and screw on diaphragm actuator (27).
4. Mount pressure line for the control of the diaphragm actuator.

13. Spare parts

13.1 Spare parts list

Part	Designation	Article-no.	
		KAV1 R1-N	KAV2 R1-N
10	Packing set DN20-50	15-04206	15-04206
11	4 x Packing ring		
13	1 x Thrust ring		
	1 x Gland packing DN 20-50		
9	Guide socket	25-04350	25-04350
3	Valve seat DN20-32	25-02728	25-02728
4	Lower sealing ring DN20-32	40-01041	40-01041
8	Upper sealing ring DN20-32	40-01986	40-01986
5	Valve spindle DN20-32	25-04928	25-04928
3	Valve seat DN40-50	25-02708	25-02708
4	Lower sealing ring DN40-50	40-00197	40-00197
8	Upper sealing ring DN40-50	40-01985	40-01985
5	Valve spindle DN40-50	25-04351	25-04351
27.5	Diaphragm DN20-50		40-00139
27	Diaphragm actuator DN20-50		15-00264

14. Retrofitting parts

14.1 Retrofitting parts list

Part	Designation	Article-no.	
		KAV1 R1-N	KAV2 R1-N
27	Diaphragm actuator		15-00264

15. Decommissioning



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

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

15.1 Disposal

Dismount valve and separate waste products according to the different materials indicated in the table on page 8.

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



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.

16. Declaration of conformity



Boiler Monitoring

CE-Konformitätserklärung CE-Declaration of Conformity CE-Déclaration de Conformité

Konformitätserklärung gemäß EG-Richtlinie 2014/68/EU

Wir, die Firma:

IGEMA GmbH
Antwerpener Str. 1
D-48163 Münster

erklären als Hersteller, dass die Produkte
„Abschlammventil KAV“ als druckhaltende
Ausrüstungsteile

Produkttypen:

„KAV1 R1-N“, „KAV2 R1-N“,

mit der Richtlinie 2014/68/EU übereinstimmen
und folgendem Konformitätsbewertungs-
verfahren unterzogen wurden:

Mit einem Druck-Rohrleitungsverhältnis von:

<1000 => Artikel 4 Absatz 3
1000 - 3499 => Kategorie I, Modul A

Angewandte Normen:

DIN EN 12952-7: 2007
DIN EN 12953-6: 2007
ASME Boilers,

weitere technische Regeln: AD2000

Benannte Stelle für die Module:

TÜV Rheinland Industrieservice GmbH
Am Grauen Stein
D-51105 Köln

Kenn- Nr. 0035

Declaration of Conformity in accordance with the PED directive 2014/68/EU

We, the company:

IGEMA GmbH
Antwerpener Str. 1
D-48163 Münster

declare as manufacturer, that the products
“Blow down valve“ as pressureholding parts

Type of product:

„KAV1 R1-N“, „KAV2 R1-N“,

comply with the directive 2014/68/EU and that the
following Conformity Assurance System was used:

with a pressure size ratio off

<1000 => Item 4 paragraph 3
1000 - 3499 => Kategorie I, Modul A

Applicable standards:

DIN EN 12952-7: 2007
DIN EN 12953-6: 2007
ASME Boilers,

further technical rules: AD2000

Notified body for the modules:

TÜV Rheinland Industrieservice GmbH
Am Grauen Stein
D-51105 Köln

Identification no. 0035

Déclaration de Conformité en accord avec la directive 2014/68/EU

La société:

IGEMA GmbH
Antwerpener Str. 1
D-48163 Münster

déclarent comme fabricant, que les
Vanne de purge de chaudière, tant que pièces
résistantes à la pression

Type de produits:

„KAV1 R1-N“, „KAV2 R1-N“,

sont en accord avec la directive 2014/68/EU et
sont soumis la directive d'assurance de
conformité suivante:

Avec un rapport de tuyau de pression de :

<1000 => Article 4 ventes 3
1000 - 3499 => Catégorie I, Modul A

Norme appliquée:

DIN EN 12952-7: 2007
DIN EN 12953-6: 2007
ASME Boilers,

de nouvelles règles techniques: AD2000

Organisme notifié pour les modules:

TÜV Rheinland Industrieservice GmbH
Am Grauen Stein
D-51105 Köln

Identification no. 0035

D-Ko-38781-0

Münster, den 06.09.2017

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

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