

<b>Ekorex – Consult, spol. s r.o.</b> <b>IČO: 47451394</b>	<b>OPERATING INSTRUCTIONS</b>  Servo-drive	<b>TP2016 /PTN2</b>
<b>Lázně Bohdaneč</b>	<b>Type Series PTN2-XX.XX.XX.XX</b>	

Technical specifications approved by: (on behalf of the manufacturer)	Date, stamp, signature
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## APPLICATION

Servomotors are designed to rebuild control mechanisms by means of a direct, reversible move and constant speed. Servomotors control mainly the closing and pressure reducing valves.

## MACHINE FUNCTIONING

The engaged force is transferred onto the draw bar nut when the column of Belleville washers placed between two ball bearings in which the nut is embedded is pressed down. Power switches are controlled by moving the nut in its axial direction. When the value of switch-off power is reached in both directions of the output draw bar move, along its entire working stroke, the power switches will be turned off.

The servomotor's stroke for the „OPEN“ position and the „CLOSED“ position is determined by the working valve stroke. The „OPEN“ draw bar position must be limited by a full-stop outside the servomotor, or a position microswitch in the servomotor may be used to turn off the driving electromotor.

The switching position of both position-signaling switches can be set independently throughout the entire range of the working stroke.

## DESCRIPTION

The servomotor is a linear, draw bar system equipped with constant control speed of the output part resetting. An asynchronous motor and self-locking gear mechanism are seated in a box with a removable cover.

Conductors are brought in by means of gland bushings. The servomotor output draw bar is terminated with a clutch which connects the servomotor and a valve. The servomotor construction enables the tightening of connecting elements according to the execution of a relevant valve (flange, columns, etc.). The servomotor is equipped with power switches, terminal position switch, signaling switches, position indicator, thermal fuse of the driving electromotor and heat resistance.

Furthermore, the servomotor can be equipped with a position transmitter and adjustable stroke according to the valve stroke.

The transmitter can be accompanied with a converter featured with a power signal of 4 - 20 mA for dualconductor connection in a measuring loop (direct feeding from a measured signal).

Other electrical outputs possible: i.e. 0 - 20 mA, 4 - 20 mA and 0 - 10 V must be provided with independent feeding 24 V AC, that is galvanically separated from the output.

## TECHNICAL DATA

### Operational conditions

Surrounding temperature -20°C to +60°C

At temperatures lower than -15°C, and in humid environment it is necessary to turn on heating resistance. This applies even when the servomotor is resting.

Relative humidity of surrounding environment 5 to 100 % with condensation whose maximum limit of water contents is 28 g H<sub>2</sub>O/kg of dry air  
 Atmospheric pressure 66 to 108 kPa  
 Vibrations, according to IEC 654-3 group V1  
 frequency 10 to 150 Hz  
 shift amplitude 0,075 mm  
 acceleration amplitude 9,8 m.s<sup>-2</sup>  
 Working position arbitrary. The position when the output part faces down is considered basic. However, the placement under the controlled equipment is not recommended.

#### Feeding

supply voltage 230 V + 6%, - 12% or 24 V + 10%, - 15% AC  
 frequency 48 to 52 Hz

Cover, according to EN 60 529 IP 65

Construction rendering of the sensing unit is suitable for operation in difficult climates. This climatic resistance was not verified by a relevant state testing laboratory.

#### Construction data

Rated force 2 kN, 2,5 kN, 3,2kN, 4kN

Output part resetting speed for rated force 2 kN, 2,5kN 10, 16, 25, 32 mm.min<sup>-1</sup>

Output part resetting speed for rated force 3,2 kN, 4 kN 10, 16, 25 mm.min<sup>-1</sup>

Rated force accuracy  $\pm 10\%$  of the rated force

Accuracy of output part resetting speed  $\pm 10\%$

Servomotor working stroke

maximum 40 mm

minimum 10 mm

Maximum and minimum working strokes of the servomotor are restricted by the valve's working stroke which can be arbitrary within the range of the working stroke. Power switches are turned off when the preset value is reached in any position of the working stroke.

Output part backlash at max. 25% load

of the rated force max. 0,3 mm

Reversing time interval min. 50 ms (without load)

Load factor according to EN 60034-1

2 kN, 2,5 kN interrupted run S4-80% 100-1200 cycles/hour

3,2 kN, 4 kN interrupted run S4-60% 100-1200 cycles/hour

short-term run S2 - 60 min

Current carrying capacity of the power

switches and signaling contacts 250 V/ 5 A AC

Transmitter's parameters

total resistance 100  $\pm 10\%$

residual resistance in the „CLOSED“ position max. 5  $\Omega$

residual resistance in the „OPEN“ position max. 5  $\Omega$

nonlinearity max. 1 %

hysteresis max. 2 %

current carrying capacity max. 1 W

Electrical insulation resistance min. 20 M $\Omega$

Electrical strength of insulation:

a) servomotor with a supply voltage of 230 V AC

- a circuit for feeding and signaling contacts opposite a protection clamp 1 500 V AC

- a circuit for feeding and signaling contacts opposite a transmitter circuit 2 300 V AC

- a transmitter circuit opposite a protection clamp 500 V AC

b) servomotor with a supply voltage of 24 V AC

- a circuit for signaling contacts opposite a transmitter circuit and opposite

the transmitter's circuit 2 300 V AC

- a circuit for signaling contacts opposite a protection clamp 1 500 V AC

- a circuit for feeding and a transmitter circuit opposite a protection clamp 500 V AC

Power required

motor max. 5, 7.5 W

heating resistance max. 15 W

Weight about 5 kg

#### DELIVERIES, STORAGE AND TRANSPORTATION

The servomotors are supplied with an assembled clutch used for the connection on the valve draw bar. The SZ signaling switch is set about 1 mm before the „CLOSED“ position, and the SO signaling switch is set about 1

mm before the „OPEN“ position depending on the servomotor's stroke.  
 The servomotors are supplied along with an assembly manual. Wire diagram is placed on the servomotor cover. Servomotors are supplied in packaging which guarantees their stability in contact with mechanical and/or temperature effects, in accordance with IEC 654-1 and 654-3. Servomotors can be transported by train or cars. When transportation by airplane is arranged servomotors must be placed in a heated, sealed area. Servomotors can be stored in the same packaging at temperatures ranging from 0 to 40°C, and at a maximum relative humidity up to 80%.

## **ASSEMBLY INSTRUCTIONS**

### **Assembly and connection**

The servomotor should be attached to controlled equipment with the aid of columns.

The servomotor should be connected to supply voltage after it is fastened to the valve and set.

Manual control can be implemented when the cover is removed. Pressing a toothed wheel down will release the toothed wheel from its engagement. When a draw bar is reset the toothed wheel must be pressed down. When the machine is started the toothed wheel returns into its engagement by automatically. The servomotor cover should be removed after you release two nuts. When the cover is removed the terminal box can be accessed and the supply voltage of signaling switches and position switch can be connected to it. There's a option to mount external manual control wheel too.

### **Servomotor's attachment to the valve**

Screw the column extension into the valve's flange and tighten the screw properly. Slide the servomotor's column into the extension and screw a cap nut.

### **Servomotor's setting**

Using manual control set up the servomotor's draw bar about 1 mm in front of the full/stop columns, in the „CLOSED“ position. Press the valve's draw bar to the „CLOSED“ position too. Screw the valve spindle in the clutch and secure with the aid of the nut. Using manual control repeatedly travel over the valve seat and checkup whether whether the moment switch switches off in the valve seat area and not in the full-stop columns.

### **Terminal position switch setting**

Set the KPO switch to the required stroke as follows: release the M3 screws; move the KPO switch in a groove so that it would become engaged at the required stroke.

### **Signaling switches setting**

The servomotor will be set gradually to those positions which are to be signaled. Release the M3 screws; move the switch into the groove, which will ensure that all relevant switches will become engaged.

### **Transmitter setting**

Servomotors with a transmitter are set for the required stroke. If a different stroke is selected, the following adjustment procedures must be carried out:

1. Using the manual control reset the servomotor draw bar to the „CLOSED“ position.
2. Exchange the toothed wheels which determine the stroke (provided by the manufacturing plant).
3. Confirm that the residual resistance value is in the „CLOSED“ position. This value must correspond with the value indicated in the 'Construction data' chapter. If the value does not comply with these set out values it must then be adjusted by means of turning over the transmitter.
4. Reset the servomotor to the „OPEN“ position and re-check the residual resistance value.

### **Servomotor connection**

A switch and a fuse must be installed within the mains supply. The clamps are designed for connection of conductors in a space of 1.5 mm<sup>2</sup>. The servomotor will be connected by means of Cu conductors whose total insulation resistance will be at least 10 MΩ. When the conductors are connected, their bushings will be secured with an appropriate sealing material.

### **Commissioning**

When the servomotor is attached to the controlled equipment, and when its setting and voltage connection are completed, the servomotor will be ready to be operated.

### **MARKING**

The servomotor plate reads this information:

- trade mark
- 'made in Czech Republic' line
- product number
- production number
- rating voltage, frequency and power required
- resetting speed
- rating force
- rating voltage and rated current of switches
- covers

**QUALITY GUARANTEE**

The manufacturer provides the servomotor with a 12-month guarantee in compliance with the Commercial Code. Faults that will occur during the guarantee period due to defective material or faulty execution will be repaired free of charge provided that the device is presented to the manufacturer in the original or equal packaging. The guarantee however does not include faults caused by unauthorized changes/repair of the device, by noncompliance with technical and operational conditions set out by the manufacturer, or by violent damage.

**ATTENDANCE AND MAINTENANCE**

It is recommended to treat the toothed wheels and the motion screw with suitable lubricant after 1/2 a year normal operation (e.g. COSTRAC H2 and LUBRAK-HT, respectively).

**REPAIR**

All repair work is carried out by the manufacturer.

**RECYCLING**

It is possible to separate every actuating mechanism to single types of the applied materials and to provide their stocking and a subsequent liquidation according to the principles of the Security of the Waste System SM-15 directions.