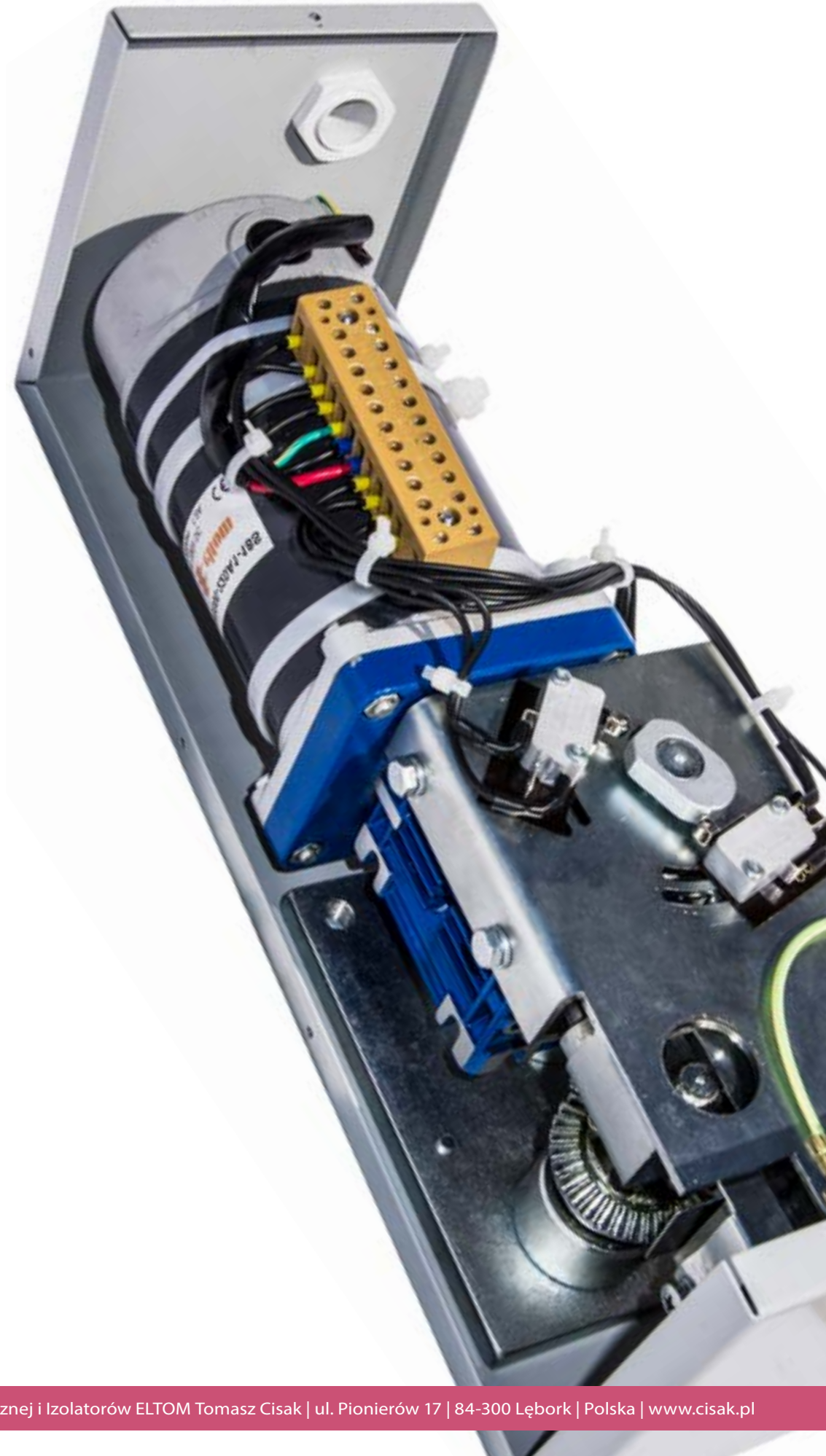


Motor drives



NS-EL - motor drive with worm gear

Application:

NS – EL motor drives is designed to work with medium voltage indoor devices, such as cut – off switches and earthing switches. Drive's application allows to operate the switch (which is mounted in the switch-gear's chamber) in remotely or local way. There is the opportunity to replace pneumatic or manual NRK drives in simple way, without any changes in the switchgear.

Advantages:

- simple design with proven mechanisms (2000 switching cycles)
- strong torque, which allows to operate many medium voltage distributive devices (eg. disconnectors, earthing switches)
- reliability
- smooth adjustment of rotation angle of output shaft (in range 220 degrees)
- simple replacement of NRK manual drive to NS – EL 30 – 1 drive without having to make changes in the switchgear
- in the case if voltage loss, there is the possibility to manual operating
- small size

Housing:

The housing is made of steel sheet, covered by epoxy powder paint. The lid is mounted to the drive's panel with 2 bolts. There is the straight-through joint in the bottom, which allows to lead the conductors to the control system.

Operating and design:

The motor drive includes:

- multi – degrees cylindrical – worm gear driven by direct current series motor
- limit switches which turn off the power, after the angle of torque is achieved by main shaft
- terminal strip which joints operating and supplying circuits
- electrical interlocking micro switch which turns off the power when manual operating



Driving mechanism includes:

- direct current series motor
- intersecting axis worm gear
- intersecting axis rack – type gear for manual opening

Electrical motor drives the cylinder by the worm gear. The output shaft's angle of rotation is limited to 220 degrees because of limit switches.

The regulation of output shaft's angle of rotation takes place by the limit switches mounted on the panel of distributor rotor arm. Loosening M3 bolt allows to smooth adjustment of rotation angle of output shaft (in range 220 degrees).

Manual control:

To operate the drive:

- pull out the damper (placed upper or on the left side) which blocks the hole in the left side, it causes the blockade of the operating of electric motor
- insert the crank in the hole (which opens when pulling out the damper)
- rotate right (to close) or left (to open)
- after pulling out the operating lever, it is necessary to insert the damper to unlock the motor for electrical operating

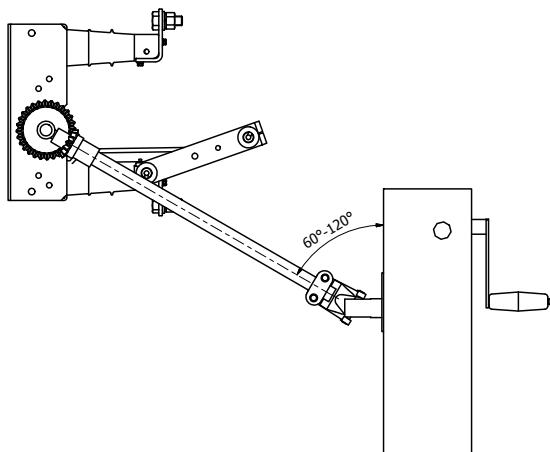
Mounting:

Mounting the drive to the structure requires two M10 bolts. The wall on which is drive mounted should be rigid enough to provide suitable transfer of driving torque.

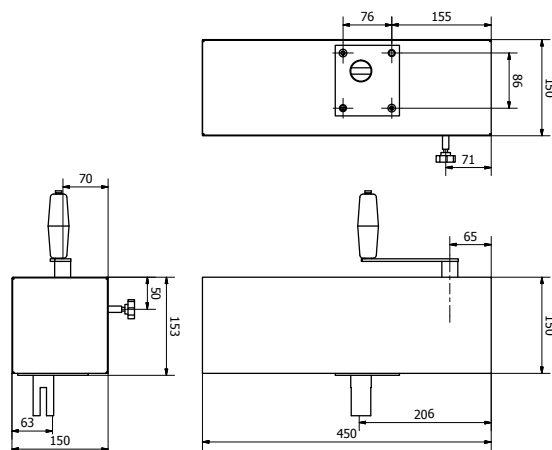
Parameters:

| | NS-EL 30-1 | NS-EL 90-1 |
|-----------------------------|------------------------|------------------------|
| type of motor | with permanent magnets | with permanent magnets |
| motor's rated voltage | 220 VDC | 220 VDC |
| rated power | 90 W | 300 W |
| motor's rated current | 0,5 A | 1,9 A |
| torque | 28 Nm | 90 Nm |
| rated mechanical durability | 2000 cycles | 2000 cycles |
| weight | ~ 8 kg | ~ 8 kg |

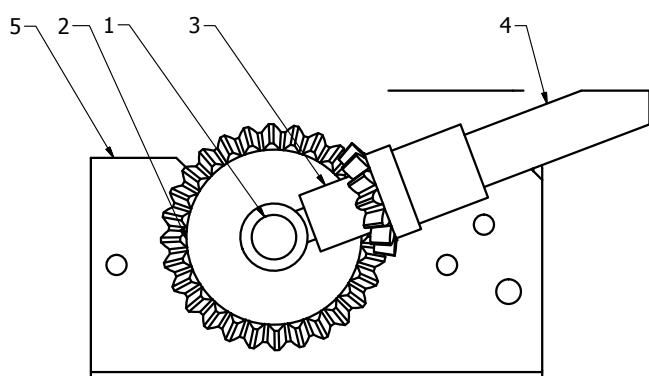
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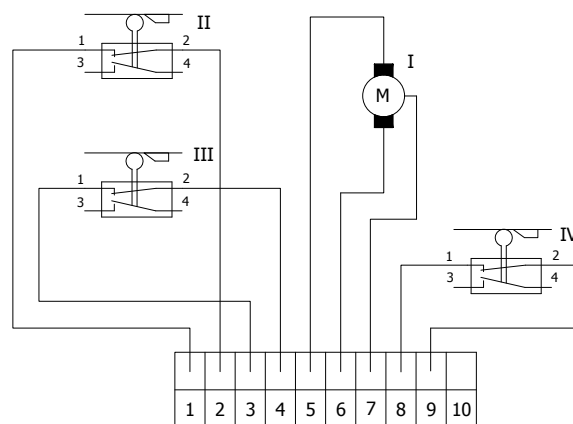
disconnector with drive



dimensional sketch of the drive



Drawing no. 3



Drawing no. 4

Description of the drawings no. 3 and 4:

| Drawing 3 - connection on the side where the earthing switch or disconnector is mounted | |
|---|------------------------------|
| 1 | shaft |
| 2 | pinion (large toothed wheel) |
| 3 | rack (small toothed wheel) |
| 4 | tubular shaft |
| 5 | basis |

| Drawing 4 - connection diagram | |
|--------------------------------|--------------------------------------|
| I | motor drive |
| II | limit switch |
| III | limit switch |
| IV | electrical interlocking micro switch |

NSP 30-04 - motor drive with planetary gear

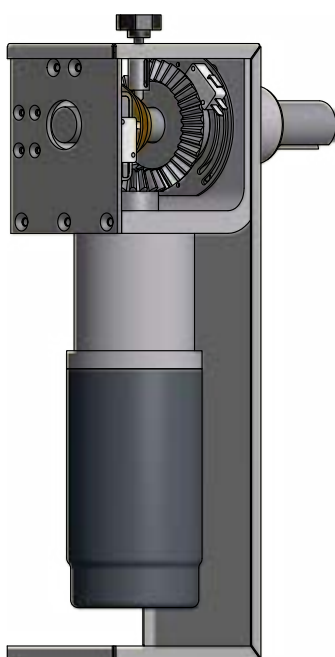
Application:

Motor drives NSP 30-04 are designed for cooperation with disconnectors, cut-off switches and earthing switches in medium voltage indoor conditions. The use of the drive allows for remote or local control of the switch mounted in the the switchgear's chamber.

In a simple way, with no changes in the existing switchgear the pneumatic or manual drives can be replaced by NSP 30-4.

Advantages:

- simple construction, using proven mechanisms (2000 cycles)
- high torque, which allows for easy maneuvering the wide range of medium voltage switches (circuit breakers, disconnectors, earthing switches)
- reliability
- smooth adjustment of the output shaft rotation angle in the range of 220 degrees
- easy replacement of manual drive type NR1 on the NSP 30-04 without having to make changes to existing switchgear
- in event of voltage loss, the possibility of manual operation
- small size



The motor drive includes:

- three-stage planetary gear driven by a DC motor with permanent magnet
- the limit switches, switching off the motor's power supply after reaching the founded rotation angle by main shaft
- terminal strip for connection the control circuits and power supply
- the limit switches of electrical interlocking, turning off motor's power supply during operation the manual drive

Housing:

The housing is made of steel sheet coated with a layer of epoxy powder paint. The housing cover is mounted to the drive's plate by two screws. At the bottom of the housing there is a straight-through joint that enables the supply of cables to the control system. The housing cover is connected with the 8 screws.

The drive mechanism includes:

- dc motor with permanent magnets
- three-degree planetary worm gear
- intersecting axis rack gear, to transfer angular moment and the crank for manual opening

The electric motor drives the shaft through the planetary gear. The angle of rotation of the output shaft is limited by a limit switch 220 degrees.

Adjusting the angle of rotation of the output shaft:

Adjusting the angle of rotation of the output shaft is performed by using limit switches mounted on the limit switch's plate. Loosening the screw M3 allows for smooth adjustment of the angle of the output shaft in the range of up to 220 degrees.

Technical data:

| | value | value |
|-----------------------------|-------------------|-------------------|
| type of the drive | NSP 30-04 | NSP 30-05 |
| type of the motor | permanent magnets | permanent magnets |
| motor's rated voltage | 220 V DC | 220 V DC |
| rated power | 300 W | 300 W |
| motor's rated current | 1,9 A | 1,9 A |
| drive shaft torque | 180 Nm | 300 Nm |
| rated mechanical durability | 2000 cycles | 2000 cycles |
| weight of the motor drive | 9 kg | 12 kg |

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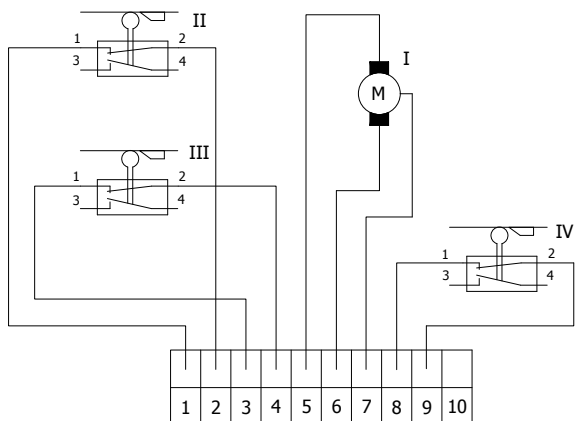
Manual control:

In order for manual operating the drive you need to:

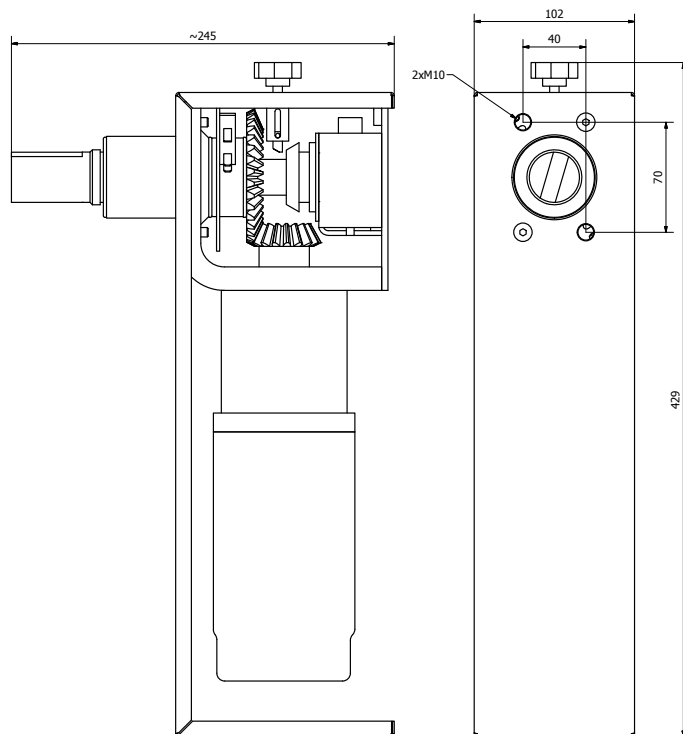
- insert the lever in the hole on the knurled shaft
- rotate, causing the closure of the device (right), or open (left) depending on the current position of the switch
- after removing the lever, the electric motor unlocks to an electrical operating version
- the interlocking of motor's operating

Mounting the drive to the supporting structure:

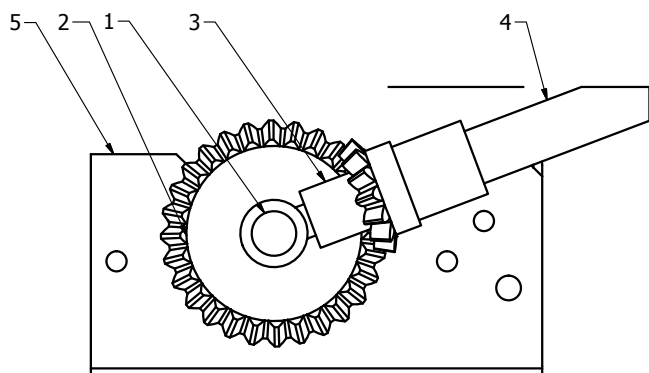
Mounting the drive to the supporting structure is performed by using two M10 bolts. The wall on which the drive is mounted should be sufficiently rigid thus providing the driving torque transmission.



Drawing no. 4.



dimensional sketch of the drive



Drawing no. 3

Description of the drawings no 3 and 4:

| | |
|---|---|
| | Drawing 3 - connection on the side where the earthing switch or disconnecter is mounted |
| 1 | shaft |
| 2 | pinion (large toothed wheel) |
| 3 | rack (small toothed wheel) |
| 4 | tubular shaft |
| 5 | basis |

| | |
|-----|---|
| | Drawing 4 - connection diagram of NS-EL 30-01 and NS-EL 90-01, series motor |
| I | motor drive |
| II | closing limit switch |
| III | opening limit switch |
| IV | electrical interlocking micro switch |

NSN 24-1 - outdoor motor drive

Technical characteristics:

Motor drive NSN is designed for opening and closing the traction switches by the plane motion of tubular string. Because of using the trapezoidal screw, the drive has a high mechanical strength. The mechanism is located inside the box made of aluminum, powder-coated.

The drive is mounted to the traction column by suitable structure. In the event of an emergency maneuver of the crank, the drive has an electrical interlock that prevents its launch.

Advantages:

- high mechanical durability
- slim design
- high strength allows for the movement in difficult weather conditions
- the ability to manually move the crank in emergency situations

Purpose:

Outdoor traction drive type NSN 24-1 is designed for remote and local opening and closing switches in the lines of traction.

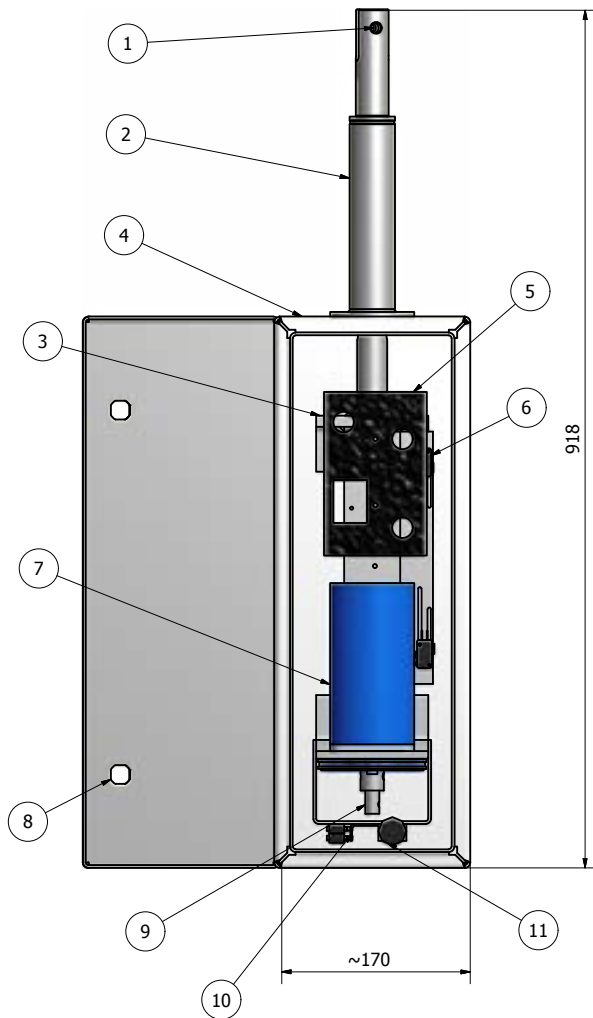
We also offer electric drive - NSR, much faster maneuvering the traction cut-off switch. This results in quicker disconnection. The drive is equipped with permanent magnets and a worm gear. It is also adapted to control manual and remote, and it is protected by the separation of supply voltage.



Technical data:

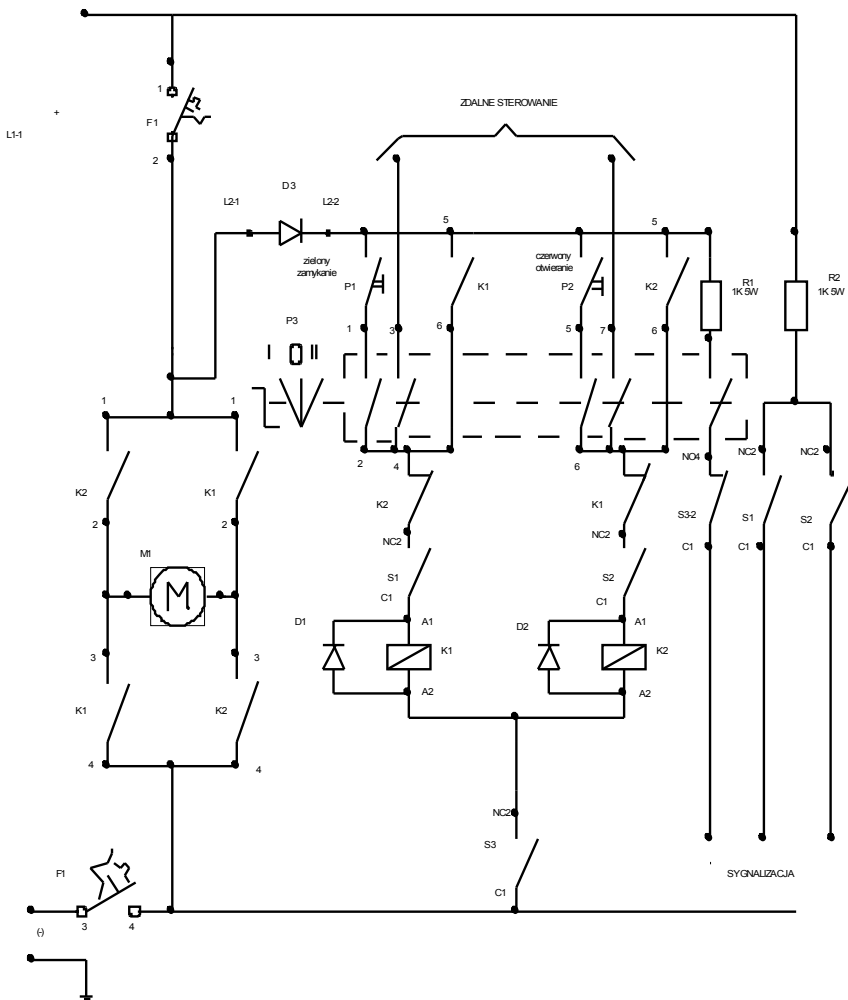
| | |
|--|--------------|
| type | NSN |
| rated supply voltage | 24 VDC |
| operating voltage range | [0,85 - 1,1] |
| the average current consumed by the loaded drive | 15 A |
| level of protection | IP 55 |
| the average cycle time | 2,5 s |
| max. skip of connector of string | 160 mm |
| permitted load | 1600 N |
| dimensions [W x H x L] | 170x550x280 |
| weight | 24 kg |

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Technical drawing:

| | |
|----|----------------------------|
| 1 | handle |
| 2 | the cover of the mandrel |
| 3 | contactors |
| 4 | drive's box |
| 5 | control panel |
| 6 | limit switch |
| 7 | motor |
| 8 | lock |
| 9 | shaft of emergency opening |
| 10 | crank's limit switches |
| 11 | blocking of the crank |



Connection diagram of the electrical installation for NSN 24-1:

| | |
|----|--|
| S1 | switch (position of the configuration) "making-capacity" |
| S2 | switch (position of the configuration) "disconnect" |
| S3 | łącznik poz. blokady napędu odł. |
| P1 | configuration button "making-capacity" |
| P2 | configuration button "disconnect" |
| F1 | overcurrent switch of instal. |
| K1 | contactor "making-capacity" |
| K2 | contactor "disconnect" |
| D1 | rectifying diodes |
| D2 | |
| D3 | |
| M | motor 24 V 90 W 3000 mpr. [NSN 241] |

