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## Electrical polarized drainage EPD160R Installation and Operation Instructions

Electrical polarized drainage EPD160R consists of DRN206 and REGDRN modules supplemented by fuse and overvoltage protection. DRN206 is transistor-based switch that works as a diode with a very low voltage drop in the forward direction. The module is supplied from an alkaline battery that is partially recharged from the differential voltage.

REGDRN module represents a controller to limit the drainage current on overrun the predetermined difference of potentials between protected pipeline and measuring Cu/CuSO<sub>4</sub> electrode. The current is pulse-limited and a power released in the inductance on the current commutation covers an energy consumption of electronics and a fan if used.

From electrical safety point of view the electrical polarized drainage is a device with a safe voltage.

### Installation

Electrical polarized drainage EPD160 is designed for installation in an electrical switch-board panel, located either in indoor or outdoor environment. There are four mounting holes on the main board. Input conductors equipped with cable eyes  $\Phi$  8 mm are connected to terminals marked "KOLEJ" ("RAIL") and "POTRUBÍ" ("PIPE").

For the correct functionality of the controller it is necessary to connect measuring Cu/CuSO<sub>4</sub> electrode and separate measuring output of the pipe to the device terminal board. On the controller module there is possible to adjust the differential voltage for the current limit in the range from 1.55 to 2V. For the proper cooling a free space of at least 10 cm above the module cooler shall be provided.

### Operation and maintenance

Maintenance of the device consists of periodical inspection of battery charge, the fuse, overvoltage protection and overall functionality of the device. Inspection Interval is specified by the keeper.

By pressing the test button for at least 2 seconds the battery charge will be tested and 5-minute measurement of drainage current will be activated.

If the battery is fully charged the red "BAT" LED lights for 1 second after pressing the button. The lower the voltage of the battery is, the shorter the LED lights. The device uses exclusively an alkaline 9-volt battery. The battery is not recharged, service life is up to 5 years depending on operating conditions.

By pressing the test button the green LED "MER" is turned on for the next 5 minutes. That means the drainage current is being measured. After those 5 minutes the green LED goes off and the ammeter will return to value 0, regardless the actual drainage current.

If the drainage current occurs during the measurement, the fuse is also checked. If the current is zero, the fuse should be checked manually by fuse tester or by ohmmeter after disconnecting the fuse disconnecter.

Overvoltage protection includes mechanical fault indicator. Overvoltage protection fault is indicated by the indicator release. Faulty overvoltage protection shall be immediately replaced by a device with the same parameters. The system uses overvoltage protection 60V 15KA 8/20  $\mu$ s.

Functionality of EPD160 can be checked by a tester after disconnecting the fuse. The tester is connected directly to the output of DRN206 module. In case of testing current of 0.1A in the forward direction there should be a voltage drop of 15 to 25 mV. In the reverse direction there should be current of 0.5 to 15 mA using testing voltage of 9V depending on the charge level of battery in EPD160. If a malfunction is detected either the whole EPD160 device or only DRN206 module can be replaced. Disconnected DRN206 module needs to be protected against mechanical damage, especially the bottom side of the circuit. It is recommended to store the module immediately after replacement into its original wrapping.

## Technical parameters of EPD160R

constant current capacity	160A
maximal reverse voltage	26V
resistance for current of 160A	2.5 m $\Omega$
voltage drop of DRN204 module for low current	20 mV (15 - 25)
battery current supply	6 $\mu$ A
current measuring accuracy	3 %
Input current from Cu/CuSO <sub>4</sub> electrode	2nA
pipe / SE voltage for the current limit	1.55 - 2V, adjustable
operational temperature range	from -20 to +70 °C
dimensions	253 x 370 x 141 mm
weight	5 kg

## Type and characteristics of the fuse

The fuse used in EPD160R is a size 000 safety fuse link of with nominal current of 160A. Overload capacity of the module matches fast fuse characteristic (aR, gR) with limited current increase slope to maximum of 100A/ $\mu$ s due to inductivity of a rail circuit. In the referenced mode the current in EPD circuit doesn't exceed 5000A on the fuse trip. In case of maximal short-circuit current under 1000A it is possible to use also a fuse with gG characteristic. If the EPD panel is placed on the direct sunlight it is recommended to use 125A gG fuse so the maximum short-circuit current in the EPD circuit can reach up to 1500A.

## Service

Both the warranty and after-warranty service is provided by the manufacturer.