

NSW30

Motor Operating Mechanism

Manual DTR.05.04.04.EN

.....○ **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.

Spis treści

1. TRANSPORT	4
1.1 Unpacking and inspection	4
1.2. Transport and storage	4
2. Description	4
2.1. Cosntruction and principle of operation.	4
2.2. Housing box	5
2.3. Driving mechanism	5
2.4. Environmental conditions	5
2.5. Nominal plate	6
2.6. Technical dat	6
3. ADDITIONAL EQUIPMENT	7
3.1. Electromagnetic interlock	7
3.2. Control system in box	8
3.3. Control system on TH-35 bar5	8
3.4. Coupling joint	9
3.5. Coupling rod	9
3.6. Angular gears	10
3.7. Disconnecter gears	11
4. INSTALATION AND ADJUSTMENT	11
4.1. Assembling to the supporting construction	11
4.2. Assembling on MV switch	12
4.3. Coupling with rod assembling on the main shaft of MV switch	12

4.4. Connecting protective grounding..	12
4.5. Connecting control and supply circuits.	12
4.6. Adjusting the rotation angle of the output shaft.	13
4.7. Tests before putting into service	13
5. EXPLOITATION	14
5.1. Manual control.	14
6. PERIODIC INSPECTIONS AND CONSERVATIONS	16
6.1. Visual inspection	16
6.2. Spare parts and recommended maintenance materials.	16
7. DIMENSION DRAWING OF THE OPERATING MECHANISM	17
8. DIMENSION DRAWING OF THE CONTROL BOX	17
9. WIRING DIAGRAM OF NSW30-3 – MOTOR WITH PERMANENT MAGNETS	18
10. WIRING DIAGRAM OF NSW30-4 – SERIAL MOTOR.	19
11. UTILIZATION	20

1. TRANSPORT

1.1. Unpacking and inspection

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. Upon receipt of delivery, the stretch film must be removed to ensure adequate ventilation to counteract the formation corrosion.

The drive is delivered in a cardboard package. Drives are delivered to the recipient completely assembled.

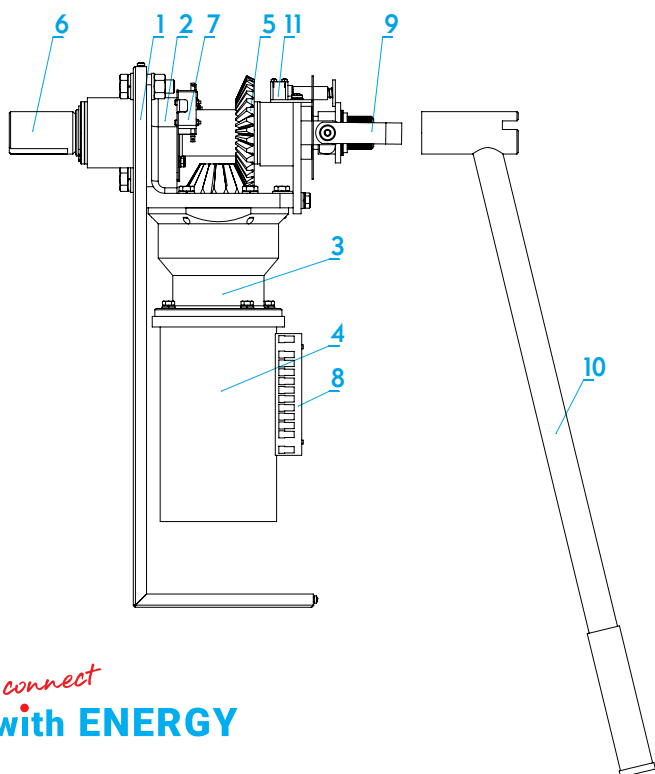
1.2. Storage and transport

For storage and installation, the drives can be transported by any means of transportation 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.

2. DESCRIPTION

NSW30 motor drives are designed for cooperation with disconnectors, disconnectors and earthing switches of medium voltage in indoor conditions. The use of the drive allows remote or local control of the switch installed in the switchgear cubicle. In a simple way, without any additional changes in the existing switchgear, you can replace the existing pneumatic or manual drives of the NRK type, thereby introducing a new standard of operation and safety (remote control option, local or manual)

2.1. Construction and principle of operation.



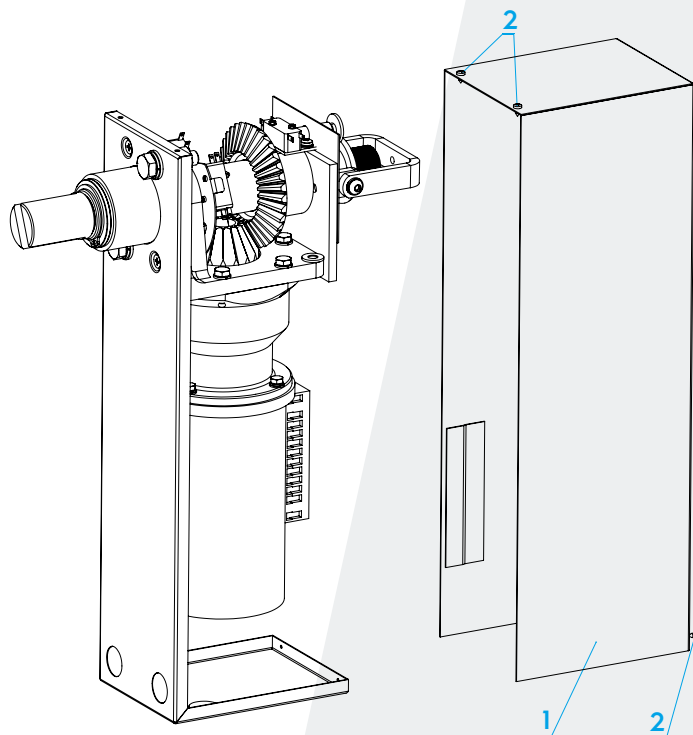
1. housing box,
2. core,
3. gear,
4. motor,
5. angular gear,
6. output shaft,
7. limit switch,
8. terminal block,
9. lock handle enabling switching to manual or motor operation,
10. manual lever
11. microswitch of electrical blockade.

2.2. Housing box

The housing box is made of steel sheet, covered with a layer of epoxy powder paint. The housing cover is attached to the corp behind using four self-tapping screws [12]. In the bottom parts of the housing, on both sides, are located embossments with a diameter of 14 mm allowing bringing wires to the control system.

1. casing

2. sheet metal screws



2.3. Driving mechanism

Driving mechanism includes:

- DC electric motor
- Multistage transmission gear
- angular gear.

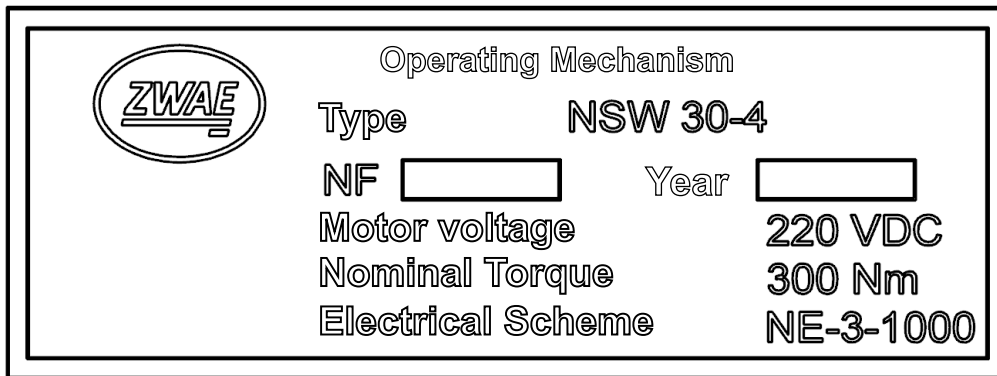
An electric motor drives a bevel gear through a three-gear gear.

As a result of the gear transmission, the maximum drive torque is approx. 300Nm, and the angle of rotation of the output shaft is limited by the limit switches to 220°. The casing is made of steel sheet, covered with a layer of epoxy powder paint. The housing cover is attached to the body by means of four self-tapping screws [12]. In the lower part of the casing, a cable gland with a diameter of 14 mm is provided, enabling the supply of control and supply wires.

2.4. Environmental conditional

The drives are recommended to be used indoors, in an atmosphere free from aggressive chemical agents, at ambient temperatures of -5 to + 40 ° C and relative humidity not exceeding 70%.

2.5. Nominal plate

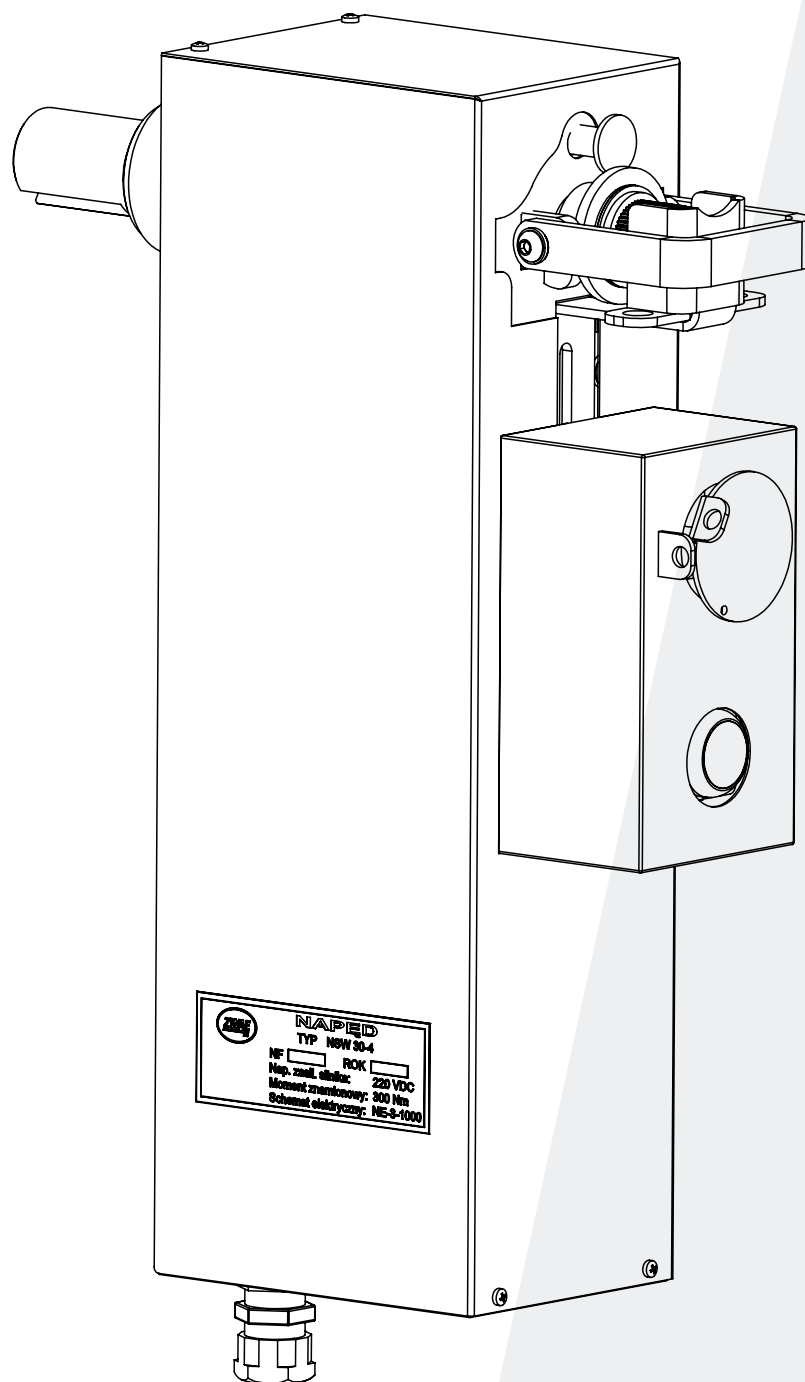


2.6. Technical data

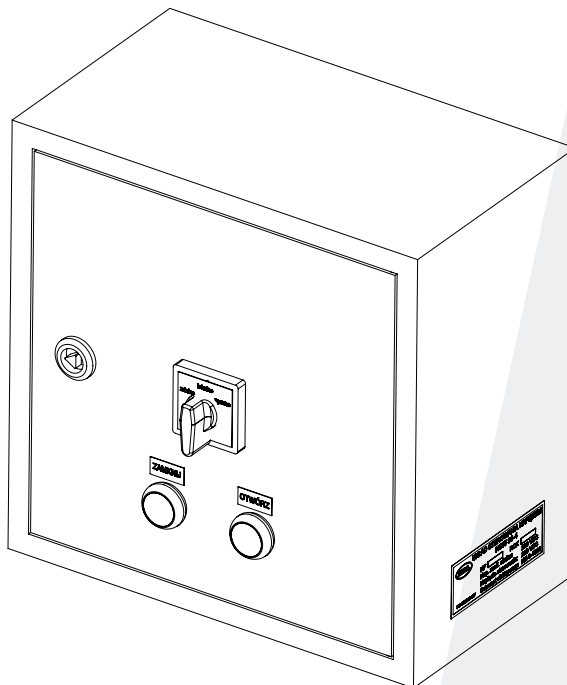
Lp.	Parameter	Value	
1.	Type	NSW30-3	NSW30-4
2.	Nominal voltage	110 VDC 110 VAC 24 VAC	220 VDC 230 VAC
3.	Nominal current	4,9A/220V 5A/220 V 19 A/24 V	4,9 A/220 V
4.	Nominal power	300W	
5.	Torque: - nominal - maximum	150 Nm 300 Nm	
6.	Switching time	ca. 5s	
7.	Maximum diameter of wires	4 mm ²	
8.	Weight	ca 10kg	
9.	Mechanical endurance	2000 cycles	

3. ADDITIONAL EQUIPMENT

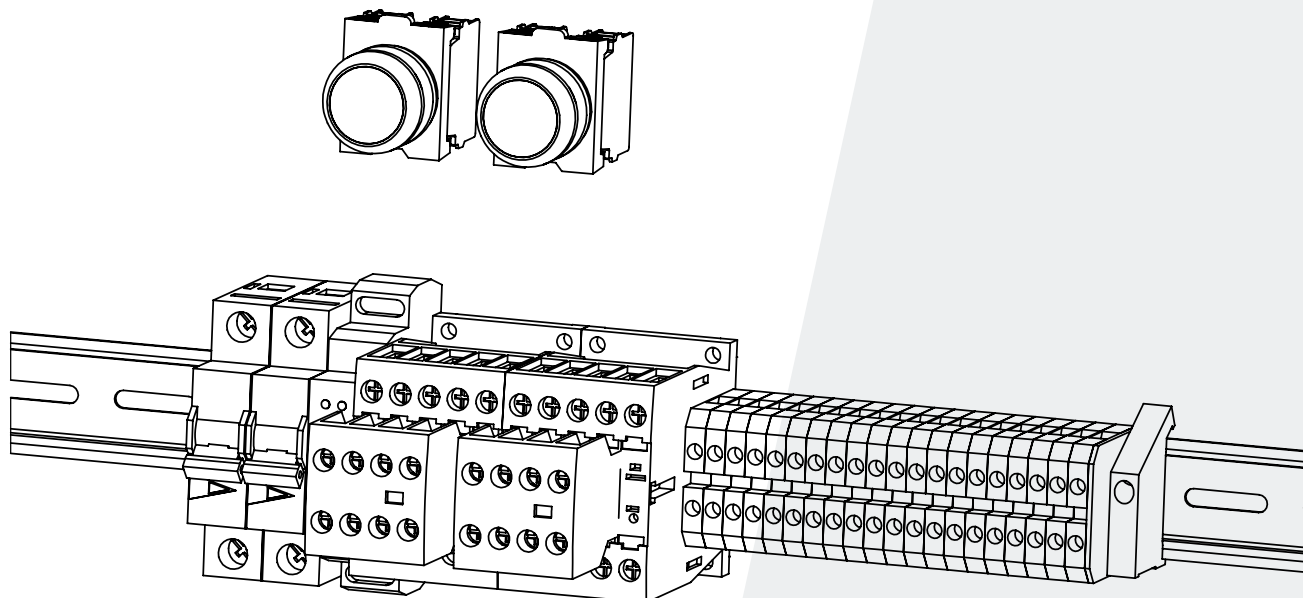
3.1. Electromagnetic interlock



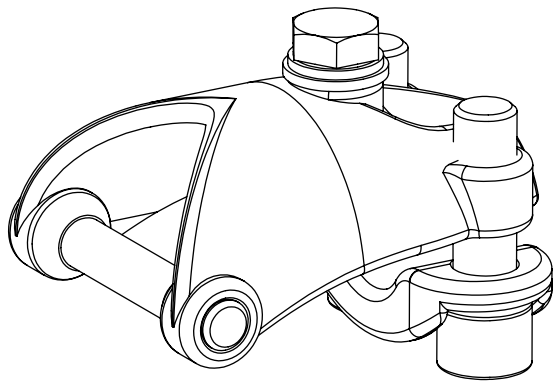
3.2. Control system in the box



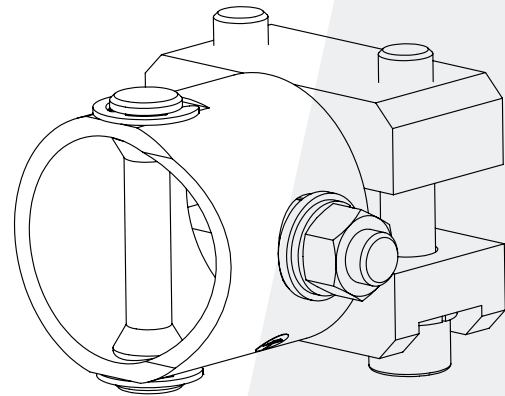
3.3. Control system on TH-35 bar



3.4. Coupling joint

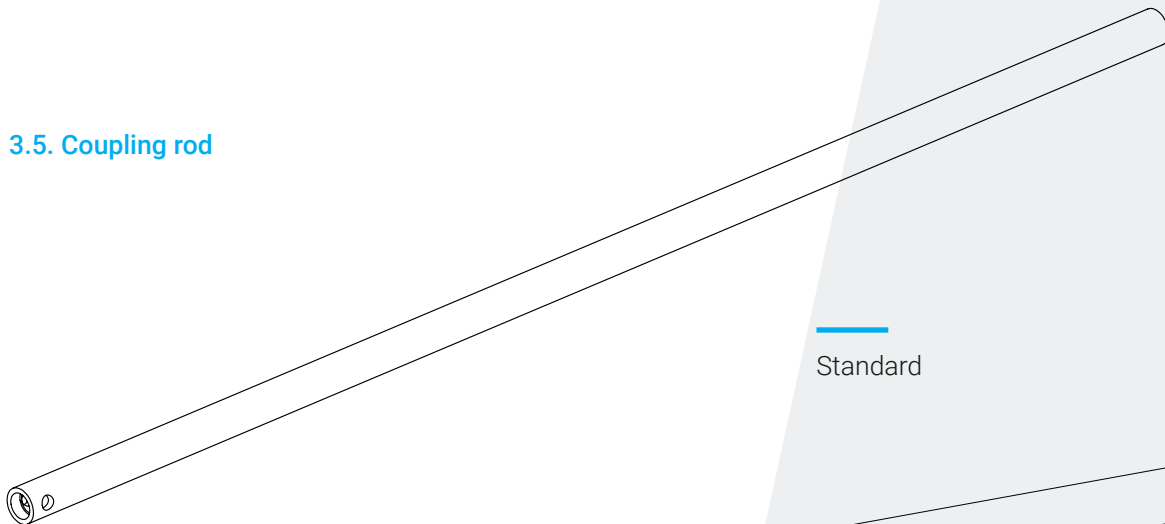


Standard



Strengthened

3.5. Coupling rod

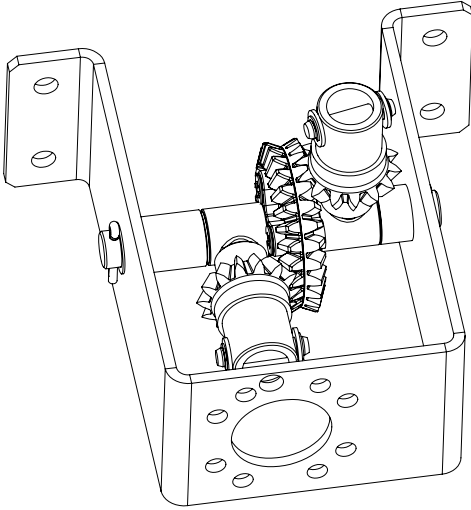


Standard

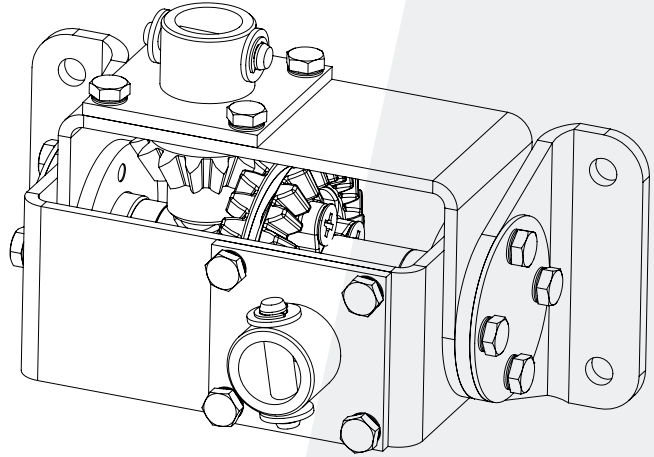


Insulated

3.6. Angular gear

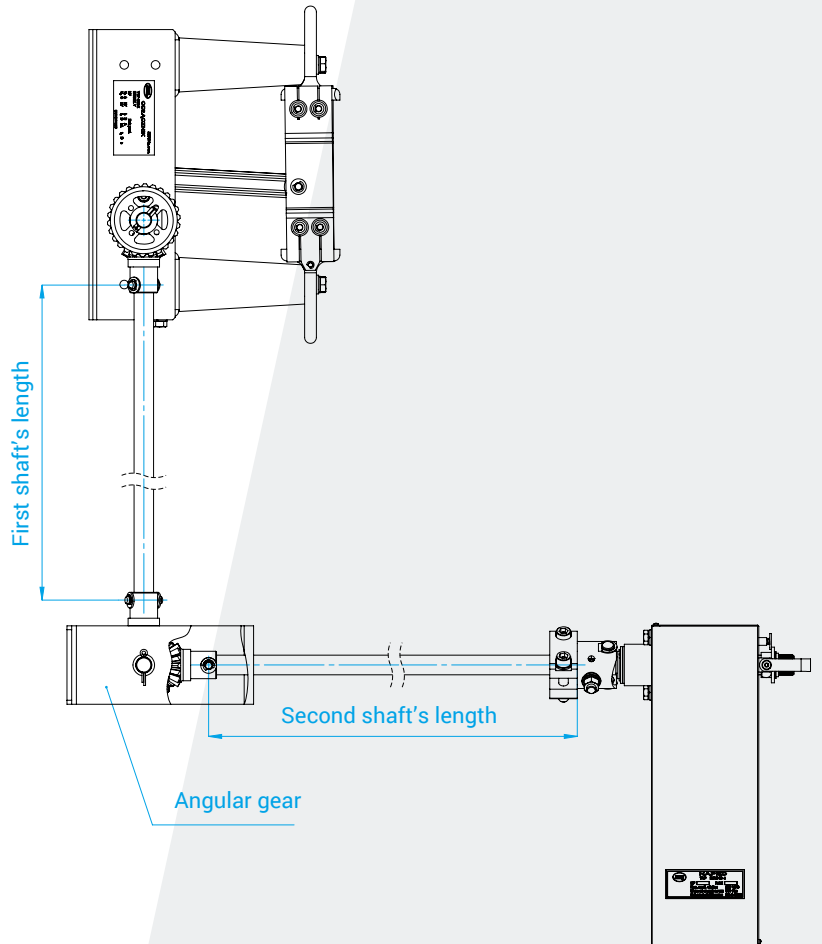


Standard

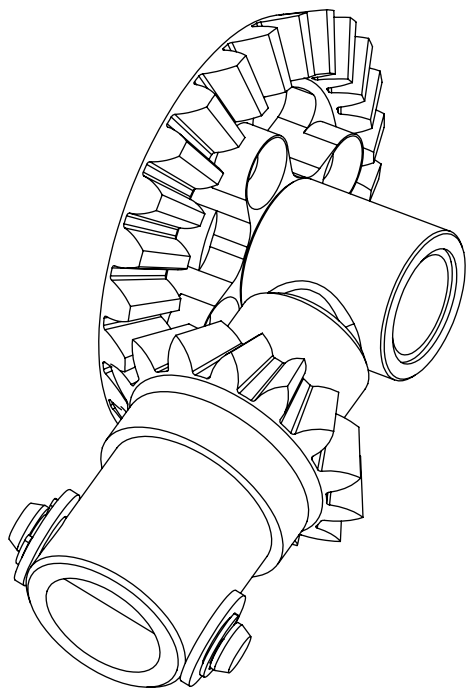


Strengthened

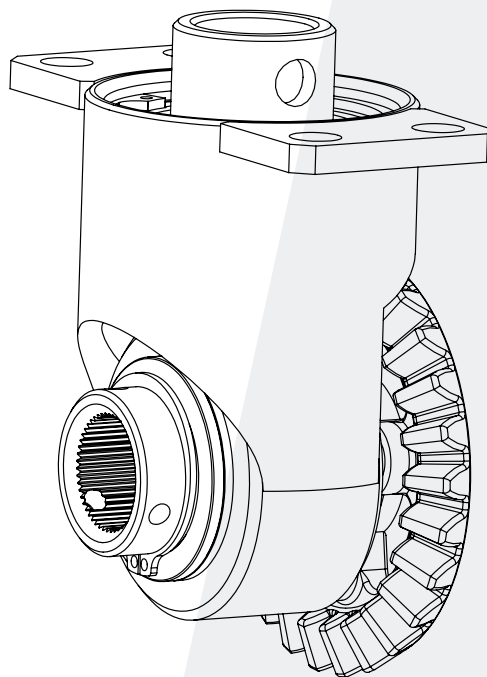
An example of angular gear application.



3.7. Disconnecter gears



Standard



Strengthened

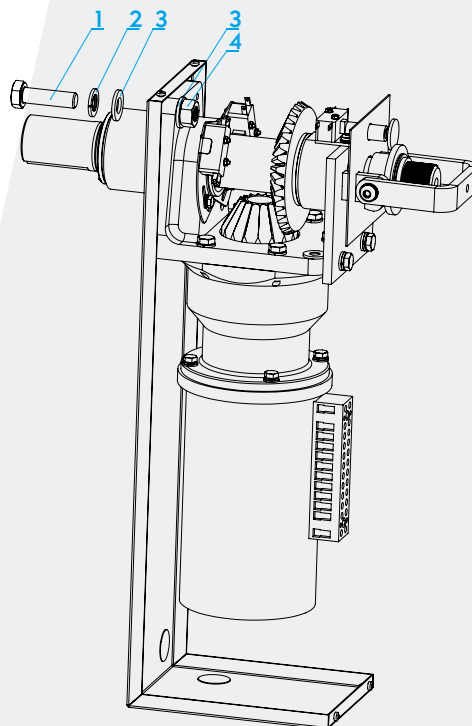
4. INSTALATION AND ADJUSTMENT

4.1. Assembling to the supporting construction

The drive is fastened to the supporting structure with two M10 screws. The wall on which the drive is mounted should be sufficiently rigid, thus ensuring a certain transmission of the drive torque.

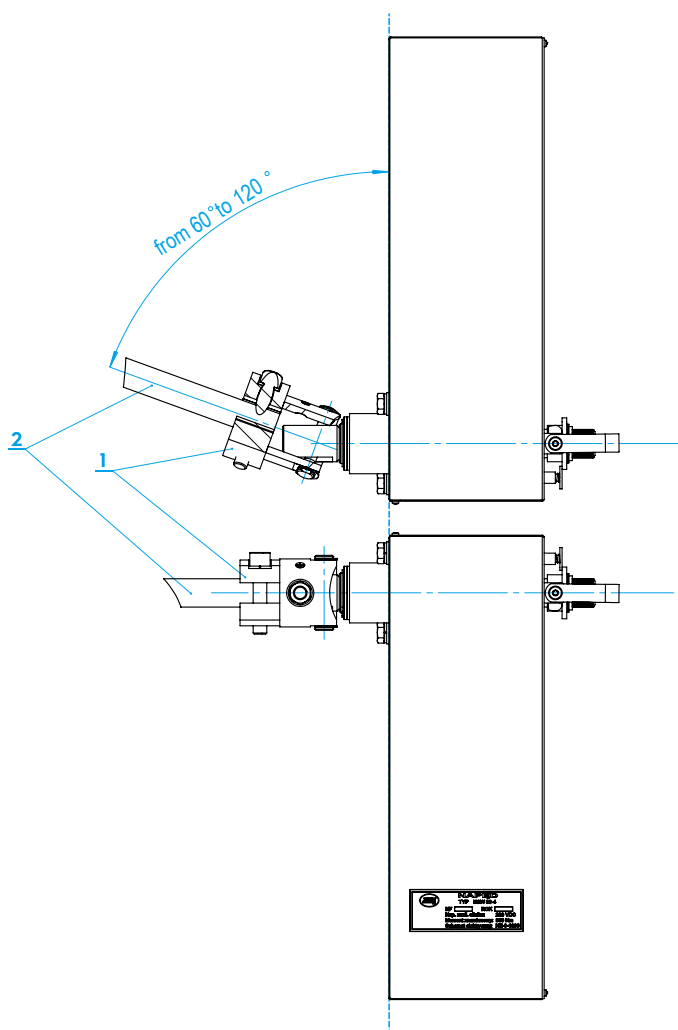
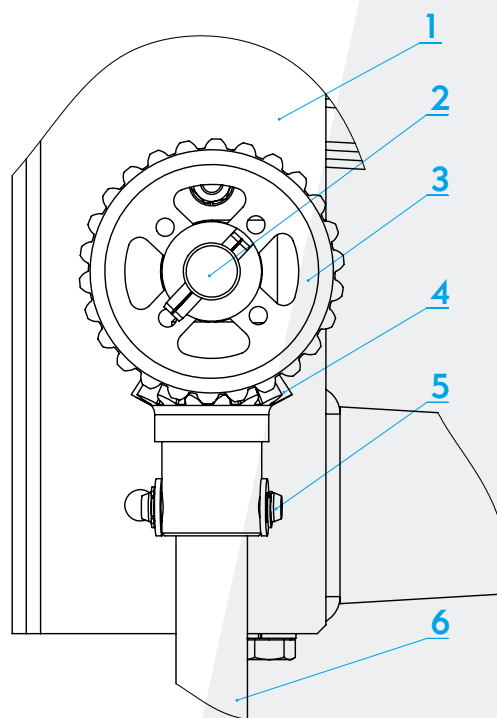
Compatibility between the spacing of mounting holes and the shape of the output shaft ensures full interchangeability for manual drives of the type NRK produced by ZWAR S.A and manual drives NR-1 produced by ZWAE sp. O.o.

1. screw M10x35
2. spring washer B10-A70
3. washer M10
4. nut M10



4.2. Assembling on MV switch

1. Apparatus frame
2. Apparatus shaft
3. pinion (large bevel gear)
4. pinion (small bevel gear)
5. pin 10x50
6. operating mechanism's propulsive shaft



4.3. Coupling with rod assembling on the main shaft of MV switch.

1. clamp
2. coupling joint

4.4. Connecting protective grounding.

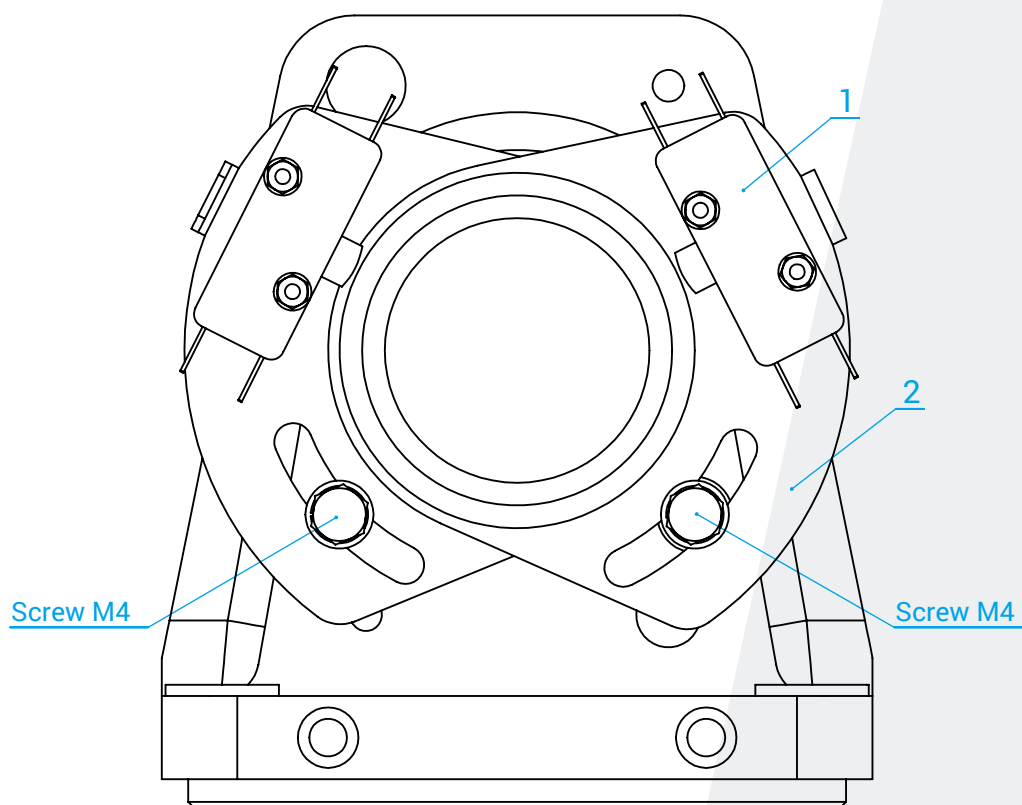
For grounding the coupling shaft of the motor drive with the apparatus, a clamp on the cross-joint is used, consisting of an M12 screw and washer. The cross-section of the earthing conductor should be selected in accordance with the applicable regulations.

4.5. Connecting control and supply circuits.

The control cable must be inserted into the drive housing via a throttle. Connection of the control cable with the terminal block of the drive should be made in accordance with the designed control system. The maximum cross-section of wires supplied to the terminal block can be 4 mm².

4.6. Adjusting the roatation angle of the output shaft.

The angle of rotation of the output shaft is adjusted by limit switches [23] mounted coaxially with the control bracket [24]. Unscrewing the M4 bolt allows you to move the control bracket with the connector to the cam on the shaft, and this allows you to smoothly adjust the angle of the output shaft in the range of 220 degrees.



4.7. Tests before putting into service

Before putting the drive into service, check the quality of its assembly and the correct interaction with the device. For this purpose, 10 - 20 electrically controlled shifts should be made, carefully observing the interaction of the 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.

5. EXPLOITATION

5.1. Manual control

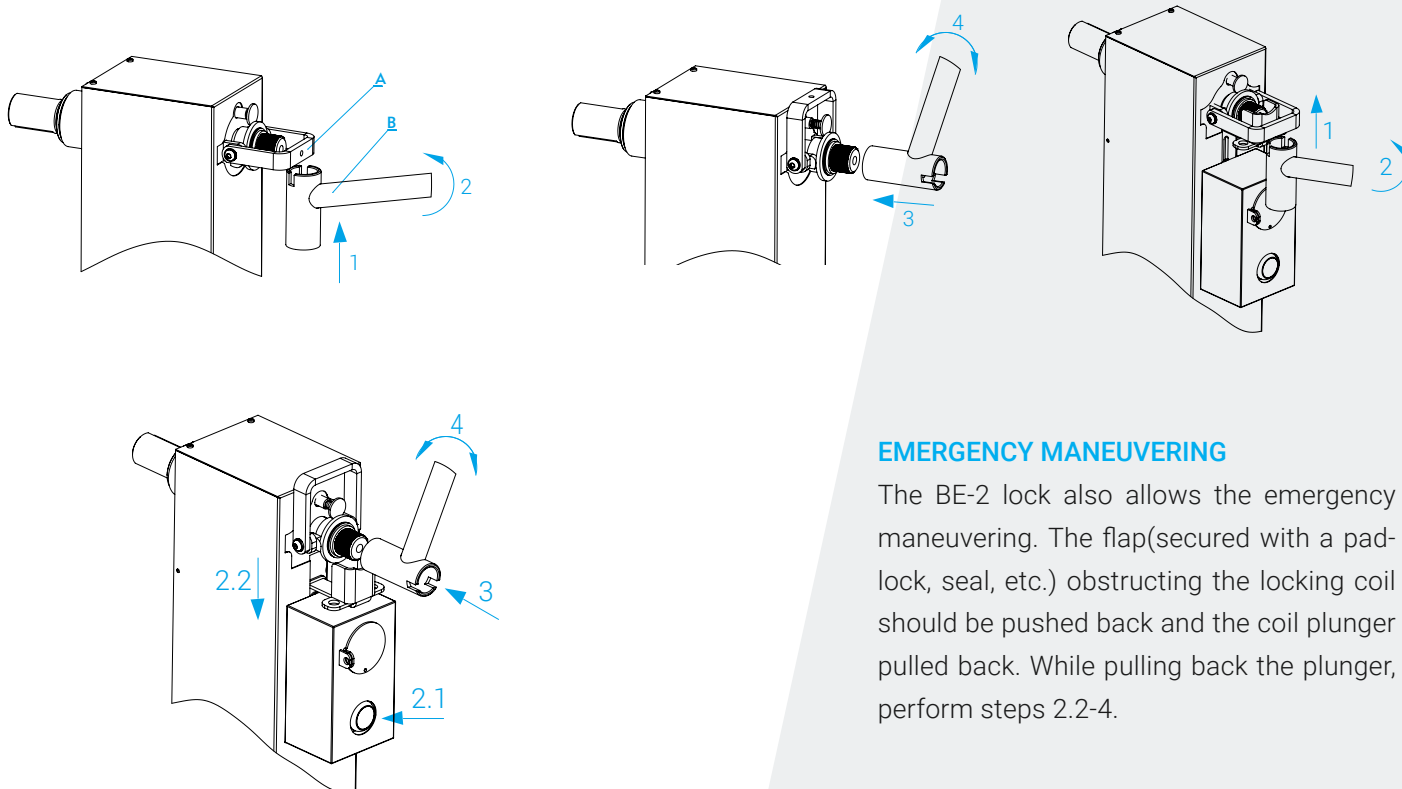
In order to manually maneuver the drive:

- (1) insert the notch of the drive lever [10] into the lock handle [9]
- (2) swing the lever in the direction indicated in the sketch

For version with BE-2 blockade:

- (2.1) Press the lock release button
- (2.2) Slide the drive shaft slide gate with your fingers
- (4) put the lever on the drive shaft
- (5) rotate to close the apparatus (right) or open (left) depending on the current position of the apparatus.

After completing the maneuver, lower the grip handle [9] and retract the drive lever [10].



EMERGENCY MANEUVERING

The BE-2 lock also allows the emergency maneuvering. The flap (secured with a padlock, seal, etc.) obstructing the locking coil should be pushed back and the coil plunger pulled back. While pulling back the plunger, perform steps 2.2-4.

.....○ ATTENTION

After manual override, check whether the drive shaft has been engaged, i.e. retraction to the original position (the shaft flange must be adjacent to the cam causing the shaft to move away).

If the coupling is not engaged, turn the drive shaft a few degrees to the right or to the left.

6. PERIODIC INSPECTIONS AND CONSERVATIONS

6.1. Visual inspection

Visual inspection is recommended to be carried out once a year and after any failure or short circuit in the switchgear. Check especially:

- a) the state of the earth terminal,
- b) the state of the coupling mechanisms,
- c) the condition of external parts (housing).
- d) connection of wires with terminal block, fixing of limit switches.

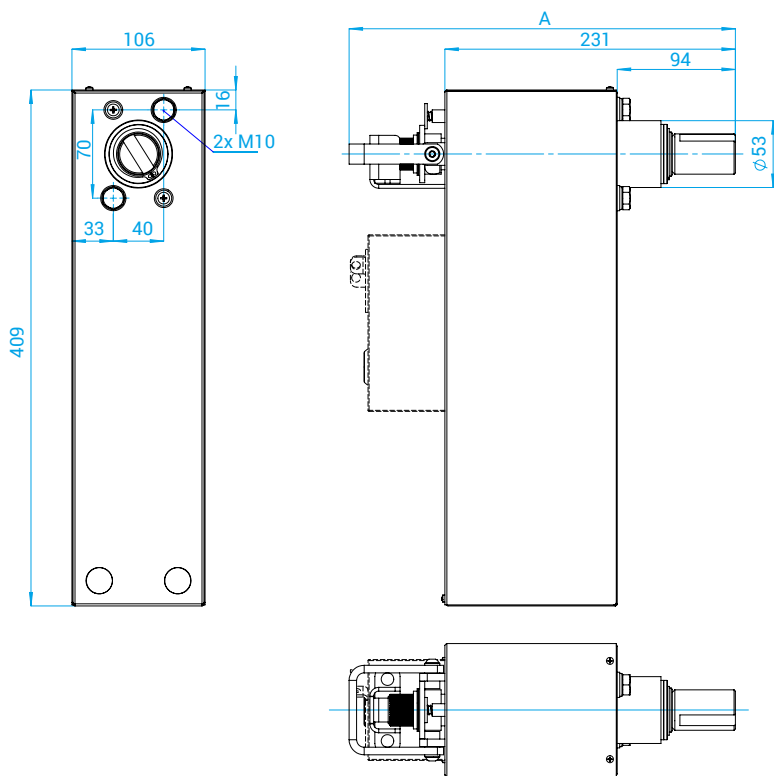
6.2. Spare parts and recommended maintenance materials.

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, it is possible for the manufacturer to pay for repairs.

MOLYKOTE 111 COMPOUND used for lubrication of electric contacts (earthings),

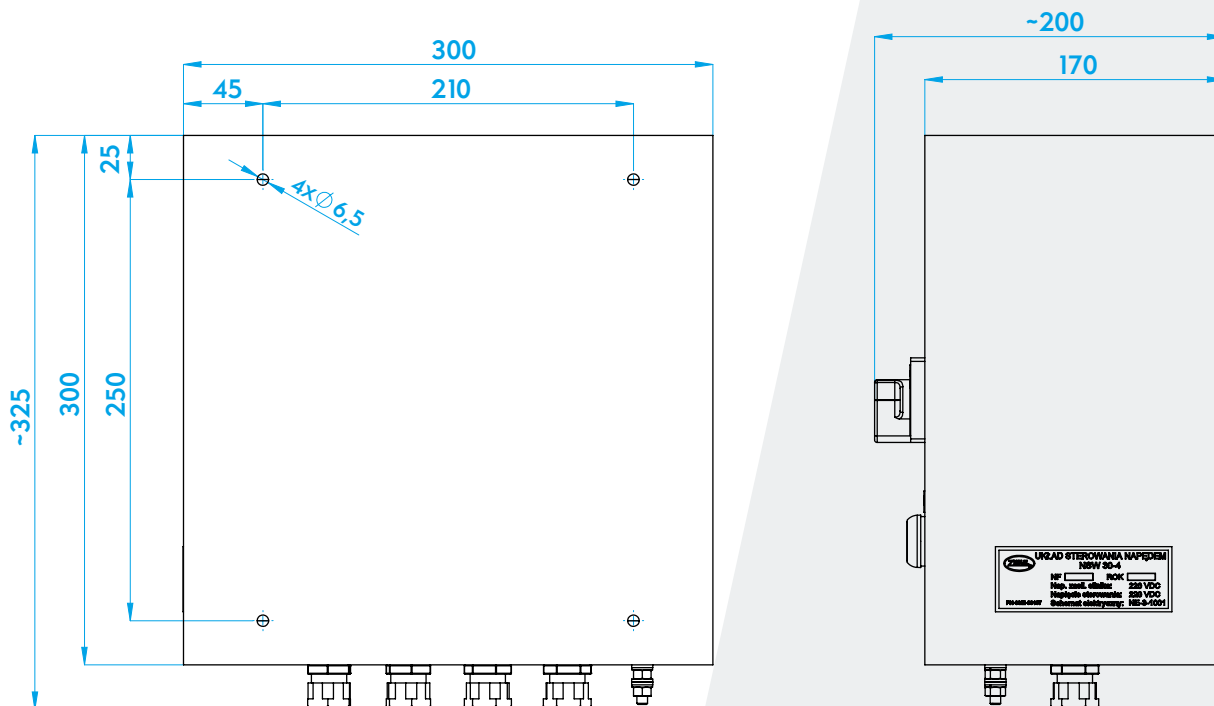
PROTECTION GREASE TDM according to PN-64 / C-96146 used for the preservation of metal surfaces (shaft articulation elements and coupling mechanism).

7. DIMENSION DRAWING OF THE OPERATING MECHANISM

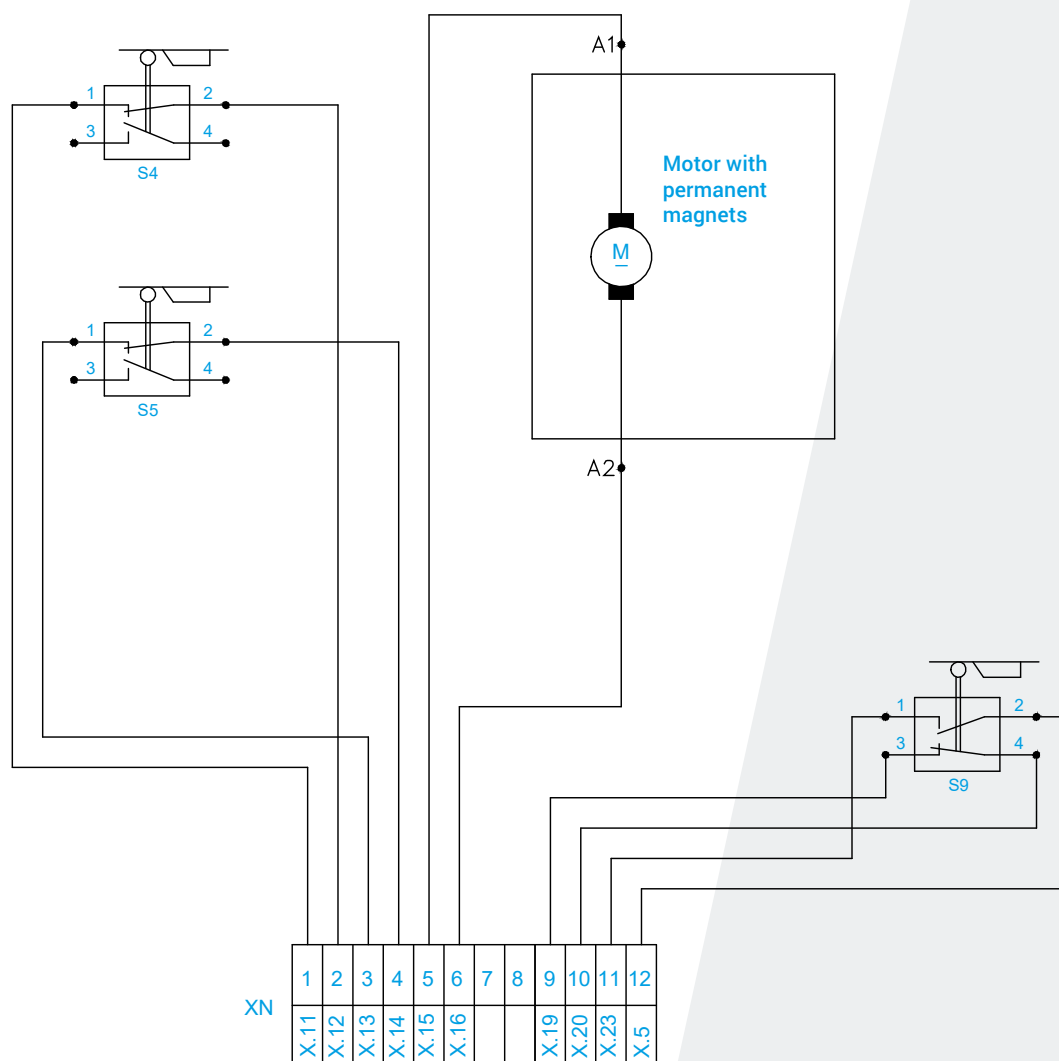


Type of operating mechanism	A
Without lock	296
With lock	306

8. DIMENSION DRAWING OF THE CONTROL BOX



9. WIRING DIAGRAM OF NSW30-3 – MOTOR WITH PERMANENT MAGNETS



XN – terminal block of the operating mechanism

S4, S5 – limit switch

S9 - microswitch of the electric lock

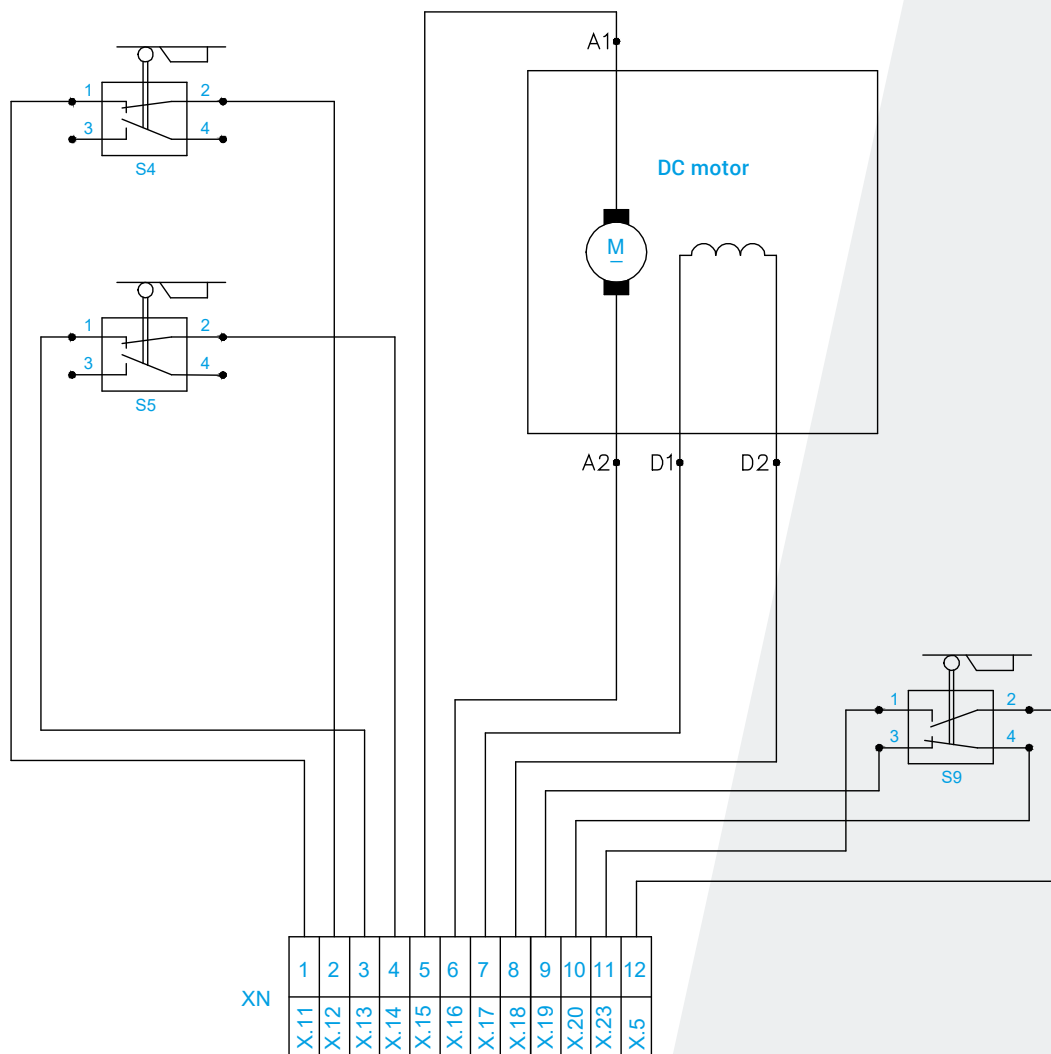
M – electric motor

X – terminal block of the control system

S9 - microswitch of the electric lock

Type of controller	1-2	3-4
Manual control	X	X
Electric control	X	X

10. WIRING DIAGRAM OF NSW30-4 – SERIAL MOTOR



XN – terminal block of the operating mechanism

S4, S5 – limit switch

S9 - microswitch of the electric lock

M – electric motor

X – terminal block of the control system

S9 - microswitch of the electric lock

Type of controller	1-2	3-4
Manual control	X	X
Electric control	X	X



11. UTILIZATION

NSW30 drives are made of materials that are recyclable.

The main materials from which the disconnectors are built are:

- steel (painted, galvanised);
- aluminum;
- plastics (epoxy mix, 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.

Zakład Wytwórczy Aparatów Elektrycznych Sp. z o.o.

Gdańska 60, 84-300 Lębork
POLAND

zwae@zwae.com.pl
tel.: +48 59 863 36 15

www.zwae.com.pl

Address of correspondence:

Kębłowo Nowowiejskie, ul. Łąkowa 2
84-351 Nowa Wieś Lęborska
POLAND