Ekorex – Consult, spol. s r.o. **IČO: 47451394**	OPERATING INSTRUCTIONS Rotary Servo-drive	**TP1002 /PPN3**
Lázně Bohdaneč	**Type Series PPN3-XX.XX.XX.XX**	

Technical specifications approved by: (on behalf of the manufacturer)	Date, stamp, signature
Kohoutek Petr Director	1.10.2002

Contents:

1. Principle and Use

The servo-drives are designed for control and regulation of taps, valves, louvers, heating and air-conditioning equipment. The servomotors are mounted to the controlled device by a connecting component or by a yoke.

The twisting moment is transmitted by a gear directly to the output shaft. The working angle is set by cams controlled by position switches (microswitches). The position of switching of both signalling switches can be set separately within the entire working angle. The servo-drive may be equipped with transmitter (potentiometer) with resistance signal or converter with unified electric output corresponding to the position of the controlled device.

2. Description

The servo-motors are lever, rotary with max. turning 270^{o}, with constant control speed. The reversible synchronous motor and the self-locking gear mechanism are located between two plates in a cover made of sheet steel. The twisting moment of the rotor is transmitted by a gear directly to the output shaft. The servomotor is equipped with position (terminal) and signalling switches with the possibility of manual control. The working angle is set by cams controlled by position switches. The position of switching of both signalling switches can be set separately within the entire working angle. The servomotor may be equipped with a resistance transmitter of position. The device may be equipped with converter with current signal 4 – 20 mA for two-wire connection in the measuring loop (supply directly from the measured signal) or with the possibility of electric output , i.e. 0 – 20 mA, 4 – 20 mA and 0 – 10V. The converter must have separate supply 24 V AC, galvanically isolated from the output signal.

3. Operating Conditions

Ambient temperature	-20 °C to + 60°C
Covering	IP 65 according to ČSN EN 60 529
Power supply	230 V AC +6;-12 % or 24 V AC ±10
Frequency	48 Hz to 52 Hz
Relative humidity	ambient 5 až 100 % with condensation with the upper limit of the water content 28 g H_2O/kg of dry air
Atmospheric pressure	66 to 108 kPa
Working positions	any (recommended place: above the controlled component)
Input	up to 16 VA (depending on the motor type)
Design:	
Twisting moment: 35 Nm	- 15 s / 90°
Twisting moment: 50 Nm	- 30 s / 90°
Twisting moment: 65 Nm	- 60 s / 90°
Twisting moment: 80 Nm	- 90 s / 90°
Twisting moment: 90 Nm	- 15 s / 90°
Twisting moment: 105 Nm	- 30 s / 90°
Twisting moment: 120 Nm	- 60 s / 90°
Twisting moment: 135 Nm	- 90 s / 90°

4. Technical Data

Electric insulance	min. 20 MΩ
Load capacity of position and signalling switches	250 V / 5 A AC
Follow-up of the shaft with load	max. 30° angular
Clearance of the shaft with load	max. 1.5° angular
Time interval for reversal	min. 50ms (without load)
Hysteresis of signalling switches	max. 3° angular
Load factor according to ČSN EN 600 34-1	intermittent working S4-80%, 100 cycles/hour up to 1200 cycles/hour short-time (max. 24 hours)
Parameters of the potentiometer	
total resistance	100Ω ± 20%
residual resistance in position "SHUT"	max. 5Ω
residual resistance in position "OPEN"	max. 5Ω
nonlinearity and hysteresis	max. ±2 %
nominal load	max. 1 W
El. durability	1000 hj + 70°C ± 3 % max.
Clips for connectors	up to a cross-section of 1.5 mm^2
basic torque and closing time	see Tab. Design, accuracy ± 10%

The device has no built-in fuse and it must be protected by an external fuse according to ČSN EN 60127-2.

Electric strength of insulation

a) servomotor 230 V AC	
- circuit of supply and signalling contacts against the protective clamp	1 350 V AC
- circuit of supply and signalling contacts against the potentiometer circuit	2 300 V AC
- potentiometer circuit against the protective clamp	350 V AC
b) servomotor 24 V AC	
- circuit of signalling contacts against the potentiometer circuit	2 300 V AC
- circuit of signalling contacts against the protective clamp	1 300 V AC
- potentiometer circuit against the protective clamp	350 V AC

5. Other Data

Data on the product:

6.1 Data on the label

a)	identification of the manufacturer including the address	
b)	device type	PPN3-XX.XX.XX.XX
c)	year of production	e.g. 2002
d)	serial number	s.n. ……..
e)	identification of the country of production-	Made in Czech republic

6.2 Overview label (placed on the rear cover or on the side of the device) :

The overview label may contain additional needed data – e.g. the wiring diagram, information about data on the label of a built-in component, etc. – this information is on the rear cover of the device

6.3 Reference part of the product
Reference number of prod. part of tech. document. - TP1002/ PPN3 (technical specifications)

6. Storage, Delivery and Transport

6.1 Storage
The device can be stored at an ambient temperature of -20 ^{0}C to +40 ^{0}C, with a relative humidity of the ambient air max. 75 %.
6.2 Delivery
The device is delivered together with the following documentation: Operating instructions NKO1002 / PPN3 including appendices and possibly other documentation agreed between the manufacturer and the customer.
6.3 Transport and Storage
The devices are delivered in the packing which ensures stability after acting of mechanical and thermal effects.
The complete device is delivered in the packing with an indication of the supplier and the customer.
6.4 Recycling
Every device can be separated into individual sorts of material which shall be deposited and subsequently disposed of in accordance with Directive SM-15, Waste Management.

7. Assembly and Setting of the Mechanical Part, Putting into Operation

7.1 The works according to technical specifications at connection of the electric part may be carried out solely by skilled employees according to Regulation 50/1978 Coll. § 5 or according to 51/1987 Coll. The servo-drive is an electrical equipment in terms of ČSN EN 61010-1, belonging to overvoltage in installation category II.

7.2 Connection of the servo-drive to the operated valve or another operated device
Fix the servo-motor to the operated device using the stand, clamp or in another way according to the design. Do not connect it to the supply voltage before fixing to the valve and adjustment. The wiring diagram and the drawing of the terminal box are in the drive housing.
Manual control of the device is possible after removal of the housing. After pressing the rod, the toothed wheel releases from the mesh. During adjustment the toothed wheel has to be pressed down. After release, the toothed wheel returns automatically to the mesh. The housing of the servo-drive can be removed after loosening of two nuts. After removal of the housing the terminal box is available for connection of supply voltage for the signalling switches and the transmitter of position.

8. Setting of the Electric Part, Service, Repairs

8.1 Setting of the signalling switches:
The terminal switches are set. At the change of position "SHUT" and "OPEN" loosen slightly the central screw of the pressing cam. Using a screwdriver of a diameter of approx. 2 mm loosen the two screws corresponding to KPZ (the lowest one) and the cams reset in the way that KPZ switches off as needed. Tighten the screws, including the central one.
The order of the cams from below to top is KPZ, KPO, SZ, SO. The highest screws control the cams for SO, each another pair is always to the right from the previous ones.

8.2 Setting of the signalling switches

The servo-drive successively sets in the positions which have to signal setting of the operated device. Switching of the microswitches shall be set the same as for the terminal switches.
8.3 Setting of the transmitter
After fixing the drive to the valve check the data in the utmost levels by the ohmmeter. The same applies for the unified output signals. The mechanic may write down also the value of the signal at the moment of switching of the position microswitches and use this information e.g. at repair of the drive.
For the electric output signal it is necessary to set the device to the utmost positions and check or set the range of the output signal by the setting potentiometers according to the type of the device. Check the output signal by the multimeter.
8.4 Repairs and Maintenance
Depending on the environment and loading of the servo-drive we recommend greasing of the gears and checking of the setting of the output signal after one to three years of operation. Assembly, maintenance and repair should be done by professional companies that are authorized from the manufacturer of the servo-drive for servicing.
8.5 Spare parts
O-rings, microswitches, nuts for the cover, transmitter, terminal box, motor - all depending on the type of the device and on agreement with the manufacturer.

9. Assortment Table PPN3-XX.XX.XX.XX

See Attachment - Assortment table PPN3

10. Guarantee of Quality

10.1 The manufacturer provides guarantee for 12 months in terms of the Commercial Code (§ 429 and next). Defects originating within the guarantee period through provably defective material or defective design will be repaired free of charge, if the device is sent in the original or equivalent packaging to the manufacturer, or if the repair is ordered from the manufacturer.
10.2 The guarantee does not apply to defects caused by unauthorized intervention to the device, nonobservance of technical and operating conditions specified by the manufacturer, forcible mechanical damage or wrong process of assembly.
10.3 The manufacturer stipulates the right for changes. Possible changes will be stated in the accompanying document.

Address of the manufacturer: Ekorex-Consult, spol. s r.o.
Na Lužci 657
533 41 Lázně Bohdaneč

Phone./Fax: 466 92 10 00 **E-mail:** ekorex@ekorex.cz