



CE

INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS



Electric part-turn actuators SP MINI

TEST CERTIFICATE

ELECTRIC PART-TURN ACTUATOR SP MINI	
Type number 272.	Power supplyVHz
Serial number	Max. load torqueNm
Production year	Operating times/90°
Wiring diagram	Operating angle°
Warranty period months	Transmitter
Serial number of electric motor	
Serial number of transmitter	
Serial number of position controller	
Tests made in accordance with TP 74 1001 00	
Tests made by	Packed by
Date	Signature and stamp

COMPLETENESS CERTIFICATE

Used valve.....	
Assembled by: Firm.....	
Name	
Warranty period months	
Date	Signature and stamp

INSTALLATION CERTIFICATE

Location	
Installed by: Firm	
Name	
Warranty period..... months	
Date	Signature and stamp

Contents

1. General	2
1.1 Purpose and applications	2
1.2 Safety instructions	2
1.3 Warranty conditions	3
1.4 Under-guarantee and after-guarantee service.....	3
1.5 Operating conditions.....	3
1.6 Description	6
1.7 Technical data.....	7
1.8 Conservation, packing, transport, storing and unpacking	9
1.9 Assessment of the product and packaging and removal of contamination	10
2. Installation and dismantling of actuator	10
2.1 Installation	10
2.2 Dismantling.....	12
3. Adjusting actuator	12
3.1 Adjustment of position switches (Fig.3).....	12
3.2 Adjustment of resistant transmitter (Fig.4)	13
3.3 Adjustment of the Electronic Position Transmitter (EPV) - the Resistive Transmitter (Potentiometer) with the Converter PTK 1	13
4. Service and maintenance.....	14
4.1 Service.....	14
4.2 Maintenance – extent and periodicity	15
4.3 Troubleshooting	15
5. Spare part list.....	16
6. Appendices	17
6.1 Wiring diagrams	17
6.2 Dimensional drawings and mechanical connections	18
6.3 Record on warranty service intervention	22
6.4 Record on after-warranty service intervention	23
6.5 Commercial agency and contractual service centers.....	24

1. General

1.1 Purpose and applications

Electric part-turn actuators (hereinafter as **EA**) of **SP MINI** (hereinafter **SP**) is a high- powered electric - mechanical product designed for installation onto controlled devices (regulating bodies – mixture fittings, valves, ball cocks, louvers and other devices). EA is provided for remote control of regulating control bodies in both movement directions. It can be equipped with means of measuring and control of technological processes where an unified analogue direct current or voltage signal is an information bearer on their input and/or output. It can be also used in heating, energy, gas, air-conditioning and other technological systems, which they are suitable for, regarding their features.



Note:

It is forbidden to use the EA as a lifting mechanism!

Switching of actuator by a semiconductor components/switches have to be consulted with producer.

1.2 Safety instructions

Product characteristics as hazard risk concerns

ES type SP MINI based on the characteristics presented in “Operating conditions” and as hazard risk is a reserved technical equipment with high hazard degree as the Electrical Equipment Group A (see Ordinance 718/2002 Coll. MPSvR SR, §2 and Annex I, Part III, sect. 1 – valid for the Slovak territory). Electric actuators are according to directive LVD 2006/95/EC and standard IEC 61010-1 within valid edition assigned for installation category II (overvoltage category).

Note: *Assigning to the Group A means the possibility of installation in areas with special dangers regarding casualties caused by electric current (wet surroundings – spraying water).*

Product influence to environment

Electromagnetic compatibility (EMC): the product complies with the requirements of the Directive 2004/108/EC of the European Parliament and of the Council on the approximation of the laws the Member States relating to the electromagnetic compatibility and with the requirements of standards as well EN 55014-1, EN 55014-2, EN 61000-3-3 and EN 61000-3-2 within valid edition.

Vibrations caused by the product: product influence is negligible

Noise produced by the product: during operation the noise level A at the service area can be max. least 62 dB (A).

Requirements for professional qualification of people performing installation, service and maintenance



*Electric connection can be provided an **electro technically educated** person with a professional education of an electro-technical apprentice or study field and his professional qualification was approved by an authorized educational institution.*

Instructions for staff training



*The device can be operated by **workers professionally qualified and trained by the producer or contracted service centre.***

Warning for safety use

Product protection

EA **SPMINI** does not have own short-circuit protection, therefore there must be included suitable protective device into the supply power (circuit breaker, or fuse), which serves at the same time as main switch.

Type of equipment from a connection point of view: The equipment is designed for permanent connection.

1.3 Warranty conditions

The supplier is responsible for completeness of the delivery and guarantees these specifications of the product which are stated in Technical conditions (TP) or specifications agreed in the Contract.

The supplier is not responsible for any deterioration of parameters caused by the customer during storage, unauthorised installation or improper operation.

1.4 Under-guarantee and after-guarantee service

Under-guarantee service is performed by the service department of the production plant, or by a contracted service centre according to a written claim.

This claim should be integrate the following:

- copy and/or note on assembly and installation
- basic data from nameplate (type code an serial number)
- description of the claimed fault (operation duration, ambient parameters – temperature, humidity... operational mode incl. frequency of switching)

It is recommended to have **after-guarantee service** performed by the service department of the production plant, or by a contracted service centre.

1.5 Operating conditions

1.5.1 Product location and operating position

- EA can be installed and operated at sheltered areas of industrial plants without temperature and humidity regulation, protected against climate effects (e.g. direct sunshine).
- EA have to be placed with the view of access toward wheel of manual operating, top cover and bushing.
- Installation and operation of EA is possible in **any position**. The standard position is with perpendicular axis position at the output and the top control.



Warning:

When the EA is installed in open air, **it must be** sheltered lightly to protect it against direct effects of atmosphere.

1.5.2 Operating environment

CLIMATE GROUPS AND TYPES

According to standard IEC 60 721-2-1:

EA have to resist external effects and operate reliably:

- in climatic conditions for the group / type of climate:
- version „**standard**“- for climate group **Restricted** (R) + /Warm temperature (WT), Warm Dry (WDr), Mild Warm Dry (MWDr) and Extremely Warm Dry (EWDr) with corrosion resistance C3 resp. C4 (EN ISO 12944-2)

Category of location

- version “**standard**“ is intended for location **under the** shelter (category 2)

Atmosphere type

- version “**standard**“ is intended for location in atmosphere type **II** industrial

ES **SP MINI** must resist to external effects and operate reliably:

In the conditions of the following types of environment:

- mild to hot dry with temperature in range -25°C to $+55^{\circ}\text{C}$ **AA 7***
- in industrial environment:** at temperatures stated above
- with relative humidity 5 to 100 %, with occasional condensation, with max. contain of water 0,028 kg/kg of dry air, with temperatures stated above **AB 7***
- with height above sea level 2 000 m, with barometric pressure range 86 to 108 kPa **AC 1***
- with spraying or jet water from all directions–(protection enclosure IP x5) **AD 5***
- with medium level of dust content – with a possibility of effects of flame-proof, non-conducting and explosion-proof dust, medium cover of dust; dust fall more than 350 but at most 1000 mg/m² (products with protection enclosure of IP 6x)..... **AE 6***
- with atmospheric occurrence of corrosive and pollution media (with high degree of atmosphere corrosive aggressiveness); important presence of corrosive pollution **AF 2***
- with a possibility of influences of mechanical stress:..
 - medium sinusoid vibrations with frequency in range 10 up to 150 Hz, with shift amplitude of 0,15 mm for $f < f_p$ and acceleration amplitude 9,8 m/s² for $f > f_p$; (transition frequency f_p is from 57 up to 62 Hz) **AH 2***
 - medium impacts, shocks and vibrations..... **AG 2***
- with serious danger of plants and moulds growing..... **AK 2***
- with serious danger of animals occurrence (insects, birds, small animals) **AL 2***
- with detrimental influence of radiation:
 - of stray current with intensity of magnetic field (direct and alternating of power supply frequency) to 400 A.m⁻¹ **AM 2***
 - of sun radiation with intensity $> 500 \text{ a} \leq 700 \text{ W/m}^2$ **AN 2***
- with effects of medium seismic activity with acceleration $> 300 \text{ Gal} \leq 600 \text{ Gal}$ **AP 3***
- with indirect danger of storm activity **AQ 2***
- with fast moving of air and strong winds **AR 3 , AS 3***
- with qualified staff:
 - **electricians** according to §21, reg. 718/2002 of MPSvR (**valid for SR**) **BA 4÷BA 5***
 - **acquainted persons** according to §5, reg. No. 50/1978 (**valid for CR**)..... **BA 4÷BA 5***
- with persons frequent touching earth potential (persons often touch conductive parts or they stand on the conductive basement) **BC 3***

* Marking in accordance with IEC 60 364-3:1993

1.5.3 Power supply and operating mode

Power supply:

electric motor	230 V AC ±10%, or 24 V AC ±10%
control.....	230 V AC ±10%, or 24 V AC ±10%
potentiometer transmitter	$\sqrt{P \times R}$
electronic positional transmitter (EPV) without power supply.....	15 up to 30 V DC
Power supply frequency	50/60 *Hz ± 2%

**Note: At frequency of 60 Hz closing time is reduced by 1.2 times.*

Duty cycle (according to EN /IEC 60034-1.8):

ES SP MINI is designed for remote control:

- short-time operation **S2-10 min**
- intermitted operation **S4-25%**, 6 up to 90 cycles per hour

ES SP MINI with external regulator for automatic regulations

- intermitted operation **S4-25%**, 90 up to 1200 cycles per hour

Note:

SP MINI with external regulator can be used for automatic regulation considering that the max. loading moment is 0,8 multiple compared with max. loading moment for SP MINI with remote control.

1.6 Description

The electric actuator SP MINI is a device designed for remote control and automotive regulation of rotary mixing, butterfly, ball valves, shutters and blinders, or other valves and devices meeting conditions for their operation.

The actuator is driven with synchronous electric motor (3) (Fig. 1) from which is the torque transferred through the spur gear train located between the bottom case (1) and the control panel (2) representing the base of the actuator. The gear train is equipped with a mechanism for disengagement in case of manual control of the actuator. The electric motor is controlled directly with position switches (4) switched by turning of cams (5) placed directly on the output shaft leading from the gear board to the control part. The control panel can be optionally equipped also with the terminal board for electric motor connection, the terminal board for transmitter connection (6) and a resistive transmitter (8). On the external EA housing is located the cable leads (7). The external side of the bottom case is located the earthing clamp and the disengagement button.

Optionally can be the control section equipped with resistive position transmitter (8) for system feedback or as remote position transmitter. The remote position transmitter with unified output signal is composed of the resistive transmitter (8) and the electronic board (9). The turning movement of the transmitter continues from the output shaft through the gearbox system.

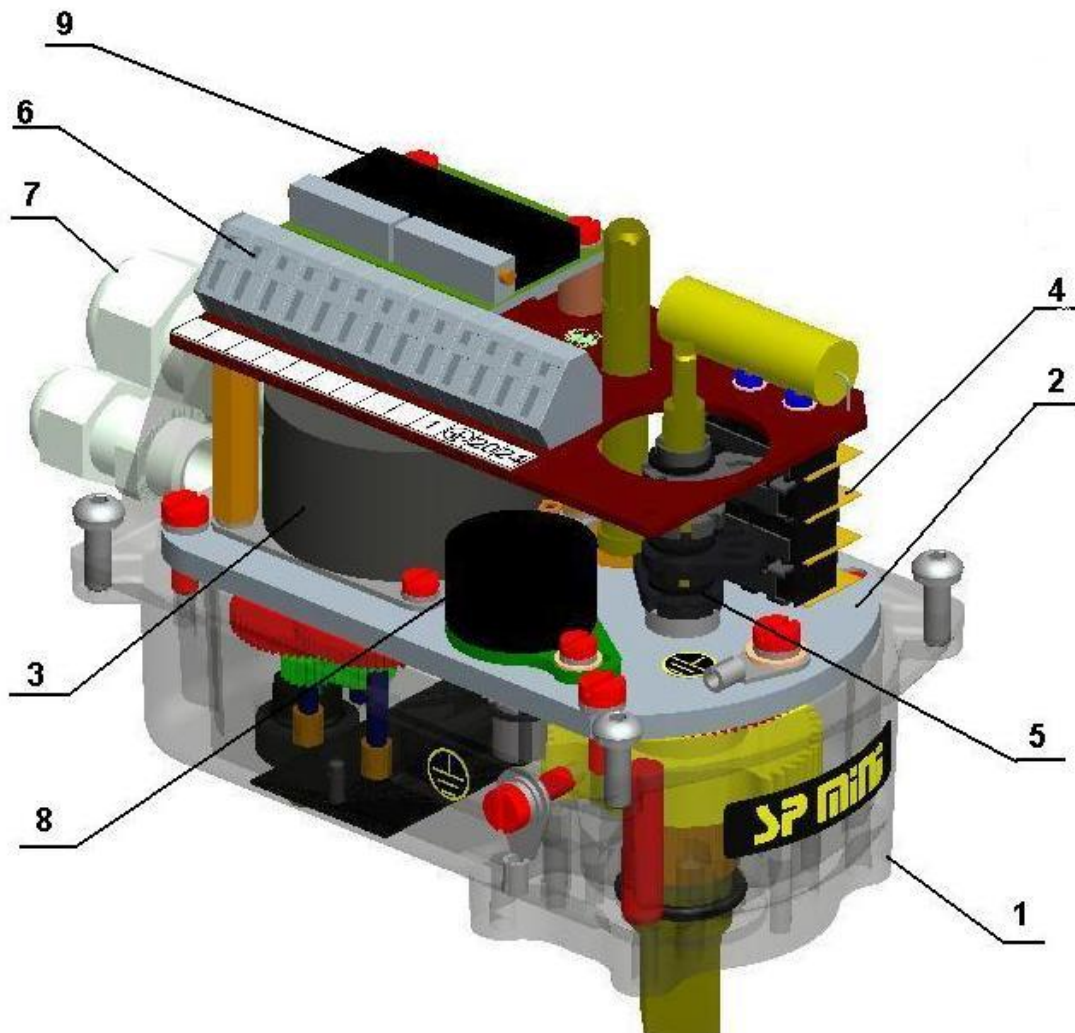


Fig.1

1.7 Technical data

1.7.1 Basic technical data

EA basic technical data:

Maxi. load torque [Nm], operating time [s/90°], operating angle [°] and parameters of the electric motor are given in Table 1.

Table 1: Basic specifications

Type No.	Operating time ±10 [%]	Operating angle	Max. load torque	Weight	Electric motor ¹⁾					
					Power supply nominal voltage	Nominal power	Nominal speed	Nominal current	Capacitor capacity	
	[s/90°]	[°]	[Nm]	[kg]	[V] ±10%	[W]	[1/min]	[A]	[µF/V]	
1	2	3	4	5	6	7	8	9	10	11
SP MINI, Type No. 272	80	90°; 120°; 160°; without position transmitter 0° to 270° (≤220° execution S5 a S6)	6	1,5 – 2,1 (SP MINI)	Single-phase	230; or 24	0,45	250	0,008 or 0,16	0,05/400 or 10/63
	120		9							
	150		12							

Working angle £220° valid for types with additional position switches S5, S6.

1) Switching elements for different type of load (also for EA) defines standard EN/IEC 60 947-4-1.

Other specifications:

EA protection:..... IP 65 (EN/IEC 60 529)

Mechanical ruggedness:

sinusoid vibrationswith frequency in range from 10 up to 150 Hz,
with shift amplitude of 0.15 mm for $f < f_p$
with acceleration amplitude of 19.6 m/s^2 for $f > f_p$
(transition frequency f_p is from 57 up to 62 Hz)
drop resistance:.....300 drops with acceleration 2 m.s^{-2}
seismic resistance:amplitude of the shock off 6 on Richter scale

Transmitters:

Resistive transmitter:

Resistance (single B1):..... 100 Ω, 2000 Ω
 Operating life of transmitter 1.10⁶ cycles
 Load power output : 0.5 W up to 40°C (0 W/125°C)
 Rated current of sliding contact max. 35 mA
 Maximum supply voltage: $\sqrt{P \times R}$
 Resistive transmitter linearity error: ±2 [%]¹⁾
 Resistive transmitter hysteresis:max. 1,5 [%]¹⁾
 Output signal values in limit positions : "O" ≥ 93%
 "Z" ≤ 5%

Electronic positional transmitter (EPV) - converter R/I (B3)

a) 2-wire version (without built-in power supply)

Output current signal 4 ÷ 20 mA (DC)
 Supply voltage 15 ÷ 30 V DC
 Load resistance max. $R_L = (U_n - 9V) / 0,02A$ [Ω]
 (U_n - supply voltage [V])
 Temperature dependency max. 0,020 mA/10°C
 Output signal values in limit positions: "O" 20 mA (clamps 81,82)
 "Z" 4 mA (clamps 81,82)
 Output signal tolerances "Z" +0,2 mA
 "O" ±0,1 mA

b) 3-wire version (without built-in power supply)

Current signal	0 ÷ 20 mA (DC)
Current signal	4 ÷ 20 mA (DC)
Current signal	0 ÷ 5 mA (DC)
Supply voltage	24 V DC ±1,5%
Load resistance	max. 3 kΩ
Temperature dependency	max. 0,020 mA/10°C

Output signal values in limit positions: "O".... 20 mA (clamps 81,82)

..... "Z"....4 mA (clamps 81,82)

Output signal tolerances "Z" +0,2 mA

..... "O" ±0,1 mA

EPV linearity error:..... ±2 %¹⁾

EPV hysteresis: max. 1.5 %¹⁾

¹⁾ from rated value of the transmitter referred to output values

Switches:

Supply voltage 250 V(AC); 2 A; cos φ=0,8, resp.: 24 V (DC); 2 A; T=L/R=3ms

min. switching voltage 20 V

min. switching current 100 mA

switching time max. 20 ms

insulation resistance 20 MΩ

Manual control: push-button on EA and lever on the device .

Pushing button disconnects the transmission and the lever on the device adjusts the EA shaft in the required position.

Electrical control:

- Remote control (movement of EA output member is controlled by the supply voltage)

Clearance of the output part: max. 1° (with 5 % loading through max. loading torque).

Adjustment of limit switches:

Position switches (S3, S4) are adjusted for the working angle depending on data the type table.

Auxiliary position switches (S5, S6) are adjusted for ca. 15° before limit positions.

Working angle tolerance:

for SP MINI ± 1°

1.7.2 Mechanical connection

- flange (ISO 5211)
- stand and lever

Basic and connecting dimensions are given in **dimensional drawings**.

1.7.3 Electric connection

Terminal board (X): - max. 13 terminals, connecting cable size max. 1.5 mm²

- 2 cable bushings, 1x cable diameter 6-10,5 mm, 1x cable diameter 3,5-5 mm

Note:

1. Supply cables to be fixed to rigid structure not longer than 150 mm from bushings.

2. Conductors of output signals from transducer to be laid separately from power conductors or apply shielded conductors.

Protection terminal: external and internal, mutually connected and marked with protection earthing mark. Electric connection - according to wiring diagrams.

Attention!

The product is IP 65 covered. This covering type requires careful fixation of the top cover, keeping with connecting cables diameters and careful fixation in bushings. When the product has been flooded, it is recommendable to inspect it visually with the removed upper cover. When water has penetrated inside, the interior of the product must be dried before the next put in operation.

1.8 Conservation, packing, transport, storing and unpacking

Surfaces without surface treatment are treated by conservation preparation MOGUL LV 2-3 before packaging .

Conservation is not necessary if the following storage conditions are complied with:

- Storage temperature: -10 to +50 °C
- Relative air humidity max.80 %
- Electric actuators and their accessories must be stored in dry, well ventilated covered spaces, protected against impurities, dust, soil humidity (by placement to racks, or on palettes), chemicals and foreign interventions
- There shall be no corrosive gases present in the storage areas.

The **EA SP MINI** are delivered in solid packages guaranteeing resistance in accordance with EN 60 654 (IEC 60 654-1 and IEC 60 654-3).

Package is a box. Products in boxes is possible to load on the pallets (pallet is returnable). On the outer side of the package is stated:

- manufacturer label,
- name and type of product,
- number of pieces,
- other data – notices and stickers.

The forwarder is obliged to secure packed products, loaded on transportation means, against self-motion; if open transportation means are used, to secure their protection against atmospheric precipitations and splashing water. Displacement and securing of products in transportation means must provide their stable position, exclude the possibility of their inter-collision and their collision with the vehicle walls.

Transportation can be executed by heatless and non hermetic spaces of transportation vehicles with influences within the range:

- temperature: -25° C up to +70° C (a strange version –45 ° C up to +45 ° C
- humidity: 5 up to 100 %, with max. water content 0.029 kg/kg of dry air
- barometric pressure 86 up to 108 kPa

Upon receiving of EA examine, if during transportation, resp. storing did not come to its damage. At the same time verify, if the data on the labels corresponds to accompanying documentation and purchase-sale contract / order. Eventual discrepancies, faults and damages should be reported without any delay to supplier.

Electric actuators and their accessories must be stored in dry, well ventilated covered spaces, protected against impurities, dust, soil humidity (by placement to racks, or on pa-lettes), chemicals and foreign interventions, at ambient temperature from -10°C up to +50°C and at relative air humidity max. 80 %.

It is not acceptable to store EA outdoors, or in areas not protected against direct climate influence!

Eventual damages to surface finish remove without delay – thus preventing damage by corrosion.

If storing takes longer than 1 year, it is necessary to inspect lubrication fillings before putting EA into operation.

Assembled EA, but not put into operation is necessary to protect by the equivalent method as during storage (for example suitable protective cover).

After assembly to the armature in free and wet areas, or in areas with temperature changes, connect without delay heating resistor – thus preventing damages caused by corrosion from liquefied water in the control area.

Excessive preserving grease remove just before putting EA into operation.

1.9 Assessment of the product and packaging and removal of contamination

The product and its package are made of recycling materials – metallic (steel, aluminium, brass, bronze, copper), plastics (PP, PA, PC) and rubber products.

Do not throw the single parts of the package and of the product after their life but sort them according to instructions in corresponding executives or regulations of environment protection, and allow their recycling. After expiration of the product life expectation must be the device disassembled, its content classified depending on the applied material and transfer to sites where can be used materials recycled or disposed.

The product itself and its packing are not a source of any environment pollution or contamination and do not contain any dangerous waste.

2. Installation and dismantling of actuator

Note:

Check again whether the EA is place in accordance with the Chapter “Operation Conditions”. If the installation conditions are different than recommended it is needed to consult the situation with the producer.

Before starting the installation onto the valve:

- Check again whether the EA was not damaged while storing.
- Check compliance of the stroke adjusted by the producer and the connecting dimensions of the EA with the parameters of the valve.

In case of any difference perform the adjustment according to the Chapter “Adjustment”.

2.1 Installation

EA is by the manufacturer adjusted to parameters according to the nameplate, with connecting dimensions according to the corresponding dimensional drawing and put it to a mid-position.

2.1.1 Mechanical connection to the valve

Note that before the mechanical connection it is needed to check whether the operation angle of the actuator (see the type label) and the valve are the same.

Electric actuators SP are designed for operation of butterfly, ball and mixing valves with operation angle to 270°.

The actuators can be installed and operated in any position. The product must be placed to have enough space for the upper cover dismantling and control element setting.

Before installation clean the contact areas of the actuator and the valve, coat the output shaft and sliding areas with acid-free grease.

Mechanical connection with bracket and coupling:

The mechanical connection of the actuator (A) and the valve (D) is performed with the use of bracket (B), coupling (E) and screws. The coupling shale must be adapted to the shape of the EA output shaft and the shape of the valve connecting shaft incl. the possibility of slight moving with side key or lever.

Proceed as follows during the EA installation (Fig. 2):

- check the labels whether the operation angle of the actuator (A) is the same as the operation angle of the valve (D),
- put the actuator A) and the valve (D) into position “Closed”,
- place the actuator (A) onto the valve (D) with the help of bracket (B) and coupling (E)
- fix the positioned actuator (A) with the bracket (B) by screws with thread M5 (1) incl. spring washers (2) and tighten (screws must be screwed 10 mm deep in the EA flange), fix the bracket by screws (3) and washers (4) depending on the valve type.

- if the holes in the valve flange (D) do not fit with holes on the bracket (B) push the button for dividing the transmission, turn slightly the coupling (E) with lever (C) or with side key until the holes fit. Adjust the electrical actuator after have been mechanically connected.

Legend:

- A.....electric actuator
- B.....bracket
- C.....lever
- 1screw
- 2.....washer
- 3.....screw
- 4.....washer
- D.....valve
- E.....coupling

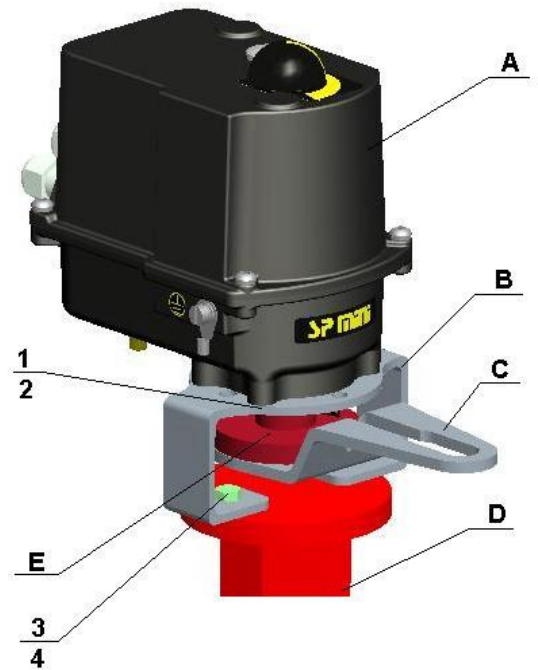


Fig.2

2.1.2 Electrical connection with mains and/or control system



1. Follow instructions in the part "Requirements for professional qualification"!
2. While laying electrical line abide by the instructions for heavy current installations.
3. Cables to terminal boards or connectors lead through screw bushings.
4. Before initiation EA into operation internal and external protection terminals are needed to be connected.
5. Feeding cables are to be fixed to the solid construction at most 150 mm from the bushings.
6. Conductors of output signals from transducer to be laid separately from power conductors or apply shielded conductors.
7. To prevent moisture from entering the actuator around the connecting cables, the cables must be sealed with silicone material at the point of penetration through device shell.

Connecting with the control system:

The EA can be controlled with an external position controller.

Notes:



1. If the EA is controlled with an external controller using unified signal from a two-wire transmitter (capacitive or resistive with a converter in two-wire connection), it is needed to arrange connecting of the two-wire transmitter loop to electrical earth of the successive external controller!
2. Connection can be performed only in one point, in any part of loop out of the EA.
3. Electronics of the two-wire transmitters is galvanically insulated that is why it can serve as an external source for supplying of several transmitters (their number depends on current which the source can supply).

The electric connection can be made with two cable bushings MBF 16 and MBF12 to terminal boxes with terminal size 1,5 mm²; total quantity of terminals is 13 and they are marked with numbers corresponding to the wiring diagram inside of the cover. The cable bushings allow connection of cables 6-10,5 mm, resp. 3,5-5 mm.

After the electric connection recommended to check the function:

Set the actuator into a mid-position. Check the right direction of output shaft movement with pressing the button "closing" (on a manual control board or on a test button panel) and the output shaft should turn clockwise looking from above. If not, change the order of the mains phases.

Checking of position switches: while the actuator is running in the chosen direction consequently switch contacts of switches pressing springs of correspondent switches. In case of correct connection the actuator is to stop. If any of the functions is not correct check the connection in accordance with the wiring diagrams.



Keep with safety instructions!

2.2 Dismantling



*Disconnect the EA prior to the dismantling!
Do not connect and disconnect live connectors!*

- Disconnect the EA from mains.
- Disconnect the leads from the EA terminal boards and loosen the cables from bushings.
- Loosen the fixing screws of the EA flange and disconnect the EA from the valve.
- While sending the EA to be repaired put it into a package solid enough to avoid damages of the EA during transportation.

3. Adjusting actuator



Attention! See chapter Requirements for professional qualification.
Disconnect EA from mains!
Abide by safety measures!

The adjustment can be performed at a mechanically and electrically connected EA. This chapter describes adjustment of EA to specified parameters in case that any unit of EA is reset. The arrangement of adjusting elements on the control board is presented by the Fig. 1.

The control parts designed for adjustment are accessible after removing of the actuator upper cover. Unscrew the 4 screws fixing the cover to the bottom case, and remove the cover.

After adjustment fix again the cover with the 4 screws.

3.1 Adjustment of position switches (Fig.3)

By the manufacturer were the actuators are adjusted to the fixed angle (90°, 120° or 160°) in accordance with the nameplate. While adjusting follow these steps:

- Set the actuator to the end position "closed" and turn the cam (13) clockwise until the switch S4 (18) will switch. Adjust also the additional position switch S6 (20) turning the cam (15) in the same direction as the cam (13) for the switch S4.
- Set the actuator to the position „open“ and turn the cam (12) counter-clockwise until the switch S3 (17) will switch. Adjust also the additional position switch S5 (19) turning the cam (14) in the same direction as the cam (12) for the switch S3.

Legend:

- 12 cam of switch S3
- 13 cam of switch S4
- 14 cam of switch S5
- 15 cam of switch S6
- 17 position switch "open"
- 18 position switch "closed"
- 19 additional position switch "open"
- 20 additional position switch "closed"

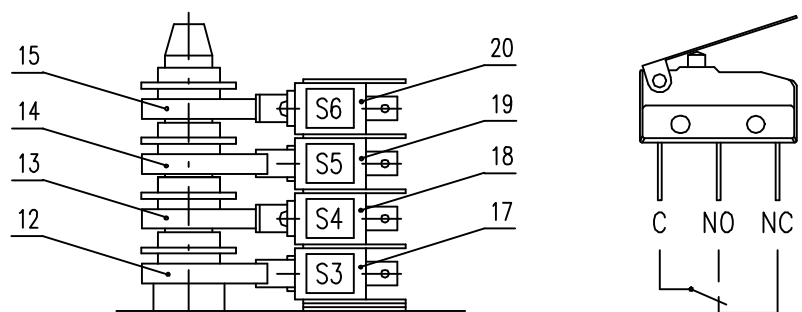


Fig.3

The position switches of the actuator with the position transmitter can be set in connection with the range possibilities of the transmitter.

3.2 Adjustment of resistant transmitter (Fig.4)

- The **resistant transmitter** is in the EA **SP MINI** used to function as a remote position indicator.
- Before the resistant transmitter adjustment the position switches have to be adjusted.
- Resistant transmitter does not need adjustment, because of self-adjustment by adjusting actuator to both end positions. Transmitter is not possible set up to other operating angle, than is shown on nameplate of actuator.
- Adjustment consists in setting of the resistance in the defined limit position of the EA.

Note:

In case that the EA is not used in the whole stroke range given on the nameplate, the resistance in the limit position "open" is proportionally reduced.

To adjust transmitter follow these steps:

- Loosen the fixing screws (12) of the transmitter holder and push the transmitter out of mesh.
- Connect a meter for resistance measuring to the terminals 71 and 73 of the EA **SP MINI** terminal board.
- Put the actuator to the position "closed" (with the handwheel, or with the local electric position control until the corresponding position switch S4).
- Rotate the transmitter shaft until resistance of $\leq 5\%$ of the nominal transmitter resistance can be read on the meter in case of EA **SP MINI**, or 3 up to 5% of the nominal transmitter resistance in case of EA **SP MINI** with EPV , i.e. with the resistant transmitter with the converter PTK1.
- In the position put the transmitter to mesh with the drive wheel and fix the fixing screws on the transmitter holder.
- Disconnect the meter from the terminal board.

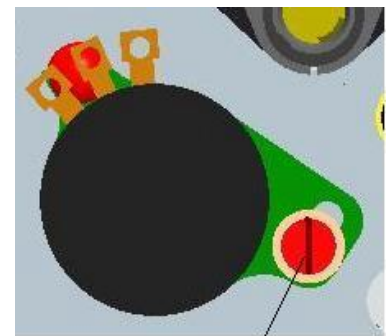


Fig.4 12

3.3 Adjustment of the Electronic Position Transmitter (EPV) - the Resistive Transmitter (Potentiometer) with the Converter PTK 1

3.3.1 EPV – the 2-wire version (Fig. 5)

The position transmitter with the converter PTK1 is in the plant adjusted to have the output current signal on the terminals 81-82 (the wiring diagram Z23) as follows:

in the position "open" 20 mA
 in the position "closed" 4 mA

If the transmitter requires a new adjustment follow these steps:

- Put the actuator to the position "closed" and switch the power supply off.
- Adjust the resistive transmitter according to the previous chapter. The resistance is to be metered on the terminals R-R (Fig. 5). The used transmitter resistance is 100 Ω.
- Switch the converter's power supply on.
- Turn the adjusting trimmer A (Fig. 5) to adjust the output current signal rate measured on the terminals 81-82 to 4 mA.
- Set the actuator to the position "open".
- Turn the adjusting trimmer B (Fig. 5) to adjust the output current signal rate measured on the terminals 81-82 to 20 mA.
- Check the output signal of the converter in the both limit positions, and repeat the procedure if needed.

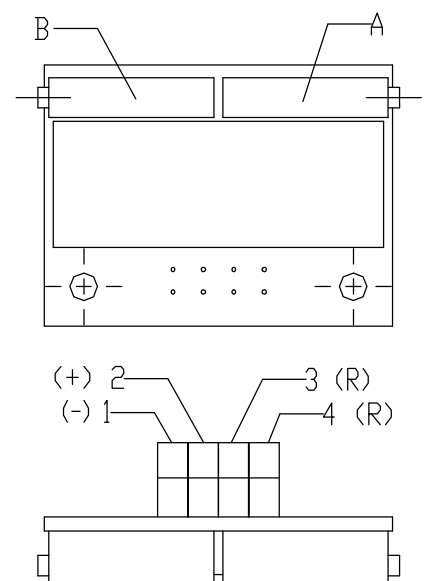


Fig.5

Note:

The output signal of 4-20mA can be adjusted at the range from 75 up to 100% of the rated stroke stated on the actuator's nameplate. At values less than 75% the value 20 mA is reduced proportionally.

3.3.2 EPV – 3-wire version (Fig. 6)

The resistive transmitter with the converter is in the plant adjusted to have the output current signal metered on the terminals 81-82 (the wiring diagram Z257 - without power supply) as follows:

- in the position „open“ 20 mA or 5 mA
- in the position „closed“ 0 mA or 4 mA

according to the specified version of the converter.

If the transmitter requires a new adjustment follow these steps:

- Put the actuator to the position „closed“ and switch the power supply off.
- Adjust the resistive transmitter according to the previous chapter. The resistance is to be metered on the terminals 0%-100% (Fig. 6). The used transmitter resistance is 2000W or 100 W.
- Switch the converter's power supply on.
- Turn the adjusting trimmer A (Fig. 6) to adjust the output current signal rate measured on the terminals 81-82 to 0 mA or 4 mA.
- Set the actuator to the position „open“.
- Turn the adjusting trimmer B (Fig. 6) to adjust the output current signal rate measured on the terminals 81-82 to 20 mA or 5 mA.
- Check the output signal of the converter in the both limit positions, and repeat the procedure if needed.

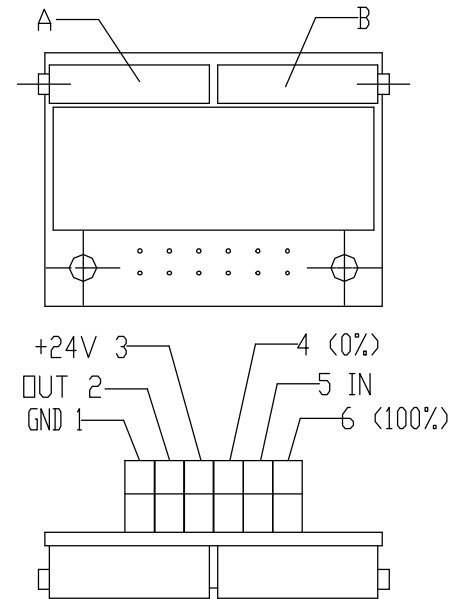


Fig.6

Note:

The output signal of (0-20mA, 4-20mA or 0-5mA - according to the specification) can be adjusted at the range from 85 up to 100% of the rated stroke stated on the actuator's nameplate. At values less than 85% the value of the output signal is reduced proportionally.

4. Service and maintenance**4.1 Service**

In general it is provided that service of the EA is performed by a qualified worker in accordance with requirement given in Chapter 1!

After putting the EA into operation it is needed to verify whether during manipulation any scratch on surface occurred, it is to be removed to prevent actuator against corrosion!

The EA requires just negligible service. Proper putting into operation is a recondition of reliable operation.

The service of the EA leads from the operation conditions and usually resides in information processing for further arranging of required functions.

The staff has to perform prescribed maintenance to prevent the EA during operation against impacts of environment, which exceed the frame of allowed influences.

While mains failure the actuator stops in the position where it was before the failure. If needed the actuator can be reset with the handwheel (if equipped with the mechanism for gear disengagement).

Manual control: (Fig. 7)

If needed (during adjusting, function checking, failure etc.) the staff can change setting of the controlled body using the handwheel. Follow these instructions:

- Switch the power supply off.
- Keep pushing the disconnection (13) which actuates the gear disengagement in the EA.
- Set the valve to the selected position.
- Adjust manually with lever the EA output shaft in the selected position.

Note:

When after turning the button for gear disengagement the gears does not engage, is needed to turn by lever to engage the gears.

In case of manual control the set end positions are not mistuned.

Actuators without gear disengagement cannot be manually controlled.

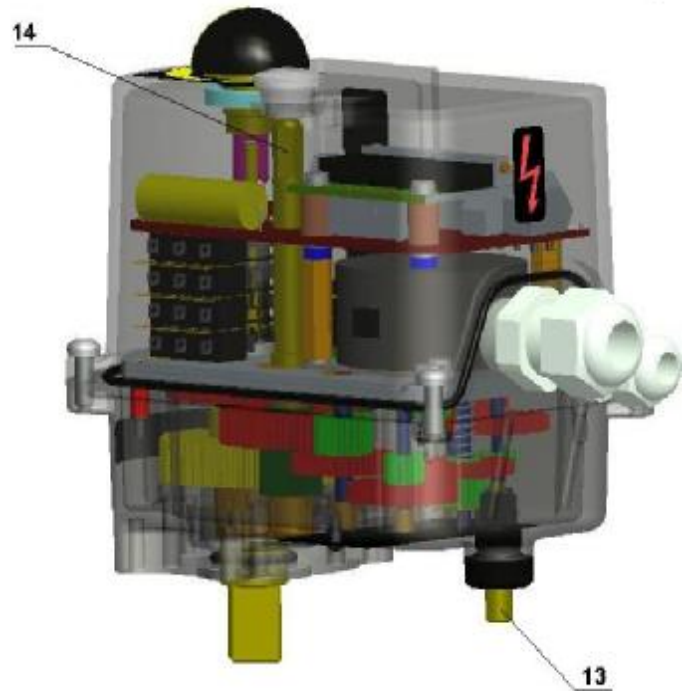


Fig.7

4.2 Maintenance – extent and periodicity

After putting the actuator into operation after ca 50 operation hours it is needed to tighten the fixing screws.

Gearings, bearings 2RS and gearings of control elements are lubricated with the grease GLEIT- μ HF 401/10. After one year of operation we recommend to check the lubrication, filling eventually the grease. Shall the EA work only occasionally, so must be controlled each two years and the lubrication performed after consideration of the limit working temperature or high loading.

Gearwheels of the control elements and current transmissions are accessible after removal of the cover.

Unless otherwise stated in revision rules, perform inspection of EA once a four years, whereby check tightening of all connecting and grounding bolts, to prevent heat-up.

After 6 months and once a year it is recommended to check tightening of fixing screws between the EA and the valve/gearing.

4.3 Troubleshooting

At failure of power supply the EA stops in the position where it was before the failure. If needed the EA can be set only with the manual control (the handwheel). After restoration of power the EA is prepared for operation.

In case of failure of any element of the EA it can be changed by a new one. Entrust the change to a service centre.

In case of an EA failure, which cannot be eliminated directly in operation, follow instructions for warranty and after-warranty service.

For controller repair a F1,6 A subminiature fuse for PCB should be used, alternatively also F 2A, 250 V e.g. Siba type 164 050.1,6 or MSF 250, and for DB voltage source repair a M160 mA, 250V fuse, e.g. Siba, or MSF 250.

Note:

If the EA requires dismantling follow the chapter "Dismantling".

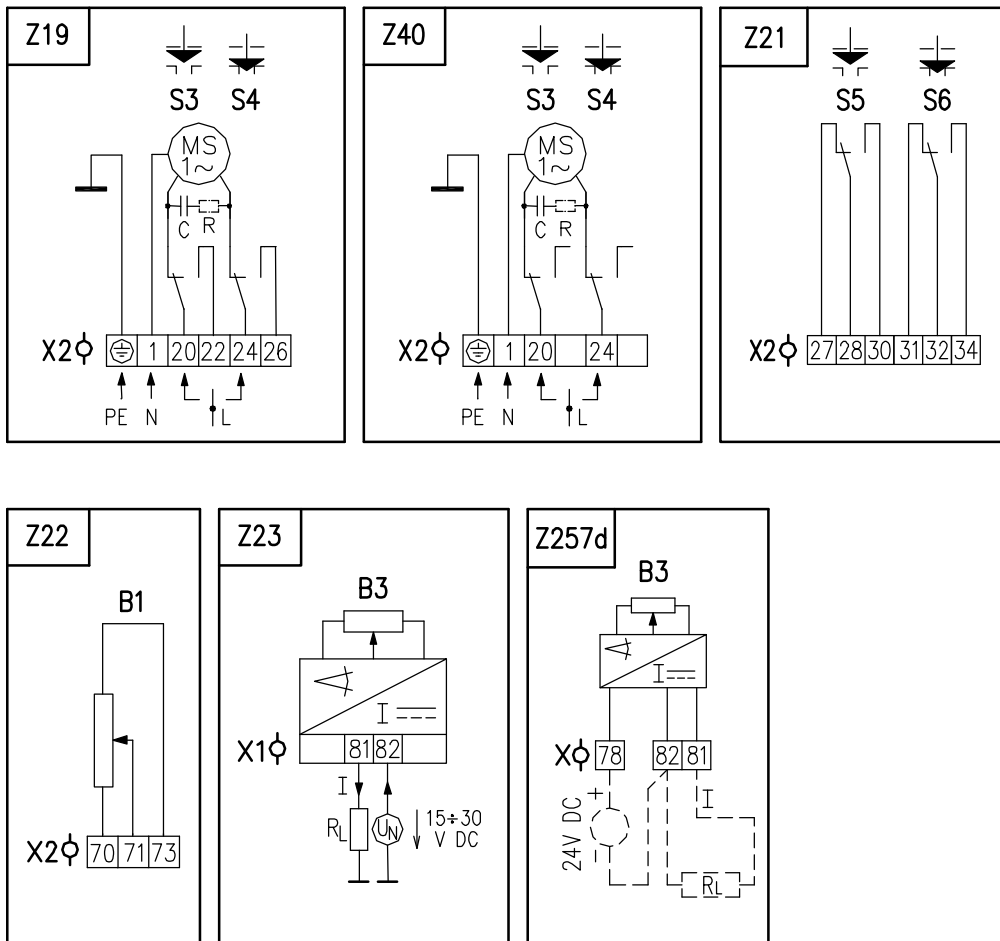
5. Spare part list

Table 2 Spare parts

Spare part	Order Nr.	Position	Figure
Electric motor; 0,45 W; 230 V AC	63 592 407	3	1
Electric motor; 0,45 W; 24 V AC	63 592 406	3	1
Micro switch CHERRY DB 6G A1LB	64 051 466	4	1
Resistant wire transmitter RP19; 1x100	64 051 812	8	1
Resistant wire transmitter RP19; 1x2000	64 051 827	8	1
Sealing	04 790 800	-	-

6. Appendices

6.1 Wiring diagrams



Legend:

- Z19 connection of electric motor with position switches
- Z21 additional position switches connection
- Z22 connection of single resistive transmitter
- Z23 connection of current electronic position transmitter - 2- wire – without power supply
- Z40 connection of electric motor with position switches for the EA type with additional position switches and with resistive transmitter
- Z257d connection of resistive transmitter with current converter – 3 - wire – without power supply

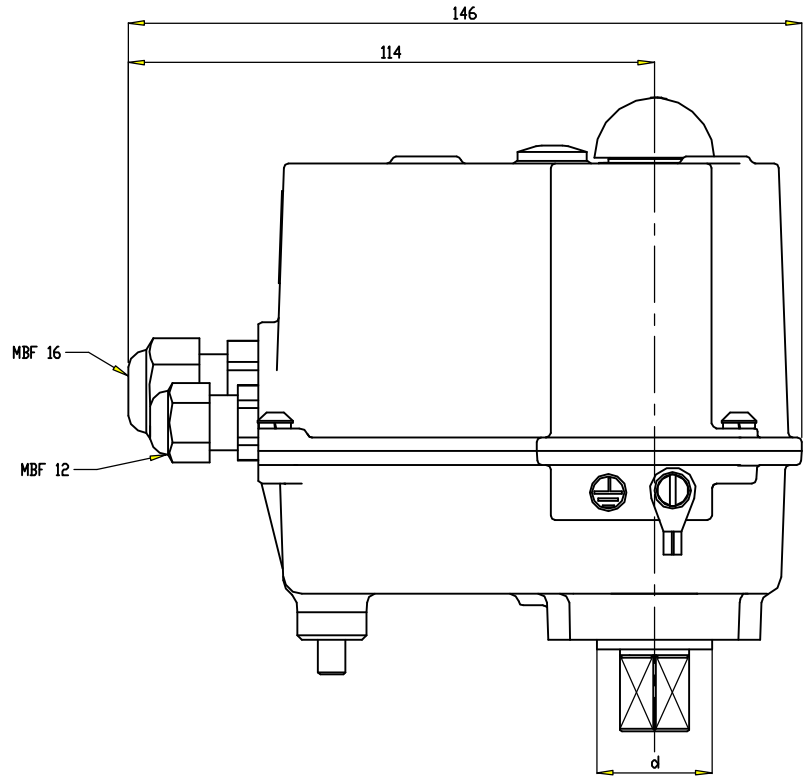
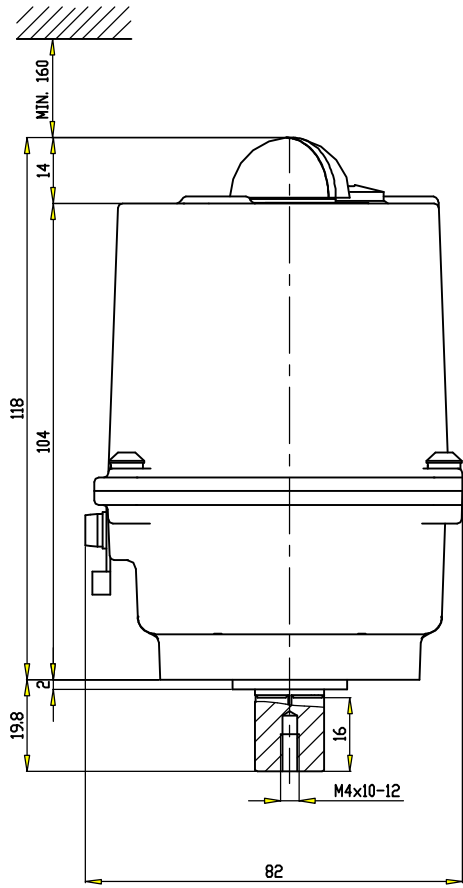
- | | |
|--|--|
| B1 remote transmitter-resistive, single | MS single-phase electric motor |
| B3 electronic position transmitter | S3 position switch „open“ |
| C capacitor | S4 position switch „closed“ |
| I/U output (input) current (voltage) signals | S5 additional position switch „open“ |
| | S6 additional position switch „closed“ |
| R resistor | X, X1, X2 terminal board |
| RL load resistance | |

Notes:

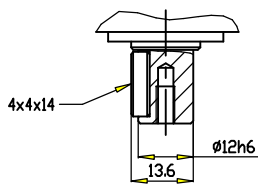
1. For connection of the electric motor following the diagram Z19 can be specified additional position switches or the position transmitter. The connection is limited by the number of terminals 13.
2. For connection of the electric motor following the diagram Z40 can be specified additional position switches and the position transmitter or the resistive transmitter only. The connection is limited by the number of terminals 13.

6.2 Dimensional drawings and mechanical connections

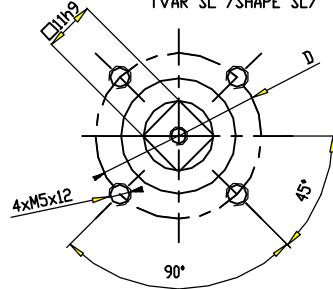
P-1473



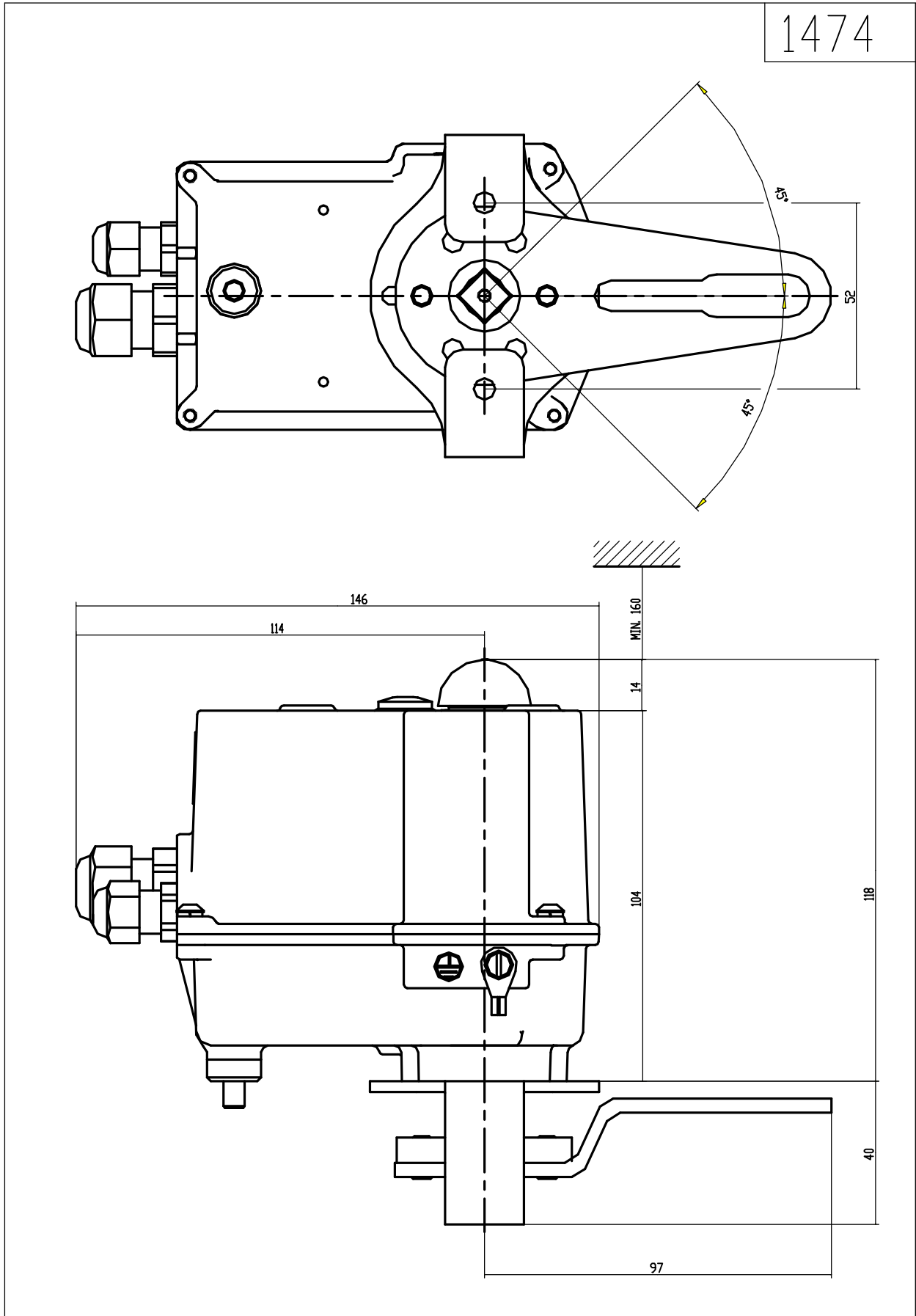
TVAR SV /SHAPE SV/



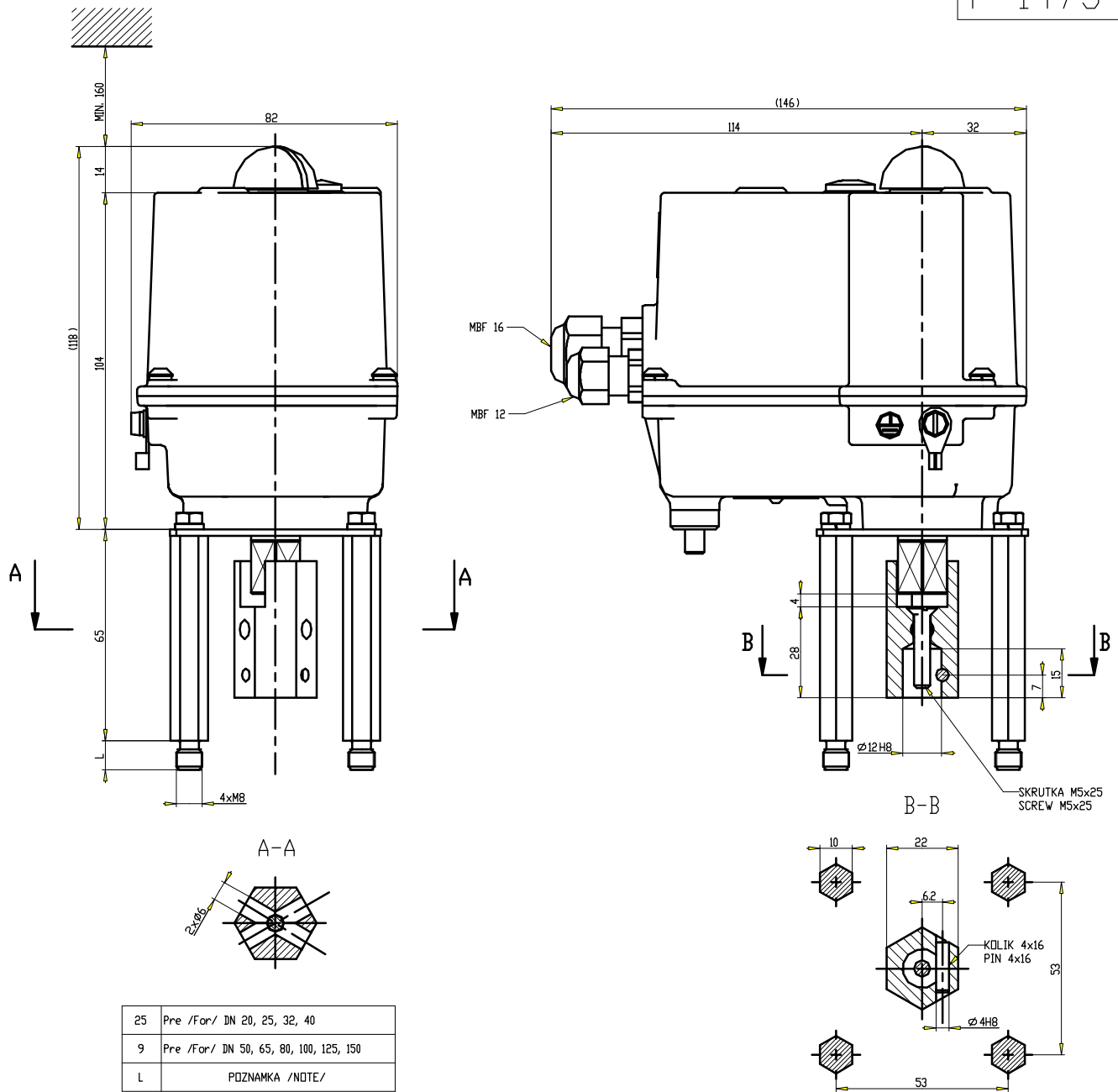
TVAR SL /SHAPE SL/



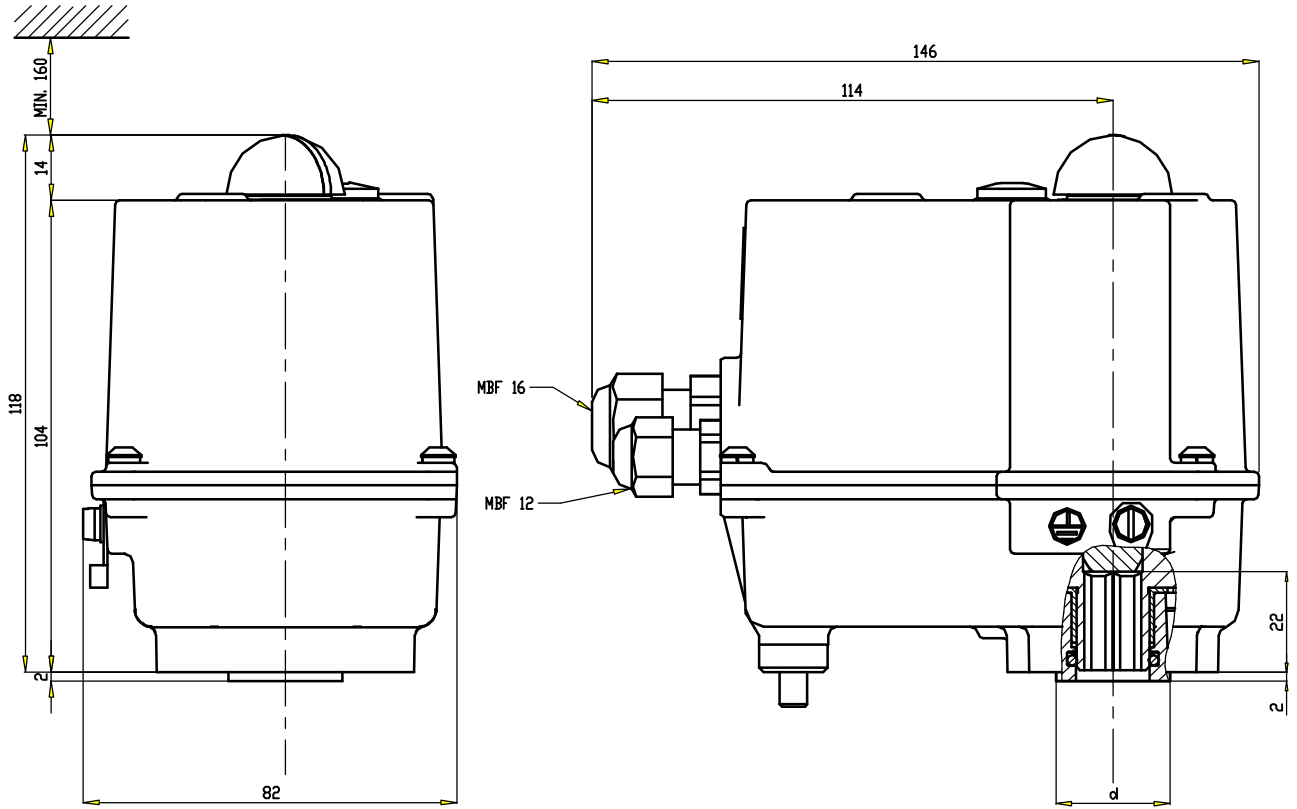
F03	Ø36	Ø25F8
F04	Ø42	Ø30F8
Príruba /Flange/ ISO 5211	D	d



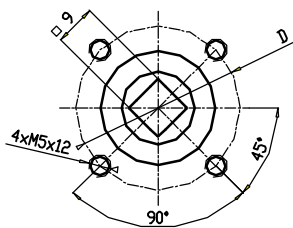
P-1475



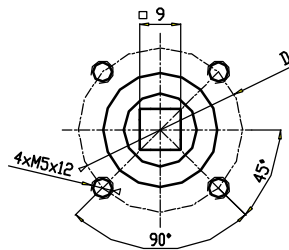
P-2002



TVAR D /SHAPE D/



TVAR L /SHAPE L/



F03	ø36	ø25F8
F04	ø42	ø30F8
Príruba /Flange/ ISO 5211	D	d

6.3 Record on warranty service intervention

Service center:	
Intervention date:	Warranty repair No.:
Electric actuator user:	Complaint submitted by:
EA type No.:	EA serial number:
Complaint object:	Detected fault:
Applied spare parts:	
Notes:	
Made on:	Signature:

6.4 Record on after-warranty service intervention

Service center:	
Intervention date:	Warranty repair No.:
Electric actuator user:	Complaint submitted by:
EA type No.:	EA serial number:
Complaint object:	Detected fault:
Applied spare parts:	
Notes:	
Made on:	Signature:

6.5 Commercial agency and contractual service centers

Slovak Republic:

Regada, s.r.o.,
Strojnícka 7
080 01 Prešov
Tel.: +421 (0)51 7480 460
Fax: +421 (0)51 7732 096
E-mail: regada@regada.sk

Czech Republic:

Regada Česká, s.r.o.
Kopaninská 109
252 25 Ořech
PRAHA – západ
Tel.: +420 257 961 302
Fax: +420 257 961 301

Poland:

REGADA Połská, Sp.z.o.o.
ul. Sekundowa 1
02 178 Warszawa,
Tel.: +4822 868 0815
Fax.:+4822 211 1246