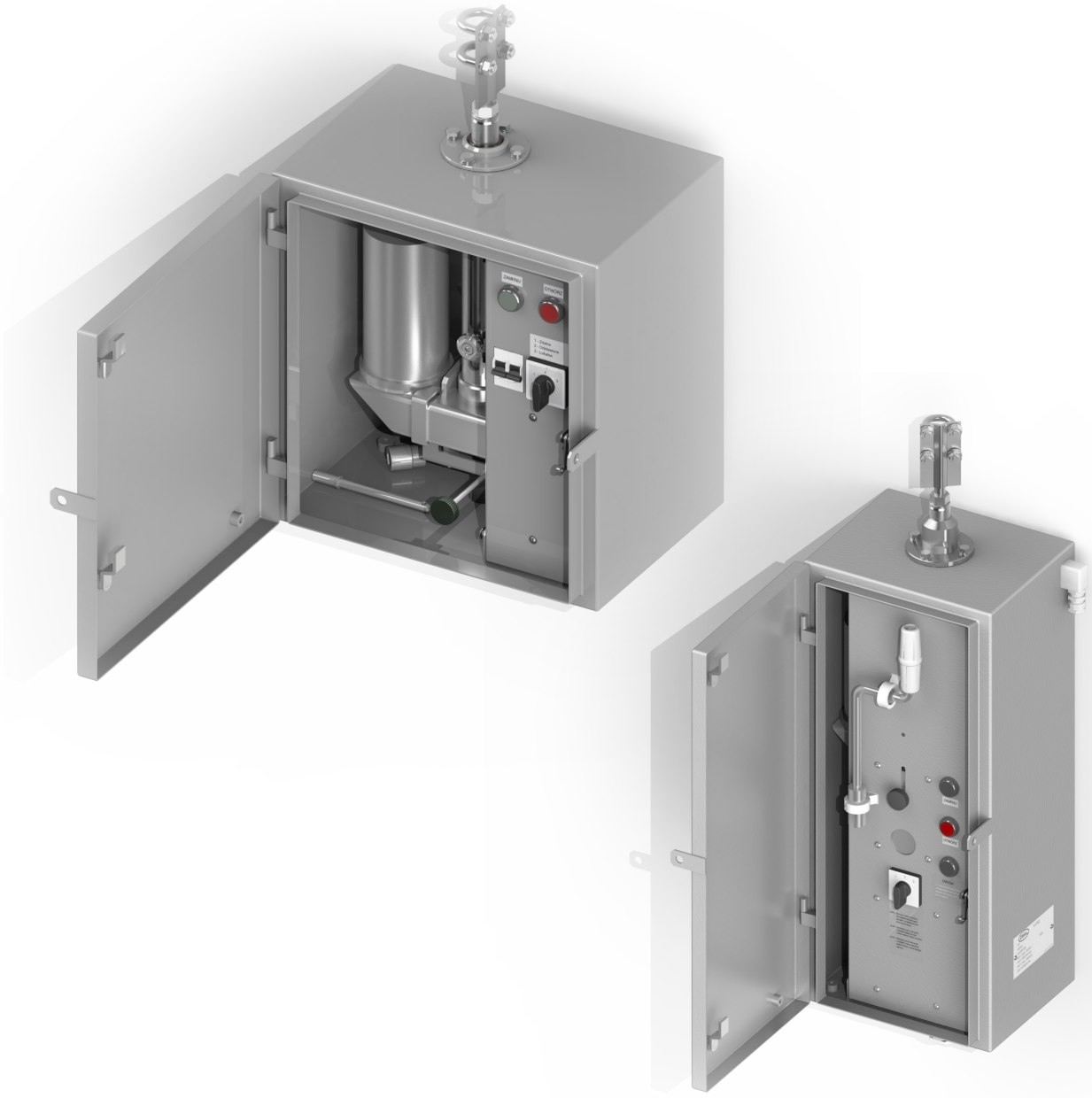
Zakład Wytwórczy Aparatów Elektrycznych Sp. z o.o.

INSTALATION AND SERVICE MANUAL



NSL60

Motor operating mechanism

Manual No. DTR.05.05.02.EN

We connect with ENERGY

WARNING:

During the operation of electrical equipment, certain parts of these devices are normally under dangerous voltage, and mechanical parts, also remotely controlled, can move quickly.

Failure to follow the warning instructions can result in serious personal injury or material damage.

Only suitably qualified personnel can work on or near the device. These personnel must know exactly all safety rules and maintenance rules in accordance with these instructions.

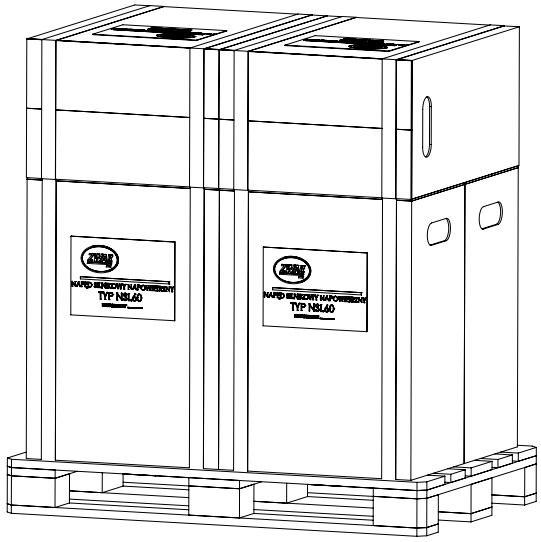
The trouble-free and safe operation of this device requires proper transport, proper storage, construction and assembly as well as careful service and maintenance.

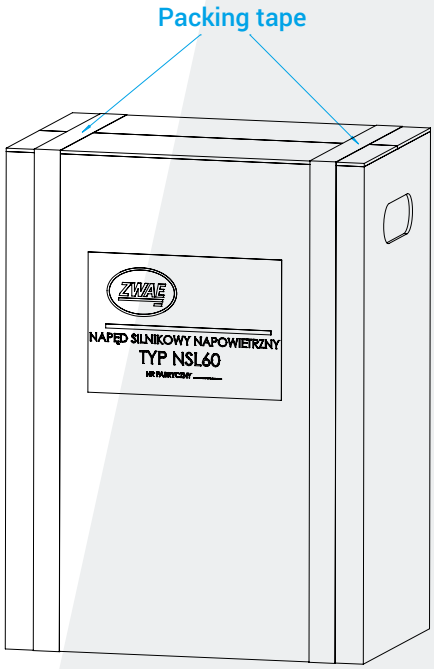
1. TRANSPORTATION

1.1. Unpacking and inspaction

Immediately after receiving the drive, check the delivery compliance with the shipping specification. Then check whether the drive has not been mechanically damaged during transport and the data on the nameplate with the order. The drive is delivered in a cardboard package. Drives are delivered to the recipient completely assembled.

Drives are delivered to the customer on a pallet (see below). We suggest transferring cartons by grabbing the tapes used to pack the drive.

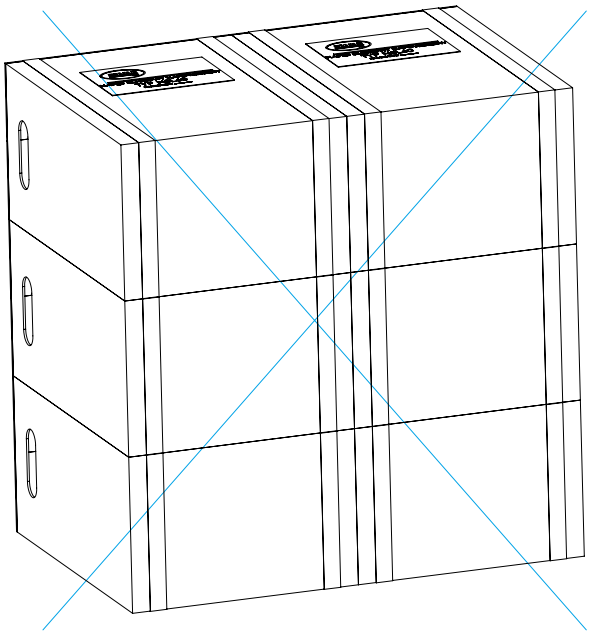




1.2. Storage and transport

For storage and installation, the drives can be transported / transported by any means of transport provided they are protected from moisture. During transport, the drives should be secured against moving and colliding with each other or parts of the vehicle. An additional protection for the time of longer transport or storage is a bag with a moisture absorbing substance. It must be removed from the drive immediately before switching on the heater.

It is forbidden to store drives on the back in a double-decker way. The drives should be laid vertically as per the sketch in point 1.1. This is the only acceptable storage system for drives.



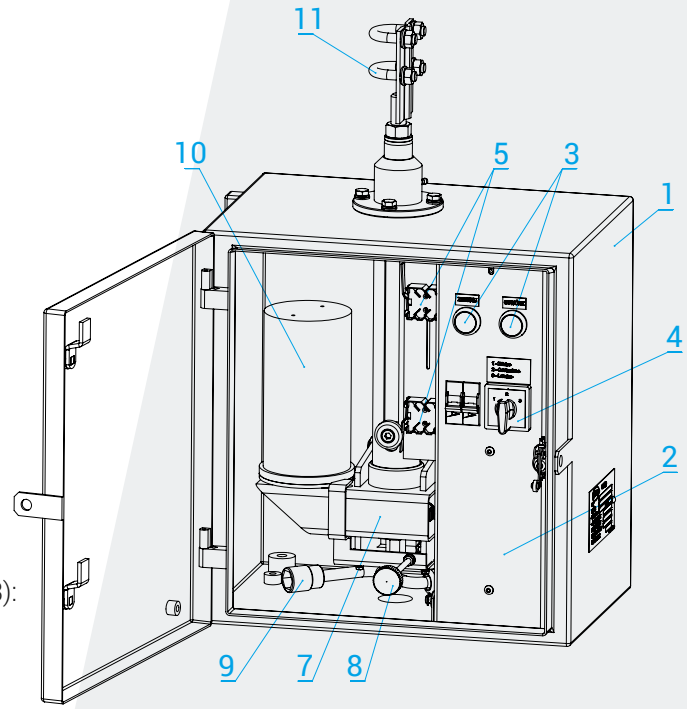
2. DESCRIPTION

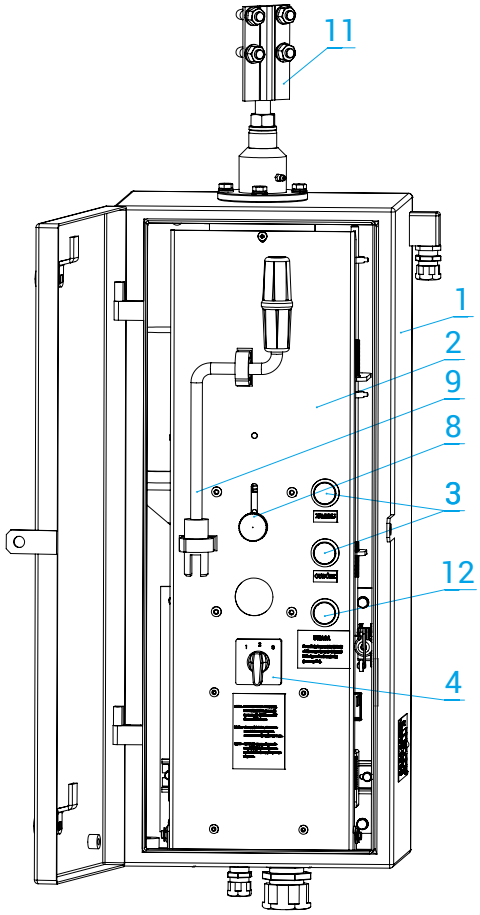
NSL-60 motor drives are designed for cooperation with disconnectors, medium voltage pole disconnectors with sliding movement of the tendon. The use of the drive allows remote or local control of the medium voltage switch. It is designed to cooperate with every switch actuated by a tie arranged along the pole with a tendon pitch in the range 0-180 or 0-200 mm (depending on the version), whose switching force does not exceed 6500N.

2.1. Construction and principle of operation.

1. housing box,
2. control board,
3. control pusbuttons,
4. type of control switch,
5. limit switches of the actuator,
7. transmission gear,
8. mechanical locking lever,
9. crank for manual maneuvering,
10. electric motor,
11. fork for attaching coupling shafts,

Additional equipment for the narrow version (NSL60-3):
[12] electromagnetic locking pushbutton





2.2. Structure

The casing is made of aluminum sheet, grade PA4, covered with a layer of epoxy powder paint. The door is sealed with a silicone gasket. The housing construction provides a degree of interior protection at IP54 level with simultaneous ventilation of the interior. This was achieved through the use of a mesh-protected stuffing box hole in the bottom of the box.

2.3. Driving mechanisms

The driving mechanism includes:

- Electric motor,
- Multistage gear transmission,
- Helical gear.

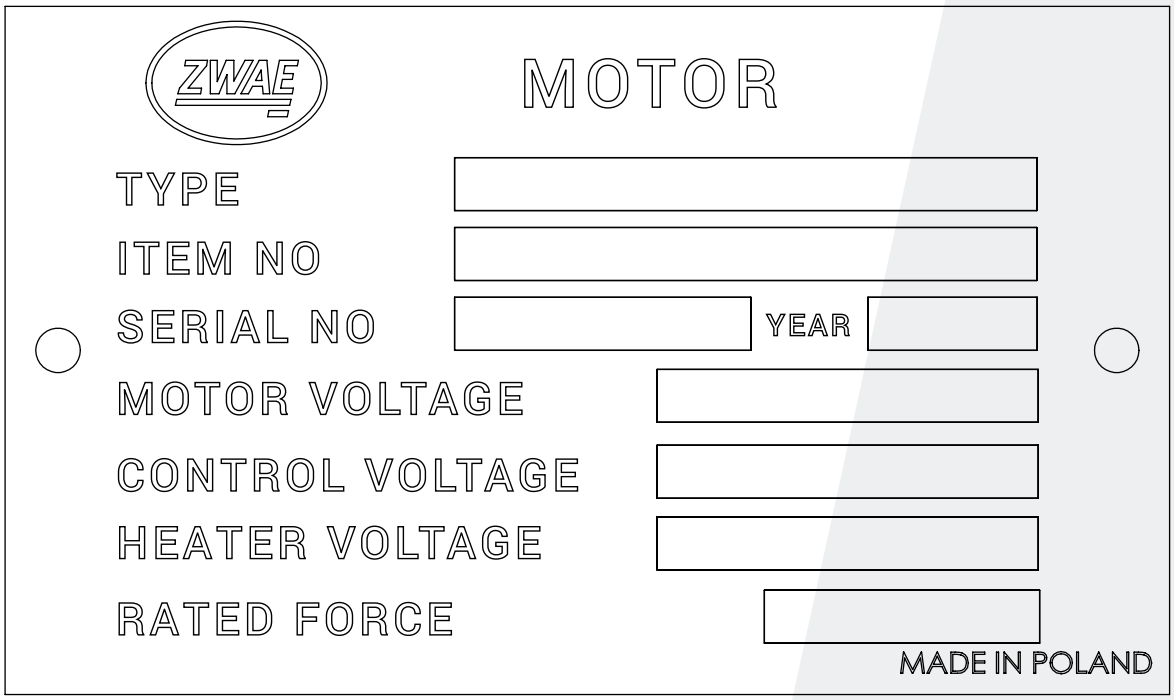
The electric motor drives a lead screw through a two-stage gear train. As a result of the rotation of the screw, the nut mounted on the screw moves along the screw causing the movement of the tie rod. The stroke of the

tendon is carried out between 0-180mm or 0-200mm depending on the version. The maximum drive force obtained by using the appropriate gearing is about 6.5kN.

2.4. Cliamatic conditions

Drives adapted for external use, in an atmosphere free from aggressive chemical agents, in ambient temperature from -40 to + 40 ° C and relative humidity not exceeding 70%.

2.5. Name plate



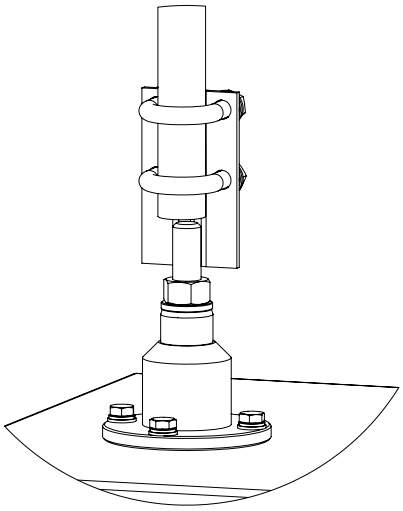
2.6. Technical data

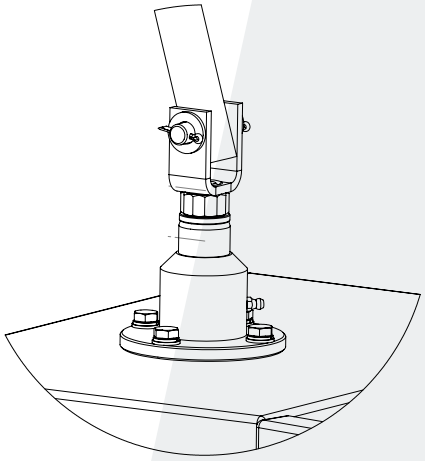
Lp.	Parameter	Value
1.	Rated voltage / rated current: - serial motor	220 VDC / 5 A 110 VDC / 4 A
	- contactor coil controlling the voltage supplying the motor (depending on the rated motor voltage)	220 VDC 110 VDC
	- contactor coil	220 VDC 230 VAC 110 VDC 110 VAC
	- heater	230 VAC 220 VDC
	- electromagnetic interlock	220 VDC 110 VDC
2.	Rated power: - serial motor	300 W
	- contactor coil	7W
	- heater	25W
	- coil of electromagnetic interlock	7W
3.	Maximum rated force	6.5kN
4.	The maximum cross-section of wires to be connected	4 mm^2 (6/10 mm^2 for special solutions)
5.	The level of housing protection	IP 54
6.	Weight of the motor drive	ok. 20 kg
7.	Rated mechanical durability	2000 cycles

3. INSTALATION AND ADJUSTMENT

3.1. Coupling with apparatus

The appropriate length of the tie rod is used to couple the drive to the apparatus (length according to the customer's requirements). On the drive side it is possible to attach the tendon rigidly (using spears) or articulated (using a fork). Selection of the version at the ordering stage.



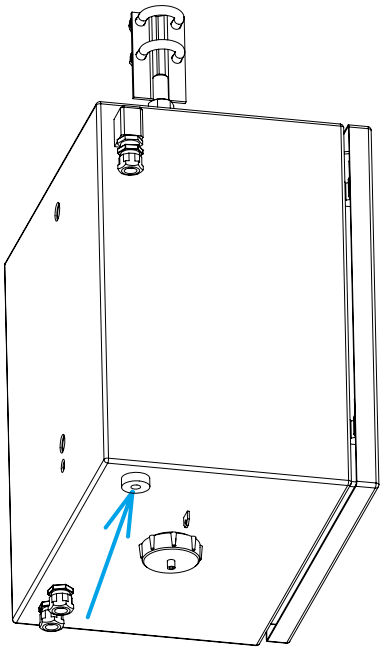


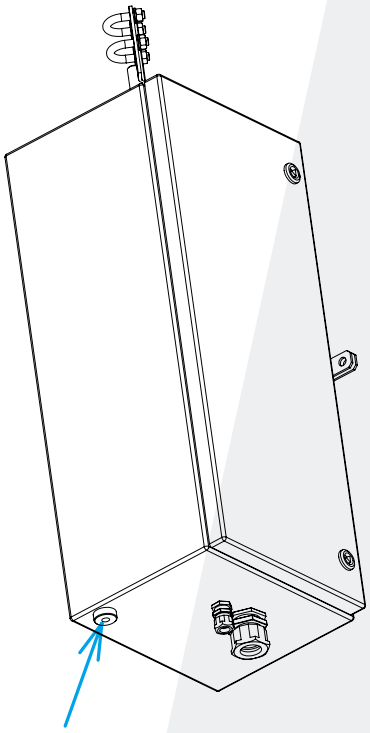
3.2. Mounting the drive on the pole

The drive is mounted using 2 M16 screws (visible on dimensional sketches). Mounting the drive to the pole is done by means of appropriate fasteners on a whirl pole or a Pn pole, according to the customer's requirements. Mounting is a separate element, not part of the drive.

3.3. Connective of protective grounding

To ground the drive, use the clamp indicated by the arrow on the sketch, consisting of an M12 screw and washer. The cross-section of the rail connecting the drive to the switchgear's ground should be selected in accordance with applicable regulations. Before connecting the protective earthing to the drive housing, carefully clean the surface of the earth terminal. At the end of the earthing bar, a hole Ø13 has to be made for the fastening screw. After leveling the surface and lubricating with the above-mentioned Vaseline, attach the rail to the earth clamp, taking care to carefully tighten the screw.





3.4. Connecting of control and power circuits

The control cable must be inserted into the drive housing via a gland located at the bottom of the drive. The connection of the control cable to the terminal block of the drive should be made in accordance with the design.

The electrical diagram is set individually, its paper version is supplied with the drive and its number is indicated on the nameplate.

3.5. Setting of microswitches

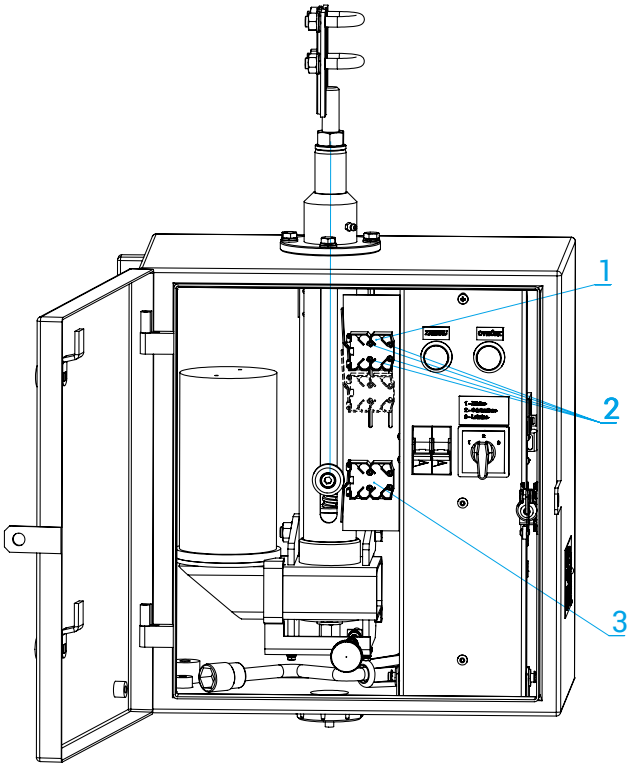
The device for which closing is carried out with the movement of the tendon up.

- set the camera in the „open" position
- manually set the drive in the „open" position (sleeve on the micro-switch [3])
- connect the drive with the camera using a pull cord
- Close the camera using the crank handle
- loosen the screws [2]
- set the microswitch [1] so that the drive is switched off before the device is resting on the bumpers

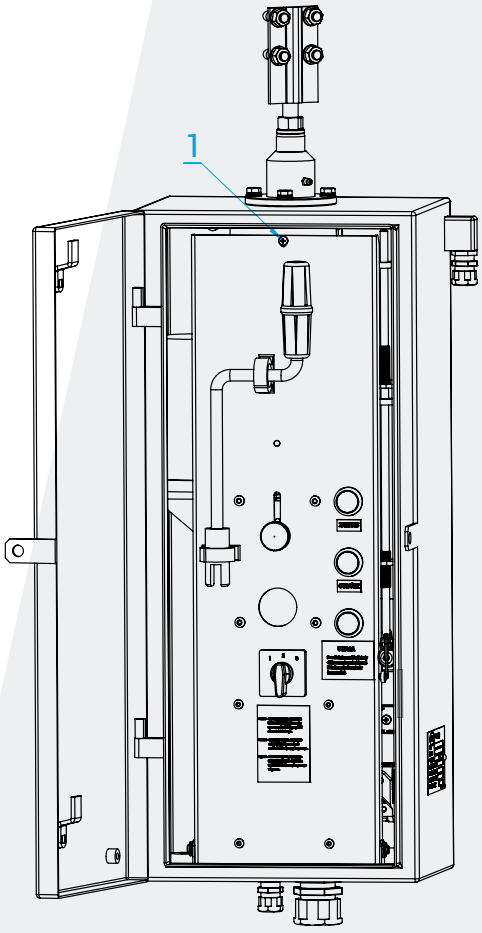
The device for which the closing is carried out with the movement of the tendon down.

- set the camera in the „closed" position
- manually set the drive in the „closed" position (the sleeve on the micro-switch [3])

- connect the drive with the camera using a pull cord
- open the camera using the crank handle
- loosen the screws [2]
- set the microswitch [1] so that the drive is switched off before the device is resting on the bumpers



Narrow version (NSL60-3): To set the microswitches in this version, unscrew the screw [1] to tilt the front panel. After deflecting the front panel, the microswitches are set up in a manner analogous to the standard version of NSL60-1.



Warning:

- Adjust the stroke of the tie rod by adjusting the top microswitch! The bottom one remains in the position set by the manufacturer (only a slight upward shift is allowed).
- Check the actuator manually after each switching of the microswitches before electric connection!

3.6. Tests before putting to use

Before commissioning the drive, check the quality of its assembly and the correct interaction with the device. For this purpose, it is necessary to perform 5 - 10 electrically controlled shifts, observing carefully the interaction of parts. In the case of any irregularities in the operation of the drive or the apparatus cooperating with it, a re-adjustment of the respective assemblies should be carried out and the tests should be repeated.

4. EXPLOITATION

4.1. Manual maneuvering

Set the mode switch to „manual". With this switch setting, remote and local control is disconnected. The electromagnetic lock of the manual drive is ready for operation.

To maneuver the drive by hand:

NSL60-1 version (standard)

- unscrew the nut securing the crank hole;
- pull away the mechanical block (black knob);
- put the hand crank;
- turn the crank clockwise or counter-clockwise until the nut on the screw reaches the position where it switches over the microswitch;
- pull out the crank;
- after completing the manual maneuvering, re-screw the nut securing the crank hole;

NSL60-3 version (narrow)

- press the „lock" button (in the case of drives equipped with an electromagnetic lock, otherwise skip the point)
- pull the bolt (black knob);
- release the „lock" button;
- insert the crank;
- turn the crank clockwise or counter-clockwise until the nut on the screw reaches the position where it switches over the microswitch;
- pull out the crank;

4.2. Local control

Set the mode switch to „local". With this setting of the remote control switch is disconnected, the manual drive lock is not powered. Local controls operate. Pressing the „turn on" button closes the camera. Pressing the „disable" button opens the camera. Incorrect use of the buttons does not damage the drive or improper work.

4.3. Remote control

Set the work type switch to „remote". With this setting of the switch, the buttons do not work, no power supply to the manual drive lock.

5. INSPECTIONS AND CONSERVATIONS

5.1. Visual inspection

External inspection is recommended to be carried out once a year and after any failure or short circuit in the switchgear. Check especially:
a) the condition of the earth terminal,
b) the condition of the coupling mechanisms,
c) the condition of external parts (housing).
d) connection of wires with terminal block, fixing of limit switches.

5.2. Spare parts and recomended maintenance materials

The use of high quality components and operational experience indicate the long service life of motor drives (about 30 years). In the event of damage to the drive due to improper assembly or operation, there is a possibility of paid repair by the manufacturer.

PHARMACEUTICAL OAELINE WHITE (acid-free) used for the lubrication of electrical contacts (grounding)

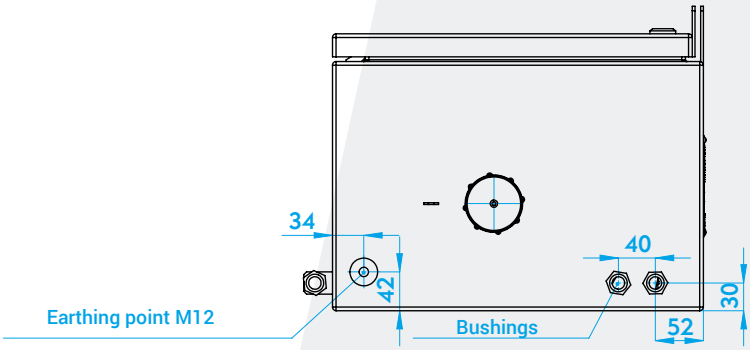
PROTECTION GREASE TDM according to PN-64 / C-96146 used for the preservation of metal surfaces (articulated elements of the tie rod and coupling mechanism).

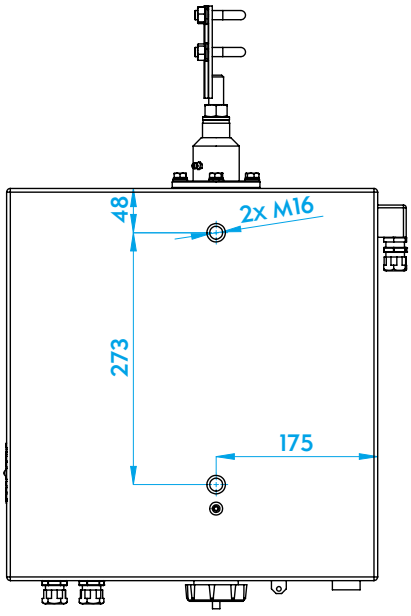
5.3. Periodic inspections

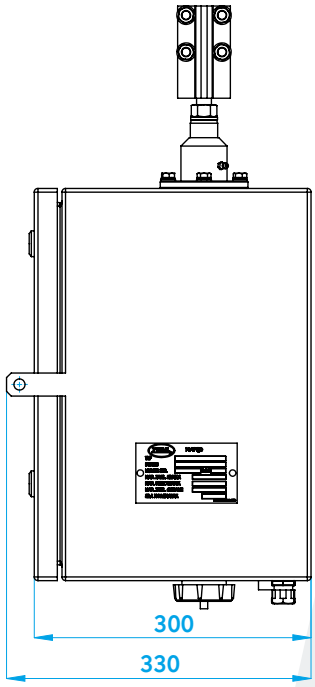
Periodic inspections and maintenance should be carried out once every 5 years. During inspection and maintenance, the applicable regulations for the operation of power equipment and the requirements for the safety of the work of maintenance personnel must be observed. In particular, check:
• the condition of the grounding clamp and the earthing installation,
• condition of mechanisms and bearings and fasteners,
• correctness of occupying the end positions,
• state of contacts of auxiliary switches,
• the condition of protective coatings protecting parts against corrosion,
• adhesion of the door cover seal to the housing edge,
• heater assembly.

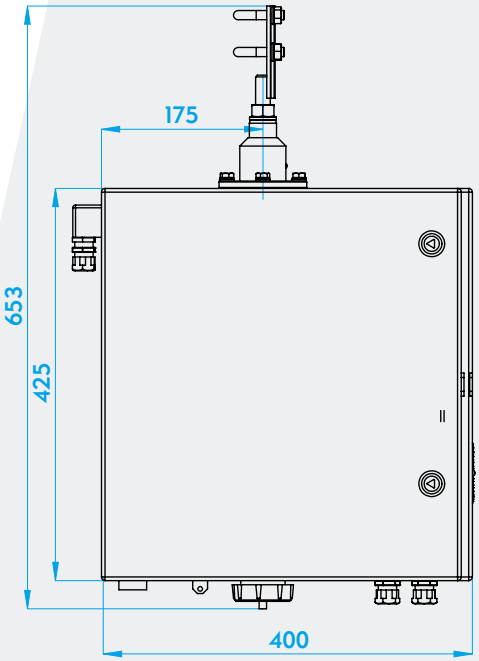
6. DIMENSION DRAWINGS

Standard version NSL60-1

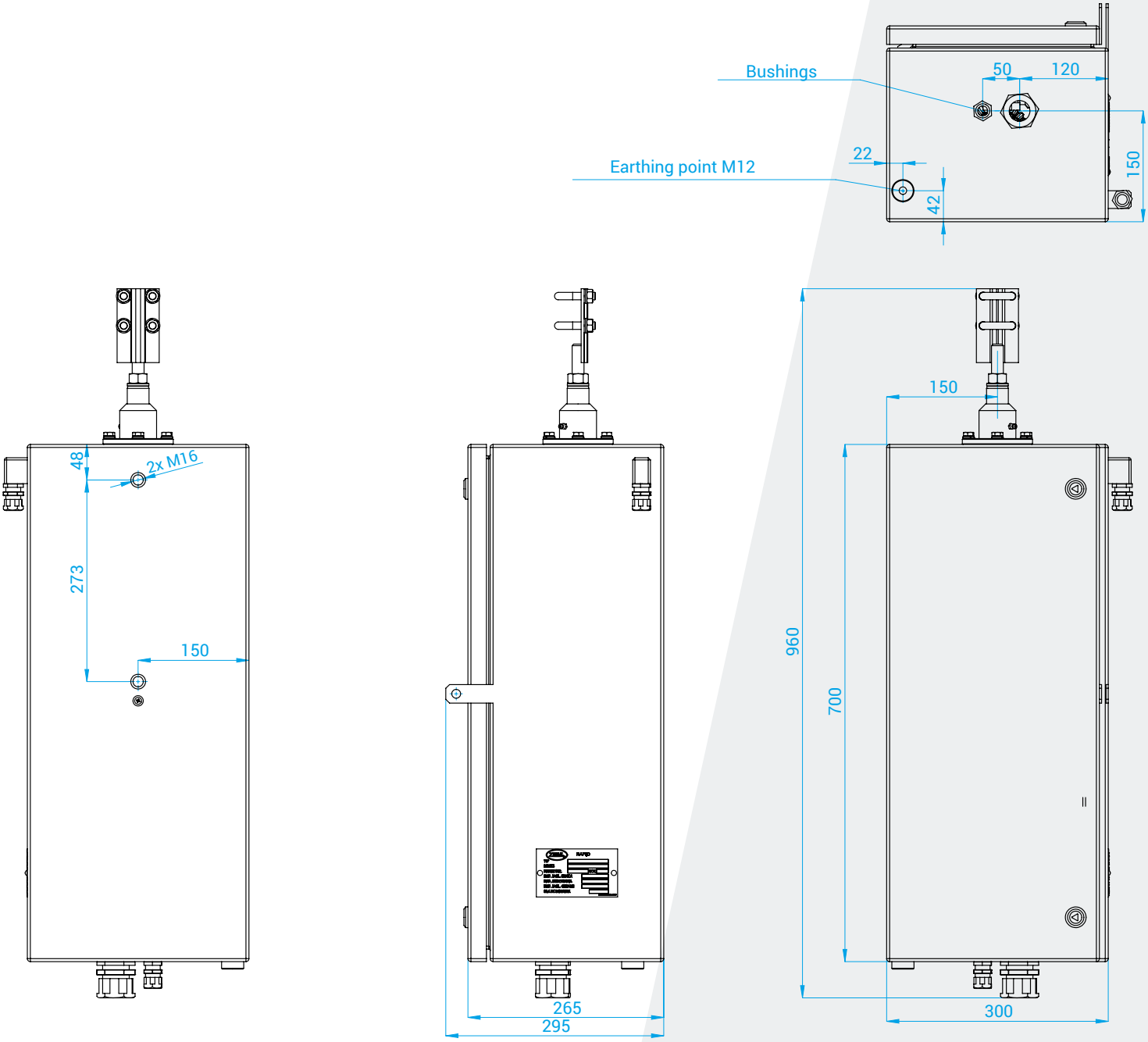








Narrow version NSL60-3



7. UTILIZATION

NSL60 drives are made of materials that are recyclable.
The main materials from which the drives are built are:
•steel(painted,galvanized);
•aluminum;
•plastics(epoxymix,polyamide).
The drives do not contain any dangerous substances. In accordance with applicable regulations, it is possible to return a worn out, complete disconnector to the manufacturer.

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