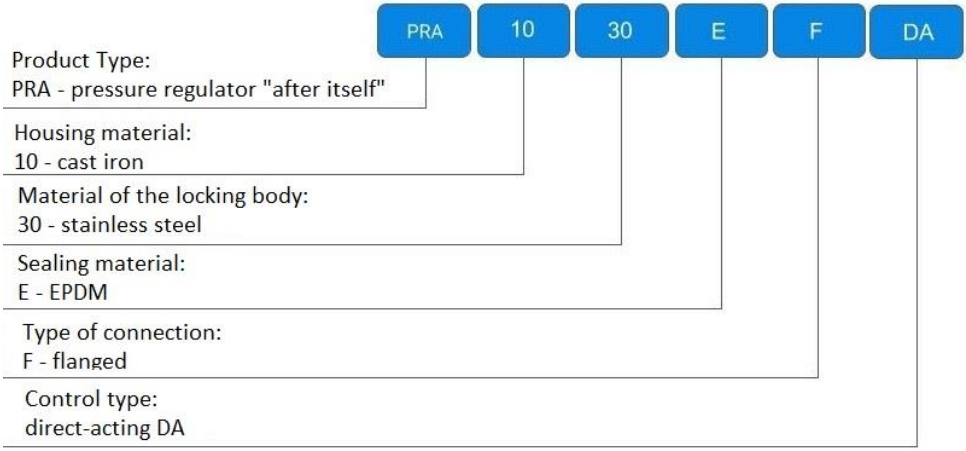
TECHNICAL DATA SHEET

Downstream pressure regulator
ELEPHANT PRA1030E-F-DA-ED DN15-100 16 bar
direct acting, cast iron, flanged

+34 900 433 073, sales@valveelephant.com
Carrer d'Aragó,264,3-1,08007 Barcelona, Spain

1. GENERAL PRODUCT INFORMATION

1.1. Product name: Pressure regulator “after itself” ELEPHANT PRA1030E-F-DA-ED DN15-100 16 bar direct acting, cast iron, flanged.
1.2. Purpose. Direct-acting differential pressure regulator is designed for automatic maintenance of the specified differential pressure of the working medium between the supply and return pipelines in the entire system of technological installation by changing the flow rate.
1.3. Principle of operation. Direct-acting differential pressure regulators are regulating devices that use the energy of flowing medium to move the regulating body. Direct-acting regulators are not shut-off valves and operate only at a constant flow rate of the medium through the regulator.
1.4. Decoding of designation:



2. BASIC TECHNICAL DATA AND CHARACTERISTICS

Table 1

Nominal diameter DN, mm	15 - 100
Working pressure PN, bar	16
Working medium temperature t, ºC	Up to 150
Working medium	cold and hot water, ethylene glycol solution up to 60%
Working medium flow direction	valve body arrow
Ambient temperature, ºC	5 ÷ 55
Relative humidity of the medium, %	30 ÷ 80
Pipeline connection	flange with sealing faces design B type
Housing material	gray cast iron
Proportionality zone	max. 6 % of the upper setting limit
Insensitive zone	max. 2.5 % of the upper setting limit
Time constant	no more than 16 seconds
Relative leakage	max. 0.05% of Kv
Areas of application	heating, water supply and ventilation systems

Table 2. Setting ranges.

Diapason number zone	Control setting range	Pressure, MPa													
		0,01	0,04	0,1	0,16	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,2
0*	0,01…0,1														
1	0,04…0,16														
2	0,1…0,4														
3	0,3…0,7														
4	0,6…1,2														

* before DN50

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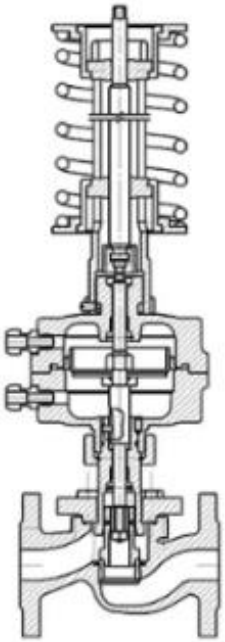
3. PARTS AND BASIC MATERIALS



3.1. The regulator consists of three elements: valve, actuator, setpoint adjuster. The regulator valve is normally open in the absence of a pulse.
3.2. Pulse with higher pressure is supplied by the pulse line to diaphragm 18 (connection "+" pos. 12).
3.3. A pulse with lower pressure is fed by a pulse line under diaphragm 18 (connection "-" pos. 13).
3.4. A change in the adjustable differential pressure above the set point set by spring 32 in setpoint adjuster III causes the stem 21 to move and the valve piston 4 to open or close until the adjustable differential pressure reaches the value set on the setpoint adjuster.
3.5. **Attention**: to avoid damage to the diaphragm it is not allowed to apply pressure unilaterally to the "-" connection pos. 13. 13. The pressure at the "+" connection pos. 12 must always be greater than or equal to the pressure at the "-" connection item 13. 13.
The operating pressure (pressure supplied to the working cavity of the diaphragm box at the "+" connection) must not exceed 1.1 MPa.

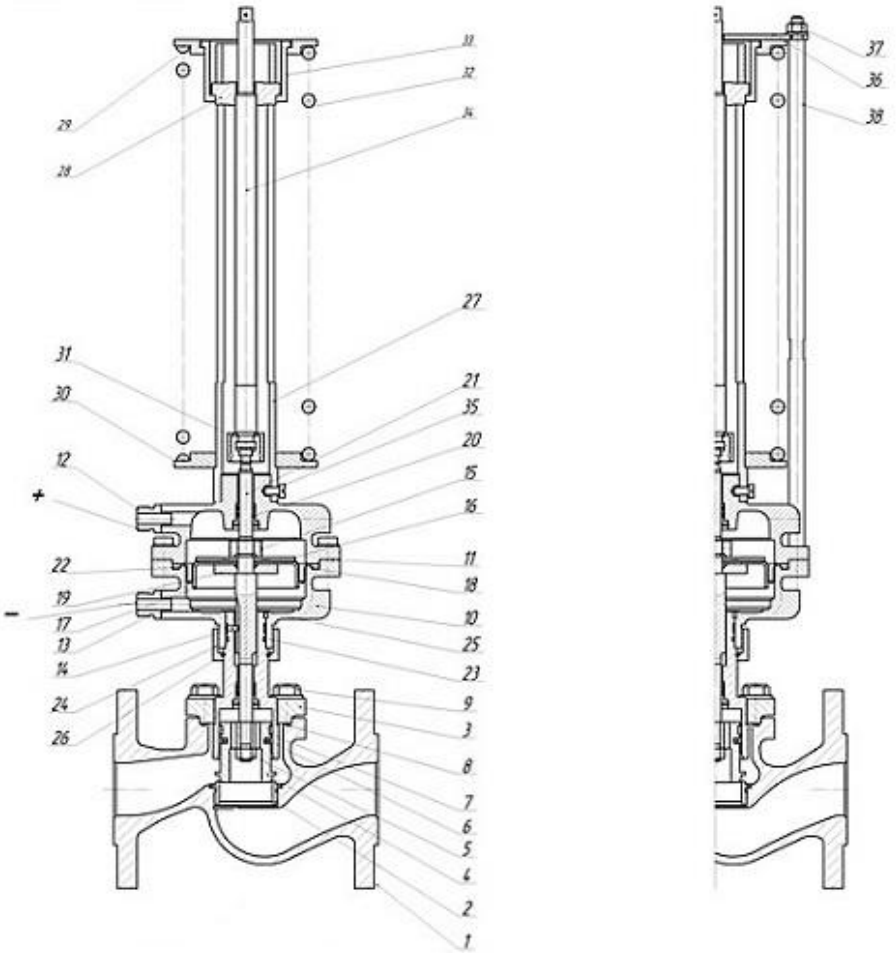


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Table 3: Parts list.

Position	Name	Name block
1	Body	Valve I
2	Seat	
3	Cover with diaphragm case bottom part	
4	Piston	
5	Nut	
6	Discharge chamber seal	
7	Guide	
8	Gasket	
9	Bolt	
10	Diaphragm case bottom part	Drive II
11	Diaphragm case top part	
12	Connector “+”	
13	Connector “-”. "	
14	Pin	
15	Nut	
16	Washer	
17	Diaphragm piston	
18	Diaphragm	
19	Washer	
20	Stem seal (seal assembly)	
21	Stem	
22	Gasket	
23	Gasket	Probe III
24	Sleeve nut	
25	Pin	
26	Locking ring	
27	Tube	
28	Spring retainer	
29	Upper diaphragm plate	
30	Lower diaphragm plate	
31	Connecting assembly	
32	Spring	
33	Hook sleeve	
34	Body	
35	Seat	
36	Cover with diaphragm case bottom part	
37	Piston	
38	Nut	

Table 4. Materials of main parts.

Case	Membrane box	Membrane	Saddle	Plunger	Spring	Screw adjusting adjusting screw	Stem	Stem seal
cast iron	Steel 20	EPDM/ NBR	Steel45/steel	Steel45/steel	60C2A	Steel 45	Steel	Rubber-fluoro formation/ NBR

4. WEIGHT AND DIMENSIONAL PARAMETERS

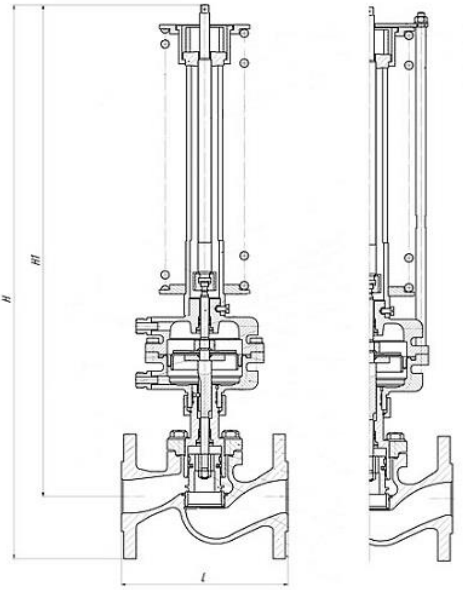

Table 5

Indicator	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
H, mm, not more	583	598	618	638	651	659	676	692	738
H1, mm, not more	535	545	560	568	576	576	583	592	628
L, mm, not more	130	150	160	180	200	230	290	310	350
Weight, kg, not more	13,3	13,8	14,6	16,3	18,3	18,8	28,3	31,7	43,3

Table 6

DN	Number of holes	Mounting option	
		Bolt	Hairpin
15	4	M12-6gx45.66.019	M12-6gx60.66.019
20	4	M12-6gx50.66.019	M12-6gx70.66.019
25	4	M12-6gx50.66.019	M12-6gx70.66.019
32	4	M16-6gx60.66.019	M16-6gx80.66.019
40	4	M16-6gx60.66.019	M16-6gx80.66.019
50	4	M16-6gx65.66.019	M16-6gx80.66.019
65	4	M16-6gx65.66.019	M16-6gx80.66.019
80	4	M16-6gx65.66.019	M16-6gx90.66.019
100	8	M16-6gx70.66.019	M16-6gx90.66.019

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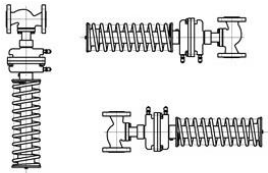
5. TECHNICAL PARAMETERS

Table 7

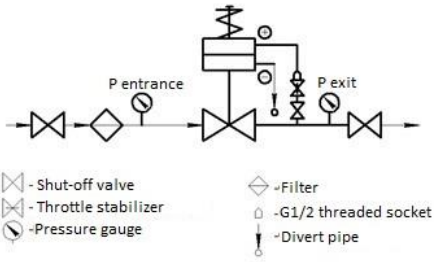
DN, mm	15	20	25	32	40	50	65	80	100
Cavitation onset coefficient, Z	0,6			0,55		0,5		0,45	0,4
Control range	50:1								

6. INSTALLATION INSTRUCTIONS

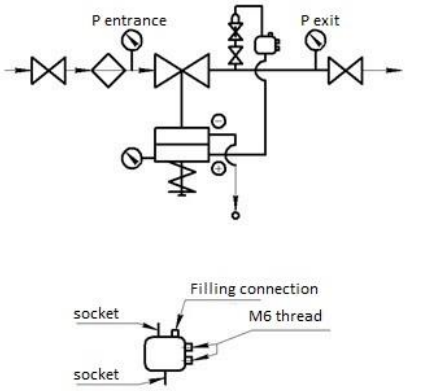


6.1. The recommended position of the regulator is with the adjuster vertically downwards.
6.2. It is recommended to install a magnetic-mesh filter before the regulator. If there are mechanical impurities with particle size more than 70 microns in the working medium, installation of a filter before the regulator is mandatory.
6.3. When installing the setpoint adjuster sideways, it is desirable to place a stop under the diaphragm box to prevent increased mechanical stress on the pipeline at the temperature of the working medium above 110ºC, the regulator should be installed vertically downwards with the setpoint adjuster. If the temperature of the working medium is higher than 110°C or if steam is used as a working medium, a condensation-separation vessel (hereinafter referred to as a condensation-separation vessel) should be installed on the impulse line.
6.4. In places of pulse intake it is necessary to provide manual shut-off cocks allowing to shut off the pressure from the pulse line. To prevent contamination of pulse lines, pulse intake should be carried out from the top or side of the pipelines.
6.5. Before the regulator and after the regulator to provide manual shut-off valves that allow repair and maintenance of the regulator without the need to release the working medium from the entire system.
6.6. During installation, dirt, sand, scale, etc. must be prevented from getting inside the pipeline and regulator.

7. CONTROLLER INSTALLATION



Pressure regulator wiring diagram



Connection diagram with condensation and separation vessel

7.1. Install the socket from the regulator set on the pipeline according to the regulator connection diagram in a place convenient for connecting the impulse line. The socket is screwed into the shut-off valve (internal thread G ½) on the pipeline outlet.
7.2. Install a pressure gauge in the vicinity of the pulse intake point (socket). If the regulator is equipped with a tee with pressure gauge, it is installed in the impulse line disconnection near the regulator "+" connection or near the connection on the pipeline. If the temperature of the working medium exceeds the maximum permissible temperature for the pressure gauge, the pressure gauge should be installed only near the "+" connection of the regulator. When connecting the tee with a pressure gauge to steel connections on the regulator or pipeline, the sealing is made by using a copper conical gasket (the gasket is supplied with the tee).
7.3. Install a pressure gauge in front of the regulator.
7.4. Install and fix the regulator between the mating flanges of the pipeline in accordance with the installation drawing of the object where the regulator is used. Ensure that the direction of the pointer arrow on the body coincides with the direction of the working medium flow.
7.5. Install gaskets between the flanges and tighten the flanges with fasteners.
7.6. Connect the "+" connection of the regulator with the connection on the pipeline with the impulse tube. Leave the "-" connection open to the atmosphere.
7.7. If the diaphragm is defective, hazardous media (hot water, steam) may leak out of the "-" connection. For safety reasons, an outlet pipe must be provided.

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7.8. When insulating the pipelines, make sure that the spring, actuator and impulse line areas remain uninsulated.
7.9. If the regulator has a tendency to oscillate (e.g.: at low flow rates; at large pressure differences upstream and downstream of the regulator; in the presence of an external source of oscillation; when using a regulator with a Kv that does not match the design Kv, etc.), a stabilizing restrictor (needle valve) should be installed on the impulse line. In this case, the restrictor should be screwed into the shut-off valve (G ½ female thread) on the pipeline outlet, and the fitting from the regulator set should be screwed into the restrictor (G ½ female thread).

8. CONTROLLER START

8.1. The adjusting screw 34 must not be turned counterclockwise as far as it will go. In the initial state before start-up, the shut-off valve on the impulse line must be in any position: open or closed. If the valve is closed, the regulator will not operate (remains open). The stabilizing choke must be opened 2-3 turns.
8.2. Fill pipelines and internal cavities of valve I of the regulator with working medium up to working pressure. Control the pressure by the installed pressure gauges.
8.3. Pressurize the regulator impulse line by smoothly opening the shut-off valve on the impulse line (if the valve on the impulse line was closed).

9. CONTROLLER SETTING

9.1. Observing the readings of pressure gauges, set the required value of pressure after the regulator by adjusting the spring force in the adjuster, turning the adjusting screw 34 with a wrench by the square in the upper part of the screw (when turning clockwise, the pressure increases and vice versa).
9.2. In case the pressure in the pipeline (in the regulator pulse line) fluctuates, remove the fluctuations by closing the stabilizing throttle.
9.3. If oscillations are not observed, in order to prevent their occurrence, the stabilizing throttle (needle valve) should be set in the following position: fully closed, then open by 1/3 turn.
Caution: the regulator must not be operated with the stabilizing throttle fully closed.
9.4. Place a seal on the adjusting screw using the hole in the upper part of the screw. The seal must not interfere with the vertical movement of the adjusting screw during operation of the regulator.

10. CONTROLLER SHUTDOWN

10.1. Close the shut-off valve on the impulse line «+».
10.2. Depressurize the impulse line «+».

11. MAINTENANCE INSTRUCTIONS

11.1. After start-up and setting of the required value of the regulated parameter, the regulator does not require further maintenance during its operation, except for periodic external inspection within the terms established by the schedule, depending on the system operation mode, but at least once every six months.
11.2 During the inspection the correctness of adjustment, presence or absence of pressure fluctuations in the pipeline (in the pulse line of the regulator), presence or absence of leakage of the working medium, external mechanical damage and foreign objects interfering with the regulator operation are checked.
11.3 During the warranty period it is allowed only to change the setting of the regulated value and eliminate pressure fluctuations in the pipeline (in the pulse line of the regulator).
11.4 During the period when the system is out of operation, the pressure in the impulse line must be released, the shut-off valve on the impulse line can be in any position: open or closed.

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12. SECURITY MEASURES

12.1. Safety requirements for installation and operation in accordance with the company's established procedure.
12.2. The regulator may be operated only in the presence of operating documentation and safety instructions approved by the head of the consumer company and taking into account the specifics of the regulator application in a particular technological process.
12.3 The operating personnel may be allowed to operate the regulator only after receiving the relevant safety instructions.
12.4 The pressure and temperature of the working environment of the object where the regulator is installed, as well as the spring of the operating regulator may pose a danger to the life and health of the operating personnel.
12.5 Before dismantling the regulator it is necessary to depressurize the working medium from the impulse line, inlet, outlet, drain the remaining working medium and watch the regulator temperature decrease.
12.6 It is strictly forbidden to carry out any works (except for regulator adjustment and elimination of oscillations by stabilizing throttle) if the regulator is under pressure of the working medium.
12.7 To avoid injuries, it is not allowed to perform any actions in the spring area of the regulator in operation.
12.8 During installation, intended use, maintenance and repair of the regulators it may not be necessary to disassemble the set point adjuster, except in case of external mechanical damage.
12.9 When disassembling the setpoint adjuster, it is necessary to take precautions due to the fact that the spring is in a pre-compressed state.
12.10. It is forbidden to dismantle the spring from the assembled regulator (first the setpoint adjuster is removed, then the spring).

13. REPAIR INSTRUCTIONS

13.1. Routine repairs are performed to ensure or restore the regulator's functionality and consist of replacing the diaphragm, seals and gaskets. The current repair is performed by the non-disassembled method, in which the components belonging to a certain instance of the regulator are preserved.
13.2 When disassembling and assembling the regulator, it is necessary to protect sealing and guiding surfaces of assembly units and parts, threads from mechanical damage.
13.3. The personnel performing the current repair must have the qualification of a mechanic of repair or mechanical assembly works not lower than the third grade.
13.4 If a malfunction is detected, the regulator must be dismantled from the pipeline for current repair. It is allowed to dismantle the regulator components that have failed if the regulator can be taken out of operation (pressure shutdown) during the repair period.

Table 8

Description of the consequences of failures and damage.	Possible causes	Instructions for repairing failures and damages
1. The controller does not support the required adjustable parameter.	The regulator is not set correctly. A foreign object has fallen between the coils of the spring. A foreign object has fallen between the valve seat and piston. Diaphragm 18 is damaged. Seal 20 is damaged. Gasket 22 is damaged. Stabilizing restrictor (needle valve) is incorrectly adjusted (fully closed). The impulse line is contaminated.	Readjust the regulator. Remove the foreign object. Remove cover 3 and remove foreign object. Replace diaphragm18. Replace seal 20. Replace gasket 22. Adjust stabilizing throttle (open). Clean impulse line.
2. Seal leakage 20.	Seal 20 is damaged.	Replace seal 20.
3. Leaky joint between the bottom and top covers of the membrane box.	Diaphragm box bolts are not tightened sufficiently. Diaphragm damaged18.	Tighten the bolts. Replace diaphragm18.
4. Leaky connections-impulse tube connections.	Insufficient tightening of cap nuts.	Tighten union nuts.
5. Leaky joint between housing 1 and cover 3.	Insufficient tightening of bolts 9. Damaged gasket 8.	Tighten the bolts 9. Replace gasket 8.
6. Pressure in the pipeline (impulse line) fluctuates.	The stabilizing restrictor (needle valve) is not installed or is not adjusted.	Install or adjust (close) the stabilizing restrictor (needle valve).
7. Leakage of medium from the connection «-».	Diaphragm is damaged18. Gasket 22 is damaged. Seal damaged 20.	Replace diaphragm18. Replace gasket 22. Replace seal 20.
8. Leakage of medium from under the coupling nut 24.	Damaged gasket 23.	Replace gasket 23.

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14. DISASSEMBLY AND MOUNTING OF THE REGULATOR

14.1. When dismantling and mounting the regulator, protect the internal cavities of the regulator, impulse line and pipelines from dirt and foreign objects. Protect the regulator against external mechanical damage.
14.2. Dismantling should be carried out in the following order:

- Disconnect the regulator according to point 10.
- Disconnect the impulse line from the "+" connection of the regulator.
- Depressurize the inlet and outlet of the regulator and drain the remaining medium.
- Unscrew fasteners from the regulator flanges, remove gaskets between the regulator and pipeline flanges, remove the regulator from the pipeline.

14.3. Install the controller according to point 7. except for the already installed impulse lines.
14.4. Start-up and adjustment of the regulator according to points 8 and 9.

15. DISASSEMBLY AND ASSEMBLY OF THE REGULATOR

15.1. **Remove the setpoint adjuster in the following order**:
15.1.1. Loosen the spring 32 as much as possible by unscrewing the adjusting screw 34 clockwise. This will bring the lock 28 to its highest position in the pipe slot 27 and the resistance force on the wrench will disappear.
15.1.2. Unscrew the adjusting screw 34 clockwise as far as it will go. Do not use excessive force on the wrench when unscrewing the adjusting screw.
15.1.3. Loosen locking screws 35.
15.1.4. Taking hold of spring 32, unscrew plate 29 or tube 27 counterclockwise by 4...5 turns (piston 4 will rise above seat 2). Unscrew the adjusting screw 34 clockwise to the stop (piston 4 will lower on the seat 2)..
15.1.5. Repeat until the set point (except for the adjusting screw 34) is unscrewed from the top of the diaphragm case. Remove the set point without the adjusting screw with an upward movement.
15.2. **Install the setpoint adjuster in the following sequence**:
15.2.1. install the setpoint adjuster from top to bottom on the upper (threaded) part of the diaphragm box by passing the adjusting screw 34 into the tube 27.
15.2.2 Take hold of spring 32, plate 30 or tube 27 and tighten the adjuster clockwise up to the stop (the threaded part of the retainer 28 will stop in the threaded part of the adjusting screw 34 and the piston 4 will lower on the seat 2). When screwing in the adjuster, do not apply a great deal of force to it: when the stop is reached (touching the seat 2) not more than 3 Nm or not more than 2 kg.
15.2.3 Screw the adjusting screw 34 into the lock 28 counterclockwise for 4...5 turns (piston 4 will rise above the seat 2).
15.2.4. Hold spring 32, plate 29 or pipe 27 and screw the set point clockwise until it stops (the piston will drop to the seat).

15.2.6. Repeat the operation until the set point is completely screwed onto the threaded part of the diaphragm box.
15.2.7 Tighten the threaded connection between the setpoint adjuster and the diaphragm box by grasping the pipe 27.
15.2.8 Tighten the locking screws 35.
15.2.9. Turn the adjusting screw 34 counterclockwise into the retainer 28 until the spring 32 starts to compress (piston 4 rises above the seat 2). Keep turning the adjusting screw 34 to compress the spring by 5...10 mm. At the moment of spring compression there is a resistance force on the wrench due to the spring force. Therefore, the spring should be compressed by applying some force to the wrench.
Attention: Do not use wrench extensions when setting the setpoint adjuster!
15.3. **To disassemble the regulator with the adjuster removed, proceed as follows**:
15.3.1. Remove the bolts 9.
15.3.2. Remove cover 3 with diaphragm box from housing 1.
15.3.3. Remove the screws in the diaphragm box.
15.3.4. Carefully remove the top of the diaphragm box 11 without damaging the seal 20.
15.3.5. Unscrew nut 5 by grasping the nut 5 and the lugs on the upper part of the rod 21 with wrenches. This will remove piston 4. Do not unscrew nut 5 by grasping the diaphragm case to counteract it, as this may damage pin 14.
15.3.6. Carefully remove the stem 21 without damaging the sealing element 20.
15.3.7. To replace diaphragm and gasket 22, unscrew nut 15.
15.3.8. To replace the stem seal 20, remove the rod, remove the upper part of the diaphragm box 11 (6 screws M8). Replace worn seals. Remove cover 3 from housing 1, unscrew nut 5, remove piston 4. Replace worn seals.
15.3.9. Remove piston 4 to replace seal 6, guide 7.
15.3.10. To replace the gasket 23, unscrew the cap nut 24, remove the lower part of the diaphragm box 10 from the cover 3. The pins 25 screwed in from above will fall out..
15.4. **The regulator is assembled in reverse order**.
15.4.1. In case of damage of the pins' anchoring points 25 re-nail the pins. Lubricate all rubbing surfaces, seals, gaskets, diaphragm and diaphragm box covers with silicone grease (PMS-500 or similar).
15.4.2. Lock nuts 5, 15, 24 with thread locker for detachable joints.
15.4.3. Lubricate the threaded surface of the adjusting screw 34 and internal surfaces of the connecting unit 31 with silicone grease (PMS-60000 or similar).
15.4.4 When disassembling and assembling the regulator it is not allowed to use impact tools.

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16. TESTING INSTRUCTIONS

16.1. Tests for tightness of gasket joints and regulator stem seals should be performed by supplying water at a pressure of pressure to the inlet pipe with the gate open and the outlet pipe plugged. Duration of dwell time at steady pressure pressure: for regulators with nominal bore up to 50 mm inclusive - 1 min; for the rest - 2 min.
16.2 Tightness control shall be carried out according to the methodology of the company performing the tests. The medium flow through the joints is not allowed.
16.3 Performance tests should be carried out by means of five-fold actuation of the regulator by means of the diaphragm actuator to the full stroke value without supplying the working medium to the regulator Moving moving parts should be smooth, without jerks and jams.
16.4 Operating pressure for the diaphragm is not more than 1.1 MPa, test pressure (short-term) - not more than 1.5 MPa.

17. TRANSPORTATION AND STORAGE CONDITIONS

17.1. The valves may be transported by any type of transport in accordance with the applicable cargo transportation regulations and in compliance with the following requirements:

- transportation conditions should correspond to storage conditions in accordance with the procedure established at the enterprise;
- the valve must be packed according to specifications and secured inside the crate;
- During loading and unloading, the packing crate must not be thrown or tilted.

17.2. Valves should be stored in the manufacturer's packing in closed warehouses at temperature from 5 to 50°C and relative humidity up to 80%, ensuring safety of packing and serviceability of valves during the warranty period. Packing variant in accordance with the procedure established at the enterprise.
17.3. Valves in long-term storage are subject to periodic inspection at least once a year. In case of violation of preservation, perform preservation again. Apply preservation lubricant on degreased clean and dry surface of parts. Degreasing should be performed with a clean rag soaked in gasoline.
17.4. To put into operation a valve, which has been completely preserved for long-term storage, it should be dismantled by removing the preservative grease with a rag and then degreasing it with gasoline in accordance with the procedure established by the company.

18. UTILIZATION

18.1. The product is disposed of in accordance with the procedure established at the enterprise (remelting, burial, resale).

18.2. Before sending the valve for disposal, the residual working medium shall be removed from the valve. Methods of removal of the working medium and decontamination of the valve must be approved in accordance with the established procedure at the company operating the valve.

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19. WARRANTY OBLIGATIONS

19.1. Warranty period - 12 months from the date of commissioning, but not more than 18 months from the date of sale.
19.2. The warranty applies to equipment installed and used in accordance with the installation instructions and product specifications described in this data sheet.
19.3. The manufacturer guarantees compliance of the product with safety requirements, provided that the consumer complies with the rules of transport, storage, installation and operation.
19.4. The warranty covers all defects caused by the fault of the manufacturer.
19.5. The warranty does not apply:

- parts and materials of the product subject to wear and tear;
- for cases of damage caused by:
    - modifications to the original design of the product;
    - violation of general installation recommendations;
    - faults caused by improper maintenance and storage; improper operation and use of the equipment.

20. WARRANTY TERMS

20.1. Claims to the quality of the goods may be made during the warranty period.
20.2. Defective products are repaired or exchanged for new ones free of charge during the warranty period. ELEPHANT decides whether to replace or repair the product. The replaced product or its parts resulting from the repair shall become the property of 'ELEPHANT'.
20.3. Costs related to dismantling, installation and transport of the defective product during the warranty period shall not be reimbursed to the Buyer.
20.4. If the claim is unfounded, the Buyer shall pay the costs of diagnostics and expertise of the product.
20.5. Products are accepted for warranty repair (as well as for return) fully assembled.

WARRANTY CARD №____

№	Product Name	Packs

Name and address of the trading organisation

_____

Date of sale _____ Seller's signature _____

Stamp or seal of the trading organisation Acceptance stamp

I agree with the terms and conditions of the warranty:
Buyer _____ (signature)

Warranty period - 12 months from the date of commissioning, but not more than 18 months from the date of sale.

For warranty repairs, complaints and product quality claims, please contact ELEPHANT at: Carrer d'Aragó,264,3-1,08007 Barcelona, Spain E-mail address: sales@valveelephant.com.

When making a complaint about the quality of goods, the buyer shall present the following documents:

1. A free-form application, which shall specify:
   - name of the organisation or full name of the buyer, actual address, contact telephone numbers;
   - name and address of the organisation that carried out the installation;
   - basic parameters of the system in which the product was used;
   - a brief description of the defect.
2. Document confirming the purchase of the product (delivery note, receipt)..
3. Act of hydraulic test of the system in which the product was installed.
4. This completed warranty card.

A note on the return or exchange of goods _____

Date: «___»_____202__г. Caption _____

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