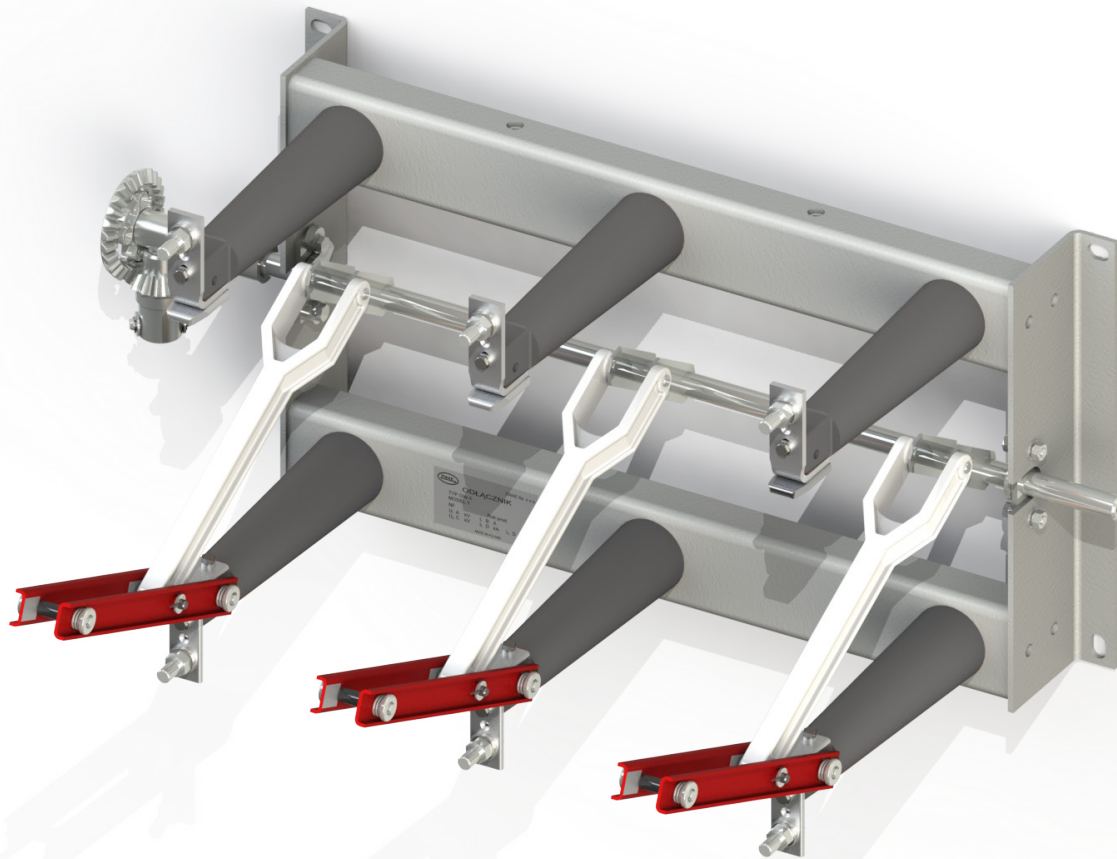




Zakład Wytwórczy Aparatów Elektrycznych Sp. z o.o.  
INSTALLATION AND SERVICE MANUAL



# OW

## Indoor disconnector

Manual Nr DTR.01.01.06.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. This personnel must know exactly all safety rules and rules for maintaining the device in accordance with these instructions. The problem-free and safe operation of this device requires proper transport, proper storage, construction and assembly as well as careful service and maintenance.

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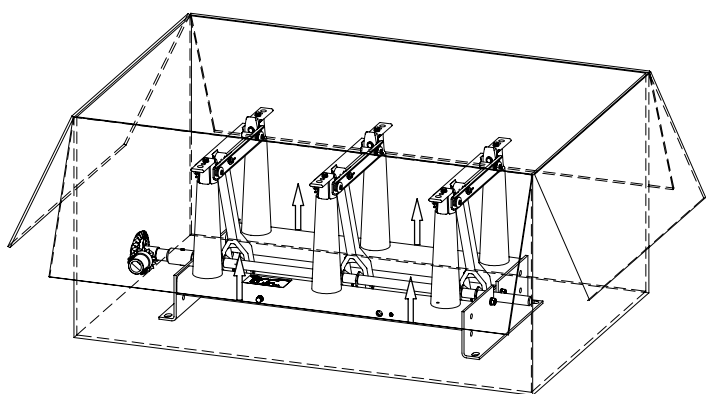
## 1. TRANSPORT AND STORAGE

### 1.1. Unpacking and inspection

Immediately after receiving the apparatus, check the delivery compliance with the packing list. Then check whether the apparatus has not been mechanically damaged during transport and the check data on the name-plate with the order. Upon receipt of delivery, the stretch film must be removed to ensure adequate ventilation to counteract the formation corrosion.

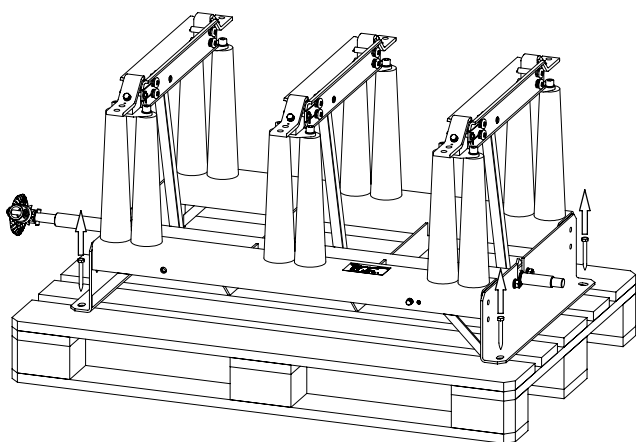
Disconnectors are delivered in the packaging or on a transport pallet to which they are screwed. When transporting the disconnector, excessive shocks should be avoided.

Disconnectors are delivered to the customer completely assembled and adjusted.



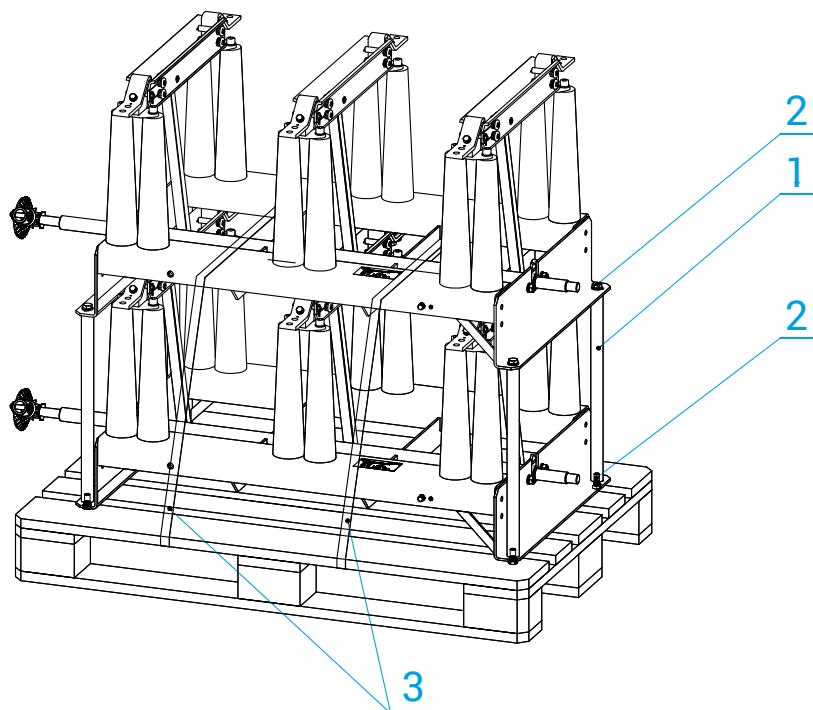
Open the top of the packaging.  
Pull the disconnector out by grabbing the base frame.  
It is unacceptable to lift the disconnector by grabbing the current paths.

Figure 1. Unpacking OWA disconnector and taking it out from the packaging.



Before moving the disconnector from the pallet to another place four screws have to be unscrewed.

Figure 2. OWC disconnector on the transport pallet screwed with screws.



To take the disconnectors off the pallet, strapping tapes have to be cut off (item 3). Then the screws (item 2) have to be unscrewed from the supports (item 1).

Figure 3. Two OWC disconnectors on supports, fastened to the pallet with a tape.

### 1.2. Transport and storage

The disconnectors can be transported to a place of storage and installation by any means of transport provided they are protected against dripping water. During transport, disconnectors should be secured against moving and colliding with each other or parts of the vehicle. It is not allowed to set the disconnectors directly on top of each other. It may damage the disconnector. The disconnector should be moved using straps with hooks as shown in figure below.

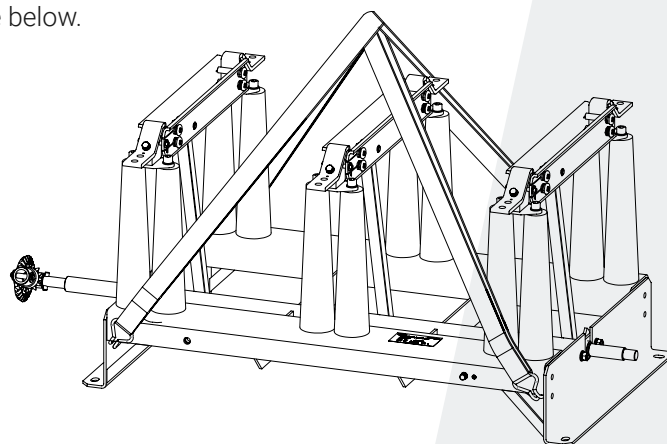


Figure 4 The way of moving the disconnector by a crane.

## 2. DESCRIPTION

### 2.1. Application

The OW type disconnectors are designed for use in indoor MV switchgears. They are designed to close and open electrical circuits in a off-load condition. In the open state, the disconnectors create a visible insulation gap in the air, thus meeting the relevant requirements of standards for disconnectors.

### 2.2. Construction and principle of operation

The OW type disconnectors are switches with a secant movement of the knives of the current path. The base of the disconnector (item 1) is a welded steel frame in which sides the main shaft is mounted (item 2). On the transverse shelves of the base there are resin support insulators (item 3), on which there is a disconnector's current path consisting of two fixed contacts (item 4) bolted to the insulators and moving contact (item 5). The moving contacts of the current path are connected to the drive shaft by insulating rods (item 6). The rotary movement of the drive shaft is transmitted trough insulating rods to the moving contacts, setting them in motion in a plane perpendicular to the base. The blades pressure to the contacts is achieved by using springs (item 7). The disconnectors have a place to connect the grounding connection (item 8). An additional equipment of disconnectors with a reduced pole spacing are insulating barriers between poles.

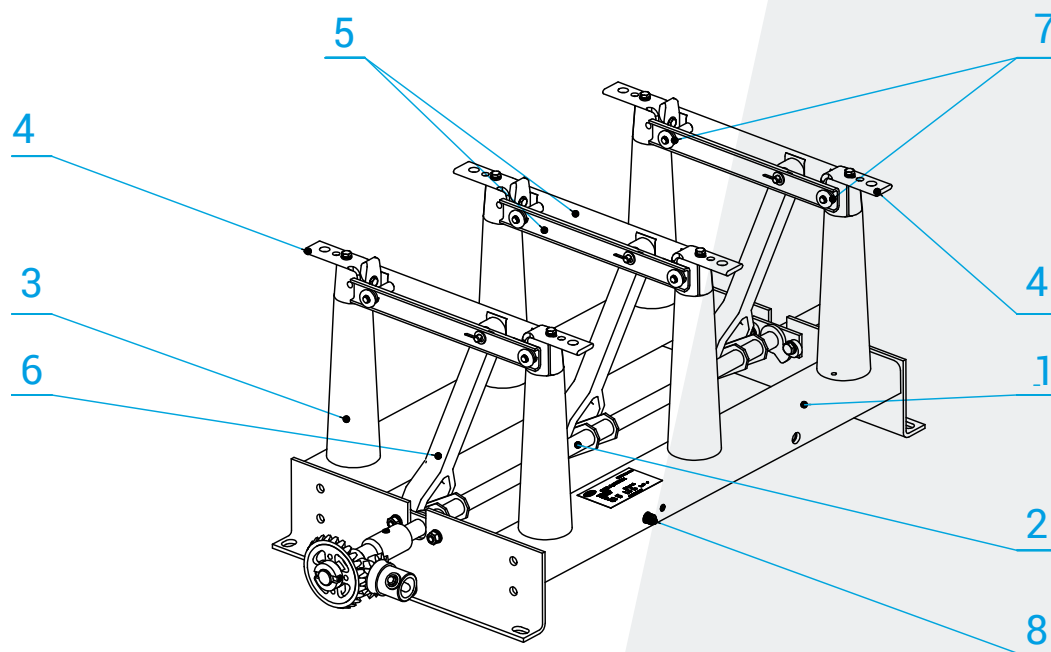


Figure 5. Indoor disconnector type OWA-24/800 / Z / 275 (24 kV, 800 A)

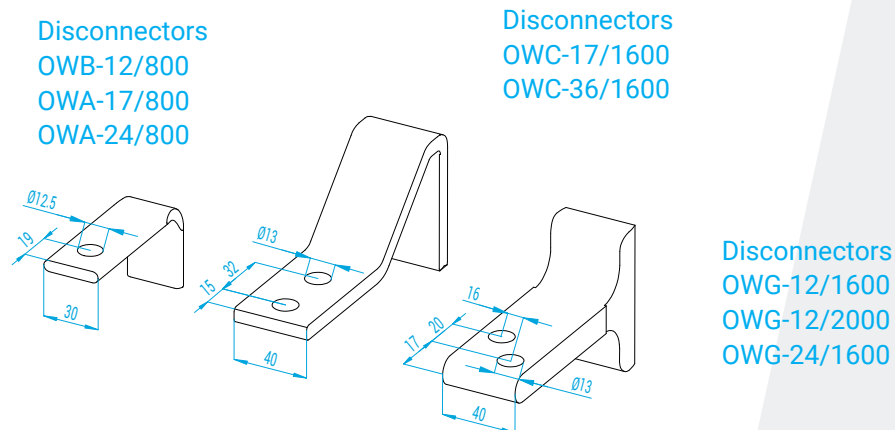


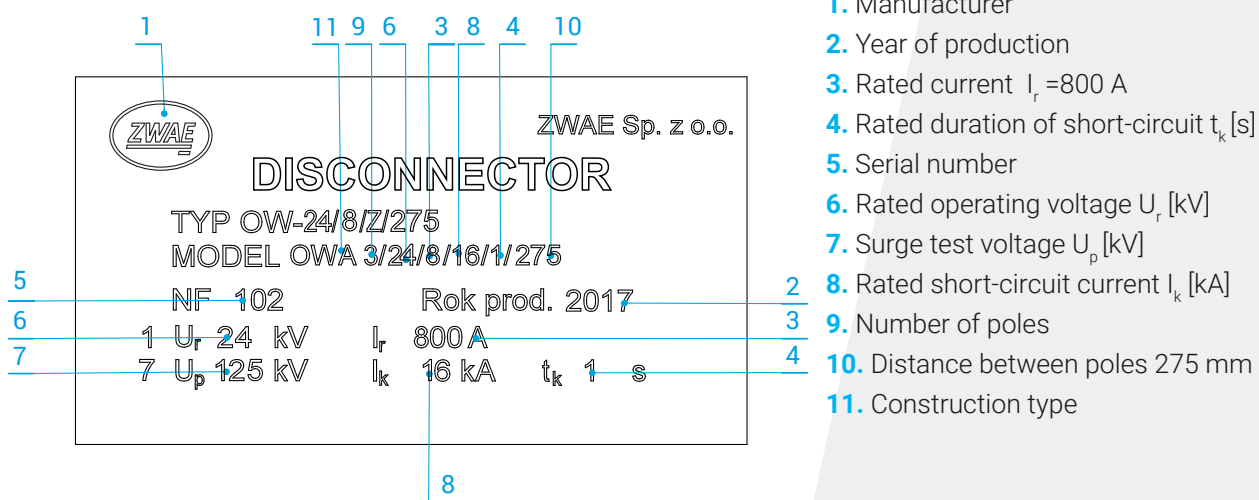
Figure 6. Types of contacts for disconnectors OWA, OWB, OWC

### 2.3. Ambient conditions during operation

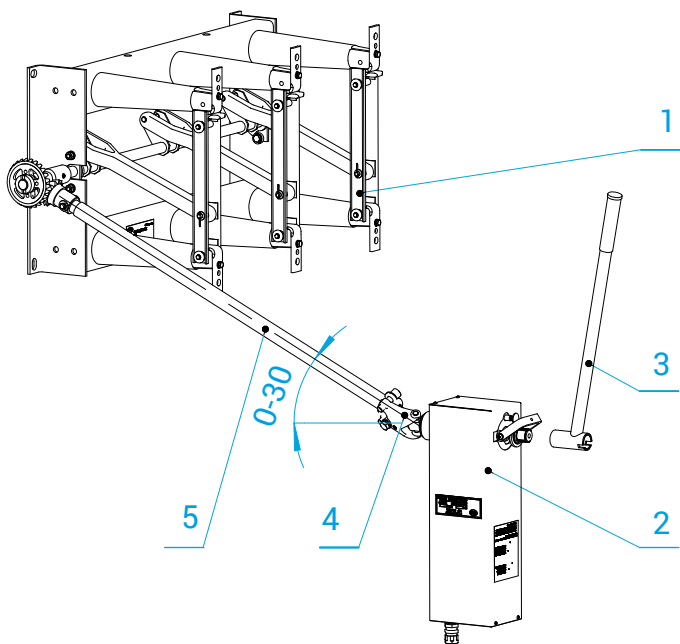
Disconnectors type OWA, OWB, OWC are adapted for installation in indoor distribution devices, in which the following ambient conditions exist:

- temperature within the range of:  $-5^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ ,
- relative air humidity ( $+30^{\circ}\text{C}$ ): 70%,
- for standard disconnectors, the maximum installation height above sea level: 1000 m.

### 2.4 . Nameplate



### 3. ACCESSORIES, ADDITIONAL EQUIPMENT

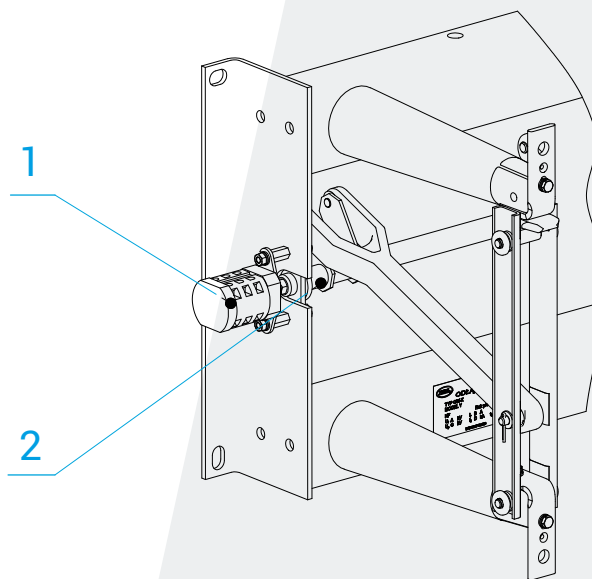
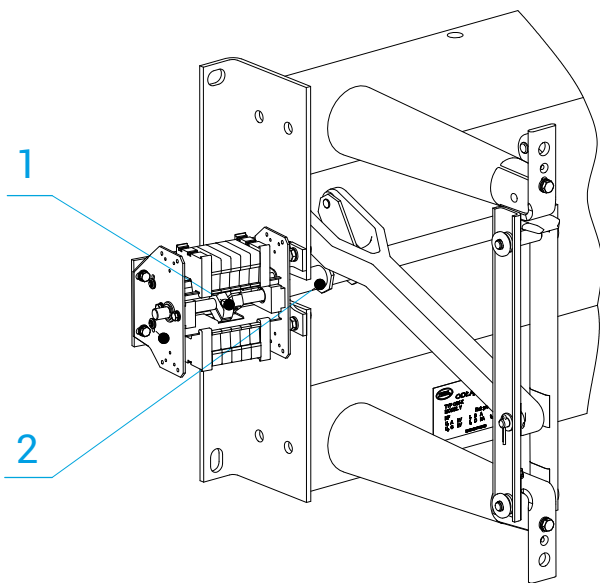


1. Disconnecter OWA
2. Operating mechanism NSW30
3. Driver lever
4. Terminal
5. Insulated driver rod

Figure 7. Connection of NSW30 operating mechanism with disconnecter

1. Cam switch LK16, number of contacts 3NO+3NC
2. Main shaft

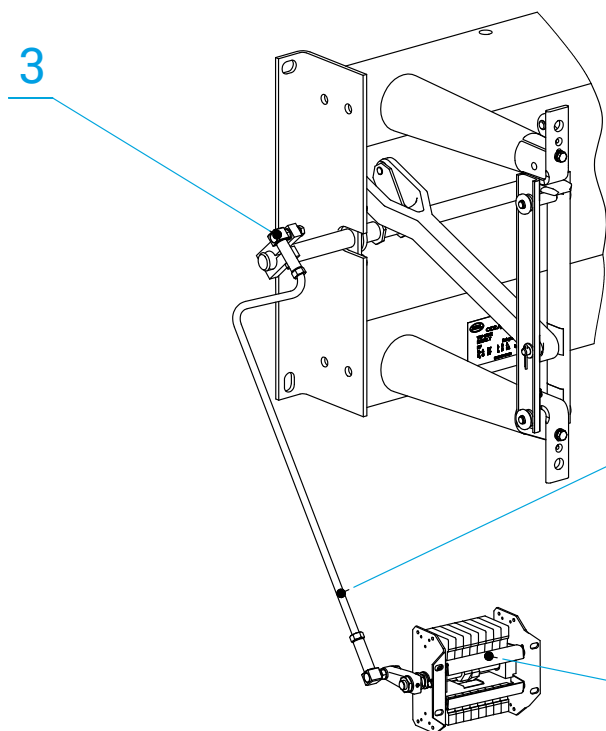
Figure 8. Connection of LK16 cam switch with disconnecter



1. Auxiliary switch LP1, max. number of contacts 16 NO + 16 NC
2. Main shaft

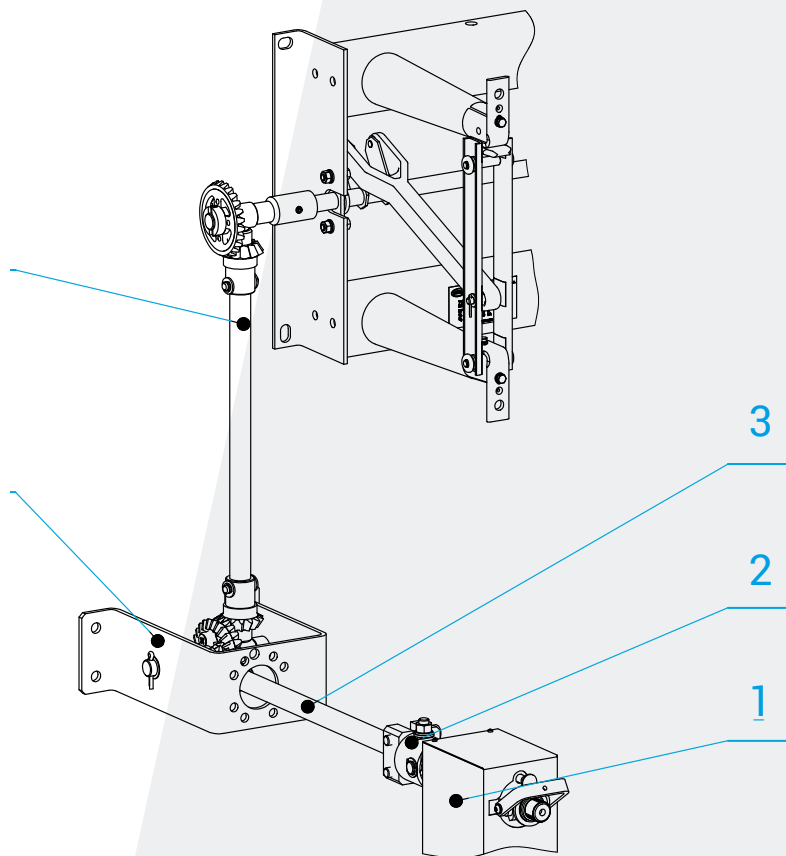
Figure 9. Connection of auxiliary switch LP1 with disconnecter





- 1. Auxiliary switch LP1, max. number of contacts 16 NO + 16 NC
- 2. Tie rod
- 3. Lever

Figure 10. Connection of the auxiliary switch LP1 with the disconnector by means of a tie rod.



- 1. Operating mechanism NSW30
- 2. Terminal
- 3. Tie rod
- 4. Right angle gear

Figure 11. Connection of the disconnector with an angle gear

## 4. INSTALLATION AND ADJUSTMENT

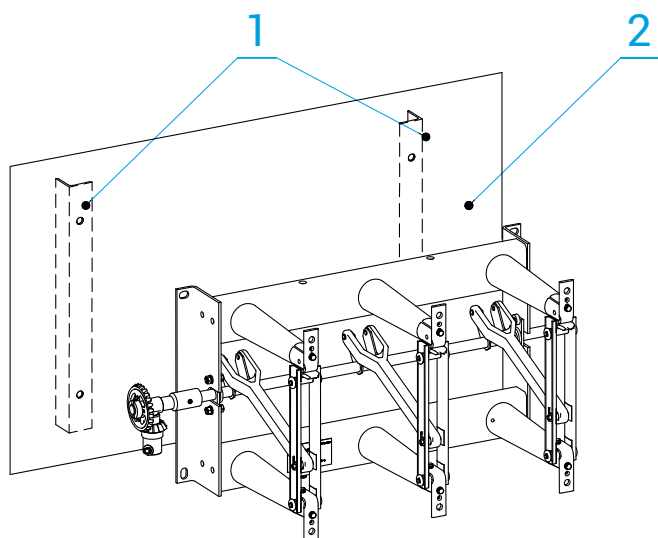
Persons performing switching activities should have proper professional qualifications and experience in servicing high-voltage equipment. When operating disconnector or its earthing switch (if installed) all health and safety regulations in force at the place where they are installed have to be obeyed.

Before making a change (closing or opening) of the disconnector or its earthing switch one should ensure that the adjustment is permissible, taking into account the conditions indicated above and the arrangement conditions of the switchgear.

### 4.1. Preparation of the supporting structure and assembly of the disconnector

The OW type disconnectors are designed for operation in horizontal and vertical positions, with moving contacts at the top. The design of the supporting structure should take into account the maintenance of appropriate ground isolation distances, and the construction itself should have adequate stiffness.

The base of the disconnector should be pre-screwed in three places (with three M12 bolts), and then place possible washers under the base to level the plane of the supporting structure. The contact points of the supporting structure with the disconnector base should lie in one plane (pos.2).

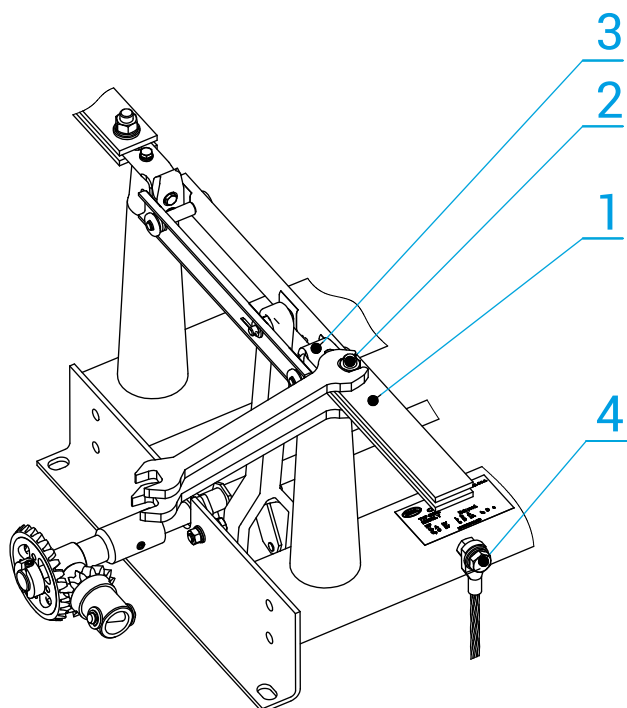


1. Elements of the supporting structure
2. The plane in which contact points of the supporting structure should be located

Figure 12. Installation of the disconnector to the supporting structure.

#### 4.2. Connecting feeding wires and grounding wire

Before screwing the rails, the terminals (item 3) of the disconnecter should be cleaned of any contamination by a method that does not damage the silver coatings. It is recommended to use a soft, lint-free cloth for this purpose. Next, one should lubricate the contact surfaces of terminals and rails with a thin layer of acid-free vaseline or other conductive grease. The screws (item 2) should be tightened carefully with a torque of 62 Nm using two wrenches. When tightening the screws, caution must be maintained to not disturb the settings of the disconnecter itself. Slight change to the position of the terminal may cause the apparatus to work improperly. The earthing conductor should be connected with a screw (item 4) (torque 54 Nm) placed in the earthing terminal located on the shelf of the disconnecter base frame. The connection must be previously greased with acid-free vaseline.



- 1. Rail
- 2. Terminal screw
- 3. Terminal
- 4. Earthing terminal screw

Figure13. Screwing on the rails and earthing conductor.

## .....○ **WARNING !**

Before switching on the disconnectors to work under voltage, the user should make sure that the assembly has been made correctly and check whether the condition of the disconnectors and operating mechanisms as well as the method and place of installation correspond to the conditions of safe operation. In particular, it is necessary to inspect the apparatus paying attention to the condition of insulators, contacts and correct tightening of screw connections.

This requirement is particularly important when transporting distribution stations with disconnectors to the place of operation.

Failure to perform inspection activities can lead to serious breakdowns of distribution stations. In case of difficulties, the regulation should be ordered from the manufacturer.

## 5. OPERATING MANUAL

During the switching operations, it is advisable to do visual inspection of external of disconnector in each case, paying attention to the correct achievement of limit positions by the apparatus, as well as condition of soiling of insulators, insulating rods and condition of contacts and operating mechanisms.

In case of finding significant faults that could damage the disconnector or threatening the safety of service, the disconnector should be immediately switched off from the power and the faults should be removed.

### 5.1. Periodical check-ups

It is recommended that disconnector inspections be carried out during periodic inspections of the interior switching station.

During inspections, please check in particular:

- condition of insulators and insulating rods, with special attention being paid to contamination of their surfaces and possible mechanical damage (scratches, cracks, etc.);
- condition of the main contacts, paying attention to possible damage (marks of melting, silver coating defects) in places of mutual contact;

### 5.2. Permitted repairs carried out by the user

Disconnector repairs performed, if necessary, by the user should not go beyond the adjustment of contacts and mechanisms conditioning the correct operation of the apparatus.

More complicated repairs requiring dismantling of the disconnector can only be carried out by the manufacturer. The manufacturer is not responsible for the work of disconnectors overhauled by the user, if the repair included the performance of activities without consulting the manufacturer.

## 6. MAINTENANCE

Maintenance of the disconnector is recommended to be carried out after each inspection.

The scope of maintenance includes:

- cleaning insulators and insulating rods using such tools and cleaning substances that do not damage their surface. First of all, for cleaning should be used a soft, lint-free cloth.
- lubrication of main contacts with MobilGrease 28
- replacement of contacts when the surfaces of mutual contact are significantly damaged;
- possible tightening of loose screw connections;
- complement damaged protective coatings.

### 6.1. Regular tests

After each inspection, maintenance and repair of the disconnector it is necessary to check apparatus mechanical work and if necessary – perform adequate regulations. It is also recommended, especially in the case of doubts regarding the judging of surface damage of the main contacts at places of mutual contact, to additionally check the resistance of the main current path. This is especially important for disconnect-

tors that conduct continuous currents with values close to their rated current. The measured resistances should not exceed the values given in the following table 1.

Measurements of the current resistance of the disconnecter and isolation should be carried out in accordance with the regulations in force in the power industry.

<b>Resistance of the current path</b>	<b>Disconnecter 3,6kV</b>	<b>Disconnecter 7,2kV</b>	<b>Disconnecter 12kV</b>	<b>Disconnecter 24kV</b>	<b>Disconnecter 36kV</b>
phase L1, L2, L3	Rmax 50 $\mu\Omega$	Rmax 60 $\mu\Omega$	Rmax 60 $\mu\Omega$	Rmax 65 $\mu\Omega$	Rmax 70 $\mu\Omega$

Table 1 Resistance of OW type disconnectors

## 7. UTILIZATION

The OW disconnector is made of materials that are recyclable. The main materials from which the disconnectors are built are:

- steel (painted, galvanized);
- copper (painted, silver-plated);
- plastics (epoxy mixture, polyamide).

The disconnectors do not contain any dangerous substances. In accordance with applicable regulations, it is possible to return a used up, complete disconnector to the manufacturer.

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