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### 1. General Remarks

The following remarks are related to quick-closing valves and quick-opening valves with manual/rope-pull actuation, pneumatic actuation and hydraulic actuation as well as self-closing valves. The main perspective of this operating manual is the shipbuilding industry, whereas the valves are certainly not limited to this application.

Rules and regulations:

The technical design is generally in correspondence with all classification societies' rules and regulations for the construction of ships as well as with the Pressure Equipment Directive (PED) 97/23/EG. There are type approvals and certificates available for specific versions (list is continuously updated):

- American Bureau of Shipping (ABS)
- Bureau Veritas (BV)
- Det Norske Veritas (DNV)
- Germanischer Lloyd (GL)
- Lloyd's Register of Shipping (LRS EMEA)
- Russian Register of Shipping (RMRS)
- TÜV (as pressure containing equipment acc. to category II, module A1)

**Since technical requirements partly vary with the a.m. bodies, please advise which rules have to be applied for a specific order.**

## 1.1. Marking

Valves are marked with the following information:

- manufacturer (nameplate at handwheel)
- type no. (sticker)
- body material (cast)
- pressure class (cast)
- nominal size (cast)
- batch no. and foundry sign (cast)
- direction of flow (cast)

Valves with CE mark (please advise with the order!) are marked with an additional name plate containing the following information:

- service pressure PS (min/max)
- test pressure PT
- fluid temperature TS (min/max)
- category acc. to PED 97/23/EG
- fluid group acc. to PED 97/23/EG
- conformity assessment module
- CE mark or Named Body
- order no.
- order position

## 1.2. Tightness of the Quick-Closing Valve

For design reasons, quick-closing valves with metal trim have a slight leakage at the seat. A leakage rate „D“ according to EN 12266-1:2003 (P12) is guaranteed by means of a 100% pressure test of the produced valves. For the body, a full pressure tightness and burst strength is guaranteed in accordance with EN 12266-1:2003 (P10/P11) depending on the respective pressure class.

Soft-sealed quick-closing valves have got a lower leakage rate, due to conceptual reasons. ARMATUREN-WOLFF fits soft-sealed quick-closing valves with different elastomer materials, depending on customer requirements and the operating conditions of the plant.

**Attention: In shipbuilding, soft-sealed quick-closing valves may not be used at storage and service tanks with a capacity of more than 500 liters!**

All ARMATUREN-WOLFF products are tested with regards to correct function as well as possible damage and leakages. Before installation, the valves should undergo an additional sight inspection procedure, and before system start-up, the tightness of the plants and systems is to be verified.

## 1.3. Medium

Before installation and start-up of the plant it is to be verified that valve materials are suitable for the medium. In case of doubt the manufacturer will be glad to approve the adequacy of the chosen materials.

Unsuitable combinations of medium and valve materials may lead to leakages at the valve seat. Dangerous kinds of medium may not get into the environment.

For assembly, we use lubricants on mineral oil basis. Please note that these can get in contact with the medium, if no special measures are undertaken against this effect. Lubricants and auxiliary liquids may theoretically get into the medium and cause pollution or provoke unintended chemical reactions.

## 1.4. Ambient and Medium Temperature

Quick-closing valves from ARMATUREN-WOLFF are not sensitive against changing ambient temperatures. The minimum service temperature is  $-10^{\circ}\text{C}$  for quick-closing valves without bellows seal as well as self-closing valves; at quick-closing valves and quick-opening valves with bellows-seal, the minimum service temperature is  $-50^{\circ}\text{C}$ .

The medium temperature can be up to  $140^{\circ}\text{C}$ .

**Attention: Valves which are intended for use with different media at different operating temperatures must be equipped with bellows-seal!** Please contact ARMATUREN-WOLFF in such cases for possible technical advice.

If electric components like limit switches are mounted, suitable measures should be undertaken to prevent heat impact on these components as well as possible (with means of isolation against ambient heat and heat radiation from the valve body, cooling, e.g.).

## 1.5. Vibrations

The valves are insensitive against weak shocks and vibrations below  $0,7g$ . In case it should not be possible to limit the local vibrations under below this value, quick-closing valves should be isolated from the pipeline. For this purpose, ARMATUREN-WOLFF offers special vibration dampers.

## 1.6. Pipe Tensions

Pipelines and pipeline systems have to be installed in such way that no tensions from expansion and temperature may have impact on the valve. This can theoretically even lead to breaks in the valve, causing danger from medium spills. ARMATUREN-WOLFF offers suitable expansion joints for this purpose.

## 1.7. Protection during Storage and Transport

All protection devices for transport and storage have to be removed before installation. If the equipment is not installed directly after delivery, the following measures should be taken care for:

- Storage in a dry place, protected from environmental impact
- Optimum storage temperature is  $5^{\circ}\text{C}$  to  $40^{\circ}\text{C}$
- Protection against dust and dirt impact
- The valves should be protected against strong heat and cold impact.

## 2. Installation

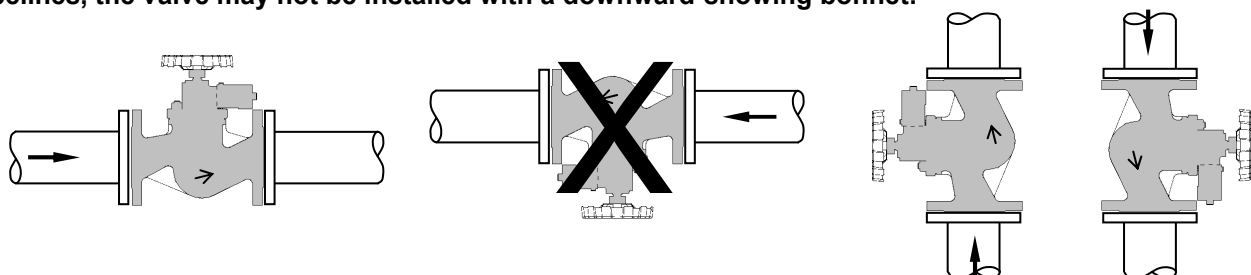
### 2.1. Instruction for the Installation of Valves into the Pipeline

Lever, switches, actuator, etc. may never be used in order to lift the valve.

Quick-closing valves should be protected against falling down, after removal of the packing material.

During the installation it has to be made sure that trim and sealing surfaces are not damaged.

Quick-closing valves, quick-opening valves and self-closing valves must always be installed in such way that the medium inlet is above the cone (direction of flow = closing direction). **In horizontal pipelines, the valve may not be installed with a downward-showing bonnet!**



## 2.2. Connection of the Control Line (Quick-Closing Valves and Quick-Opening Valves)

The connection of the valve actuators is done with pneumatic or hydraulic control line as well as straight threaded pipe unions. In standard execution, the actuators are fitted with unions for an outer diameter of 8,0 mm – other sizes available on request.

**Please note that in shipbuilding a number of flag states (like Germany) do not accept the use of copper for control lines on board of sea-going vessels – here at least steel, or stainless steel, control lines have to be applied.**

In case the valves are equipped with electric components (like limit switches), the electric connections may only be done in a voltage-free state. Before turning on the power, the correctness of the connections has to be verified.

### Technical parameters:

#### Hydraulic

1. Quick-closing valves, compact design (AW 33x14, AW 33x15)  
Cylinder volume at the valve:                 5,0 cm<sup>3</sup>     DN 15 – DN 50  
  9,0 cm<sup>3</sup>     DN 65 – DN 150
  
- 2.1 Quick-closing valves with bellows-seal (AW 33x11)  
Cylinder volume at the valve:                 7,0 cm<sup>3</sup>     DN 15 – DN 80  
   19,0 cm<sup>3</sup>    DN 100 – DN 150
  
- 2.2 Quick-closing valves with bellows-seal, compact design (AW 33x16/33x17)  
Cylinder volume at the valve:                 5,0 cm<sup>3</sup>     DN 15 – DN 50  
  9,0 cm<sup>3</sup>     DN 65 – DN 150
  
- 3.1 Quick-opening valves (AW 34xx1)  
Cylinder volume at the valve:                 19,0 cm<sup>3</sup>    DN 15 – DN 150
  
- 3.2 Quick-opening valves, compact design (AW 34xx6/34xx7)  
Cylinder volume at the valve:                 9,0 cm<sup>3</sup>     DN 15 – DN 150
  
- 4.1 Quick-closing valves DN 200 and bigger (AW 33x11)  
There are two cylinders installed at each valve,  
Cylinder volume at the valve:                 19,0 cm<sup>3</sup>
  
- 4.2 Quick-closing valves DN 200 and bigger, compact design (AW 33x14)  
There are two cylinders installed at each valve,  
Cylinder volume at the valve:                 9,0 cm<sup>3</sup>

Recommended hydraulic oil:                 viscosity 15 - 22 cSt, max. 90 °C.

#### Pneumatic

Required control pressure: 6-8 bars

## 3. Operation

### 3.1. Quick-Closing Valves (AW 33x14/33x15, compact design, without bellows-seal)

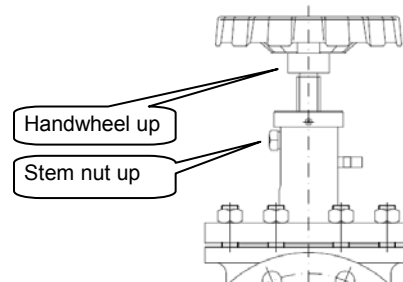
#### Opening of the Valve

After release, the valve can be reset according to the following procedure:

1. Turn the handwheel to the right (clockwise) until the tappet of the actuator is rested under the stem nut.  
A slight resistance can be noticed.
2. Turn the handwheel to the left (counter-clockwise) until a slight resistance is noticed.

Now the valve is operational in its home position with pre-compressed spring.

Operational, opened valve:

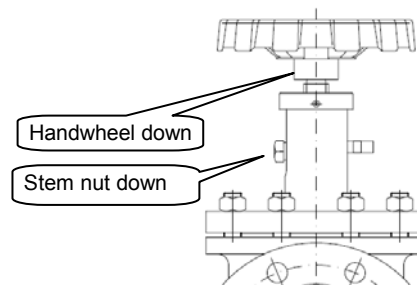


In this situation, the valve may additionally be opened and closed with the handwheel like a regular globe valve. **Attention: As long as the valve is manually locked, the function as a quick-closing valve is not given!**

#### Closing of the Valve

The valve is closed by pulling the lever of the actuator or pressurization of the actuator. In case of a purely manual valve (AW 33x04), the valve is released by pulling the ring or the lever of the actuator. Hereby, the fixing device of the valve is loosened and the pre-compressed spring quickly closes the valve.

Valve after release (closed):



### 3.2. Quick-Closing Valves with Bellows-Seal (AW 33xx1), Quick-Opening Valves with Bellows-Seal (AW 34xx1),

#### Opening of the valve

The procedure is slightly different for the valves up to DN 50 and those above.

1. Valves DN 15 – DN 50  
Depress lever until rested, Make sure that the top surfaces of the stem and the handwheel fixing nut are on one level.
2. Valves DN 65 – DN 250
  - a. Turn handwheel to the left (counter-clockwise), and simultaneously depress the lever until rested.
  - b. Afterwards turn the handwheel to the right again, until the top surfaces of the stem and the handwheel fixing nut are on one level.

Now the valve is operational in its home position with pre-compressed spring.

#### Closing of the valve

The valve is closed by pushing the lever upwards, which makes the pre-compressed spring close the valve rapidly. The actuation can be effected manually, by rope pull or by means of a fitted cylinder hydraulically or pneumatically.

Additionally, the quick closing valve can be locked with the handwheel like a globe valve after it has been closed.

### **3.3. Quick-Closing Valves with bellows-seal (AW 33xx6/33xx7), compact design**

#### Opening of the Valve

After release, the valve can be reset according to the following procedure:

1. Turn the handwheel to the left (counter-clockwise) until the tappet of the actuator is rested under the stem nut.  
A slight resistance can be noticed.
2. Turn the handwheel to the right (clockwise) until a slight resistance is noticed.

Now the valve is operational in its home position with pre-compressed spring.

#### Closing of the Valve

The valve is closed by pulling the lever of the actuator or pressurization of the actuator. In case of a purely manual valve (AW 33x06/33x07), the valve is released by pulling the ring or the lever of the actuator. Hereby, the fixing device of the valve is loosened and the pre-compressed spring quickly closes the valve.

#### Opening and Closing of the Valve by Means of the Handwheel

In order to operate the valve like a regular globe valve, the valve firstly has to be in released (closed) position and the spring pin under the handwheel has to be removed.  
For normal operation as a quick-closing valve, the spring pin should be inserted into the hole under the handwheel again.

### **3.4. Quick-Opening Valves with bellows-seal (AW 34xx6/34xx7), compact design**

#### Closing of the Valve

After release, the valve can be reset according to the following procedure:

1. Turn the handwheel to the right (clockwise) until the tappet of the actuator is rested under the stem nut.  
A slight resistance can be noticed.
2. Turn the handwheel to the left (counter-clockwise) until a slight resistance is noticed.

#### Opening of the Valve

The valve is closed by pulling the lever of the actuator or pressurization of the actuator. In case of a purely manual valve (AW 34x06/34x07), the valve is released by pulling the ring or the lever of the actuator. Hereby, the fixing device of the valve is loosened and the pre-compressed spring quickly opens the valve.

Now the valve is operational in its home position with pre-compressed spring.

### **3.5. Spring-loaded Self-Closing Valves (AW 35x04, with locking handwheel AW 35x14, without handwheel)**

#### Opening of the valve

The valve is opened by pressing the lever of the valve. The valve will stay open against the compressed spring, as long as the hand lever is pressed down.

#### Closing of the valve

The valve closes automatically, as soon as the handlever is released.

The valve type with handwheel can be locked in closed position by turning the handwheel all the way to the right (clockwise). In locked position, it is not possible to open the valve by means of the handlever.

## 4. Maintenance

### 4.1. General Remarks

In normal operation, our valves are maintenance free. It has to be made sure, however, that movable parts are kept free from dirt. In regular intervals, which should be defined by the operator and should not exceed six months, the valves should undergo a function test during which also possible dirt is removed.

In general, the components have been laid out for a permanent operation at the specified working conditions. Under the influence of external impact (heat, dust, humidity, general weather impact), especially the electrical components can however suffer from an increased fatigue.

### 4.2. Recommended Spare Parts

Description	Valves
stem group	quick-closing valves, quick-opening valves, self-closing valves
set of sealings	quick-closing valves, quick-opening valves, self-closing valves
actuator	quick-closing valves, quick-opening valves
limit switch	(if applicable)

For all components a dry and dust-free storage at a temperature of 0 – 50°C has to be observed.

## 5. Safety Remarks

- The operating instruction has to be observed in an obligatory way. In case of noncompliance, all guarantees and liabilities are reserved!
- Sharp edges and flashes can cause injuries. Handle parts with care.
- Valves may only be installed, connected and taken into service by appropriately instructed personnel.
- Maintenance personnel must be informed about the dangers related to disassembling and mounting of valves as well as electric and machinery installations.
- At all work at a valve installed in a pipeline it has to be made sure that the plant is not under pressure and not medium can escape from the pipeline.
- Never reach into spring-loaded open valves or electrical installations under electrical power, since an unintended touch of conductors or release of the valve can cause serious injuries.
- The electric installation may only be done in a voltage-free situation. Never loosen electrical contacts during operation! Electrical connections may only be installed in a voltage-free state!
- When not genuine parts are used for replacement, guarantees and liabilities become void.