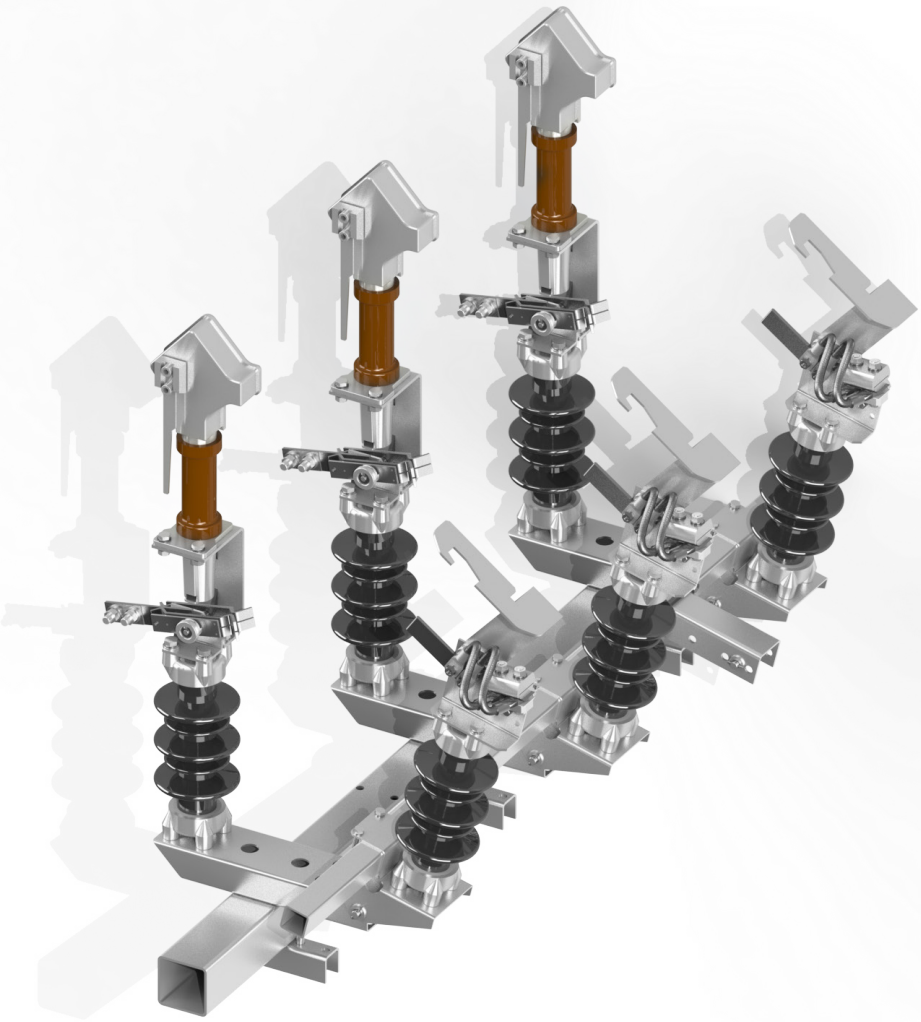
Zakład Wytwórczy Aparatów Elektrycznych Sp. z o.o.

Installation and Service Manual



RS-24

Outdoor switch disconnector

Manual No DTR.03.02.03.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 injuries 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 this instruction.

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

1.1. Unpacking and inspection

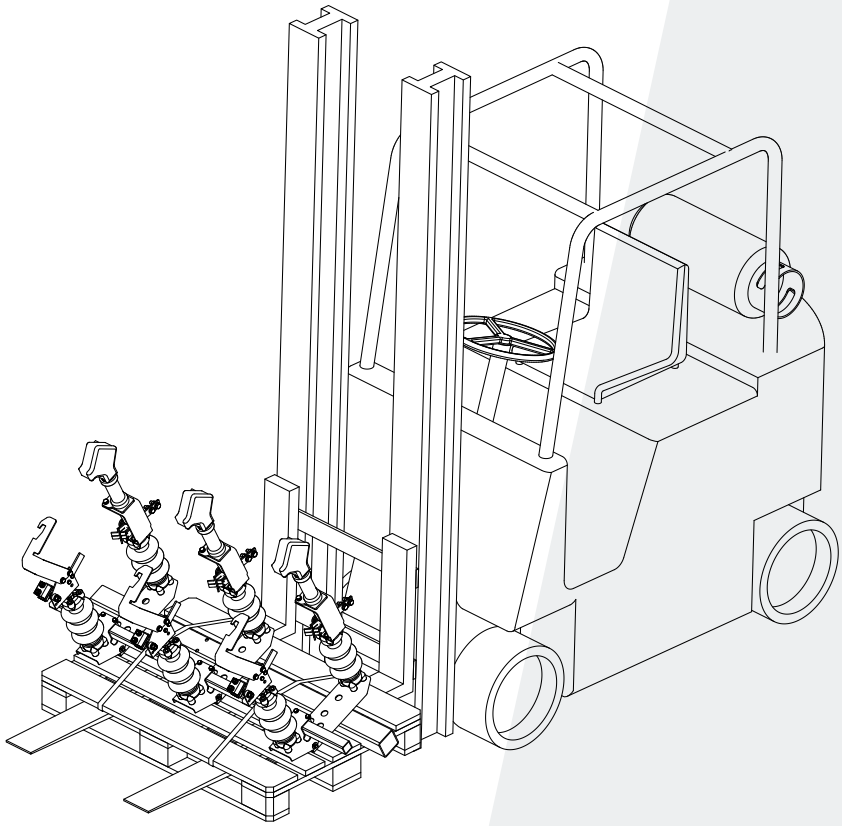
Immediately after receiving the apparatus, the delivery's compliance with the packing list should be checked. Then one should check whether the apparatus has not been mechanically damaged during transport and the data on the nameplate match the order.

WARNING!

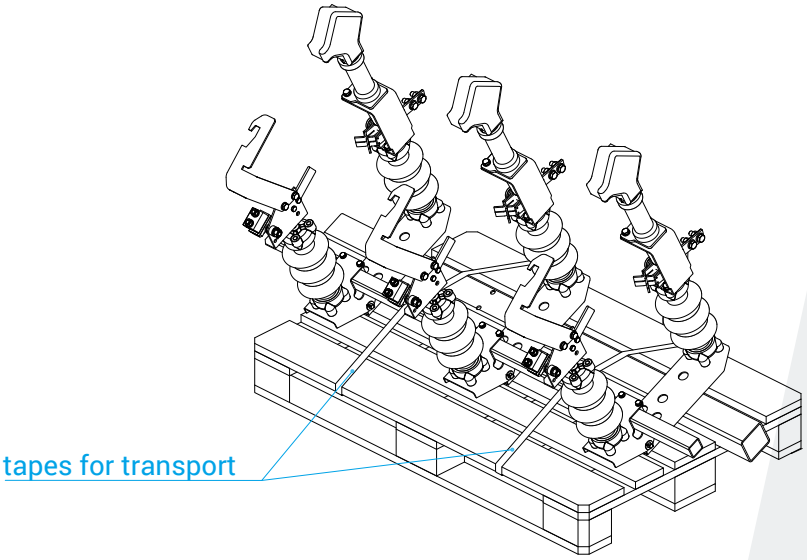
It is unacceptable to lift the outdoor switch disconnector by holding it by its contacts, breaking chambers and insulators. The outdoor switch disconnector can be carried only by holding it by its base frame.
The outdoor switch disconnectors are delivered to the recipient in a three-pole set (adjusted) or in modules (individual poles are adjusted).

1.2. Storage and transport

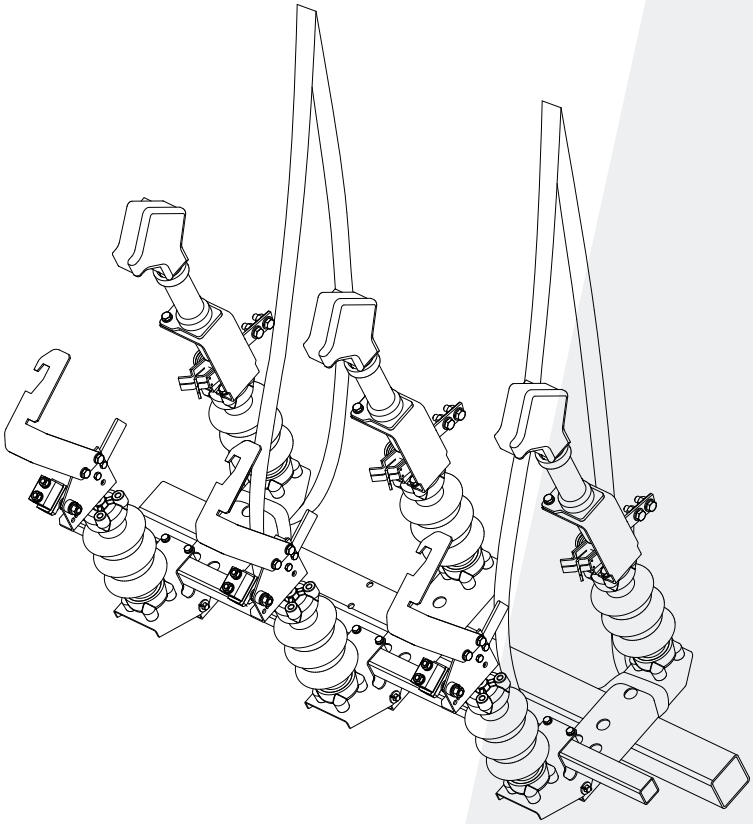
The outdoor switch disconnectors are delivered to the recipient on a pallet. The disconnectors can be transported to a place of storage and installation by all means of transport. During transport, the outdoor switch disconnectors should be secured against moving and colliding with each other or parts of the vehicle.



To take the outdoor switch disconnectors off the pallet, strapping tapes have to be cut off.



The outdoor switch disconnector should be carried by using straps, as shown in the picture.



Transport and storage of outdoor switch disconnectors should be in accordance with the handling marks on their packagings.

2. DESCRIPTION

2.1. Application

Three-pole outdoor switch disconnectors type RS-24 are used in outdoor power distribution networks 15kV and 24 kV. They are intended to close and open electrical circuits, as well as for grounding of not loaded parts of the circuit. The drive transmission use here enables mounting the apparatus (the one which is equiped with the arcing contacts) in the horizontal and vertical position , and the version with the breaking chambers in a horizontal position. The modular construction of the outdoor switch disconnector in terms of poles mounting allows to expand the sets with new options creating the required type of outdoor switch disconnector, as well as changing the spacing between poles.

2.2. Advantages

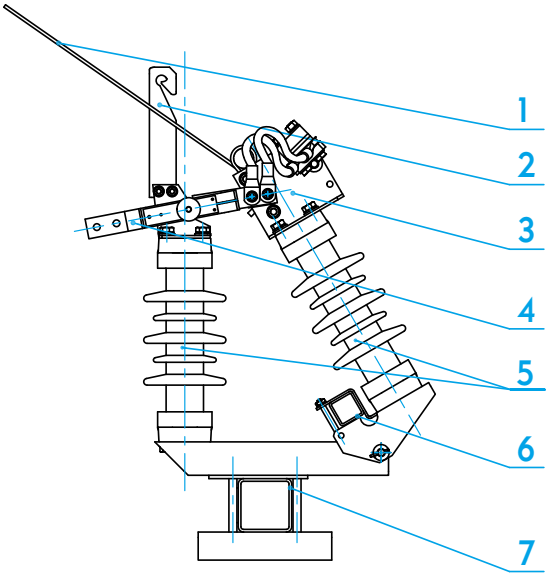
- high technical and operational parameters;
- compatible with NSL-60 and NSO-30 motor operating mechanisms, which enables remote radio control;
- equiped with elastic connector to prevent breaks of working lines of the lines;
- quick assembly and easy adjustment;
- very good corrosion protection (hot dip galvanized steel or stainless steel);
- high durability and reliability;
- simple and safe service;
- all apparatuses have the features of insulation switch devices.

2.3. Construction and principle of operation

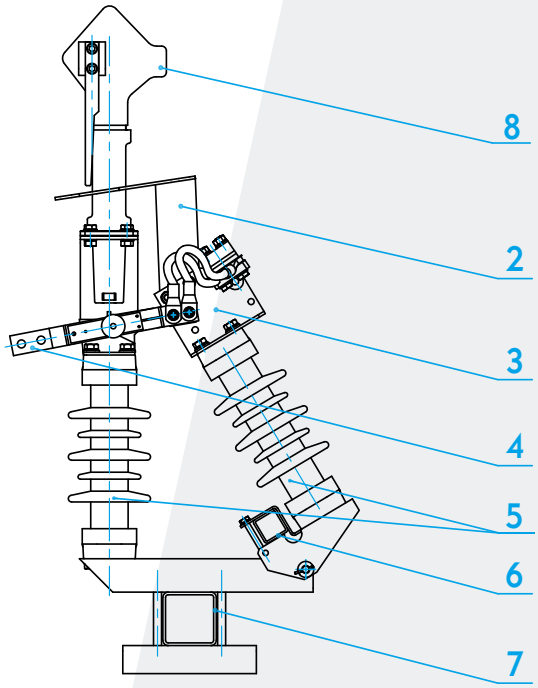
The outdoor switch disconnectors consist of three independent poles. The distance between the individual segments is adjustable in a wide range (at least 350 mm). All poles are mounted on the same shaft. The poles are mounted on a hot-dip galvanized supporting structure. By attaching an additional module to the poles of outdoor switch disconnector, the earthing switch function can be performed.

The outdoor switch disconnectors are equipped with porcelain or silicone isolators, to which the brackets with the set of main contacts are attached. They are made of copper flat bars covered with silver coating. The other end of the main contacts has connection terminals (two holes Ø13 mm at a distance of 30 mm). The contacts construction provides a large contact surface and clamping force as well as their self-guidance. The outdoor switch disconnectors poles are equipped with arc extinguishing units: arcing contacts or breaking chambers. Frame and also supporting and drive transmission mechanisms are made of steel elements protected against corrosion by hot dip galvanizing.

RS-24 + arcing contact



RS-24 + breaking chamber



1. Arcing contact
2. Supporting contact/ hook-shape contact
3. Movable contact
5. Supporting isolators
6. Driving beam
7. Supporting beam
8. Breaking chamber

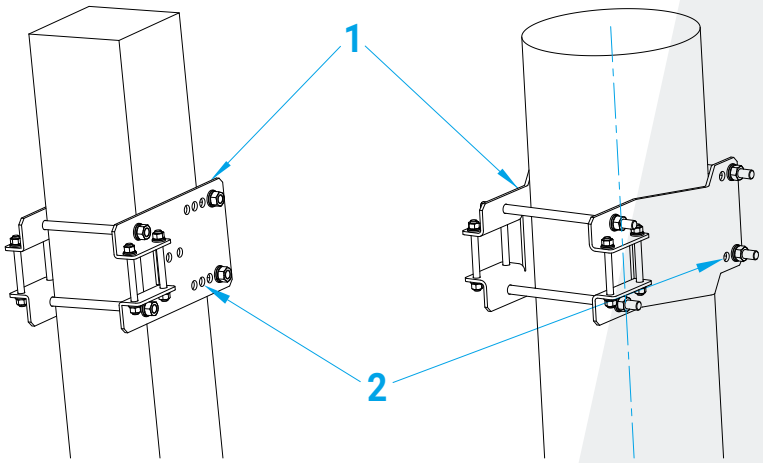
3. INSTALLATION OF OUTDOOR SWITCH DISCONNECTOR ON THE PILLAR

The outdoor switch disconnectors type RS-24 with an arcing contact are intended for operation in horizontal and vertical positions, with immobile movable contacts at the top. The outdoor switch disconnectors type RS-24 with the breaking chamber are intended for work in a horizontal position.

The instruction presents the correct sequence of work regarding mounting in the vertical position of the outdoor switch disconnector with the arcing contacts. For the horizontal position and for the outdoor switch disconnector with the breaking chambers, the assembly is analogous.

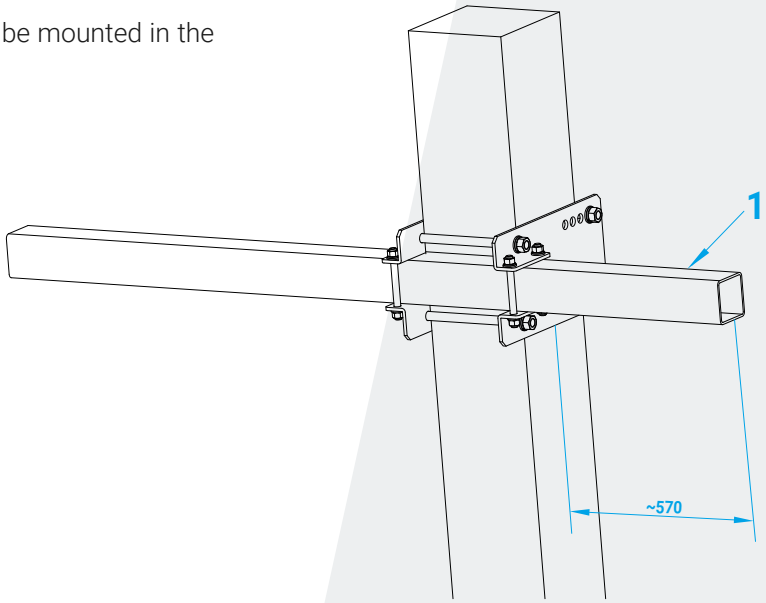
1

- The supporting beam mounting bracket (1) should be mounted to the pillar.
- When installing the supporting beam mounting bracket to the pillar, one should select the holes (2) to eliminate looseness.



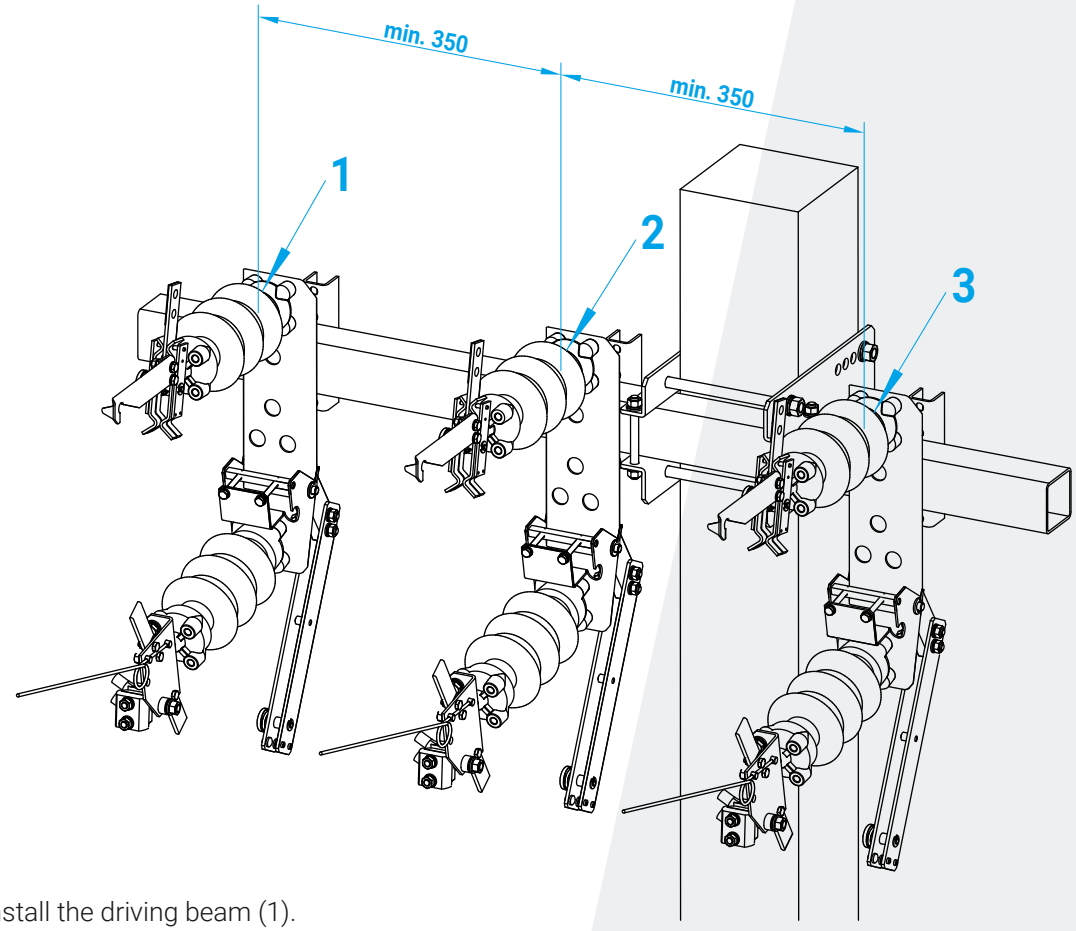
2

- Supporting beam (1) should be mounted in the mounting bracket.



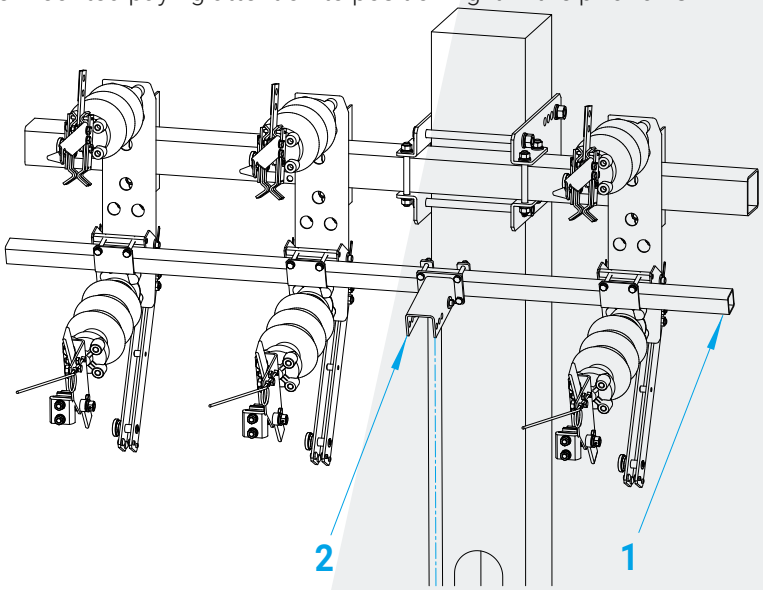
3

- Then one should mount the individual poles of the outdoor switch disconnector (1, 2, 3) taking into account the dimensions on the sketch (applies to outdoor switch disconnectors delivered in the modules).



4

- Next one should install the driving beam (1).
- The driving lever (2) should be mounted paying attention to positioning it in the pillar axis.

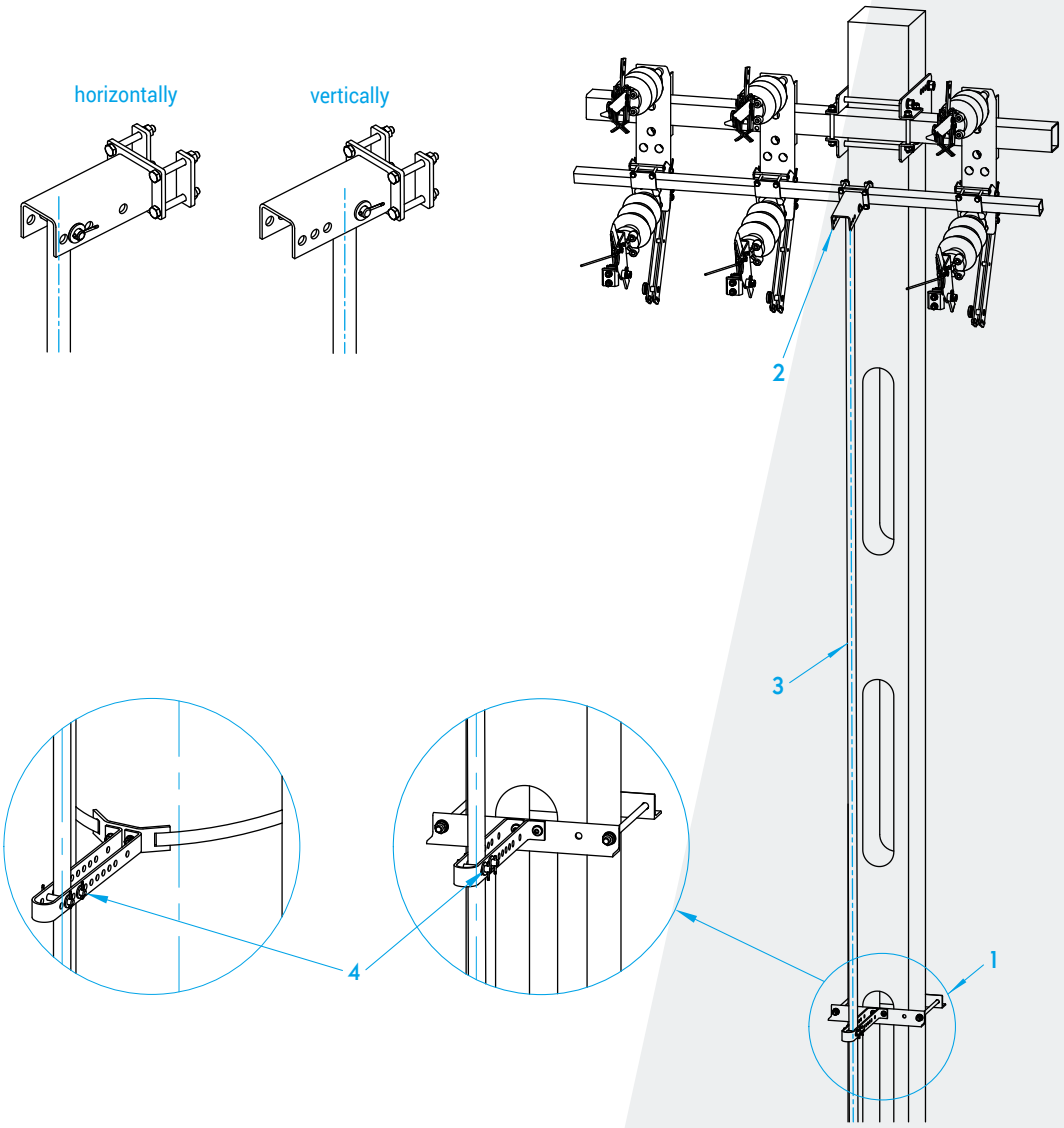


5

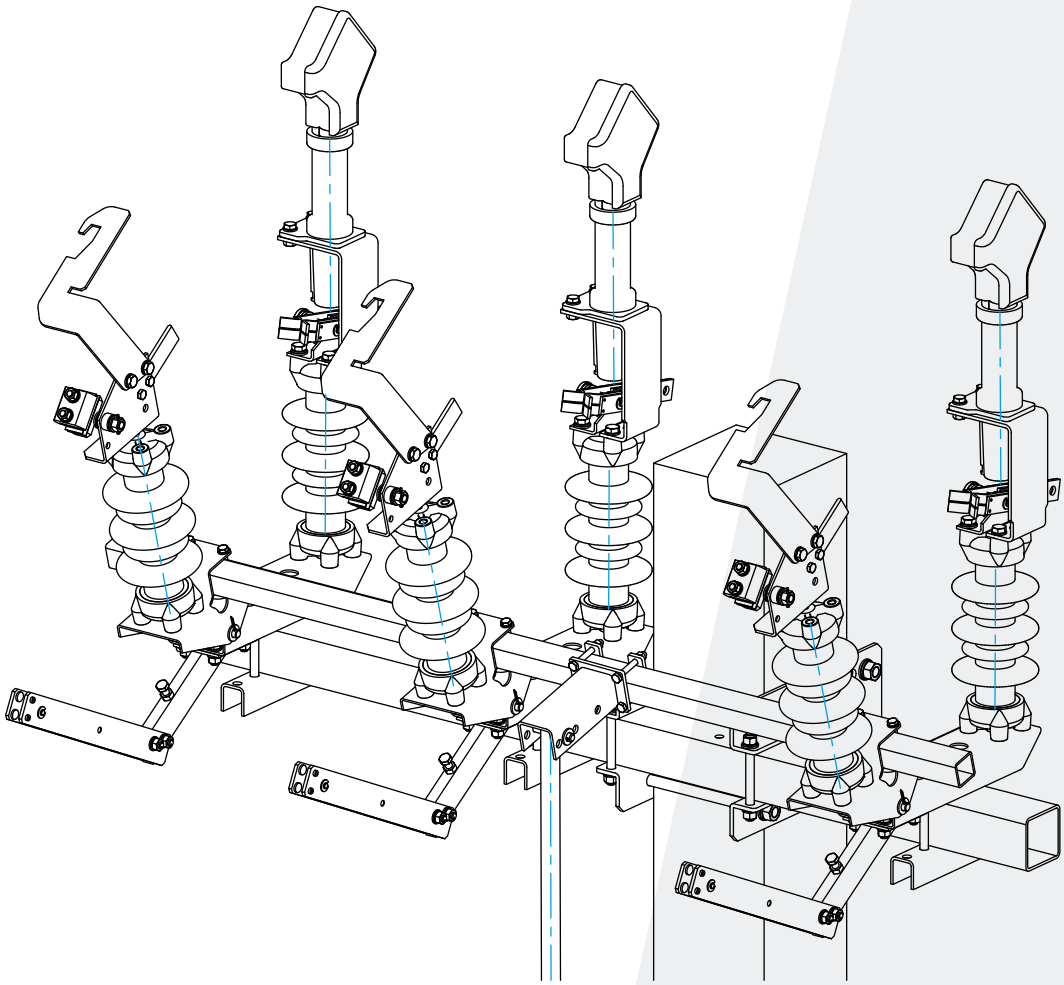
- One should mount the supporting bracket (1) of driving rod /coupling tie rod.
- The driving rod/ coupling tie rod (3) should be installed and at the same time coupled to the driving lever (2). Depending on how the apparatus is mounted (horizontally, vertically), the driving rod/ coupling tie rod should be coupled as illustrated below.

- By using the pins (4), coupling tie rod should be set in a straight line between the operating mechanism and the driving lever of the outdoor switch disconnector. The correct length of the coupling tie rod should be achieved by shortening it or by attaching the additional pipe by using coupler.

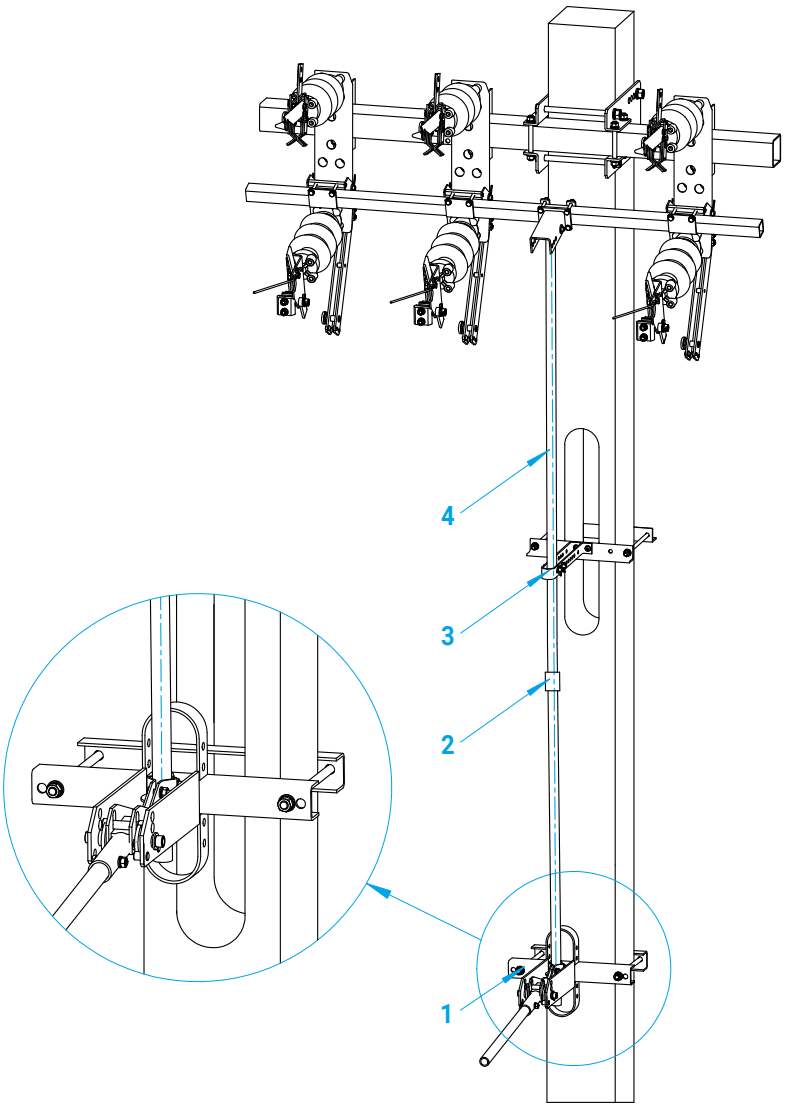
Position of the driving rod for the mounted apparatus:



The example of horizontal mounting of the RS-24 type outdoor switch disconnector equiped with breaking chambers:

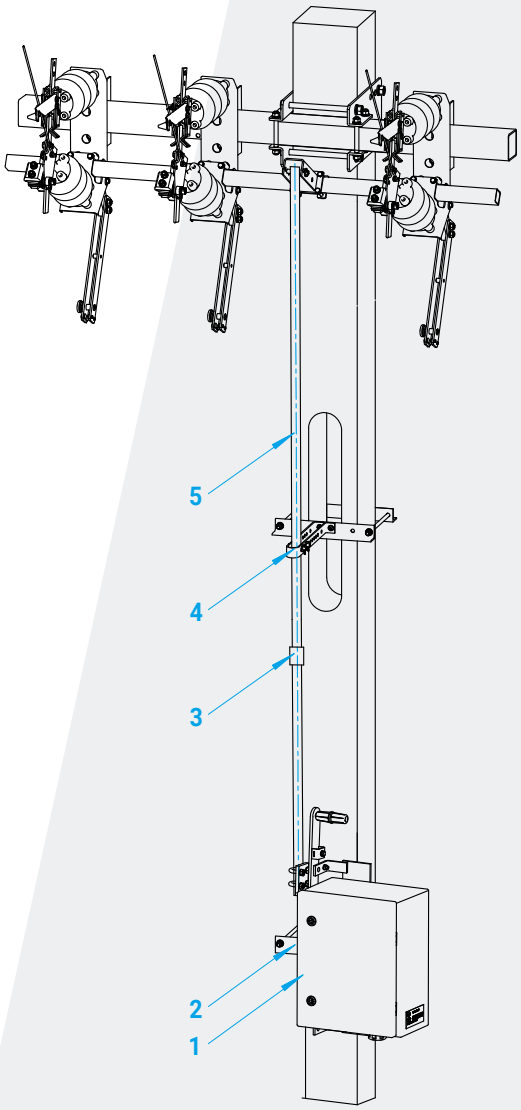


4. ACCESSORIES, ADDITIONAL EQUIPMENT



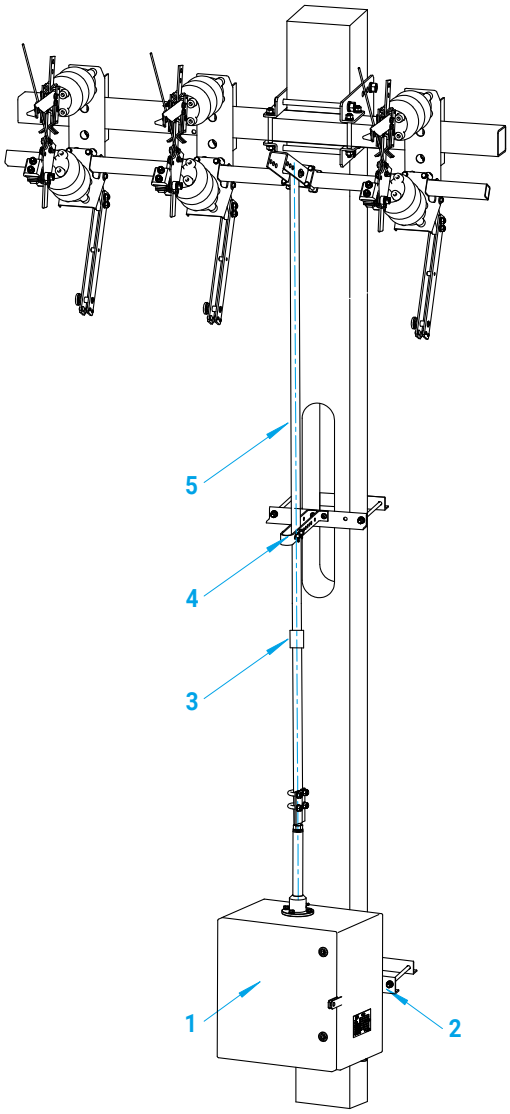
Switch disconnector with manual operating mechanism NNP

1. Tri-positional, manual operating mechanism NNP
2. Connector
3. Guidebar
4. Linking rod



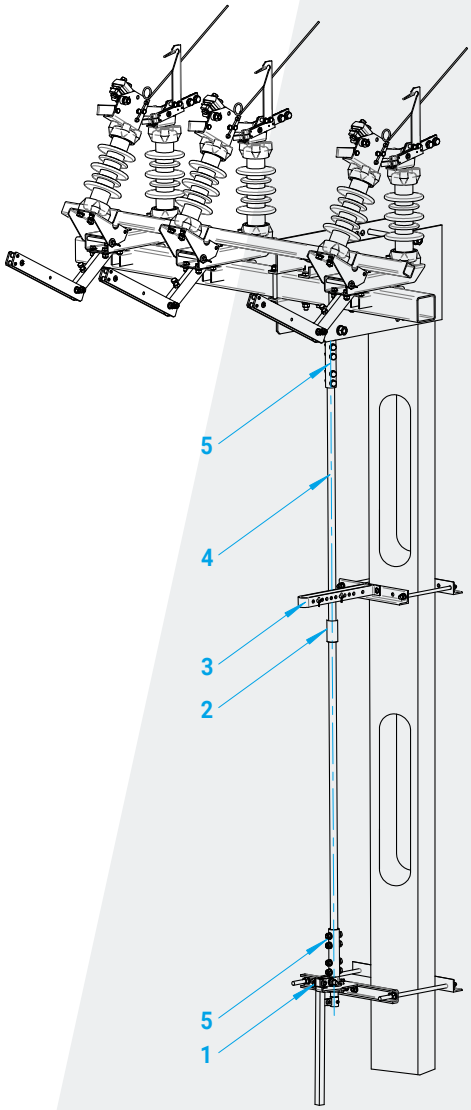
Switch disconnector with manual operating mechanism NR-5S

1. Manual operating mechanism NR-5S
2. Fixing of the operating mechanism.
3. Connector
4. Guidebar
5. Linking rod



Switch disconnector with motor operating mechanism NSL60

1. Motor operating mechanism NSL60
2. Fixing of the operating mechanism.
3. Connector
4. Guidebar
5. Linking rod



Switch disconnector with rotary operating mechanism NNO.

1. Rotary manual operating mechanism NNO
2. Connector
3. Guidebar
4. Linking rod
5. Screw connector

5. TESTS BEFORE FIRST RUN

WARNING

Before putting the outdoor switch disconnectors into service under voltage, the user should ensure that the assembly has been made correctly and check that the condition of outdoor switch 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.

Failure to perform control activities can lead to serious failures. In case of difficulties, the adjustment should be ordered from the manufacturer.

Before switching the voltage on, it is necessary to carry out electrical measurements and tests within the scope provided for in the instructions for transferring energy equipment into service. The required values of the measured quantities are given in the technical data list of the outdoor switch disconnector (point 7).

6. OPERATING MANUAL

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

Before switching (closing or opening) of the outdoor switch disconnector, one should ensure that the switching is permissible, taking into account the arrangement conditions of the system.

7. INSPECTIONS AND MAINTENANCE

7.1. Periodic inspections

It is recommended that the outdoor switch disconnector reviews be carried out:

• during periodic inspections of the outdoor apparatuses

During inspections, should be checked in particular:

• condition of insulators, attention should be paid to the contamination of their surfaces and possible mechanical damage (chips, cracks, etc.);

• main contacts condition paying attention to possible damage (traces of melting, silver coating defects) in places of mutual contact;

• condition of earthing switch and its contacts as well as a condition of earthing connections and earthing points.

7.2. Maintenance

The maintenance of the outdoor switch disconnector is recommended to be carried out after each inspection. The scope of maintenance includes:

- cleaning insulators using such tools and cleaning substances that do not damage their surface;
- lubrication of main contacts with MobilGrease 28
- tightening of any loose screw connections;
- filling in of damaged protective coatings;
- cleaning and lubrication of earthing switch's contacts.

7.3. Permitted repairs carried out by the user

The outdoor switch disconnectors repairs performed if necessary by the user should not go beyond the adjustment of the arcing contacts and mechanisms that determine its correct operation. Parts subject to wear during operation are delivered on request.

More complicated repairs, requiring disassembly of the outdoor switch disconnector, can be performed only by the manufacturer or in a repair plant with appropriate equipment and trained personnel. The manufacturer is not responsible for the work of outdoor switch disconnectors repaired by the user, if the repair included without consulting the manufacturer other elements than supplied by the manufacturer.

7.4. Regular tests

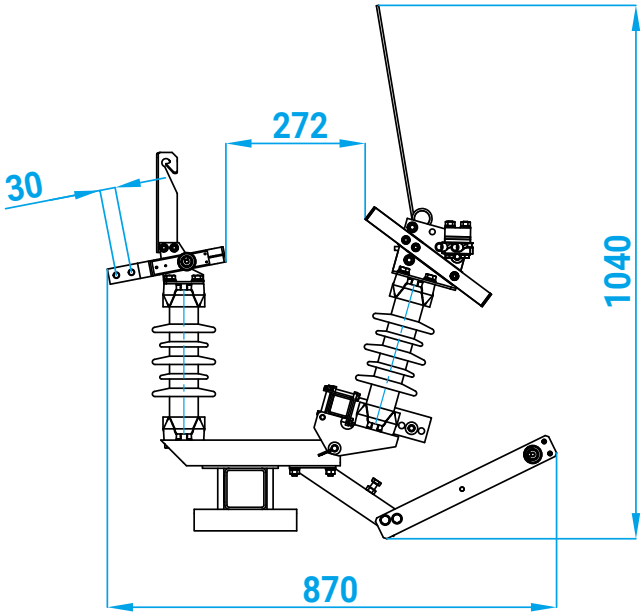
After inspection, maintenance and possible repair of the outdoor switch disconnector each time one should check the correctness of mechanical operation and the mechanisms should be adjusted if necessary. It is also advisable, especially in the case of doubts regarding the assessment of surface damage of the main contacts at places of mutual contact, performing an additional check of the main current path resistance, especially with respect to those outdoor switch disconnectors that conduct continuous currents with values close to their rated current. Measured resistances should not exceed the values given in the technical data table (point 7).

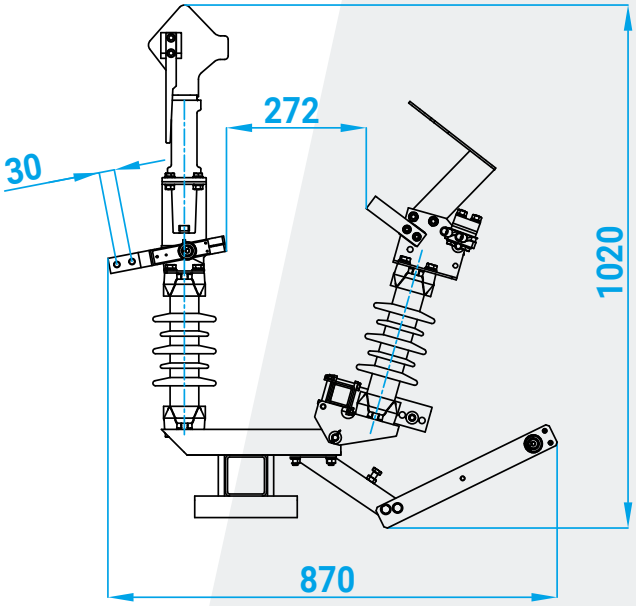
Measurements of the current path resistance of the outdoor switch disconnector and isolation should be carried out in accordance with the regulations in force in the power industry.

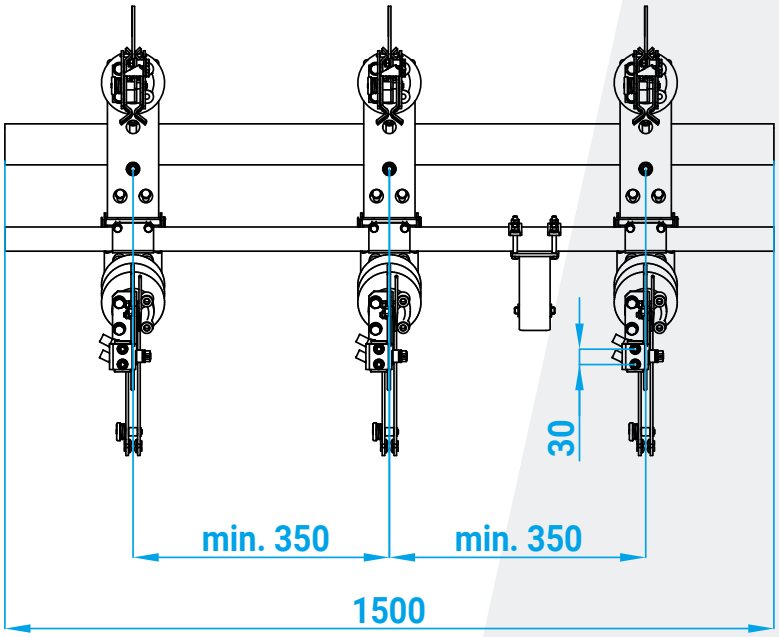
8. BASIC TECHNICAL PAREMETERS

No.	Parameter	Value	
		with arcing contacts	with breaking chambers
1.	Rated voltage	24 kV	
2.	Rated continuous current	630 A	
3.	Rated frequency	50 Hz	
4.	Lightning surge test voltage: - earth and pole to pole insulation - contact to contact insulation	125 kV 145 kV	
5.	Rated alternating test voltage: - earth and pole to pole insulation - contact to contact insulation	50 kV 60 kV	
6.	Rated current: - low inductive reactance circuit - in ring network circuits - in cable and overhead lines, idle state	20 A 20 A 10 A	630 A 630 A 25 A
7.	Rated peak current	40 kA	
8.	Rated short-circuit current, 1 sec.	16 kA	
9.	Resistance of current paths	max. 9 μΩ	
10.	Mechanical strength	1000 cycles	

9. DIMENSIONAL DRAWING







10. UTILIZATION

The RS-24 type outdoor switch disconnectors are 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 mix, polyamide).

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

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