



Manufacturer of shut-off and control valves

TECHNICAL DATA SHEET

Electropneumatic rotary positioner ELEPHANT YT-1000RSN with/without feedback, for pneumatic rotary actuators, control signal 4-20 mA, without explosion protection



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

1. GENERAL PRODUCT INFORMATION

1.1. Product name: Electropneumatic rotary positioner ELEPHANT YT-100RSN with/without feedback, for pneumatic rotary actuators, control signal 4-20 mA, without explosion protection.

1.2. Purpose: The electropneumatic rotary positioner is used for controlling pneumatic rotary actuators by means of an electric controller or a control system with an analog DC output signal with a range from 4 to 20 mA.

1.3. Operating principle: The positioner functions based on force balancing. The positioner uses a nozzle-flap type device and a feedback servomechanism (spring and lever system) to balance the control and feedback forces when the pneumatic actuator (valve) reaches the position corresponding to the control signal.

1.4 Model Features:

- No resonance in the range of 5-200 Hz;
- Low air consumption.

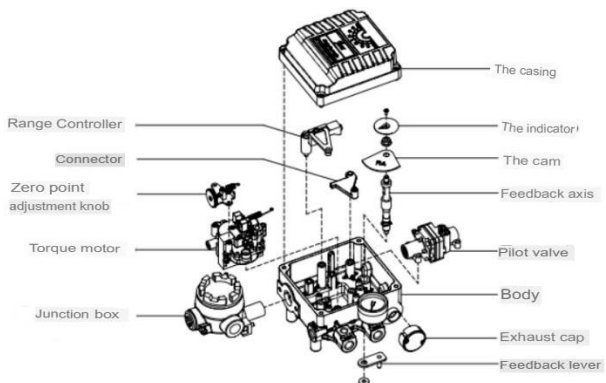


2. BASIC TECHNICAL DATA AND CHARACTERISTICS

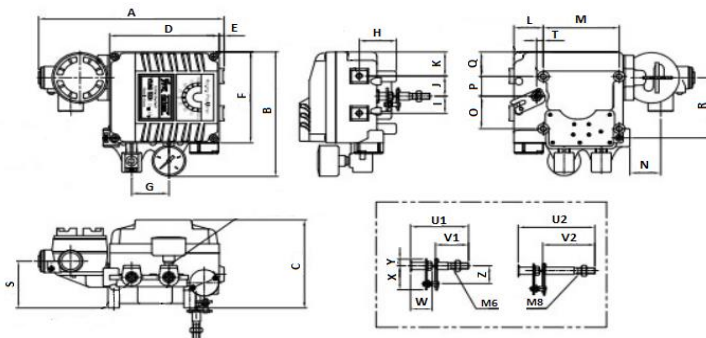
Parameters	YT-1000RSN	
	unilateral action	bilateral
Control input signal	4 ~ 20 mA	
Internal resistance	250 ± 15 oM	
Input pressure	1,4~7 bar / 20~100 psi	
Lever travel angle	0~90°	
Compressed air connection thread	1/4"	
Pressure gauge connection thread	1/8"	
Cable gland	G1/2"	
Protection type	IP66	
Operating temperature	-20°C ~ 70°C	
Permissible ambient humidity	10~90RH	
Linearity	±1%	
Hysteresis	±1%	
Sensitivity	±0.2%	±0.5%
Repeatability	±0.5%	
Compressed air flow rate	3 l/min (at 1.4 bar)	
Outlet air flow rate	80 l/min (at 1.4 bar)	
Housing material	aluminum casting	
Weight	2,8 kg	



3. MAIN DETAILS



4. OVERALL DIMENSIONS

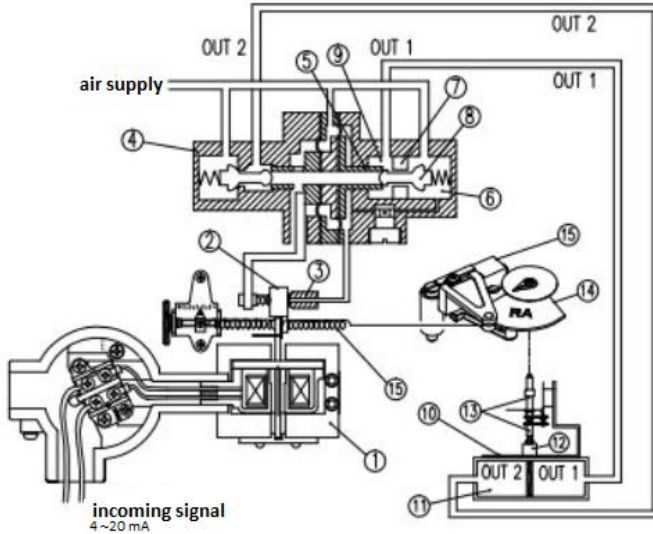


A	B	C	D	E	F	G	H	I	J	K	L	M	N
mm													
224,3	166,5	117,5	132,3	6	122	45	45	23	27	32,5	35,5	91,8	37,2

O	P	Q	R	S	T	U1	U2	V1	V2	W	X	Y	Z
mm													
43,5	26,5	33	80,25	62,5	8	70	93	40	63	26	32	9	24



5. PRINCIPLE OF WORK



The input parameter for the electro-pneumatic positioner is the value of electric current in the coil circuit of the electromagnet coil of the torque motor 1. When the current is constant, the positioner controls the actuator so that the feedback lever 13 remains in the unchanged position. When the strength of the input electric current increases, the flapper 2 moves away from the nozzle 3 and the air pressure over the coil 5 inside the pilot valve 4 is relieved. As a result, the coil 5 moves to the right, pushes the spool 8 blocking the base 7, and pressurized compressed air enters the actuator 10. When the internal pressure of the actuator chamber 11 increases, the actuator pusher 12 is lowered and the change in position of the actuator pusher 12 is transmitted to the slider 14 via the feedback lever 13. This change in displacement is then transmitted to the feedback lever 15, leading to an increase in the tension of the spring 16. When the spring tension force 16 and the force generated by the motor 1 are in equilibrium, the damper 2 returns to its original position, reducing the distance to the nozzle 3. When the volume of air passing through the nozzle 3 decreases, the air pressure above the coil 5 increases. The coil 5 returns to its original position, the spool 8 again blocks the base 7 and stops the supply of compressed air to the actuator 10. Thus, the change in the input current force leads to a metered movement of the actuator, and the movement value is proportional to the change in the input current value.



6. INSTALLATION INSTRUCTIONS

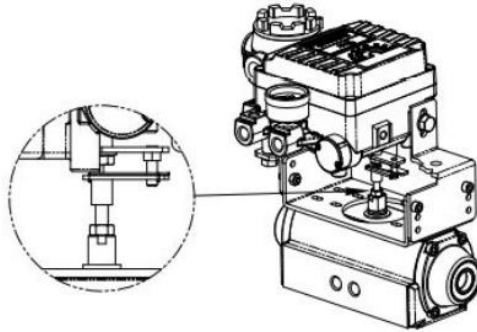
6.1. The product may be installed and operated by persons who have studied this documentation and have been instructed in the safety rules.

The product may be installed and operated by persons who have studied this documentation and have been instructed in observance of safety regulations.

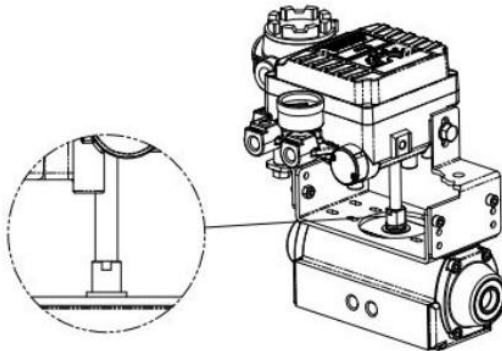
6.2 The product must be inspected prior to installation. If there are any damages, defects resulting from improper transportation or storage, the product may not be put into operation without the seller's approval.

6.3 Before connecting the product to the compressed air network, make sure that screw connections, pipelines and electrical connections are securely fastened. The supply of compressed air and electricity must be disconnected before mounting, dismantling, adjustment and maintenance of the product.

6.4 The operating and environmental conditions must comply with the technical data of the positioner.



Installation diagram when using a forked feedback lever

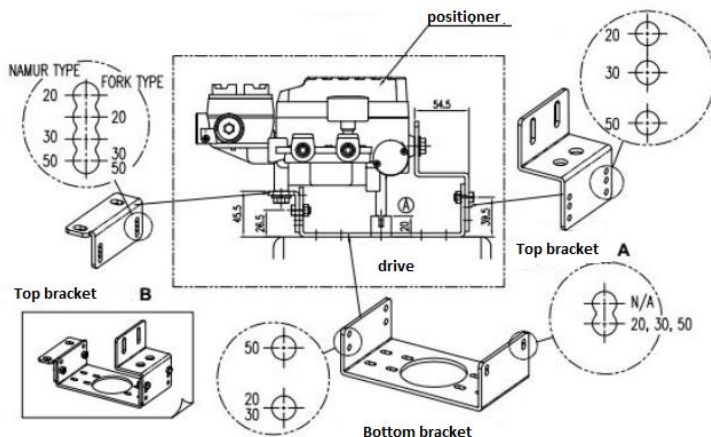


Installation diagram when using the NAMUR feedback lever

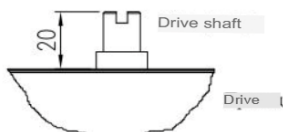


6.1. MOUNTING THE POSITIONER USING A BRACKET

6.1.1. The bracket consists of three parts. The use of the bracket for positioner mounting is permissible when using both fork-type feedback lever and NAMUR standard feedback lever.



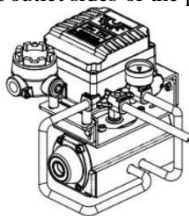
6.1.2. The height (H) of the actuator shaft is divided into 3 types: 20, 30 and 50 mm. Assemble the bracket using the mounting holes according to the available height of the actuator shaft.



Высота вала привода (при H=20 мм)

6.1.3. Connect the positioner bracket to the actuator bracket using hex bolts. To prevent the nuts from loosening due to vibration and other factors, use special washers, caulking, etc.

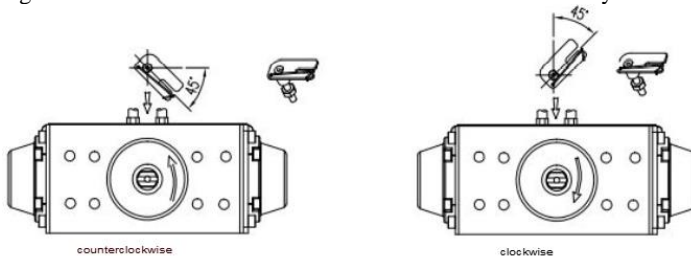
6.1.4 The mounting direction of the bracket depends on the specific operating conditions, but usually the mounting is done so that the air inlet/outlet sides of the positioner and the actuator are aligned.



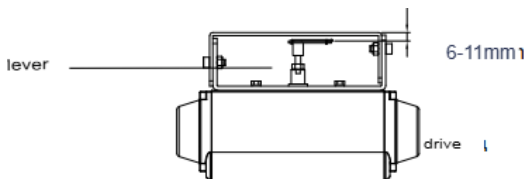
6.1.5. Set actuator shaft stem to zero position. For single-acting pneumatic actuators, the stem is in the zero position when there is no air supply. For double-acting actuators, first determine the direction of rotation of the actuator stem. After determining the direction of rotation and setting the actuator



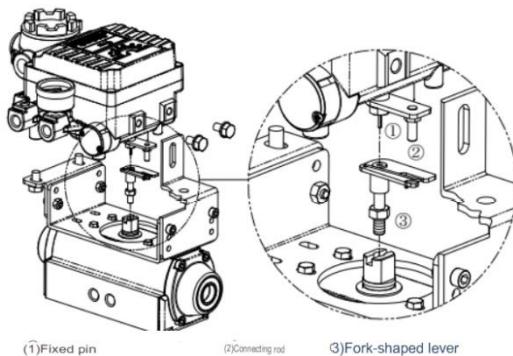
stem to zero, set the fork lever as shown in the figure below. The angle of installation of the fork arm should be 45 degrees from the horizontal axis. This condition is not necessary for the NAMUR lever.



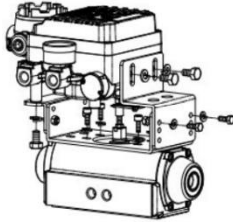
6.1.6. After installation, tighten the nuts under the fork lever. Make sure that the top point of the lever is within 6-11 mm of the top bracket.



6.1.7. Attach the positioner to the bracket. Fix the clamping pin in the center of the main shaft of the positioner and insert the connecting bar into the slot of the fork lever so that it can be locked onto the spring of the fork lever. This aligns the axes of the positioner main shaft and the center of the actuator stem. Misalignment of the positioner and actuator shafts significantly reduces the service life of the positioner.



6.1.8. Secure the positioner and bracket with anti-vibration bolts without tightening them firmly. After ensuring that the unit is correctly installed, tighten all bolts evenly one at a time.



6.2. AIR SUPPLY SYSTEM INSTALLATION

6.2.1. In order to prevent oil, moisture or dust from entering the positioner, a compressor should be used that maximally excludes the air supply with the above-mentioned inclusions.

6.2.2 It is recommended that an air filter or filter regulator with filtering function be installed in the air supply line upstream of the positioner in order to prevent oil, moisture, dust and other foreign matter from entering the positioner.

6.2.3 The supplied air must be clean and dry, with a temperature at least 10 degrees below the ambient temperature.

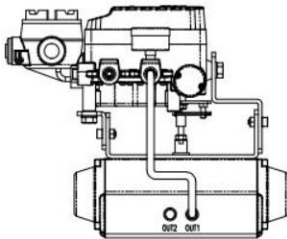
6.2.4 The pressure regulator on the air filter should be set 10% higher than the operating pressure of the actuator spring.

6.2.5. Supply air shall conform to the requirements of ANSI/ISA-57.3 1975(R1981) or ISA S7.3-1975(R1981).

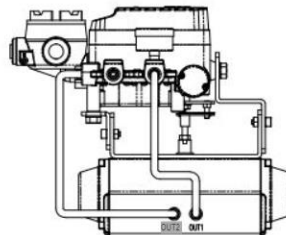
6.2.6 The allowable range of air pressure is 1.4 - 7 kgf/cm² (140 - 700 kPa).

6.2.7 An air line with an inner diameter greater than 6 mm (outer diameter 10 mm) should be used to maintain the flow rate.

6.2.8 The “OUT1” channel is used to connect the positioner to a single-acting actuator. If a spring-return single-acting actuator is used, the “OUT1” channel must be connected to the supply pressure from the actuator. For a positioner with double-acting actuator, the supply pressure is released from the OUT1 channel when the control signal is applied.

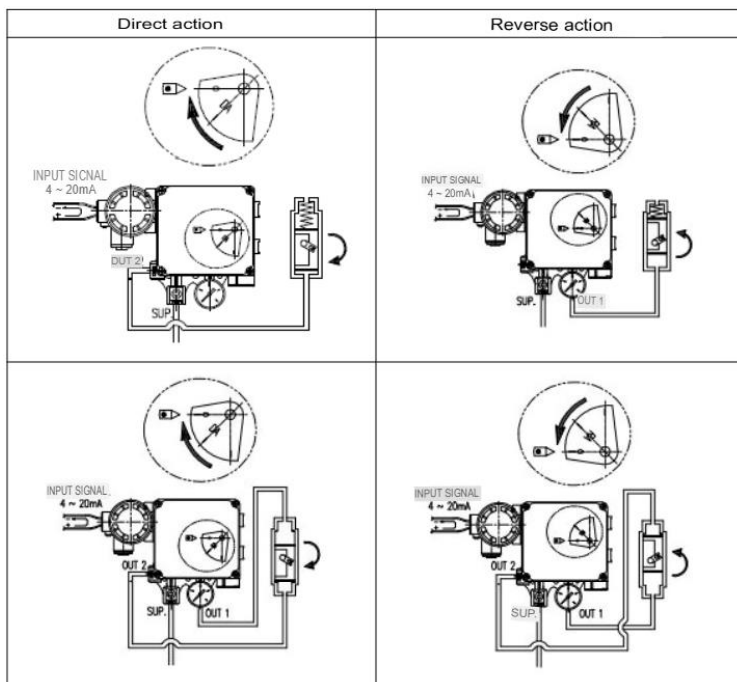


Installation diagram of an air duct with a single-acting drive



Installation diagram of an air pipeline with a two-way drive



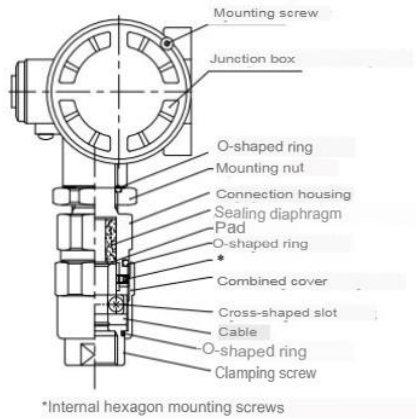


Air line connection diagram according to the direction of action of the double-acting actuator and the setting position of the range adjuster

6.3. POWER CONNECTION

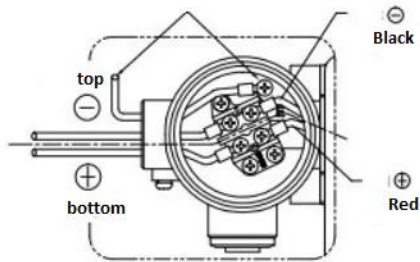
- 6.3.1. Connect the cable connector to the junction box and tighten the fixing screw.
- 6.3.2 Insert the gasket and O-ring into the cable and tighten the fixing screw.
- 6.3.3 Tighten the hexagon socket set screw.
- 6.3.4 Tighten the coupling screw.





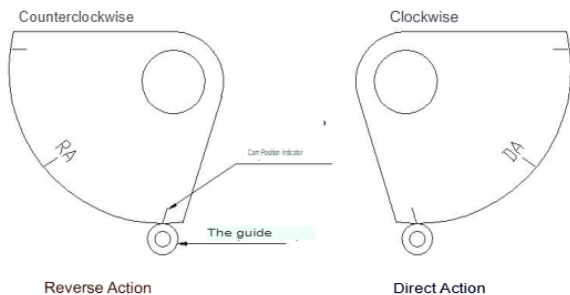
6.3.5. Loosen the fixing screws and open the cover of the junction box.

6.3.6 Connect the external wires of the appropriate polarity in the terminal block of the junction box.



7. POSITIONER ADJUSTMENT

7.1. ECCENTRIC INSTALLATION



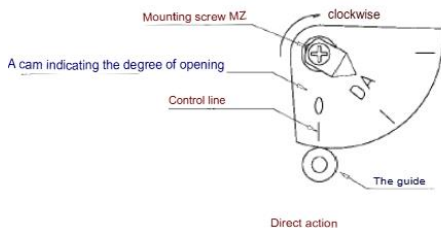
7.1.1. Use the DA side of the eccentric to turn the main actuator stem clockwise (view from the front cover of the positioner) while the feedback stem is being inserted. Use the RA side to turn it counterclockwise (reverse action). Properly attach the eccentric to the shoulder of the feedback stem.

7.1.2 First attach the eccentric to the shoulder in the order of loosening the hex nut, set the actuator in use to the start position and then set the zero line of the eccentric and the operating contact point of the scale adjustment lever so that they coincide.

7.1.3 Do not apply pressure while attaching the eccentric, it is very dangerous.

7.1.4 The eccentric is pre-fitted to the stem at the factory, but it should be screwed firmly to the lock nut (torque 2.0 ~2.5 nM 20~25 kgcm).

7.2. ATTACHING THE OPENING DEGREE INDICATION BOARD

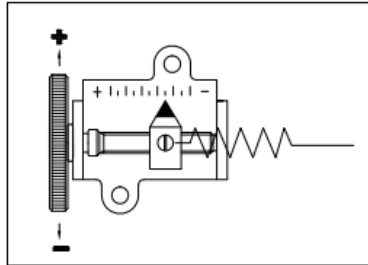


7.2.1. Lock the eccentric and then adjust the zero point and scale. Attach the opening level indication board to the stem using the M3 screw. At this time, place the opening level indication board in a position where it will be in contact with the zero line of the OPENING LEVEL..



7.3. ZERO POINT ADJUSTMENT

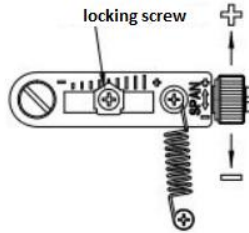
7.3.1. Apply a current signal (4 mA or 20 mA), turn the zero adjustment knob clockwise or counterclockwise to align it with the drive starting point.



7.3.2. If working with a single-acting spring actuator, check that it is set to the standard pressure at the zero point. If not, repeat the zero adjustment.

7.4. RANGE ADJUSTMENT

7.4.1. Apply a current signal (4 mA or 20 mA) and check the actuator travel. If there is not enough travel to set the actuator to the end position, turn the range knob in the “+” direction. If the travel is greater than the required travel, turn the range knob in the “-” direction. «<».



7.4.2. After adjusting the range, the zero point will change and must be set again. Once the zero point has been adjusted, adjust the range again. Repeat the zero point and range adjustment several times until the actuator stops at 0% travel at zero input signal and 100% travel at 100% input signal, respectively.



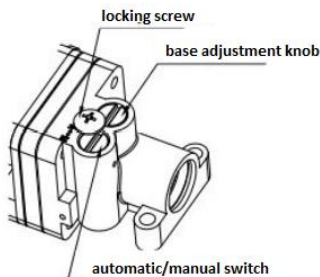
7.5. AUTOMATIC/MANUAL SWITCH A/M (BYPASS SWITCH)

7.5.1. The switch can be used to set the pilot valve adjustment to automatic or manual mode.

7.5.2 The automatic mode “A” is initially set by the manufacturer. To switch to manual mode, turn the switch counterclockwise.

7.5.3 In manual mode, air pressure will be transmitted directly to the actuator.

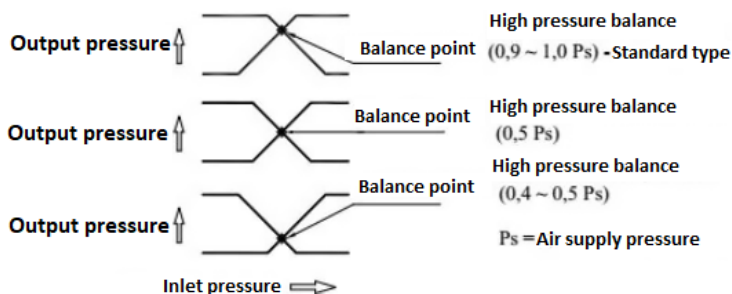
7.5.4 The automatic/manual mode switchover does not work when the OUT2 output is used in single or double acting actuators.



7.6. ADJUSTING THE PRESSURE BALANCE POINT

7.6.1. The base adjustment is set by the manufacturer and does not need to be adjusted by the user.

7.6.2 Base adjustment is possible in double-acting positioners to change the pressure balance point. This procedure is not recommended as it has a significant negative effect on positioning performance.



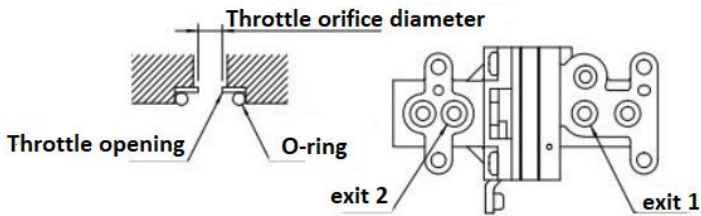
7.7. THROTTLE BORE ADJUSTMENT

7.7.1. If the positioner is installed on a low power actuator, undesired oscillations may occur. The problem is solved by adjusting the restriction orifice to reduce the incoming flow.

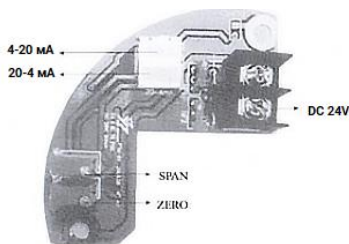
7.7.2 Throttle openings are divided into three types:

Internal air chamber volume of the actuator	Throttle orifice diameter	Number
less than 90 cm ³	Ø1	1
90 - 180 cm ³	Ø2	2
greater than 180 cm ³	-	3

7.7.3. Remove the O-rings on outlet 1 and outlet 2 below the pilot valve as shown below and insert them into the throttle port. Install the O-ring after inserting it into the throttle port. Do not allow foreign objects to enter the orifice during operation.



7.8. REVERSE MODULE DEPLOYMENT (if supplied)



7.8.1. A stabilized voltage DC24V is connected to the wired interface of the feedback module.

7.8.2 Ensure that the potential resistance value of the device is at the half position (about 15 K) at a current value of 12 mA.

7.8.3. Apply a 4 mA signal, observe the current feedback, uniformly adjust the feedback current close to 4 mA with the ZERO knob. The left rotary knob decreases the amount of current and the right knob increases.

7.8.4 Open the 0-20 mA signal, pay attention to the current feedback, adjust the SPAN knob evenly so that the feedback current is close to 4 mA. The left rotary knob is for decreasing the electric current, and the right rotary knob is for increasing the DC current.

7.8.5. Adjustment will be completed when, with input signals of 4 mA and 20 mA, the feedback current is close to the respective values.

7.8.6. If debugging at 20-4 mA is required, it is only necessary to connect the potential device connection line to the appropriate interface.



8. POSSIBLE MALFUNCTIONS AND THEIR ELIMINATION

- 8.1. Positioner does not respond to input signal.
- a) Make sure that the inlet air pressure is at least 1.4 kgf/cm². When using actuators with return spring, the inlet pressure must be greater than the spring stiffness factor.
 - b) Check that the input signal and wiring are in order. The signal range is 4-20 mA DC.
 - c) Check the zero point of the positioner and make sure that the range adjustment is not biased to one side. It is especially important to check that the zero point is not excessively offset to the extremes.
 - d) Check that the positioner nozzle is not blocked. Make sure the air supply is normal, adjust the baffle manually and check if there is air coming out of the nozzle.
 - e) Check that the feedback lever is correctly connected to the actuator.
- 8.2. OUT1 outlet pressure reaches the supply pressure level and does not decrease.
- a) Check the automatic/manual switch. If there is air leakage, replace the switch or pilot valve.
 - b) Check clearance between nozzle and damper. Inspect the assembly for damage.
- 8.3. Pressure is only relieved by the A/M switch.
- a) Check that the positioner nozzle is not blocked. Check that the air supply is normal.
- 8.4. Presence of fluctuations.
- a) Check if the safety spring (next to the pilot unit) is displaced.
 - b) If the actuator is small, adjust the throttle opening.
 - c) Check for increased friction between valve stem and actuator tappet.
- 8.5. The actuator is only adjustable to either the fully open or fully closed position.
- a) Check the operating mode of the actuator and positioner. Recalibrate if necessary.
- 8.6. Low linearity index.
- a) Check that the positioner is correctly positioned. In particular, make sure that the feedback lever holds the level when a 50% signal is input.
 - b) Check that the positioner position at 0% and the control range setting (stroke value) are correct;
 - c) Check the stability of the air pressure at the positioner input port; if the pressure is unstable, use (replace) a pressure regulator.



9. OPERATING INSTRUCTIONS

9.1. To extend the service life of the positioner when it is operated outdoors, additional measures should be taken to protect the device from rain and dust.

9.2 The positioner must be checked at least once a year. Maintenance should be carried out with the electrical and pneumatic connections disconnected. If the diaphragm, O-rings or any other parts are found to be badly worn, they should be replaced.

9.3 If the pressure in the air supply system changes, the positioner may malfunction. Ensure that the compressor and air purification devices are stable.

9.4 The throttle opening must be clean. If necessary, it should be blown out with compressed air under high pressure or cleaned with a 0.2 mm wire.

10. TRANSPORTATION AND STORAGE CONDITIONS

10.1. Shock and other impacts should be avoided during transportation.

10.2 Positioners should be stored in a clean, dry and well-ventilated place. Conduits should be sealed with Teflon tape (scotch tape).

10.3 Positioners must not be stored on the floor. Protection against dust must be ensured.

11. UTILIZATION

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



12. WARRANTY OBLIGATIONS

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

12.2. The warranty applies to equipment installed and used in accordance with the installation instructions and product specifications described in this data sheet.

12.3. The manufacturer guarantees compliance of the product with safety requirements, provided that the consumer complies with the rules of transport, storage, installation and operation.

12.4. The warranty covers all defects caused by the fault of the manufacturer.

12.5. 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.

13. WARRANTY TERMS

13.1. Claims to the quality of the goods may be made during the warranty period.

13.2. 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'.

13.3. Costs related to dismantling, installation and transport of the defective product during the warranty period shall not be reimbursed to the Buyer.

13.4. If the claim is unfounded, the Buyer shall pay the costs of diagnostics and expertise of the product.

13.5. 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__ r. Caption _____

