

Ekorex – Consult, spol. s r.o. IČO: 47451394	OPERATING INSTRUCTIONS Servo-drive	TP2016 /PTN7
Lázně Bohdaneč	Type Series PTN7-XX.XX.XX.XX	

Technical conditions are approved on behalf of the manufacturer by:	Date, stamp, signature
Petr Kohoutek Managing director	December 1st, 2000

Table of contents:	1.	APPLICATION
	2.	PRINCIPLE
	3.	DESCRIPTION
	4.	OPERATING CONDITIONS
	5.	OTHER DATA
	6.	STORAGE, DELIVERY AND TRANSPORTATION
	7.	ASSEMBLY INSTRUCTIONS
	8.	QUALITY WARRANTY
	9.	PACKAGING AND DISPATCH
	10.	RECYCLING

1. 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.

2. 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.

3. 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 dual-conductor 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.

4. 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 H₂O/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 ⁻²

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	16 kN, 20 kN
Output part resetting speed	20 - 80 mm.min ⁻¹
Rated force accuracy	± 10% of the rated force
Accuracy of output part resetting speed	± 10%
Servomotor working stroke	
maximum	70 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 pre set 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	
interrupted run S4-25%	100 cycles/hour, 630 cycles/hour on a short-term basis (max. 24 hours);
short-term run S2	10 min
Current carrying capacity of the power switches and signaling contacts	250 V/ 6 A AC
Transmitter's parameters	
total resistance	100 $\Omega \pm 10 \Omega$
residual resistance in the „CLOSED“ position	max. 5 Ω
residual resistance in the „OPEN“ position	max. 5 Ω
nonlinearity	max. $\pm 2 \%$
hysteresis	max. 2 %
current carrying capacity	max. 1 W
Electrical insulation resistance	min. 20 M Ω

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	1 350 V AC
- a circuit for feeding and signaling contacts opposite a transmitter circuit	2 300 V AC
- a transmitter circuit opposite a protection clamp	350 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	1 350 V AC
- a circuit for feeding and a transmitter circuit opposite a protection clamp	350 V AC

Power required	
motor	max. 120 VA
heating resistance	max. 15 VA
Weight	about 10 kg

5. ORDERS

Orders must indicate:

- name
- product number
- number of ordered pieces

Example:

PTN7 lever servomotor -8 pieces

6. 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%.

7. ASSEMBLY INSTRUCTIONS

Assembly and connection

The servomotor should be attached to controlled equipment with the aid of columns. The connection is portrayed in Picture 1.

The servomotor should be connected to supply voltage after it is fastened to the valve and set. Wire diagram and a terminal box drawing are shown in Picture 2.

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.

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 check-up 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 mm². 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

8. Quality Warranty

11.1. The manufacturer warrants the device for 12 months in accordance with the Commercial Code (§ 429 and subsequent ones). The defects arisen in the warranty period provably thanks to a defective material or defective workmanship, will be repaired for free. The device has to be sent to be repaired in the original or equivalent packing.

11.2. The warranty is not applied to the defects caused by a non authorized intervention in the device, by non-observance of technical and operating conditions specified by the manufacturer, and to the defects caused by a mechanical damage.

9. Packaging and Dispatch

A staff member of the dispatch department puts the actuating mechanism in a determined packing and fills the loose space with a lining material. After that he secures the packing cover and labels the packing in accordance with the Chapter Nr. 8.2.

10. 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.

Specification table

PTN7-	XX.	X	X.	X	X.	X	X.			
11								16 kN rated force	20 mm/min	speed of movement
12								16 kN	25 mm/min	
13								16 kN	32 mm/min	
14								16 kN	50 mm/min	
05								10 kN	80 mm/min	
21								20 kN	20 mm/min	
22								20 kN	25 mm/min	
23								20 kN	32 mm/min	
24								20 kN	50 mm/min	
15								16 kN	80 mm/min	
99								according to the agreement		
	0							230 V/50Hz/60Hz	Supply voltage	
	2							24 V/50Hz/60Hz	For 60Hz ops. add 20% to the speed	
		0						MO; MZ; KPZ	count and type of switches	
		2						MO; MZ; KPO	MO, MZ - rated force open/close	
		5						MO; MZ; SO; SZ; KPZ	KPO, KPZ - position open/close	
		6						MO; MZ; SO; SZ; KPO	SO, SZ - adj. position switches	
		9						according to the agreement		
			0					without		
			1					output 0 - 10 V		
			2					output 0 - 20 mA	24VAC - four wire type	
			3					output 4 - 20 mA		
			4					output 4 - 20 mA	24VDC - two wire type	
			5					output 0 - 100 ohm	resistance transmitter	
			6					output 2 x 0 - 100 ohm		
			7					output 4-20 mA	capacitive C/I transmitter - converter	
			9					according to the agreement		
				1					32	elevation [mm]
				2					40	
				3					50	
				4					62	
					1	0		columns M20	clutch M16x1,5	
					2	0		columns M20	clutch M20x1,5	

Table is relevant for 3 point driving input.

According to agreement it is possible to provide servodrives with analog control input 0-1V, 0-10V, 0-20mA, 4-20mA and external hand operation wheel.

In this case order as PTN 7-XX.XX.XX.XX / control 4-20mA / HO