

## ECON Quick Closing Valves and Accessories



ECON Quick Closing Valves and accessories Fig.100/247, 100/248, 100/398, 100/399, 100/417, 100/418, 100/436, 100/437, 100/1270, 100/1271, 100/2641, 106, 107, 108 [www.eriks.com](http://www.eriks.com)

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### **1. ERIKS operating companies**

ECON Quick Closing Valves and accessories are being delivered by several ERIKS operating companies on a worldwide basis. In this manual these will be referred to as 'ERIKS', the individual terms of delivery of the ERIKS operating company having executed the order are applicable.

### **2. Product description**

The ECON Quick Closing Valves and accessories are designed according to the information in our latest catalogue or see our website [www.eriks.com](http://www.eriks.com) and should be used in accordance with the applicable pressure-temperature rating as stated on this website.

Quick Closing Valves and accessory are provided with marking, according to EN 19. The marking makes the identification of the valve easier and contains:

- size (DN)
- pressure rating class
- body and bonnet material marking
- ECON logo
- heat numbers
- tag plate

### **3. Requirements for maintenance staff**

The staff assigned to assembly, operating and maintenance tasks should be qualified to carry out such jobs and in any circumstance, ensure personal safety

### **4. Transport and storage**

Transport and storage should always be carried out with the valves completely closed; the valves should be protected against external forces, influence and destruction of the painting layer as well. The purpose of the painting layer is to protect the valve against rust, during transport and storage. The valves should be stored in a clean area and should also be protected against all atmospheric circumstances. There should be taken care of the temperature and humidity in the room, in order to prevent condensate formation.

### **5. Function**

ECON Quick Closing Valves and accessory are designed for use on board ships and are suitable for fuel, oil etc. These valves comply with the requirements of the classification societies.

## 6. Application

The ECON Quick Closing Valves and accessory are used on board ships and are suitable for fuel, oil etc. The valves are designed for standard operating conditions. For the use of extreme conditions e.g. aggressive or abrasive media, it is recommended to mention this at the ordering stage, to verify whether the valve is suitable. The installation designer is responsible for the valve selection, suitable for the working conditions. The valves are unsuitable, without written permission of an ERIKS company, to apply for hazardous media as referred into Regulation (EC) No 1272/2008.

## 7. Installation

### 7.1. Operating principle

The ECON Quick Closing Valves are specially designed for marine use in elevated fuel and diesel lines, providing a quick shut-off in emergency situations from an accessible location outside the engine room and above the water line. In the normal position the valve can be opened and closed with the hand wheel. In the normal position and opened, the valve can be quickly closed by remote control. The transmission system that is needed for this can be pneumatic. Groups of valves can be activated / closed with one handle (see schematics below). Air is driving medium that can easily be compressed and contained in a reservoir.

The cylinders that are needed for quick closing the valves are already installed as standard pneumatic transmission.

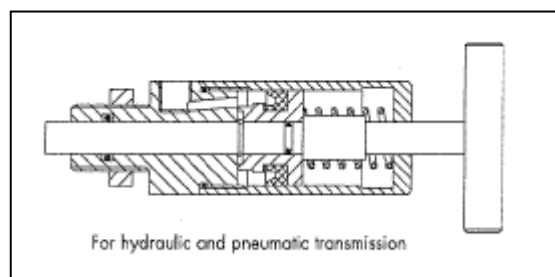
The connection between the pneumatic cylinder at the globe valve and the impulse unit must be made of seamless drawn steel tubing in the engine room with a minimum inner diameter of 6 mm. Outside the engine room other materials such as polyamide PA12 can be proposed to the classification society.

Each actuator must have a label to indicate which shut off valve it will close. One actuator can control a number of quick closing valves depending on the capacity of the air reservoir. With exception of quick closing valves used for day tanks. These should each be separately connected to an actuator switch.

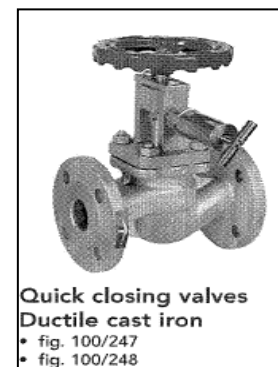
For pneumatic remote control the ECON quick closing globe valve is provided with a pneumatic cylinder. The pneumatic system operates the cylinder as indicated in the schematic below.

Each system is tailor made to the user's needs, although the following rules must be taken into account:

- The controls (pressure vessel and control panel) must be installed outside the engine room
- The pressure vessel must have ample capacity for closing all shut off valves.
- The installation must be provided with a manually operated emergency pump.



The operating pressure for the activating cylinder is min. 6 bar and max. 8,8 bar pneumatic and max. 40 bar hydraulic pressure.



## 7.2. Operating principle pneumatic control cabinet

The ECON Quick Closing Valve Pneumatic Control Cabinet is specifically designed to be used in combination with ECON Quick Closing Valves (ECON Fig. 100/247, 100/248, 100/436, 100/437). The design is ensuring a safe and quick handling in case of emergency. This manual is to provide an understanding of the working principle of the Cabinet as well as procedures for testing.

### Installation instructions

- The control cabinet should comply with the requirements of the classification society concerned
- The connection between the pneumatic cylinder of the valve and the impulse unit must be made of seamless drawn steel tubing with a minimum inner diameter of 6mm
- The number of connections and bulkhead fittings must be restricted to a minimum
- There should not be any sharp bends in the transmission lines. The assembly must be installed in such a way that mechanical damage is not possible
- Each actuator switch must have a label to indicate which shut-off valve it will close
- One actuator switch is allowed to control a maximum of three quick closing valves simultaneously, with the exception of quick closing valves used for day tanks. These should each be separately connected to an actuator switch

For pneumatic remote control, the ECON quick closing globe valve is provided with a pneumatic cylinder. The pneumatic system operates the cylinder. The installation can be tailored to the user's needs, although the following rules must be taken into account: The control cabinet (pressure vessel and control panel) must be installed outside engine room. The pressure vessel must have sufficient capacity for closing all shut-off valves at least twice. The installation must be provided with a manually operated emergency pump.

## 7.3. Working Principle of the Cabinet

The following principle is based on the example drawing of the cabinet which can be found on page-7 of this document. Please use page-7 for reference when reading the following description<sup>1</sup>.

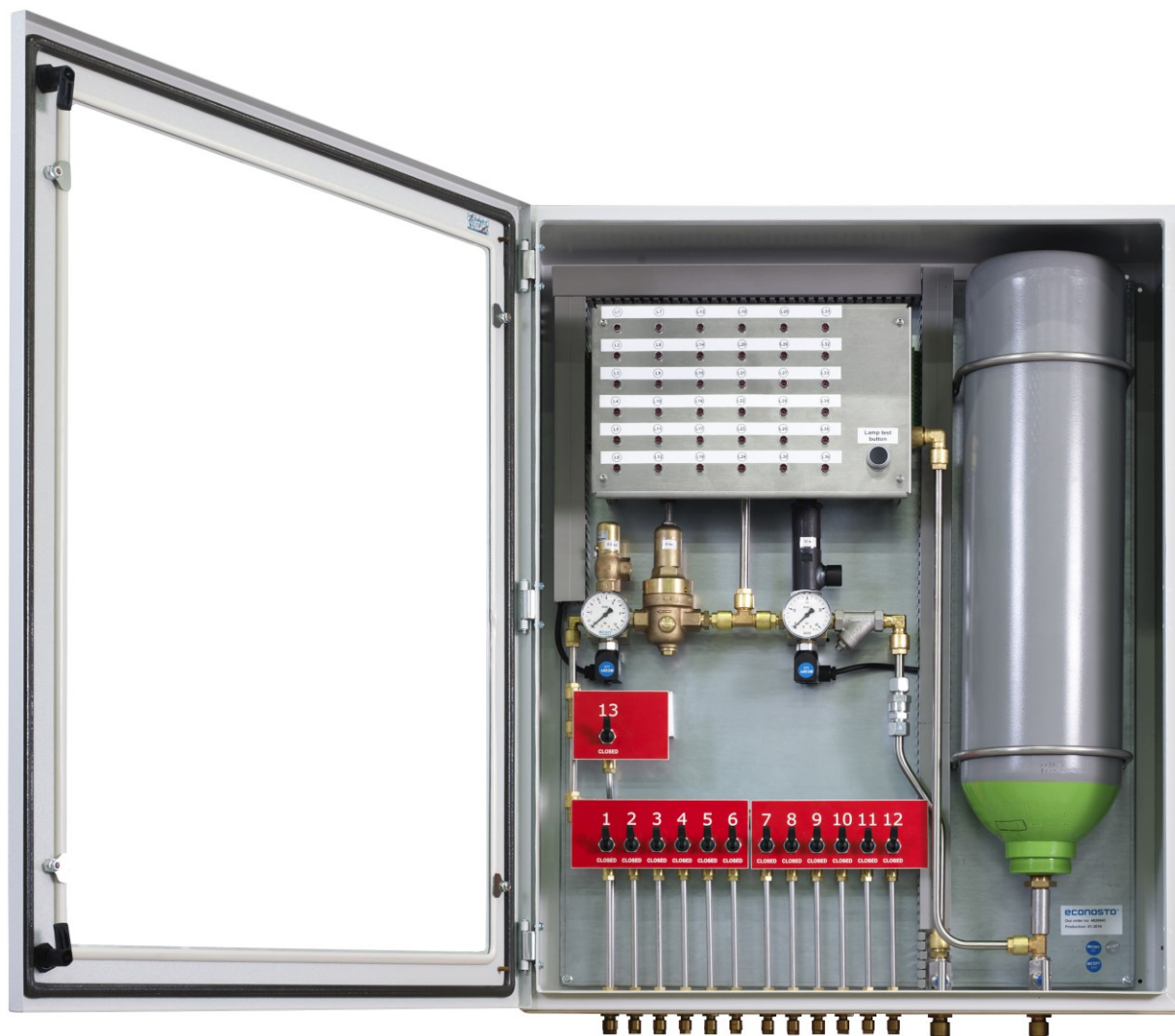
1. The control cabinet is being fed by the ship's Air system through the ball valve (Pos 2), strainer (Pos 3) and check valve (Pos 4). The check valve prevents a back flow when the Air system fails so air remains in the vessel of the control cabinet.
2. The air flow goes directly to the Emergency switches (Pos 12) and vessel (Pos 1). The vessel has a capacity based on calculations made by ERIKS. The vessel has a maximum pressure of 30 bar but is protected by a safety valve (Pos 9) with a set pressure of 32 bar. A ball valve (Pos 2) is connected to the bottom of the vessel and is used as drain valve. On the vessel is a Pressure Gauge (Pos 5) connected ranged 0-40 bar.
3. The vessel is always on pressure.
4. The air flow from the vessel or directly from the air supply goes through the reducing valve (Pos 7) which reduces the pressure from 30 to 8 bar, a pressure gauge (Pos 6) monitors the incoming pressure and is ranged 0-10 bar.
5. The safety valve (Pos 8) is positioned after the reducing valve and is adjusted at 8.8 bar.
6. When the working pressure behind the reducing valve (Pos 7) drops below 5 bar the pressure switch (Pos 10) provides an alarm.
7. By operating the 3/2 valve (Pos 12) the pneumatic cylinders mounted on the ECON quick closing valves will close the valves.

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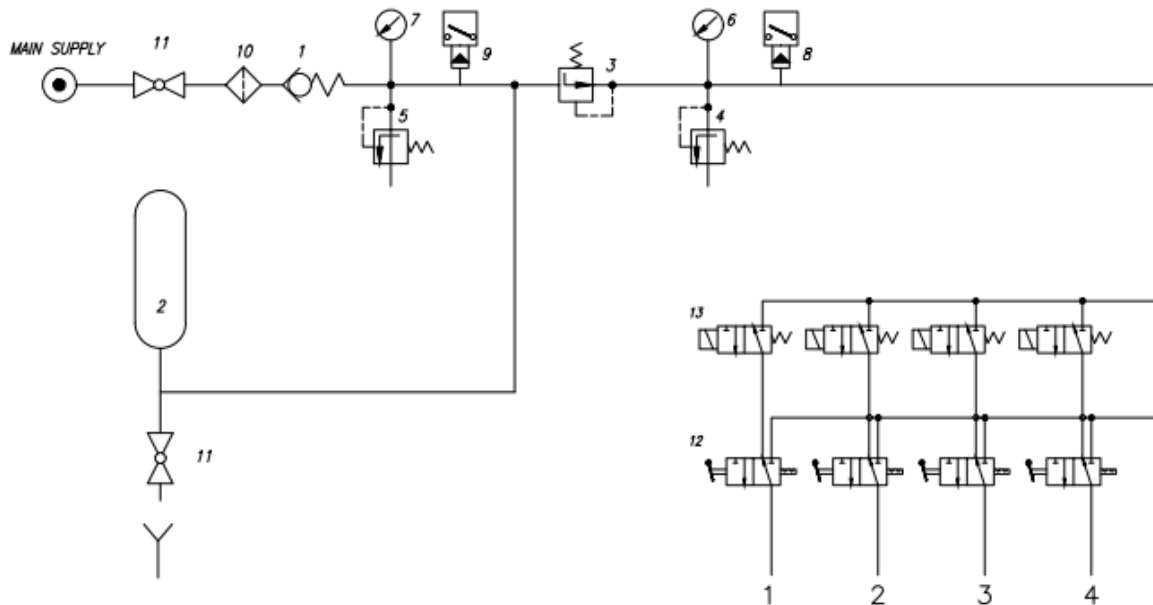
<sup>1</sup> Please note that the drawing is a standard set-up of our Control Cabinet, variations do occur although the principle remains the same. (Example: Fig. 1.1) Any uncertainties, please contact your sales engineer.

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#### 7.4.ECON standard pneumatic cabinet (manual operated)



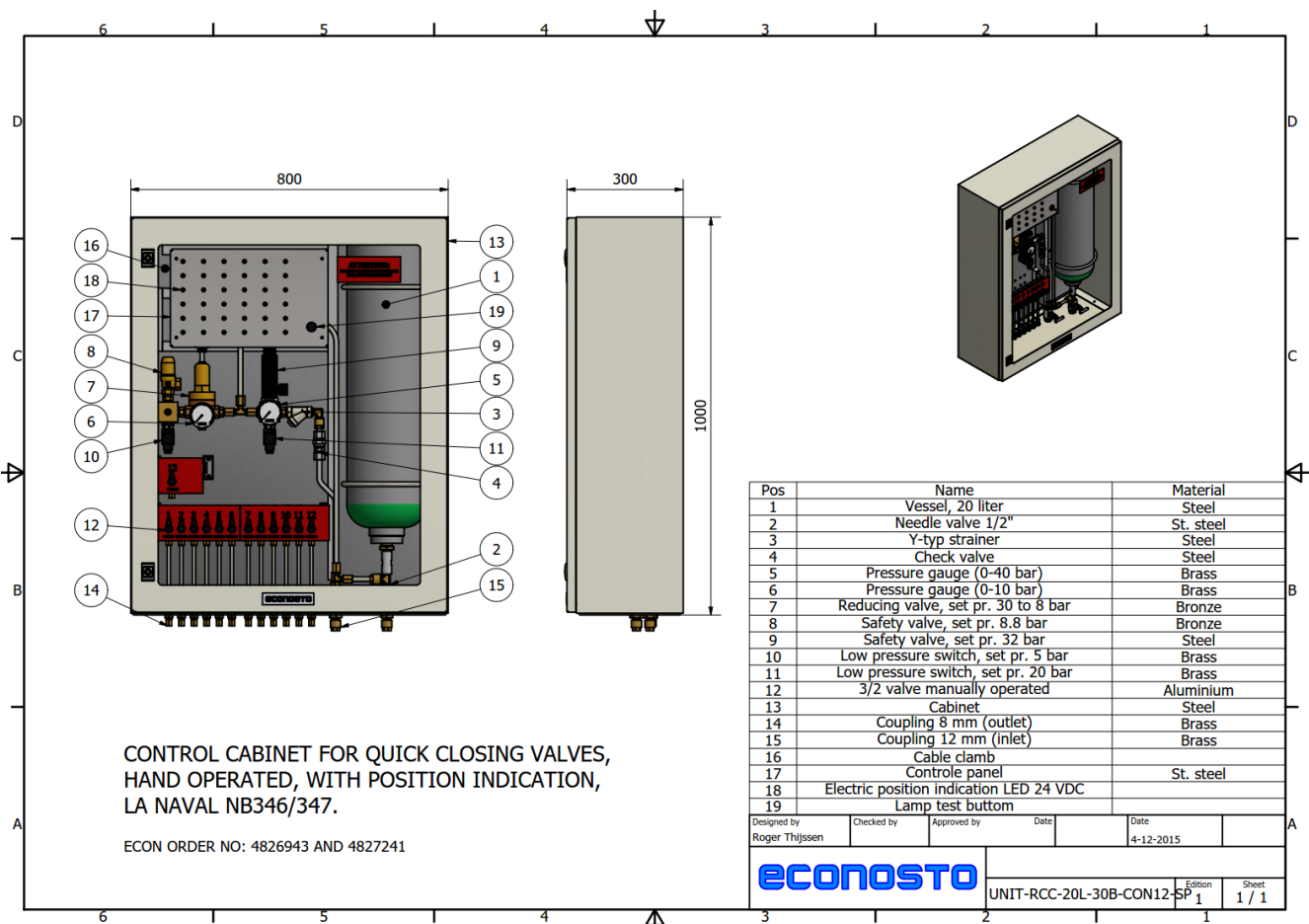
**7.5. Pneumatic diagram and parts list of a manual and (optional) electric operated system with position indication.**



## PARTSLIST

1. Non return valve.
2. Compressed air receiver for working pressure 30 bar, cap. 10 ltr.
3. Reducing valve 30-8 bar with certificate DNV / Lloyds / BV or other.
4. Safety valve (opening 8,8 bar).
5. Safety valve (opening 32 bar).
6. Pressure indicator 0-10 bar.
7. Pressure indicator 0-40 bar.
8. Low pressure alarm of 5 bar.
9. Low pressure alarm of 20 bar.
10. Strainer.
11. Ball valve.
12. Pneumatic valve manual operated mechanical blocked.
13. Pneumatic valve electric operated 24 VDC spring closed.





## 7.6. Testing/Commissioning instructions

By testing or commissioning of the Pneumatic Quick Closing system the points as described in Working Principle of the Cabinet (See: Page 4) and Installation Instructions (See: Page 4) should be taken into account.

For commissioning the following procedure applies<sup>2</sup>

- a) When commissioning please ensure there is air pressure supply from the ship's air system.
- b) The 3/2 valves, which are clearly labeled, each mentioning which Quick Closing Valve(s) they will shut, are switched from the open to the close position one by one.
- c) During the switching of all 3/2 valves to the open position the pressure gauges have to be monitored carefully. Any significant change indicated on the pressure gauges can point to a fault in the system.
- d) The vessel of the cabinet is calculated to have enough pressure to shut all quick closing valves at least twice.
- e) Once all quick closing valves are confirmed shut, all the 3/2 valves must be switched to the off position before all Cylinders on the Quick Closing Valves can be returned to normal operating position.

For testing the following procedure applies<sup>3</sup>

A visual inspection of the Control Panel to ensure any malfunctions or what so ever.

- a) The 3/2 valves, which are clearly labeled, each mentioning which Quick Closing Valve(s) they will shut, are switched from the open to the close position one by one.
- b) During the switching of all 3/2 valves to the open position the pressure gauges have to be monitored carefully. Any significant changes indicated on the pressure gauges can point to a fault in the system.
- c) The vessel of the cabinet is calculated to have enough pressure to shut all quick closing valves at least twice.
- d) Once all quick closing valves are confirmed shut, all the 3/2 valves must be switched to the off position before all Cylinders on the Quick Closing Valves can be returned to normal operating position.

Note 2: These procedures are set up by ERIKS, instructions from surveyors can differ and must be followed at all time.

Note 3: See Note 1

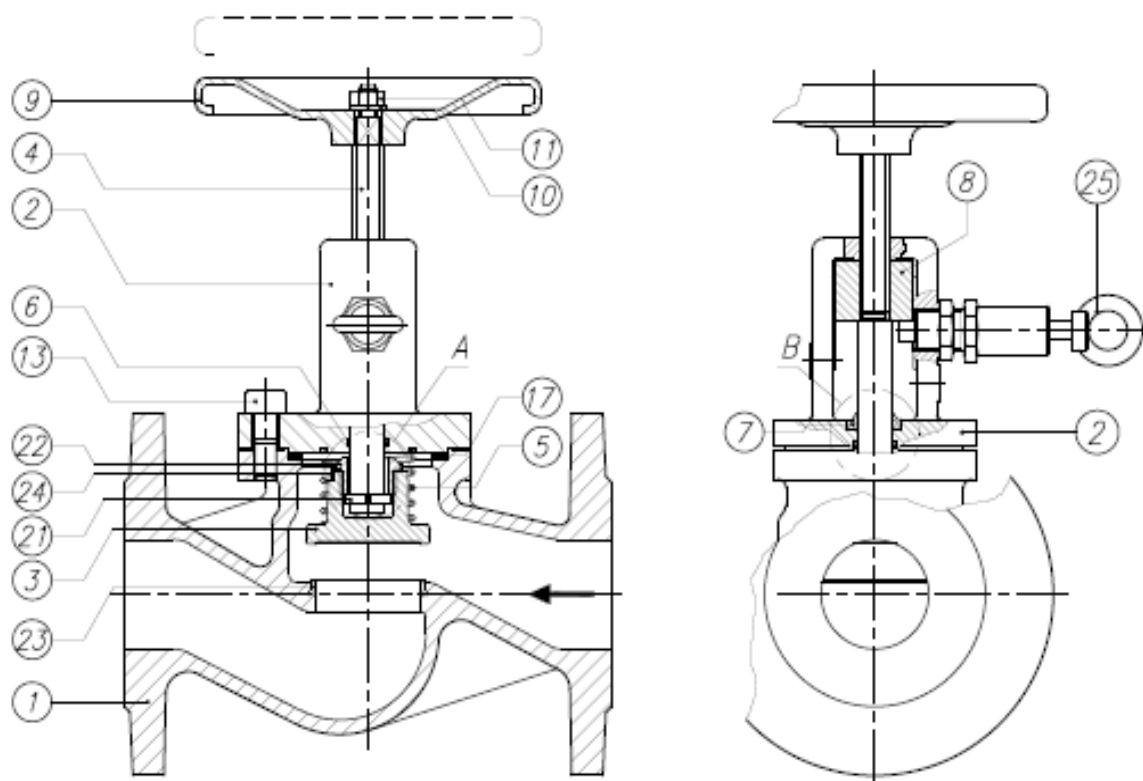


**7.7. Working principle of a quick closing valve**

The ECON quick-closing valve Fig. 100/247 and 100/248 is designed to close a fuel line rapidly in Case of emergency. Operation can be manual, pneumatically and hydraulic. The options make it possible to close the valve remotely. The valve can also closed by hand .Hydraulic operation is effected by means of an impulsunit Fig. 106 - 107 and 108. Pneumatic operation can be effected by using an ECON Cabinet.

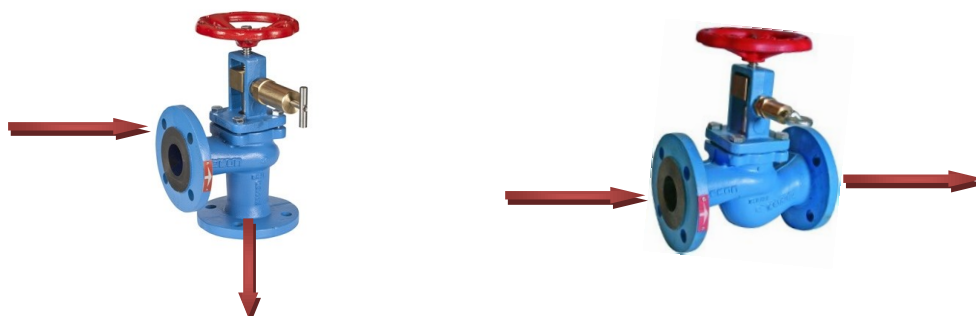
Fluid flow is with the pressure above the disc. There reason for this is that the line pressure helps in closing the disc when operated.

Let's assume that the valve is closed. To get the valve in operational position, start by turning the hand wheel clockwise. Block nr.8 will move upwards and when it passes the shaft of cylinder nr.25, the shaft will move outwards automatically and latches block nr.8 in position. Rotate the hand wheel counter clockwise and the valve will open. The valve is now in operating position.



### Mounting Instructions

1. The quick closing valve should be placed in the pipeline in such way that the flow of the media corresponds with the arrow on the valve housing i.e. from above the valve disc to below it.
2. The valve should always be installed with the stem in vertical position and the hand wheel on top.



3. For hydraulic operation:  
The max. length of the hydraulic pipe in vertical position is about 10 mtr. This because of the max. available oil pressure on the hydraulic cylinder, to remain good functioning. The max. length of the hydraulic pipe in horizontal position doesn't have any restrictions.  
Put the lever of the impulsunit upright and fill the oil reservoir with oil.  
Loosen the pipe from the release cylinder at the quick closing valves, one at the time and let oil flow out until it is clear and free from air. It might be necessary to refill the release cylinder volume. Keep on refilling the reservoir of the impulsunit under the whole process. If the pipes do not have even inclination, **venting can be eased if the pipe is filled from the valve-end with a pump.**

### The oil that can be used:

BP	- HLP HM32
Chevron	- Mechanism LPS-32
Esso	- Nuto-H32
Mobil	- DTE24 of DTE light
Shell	- Tellus S2 MX 32
Elf	- Hydrelf DS-32
Texaco	- Rando HD32



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### 7.8. Working principle of a quick closing valve (with bellow)

The ECON quick closing valve Fig. 100/436 and 100/437 has been designed to close a fuel line rapidly in case of emergency. Operating can be manual, pneumatically or hydraulic. The last two options make it possible to close the valve by remote control. Hydraulic operation can be effected by means of an impulse unit Fig. 107 and Fig. 108.

Fluid flow is with the pressure above the disc. The reason for this is that the line pressure helps closing the disc when operated.

Let's assume that the valve is closed. To get the valve in operational position, start by turning the hand wheel clockwise.

Block nr.13 will move upwards (putting spring nr. 9 under tension) and when it passes the shaft of cylinder nr.18, the shaft will move outwards automatically and latches block nr.13 in position.

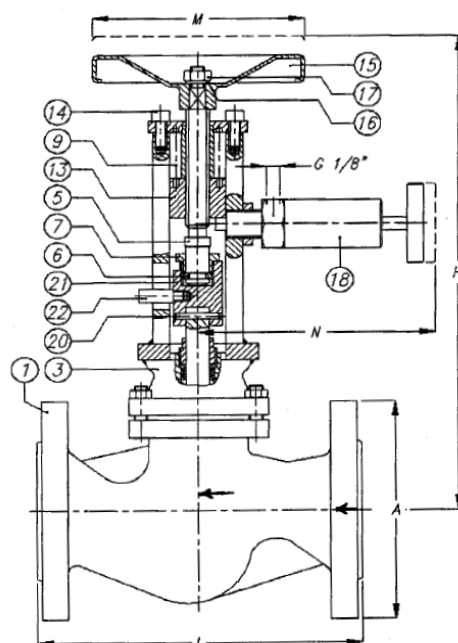
Rotate the hand wheel counter clockwise and the valve will open.

The valve is now in operating position.

When cylinder nr.18 is operated (manual, mechanical, pneumatic or hydraulic), the cylinder shaft will retract and spring nr.9 will force the stem downwards.

The force is increase by fluid pressure acting on top of the disc. The valve will close in less than 0.5 seconds.

To get the valve back in operational position repeat the steps described above.

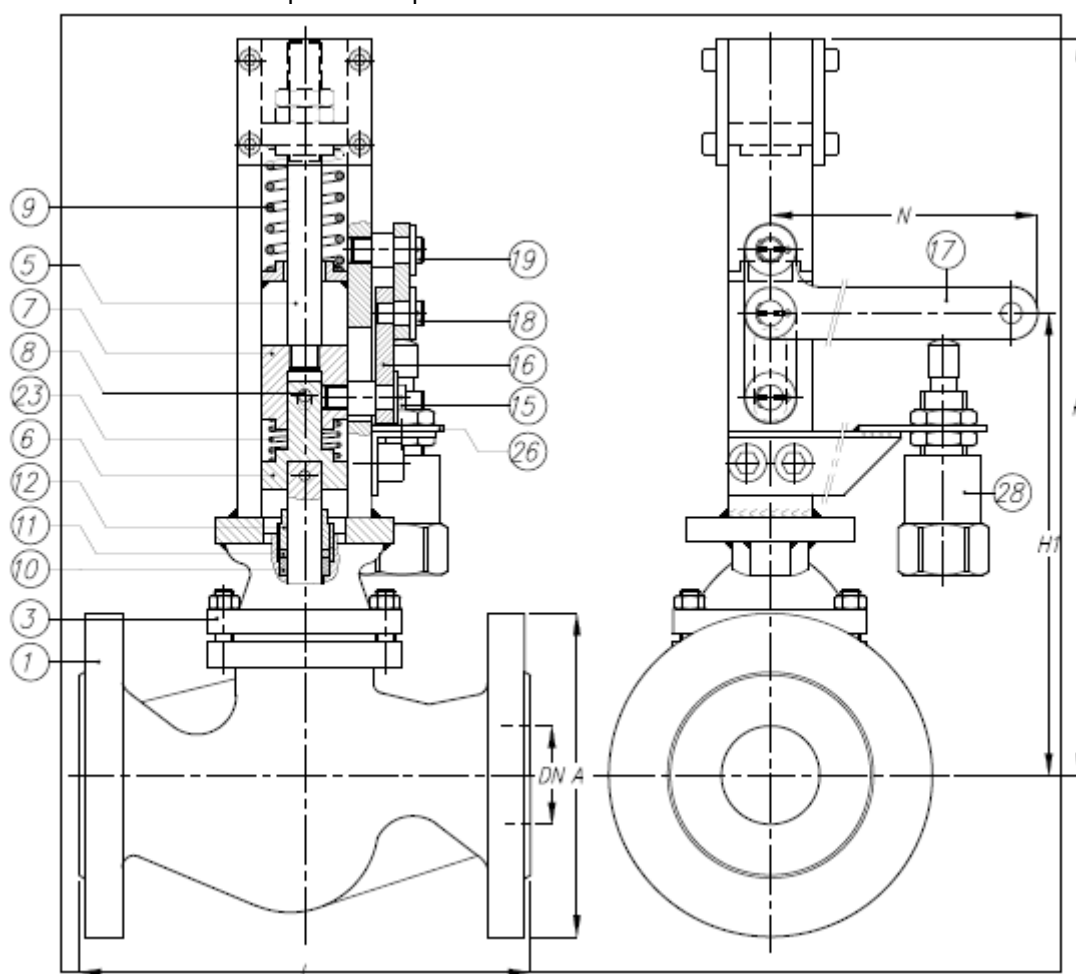


**7.9. Working principle of a quick opening valve (with bellow)**

The ECON quick opening valve Fig. 100/436QO – 100/437QO has been designed to open a thermic oil (fluid) line rapidly in case of emergency. Operating can be manual, pneumatic or hydraulic. The last two options make it possible to open the valve by remote control. Hydraulic operation can be effected by means of an impulse unit Fig.107 and. Fig. 108.

Fluid flow is with the pressure above the disc. The reason for this is that the line pressure helps closing the disc when the valve is closed.

Let's assume that the valve is open position. To get the valve in operational position, start by pulling the lever nr.17 down (direction to the body). Block nr.7 will move downwards until the lever nr.17 reach the end stop. (spring nr.6 and 9 are under tension). The valve is now in the operational position.



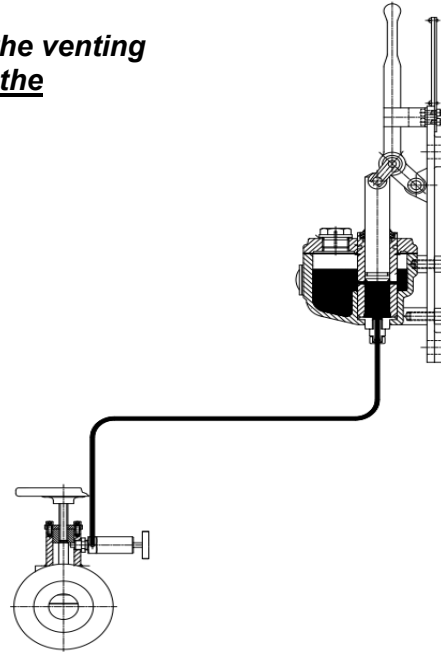
When cylinder nr.28 is operated (pneumatic or hydraulic), the cylinder shaft will come out and pulling the lever nr.17 up and the spring nr.9 will force the stem upwards. The valve will open now. For functional test the hand-lever (manual) can be used.

To get the valve back in the operational position repeat the steps described above.

7.10. How to use an impuls unit.

***Warning!!***

***Before connecting the valve first take care of the venting of the hydraulic tube. venting can be eased if the pipe is filled from the valve-end with a pump***

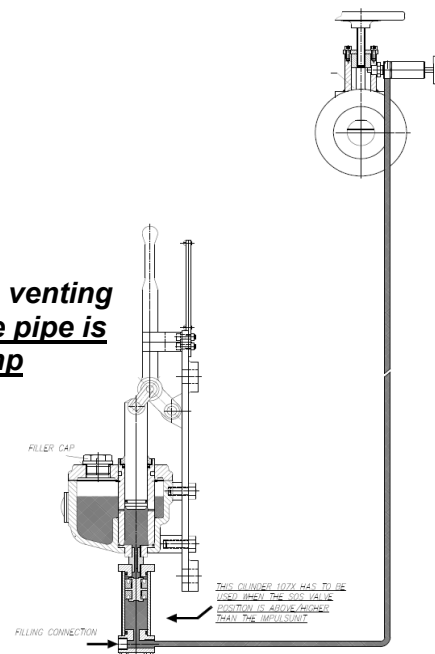


7.11. When to use an ECON fig. 107X separating cylinder.

**The 107X has to be used when the SOS valve position is higher than the impulsunit or if you want to use 2 impulse units on portside and on starboard side for operating 1 valve.**

***Warning!!***

***Before connecting the valve first take care of the venting of the hydraulic tube. Venting can be eased if the pipe is filled from the 107X filling connection with a pump***



## Appendix 1 – Electric diagrams and drawings

The diagrams and drawings as per customers request shall be enclosed from this page forward.

### 8. Maintenance

Before starting any service jobs, make sure that the medium supply to the pipeline is cut off, pressure was decreased to ambient pressure, the pipeline is completely cleaned and ventilated and the plant is cooled down. Always keep safety instructions in mind and take all personal safety precautions.

During maintenance, the following rules should be observed:

- always keep personal safety precautions in mind and always use appropriate protection e.g. clothing, masks, gloves etc.
- be alert that the temperature still can be very high or low and can cause burns.
- keep the stem well greased
- check the valve on all possible leaking possibilities.
- check if all bolts and nuts are still fastened.
- dust, grease and medium residual, must be frequently cleaned of the valve body and all moving parts, such as stem to maintain all operating functions.
- if there is a leakage across the stem, gradually tighten the stuffing box sealing, evenly in increments by means of the hex. nut, until leaking stops.
- if required repack the stuffing box gasket, for safety reasons we recommend that the valves only can be repacked, when depressurized, drained and ventilated.
- when cutting the new stuffing box packing from the roll, make sure that the ends are cut with a slant.
- check if the discs still open and close in a proper manner.
- the thickness of the body must be checked to ensure safety operation at an interval of at least three months..

### 9. Service and repair

All service and repair jobs should be carried out by authorized staff, using suitable tools and user shall use valve packing, gasket, bolt and nut of the same size and material as the original one.

- welding repair and drilling of the valve is forbidden.
- it is forbidden to replace seats or seals when the valve is under pressure.
- before you replace seats or seals you have to clean the areas where you have to place the seats or seals.
- after replacement of seats or seals it is necessary to check the valve operation and tightness of all connections. Tightness test should be carried out.
- after installation, the valve should be checked and maintained periodically at least every 3 months, depending on the medium.



## 10. Troubleshooting

It is essential that the safety regulations are observed when identifying the fault.

Problem	Possible cause	Corrective measures
No flow	Flange dust caps were not removed	Remove dust caps
Little flow	Valve not completely open	Open valve completely
	Piping system clogged	Check piping system
Valve difficult to open	Stem dry	Grease stem
	Stuffing box packing too tight	Slacken nuts of gland flange
	Wrong direction of rotation	Turn anti-clockwise to open
Leakage across the stem	Stuffing box gland slack	Tighten stuffing box gland, if necessary renew stuffing box packing
Leakage across valve seat	Valve not properly closed	Pull hand wheel tight without tools
	Seat damaged by foreign particles	Replace valve, or repair the seat
	Medium contaminated	Clean valve and install dirt screen
Leakage between bonnet flange	Bonnet bolts loose	Properly tighten bonnet nuts
	Bonnet gasket failure	Replace bonnet gasket
Operating failure	Packing too tight	Loosen gland flange nuts
	Thread of stem nut over worn	Replace stem nut
	Stem bended	Rectify or replace stem
Body and/or bonnet broken and leaking	Water hammer	Careful operation to prevent suddenly stopping pumping and rapidly shutting
	Broken because of freezing	Drain the water in the winter when valve is not used, or use proper isolation
Disc failed to open	Disc blocked	Don't use too much force
	Stem is overheated and blocks the disc	When the valve is closed and the pipeline is over-heated, rotate the hand wheel somewhat counter clockwise for unload at interval

## 11. Removal

All dismantled and rejected valves cannot be disposed with household waste. The valves are made of materials which can be re-used and should be delivered to designated recycling centres.

### General warning:

#### General note for products which may be used for seawater:

Although our products can be used in seawater systems it should always be noted that, in case of installation in a piping system made of materials which are frequently used because of their excellent seawater resistance (e.g. Cunifer), large potential differences may occur possibly causing corrosion which could permanently damage the proper functioning and integrity of our product.

A combination of different materials should always be mentioned prior to the purchase of our products in order for us to give the best possible advice on a safe functioning.