

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



# UW/UDS Indoor earthing switch Manual no DTR.02.01.04.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. 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, the delivery's compliance with the packing list should be checked. Then check whether the apparatus has not been mechanically damaged during transport and the data on the nameplate match the order. Upon receipt of delivery, the stretch film must be removed to ensure adequate ventilation to counteract the formation corrosion.

The earthing switches are delivered in the packaging. When transporting the earthing switches, excessive shocks should be avoided. The earthing switches are delivered to the customer in a completely assembled and adjusted condition.

Open the top of the packaging. Pull the earthing switch out by grabbing the base frame.

It is unacceptable to lift the earthing switch by grabbing the terminals and the contacts.



Figure 1 Unpacking the earthing switch and taking it out from the packaging.

#### 1.2. Transport and storage

Earthing switches can be transported to a place of storage and installation by any means of transport provided they are protected against dripping water. During transport, the earthing switches should be secured against moving and colliding with each other or parts of the vehicle. It is not allowed to set earthing switches directly on top of each other. It may cause damage to the earthing switch.





### 2. DESCRIPTION

#### 2.1. Application

The UW / UDS type earthing switches are intended for use in indoor MV switchgears. They are intended for earthing and short-circuiting of electric circuits in an off-load condition. They are used in indoor high-voltage alternating current distribution devices.

#### 2.2. Construction and principle of operation

The earthing switches have a knife construction. The earthing switch base frame (item 1) is built of welded steel frame, with supports bolted on the sides, to which the main shaft is mounted (item 2). Movable contacts are welded to the main shaft, at the ends of which copper and silver-plated contact rivets are fixed. On the shelf of the base frame there are resin support insulators (item 3) on which are placed the terminals (item 6) and fixed contacts (item 4) of earthing switch. The blades pressure to the contacts is ensured by springs (item 7). The earthing switches have a place to connect the grounding connection (item 8). An additional equipment of earthing switches with a reduced pole spacing are insulating plates between adjacent poles.



Figure 2 Indoor earthing switch type UDS-12/20/1 (12 kV, 20 kA / 1 sec)





#### 2.3. Ambient conditions during operation

The UW, UDS type earthing switches are adapted for installation in indoor switchgear, in which the following ambient conditions exist:

- temperature in the range of: -5oC to + 40oC,
- relative air humidity (+30oC): 70%
- for standard earthing switches, the maximum installation height above sea level: 1000 m.

#### 2.4. Nameplate



- 1. Manufacturer
- 2. Year of production
- 3. Rated duration of short-circuit t [s]
- 4. Rated short-circuit current I [kA]
- 5. Serial number
- Rated operating voltage U [kV]
- 7. Number of poles
- 8. Distance between poles 160 mm
- 9. Construction type S





# 3. ACCESSORIES, ADDITIONAL EQUIPMENT



- 1. Earthing switch UDS
- 2. Operating mechanism NSW30
- 3. Drive lever
- 4. Clamp
- 5. Insulated drive shaft

Figure 3 Connection of the operating mechanism NSW30 with the earthing switch UDS.



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

Figure 4 Connection of cam switch LK16 with earthing switch UW.







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

Figure 5 Connection of auxiliary contact switch LP1 with earthing switch UW.





- 2. Clamp
- 3. Shaft
- 4. Right angle gear
- 5. Shaft clamp



Figure 7 Earthing switch UDS with right angle gear.

# 4. INSTALLATION AND ADJUSTMENT

Persons performing switching activities should have suitable professional qualifications and experience in servicing high-voltage equipment. When switching the earthing switch, all health and safety regulations in force at the place where it is installed have to be obeyed.

Before switching (closing or opening) of the 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 earthing switch

The UW / UDS type earthing switches are intended for operation in horizontal and vertical positions, with movable contacts at the top. The design of the supporting structure should take into account keeping appropriate ground clearnance distances, and the construction itself should have adequate stiffness.





The earthing switch base frame should be pre-screwed in three places (with three M12 bolts), and then optionally washers should be placed under the base frame to align the plane of the supporting structure. The points of contact of the supporting structure should lie in one plane (item 2) with the earthing switch base frame.



**1.** Elements of the supporting structure

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

Figure 8 Installation of the earthing switch UDS to the supporting structure.



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

Before screwing the rails, terminals (item 3) of the earthing switch should be cleaned of any contamination by a method that does not cause damage to 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 change the settings of the earthing switch itself. Slight change to the position of the terminal may cause the apparatus to work improperly.

The earthing conductor should be connected by using a screw (item 4) (54 Nm torque) placed in the earthing terminal located on shelf of the earthing switch base frame. Terminal should be previously greased with acid-free vaseline.



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

Figure 9 Screwing the rails and earthing conductor.



# **5. OPERATING MANUAL**

# • WARNING!

Before switching on the earthing switches to work under voltage, the user should ensure that the assembly has been made correctly and check that the condition of the earthing switches 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 correctness of tightening of screw connections.

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

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





During the switching operations, it is advisable to do visual inspection of earthing switch in each case, paying attention to the correct achievement of limit positions by the apparatus, as well as contamination on insulators, insulated rods and condition of contacts and operating mechanisms.

In case of finding any significant faults that could cause damage to the earthing switch or threatening the safety of service, the voltage of the earthing switch should be immediately turned off and the faults should be removed.

#### 5.1. Periodical check-ups

It is recommended that the earthing switches be inspected during periodical inspections of the indoor switchgear. During inspections, please check in particular:

- condition of insulators and insulated 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

Earthing switches repairs performed if necessary by the user should not go beyond the adjustment of contacts and mechanisms conditioning the proper operation of the apparatus.

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

### **6. MAINTENANCE**

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

The scope of maintenance includes:

- cleaning insulators and insulated rods using such tools and cleaning substances that do not damage their surface. 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 of damaged protective coatings.

#### 6.1. Regular tests

After each inspection, maintenance and repair of the earthing switch it is necessary to check apparatus mechanical work and if necessary – perform adequate regulations. It is also recommended to assess the surface damage of the main contacts in places of their mutual contact.

Insulation measurements should be carried out in accordance with the regulations in force in the energy sector.

### 7. UTILIZATION

The UW / UDS type earthing switches are made of materials that are recyclable.

The main materials from which the earthing switches are built are:

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

The earthing switches do not contain any hazardous substances. In accordance with applicable regulations, it is possible to return an worn-out, complete earthing switch to the manufacturer.

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