

LV SWITCHBOARDS up to 1000 V

Assembly, operation, and maintenance instructions

LV top unit for MV switchboards

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1. Markings

Each switchboard is marked with a **data plate** according to ČSN (EN, IEC, HD) standards, placed on the inside of the door of the first section to the opposite corner of the lock.

2. Basic technical data

The supplied switchboards **comply** with the technical specification provided by the client for the individual orders, or are supplied directly as part of the client's delivery.

The voltage system of the individual switchboards supplied complies with the order and with ČSN 33 2000-1 ed. 2 (idt HD 60364-1:2008, mod IEC 60364-1:2005).

All **basic data** about the specific switchboard supplied are given in the production documentation **on the drawing** – front view and summary data table for the characteristics of interface and basic parameters of the switchboard (switchboard type, enclosure, dimensions, coating, voltage system, current, insulation voltage, protection, environment, any other data).

3. Description of the equipment

Individual switchboards are assembled in accordance with project documentation. **The arrangement of apparatus** in a wall-mounted switchboard is done in such a way that it is possible to connect both supply and outlet wires; the direction of supplies is along the upper or lower wall according to a specific requirement.

Switchboards are supplied with basic IP2X **enclosure protection**; after opening the door, IP00.

4. Equipment, controls

Full **specification** of the apparatus used is given in the production documentation of individual switchboards, in the diagrams of individual sections.

5. Important functions

Great emphasis is placed primarily on **the proper functioning** of the protective circuits, so as to ensure their faultless operation, and thus the safety of the operator. The proper function of the protective circuits is tested at the production plant. It is recommended to repeat the test before putting the switchboard into operation.

6. Mode settings

The **selectivity** of individual circuits must be tested and adjusted before switchboards are put into operation by the assembly organization.

Setting the **current values** on protection elements (if they have this setting) must be carried out by the assembly organization according to specific needs.

7. Packaging, transportation, storage

Switchboards are **packaged** in transparent PVC film. This method of packaging does not provide protection against the elements. Transport by truck and rail must always be under a tarpaulin. Overseas packaging, or other packaging requirements, can be arranged by agreement.

The device may only be placed on a flat surface.

Switchboards must be **stored** in dry, dust-free areas, without the risk of accidental physical damage. Temperature -10°C to +35°C, relative humidity up to 80% at 21°C. It is unacceptable to store switchboards in areas which have not been dried and whose construction is incomplete.

8. Assembly of switchboards

Installation of the LV top unit in accordance with the MV switchboard manufacturer's manual. Switchboards are installed in places whose construction has been completed and which are dry and clean.

The tightening torques of apparatus are given by the apparatus manufacturer.

All screw connections must be properly tightened.

When connecting external cabling to the switchboard, care must be taken to ensure that it is properly secured and arranged.

Before putting into operation, the switchboard must undergo tests in accordance with ČSN (EN, IEC, HD) and this manual.

9. Operation and maintenance

The safe operation of the switchboard demands that its running, operation, and maintenance will be governed by **valid standards and regulations** (including the regulations of the suppliers of individual pieces of apparatus). Persons entrusted with operation and maintenance must be provably familiar with such standards and regulations, in particular with ČSN EN 50110-1 ed. 4 (idt EN 50110-1:2023).

Switchboards **may not** be accessed and handled by **unauthorized persons**.

The qualification of switchboard operators is given by ČSN EN 50110-1 ed. 4 (idt EN 50110-1:2023) and the design of the enclosure of the switchboard (the enclosure of the switchboard is indicated as a whole, and after opening the door). If there are other requirements for operator qualification at the place of use, these must be entered in the on-site operating regulations. In **no case may** qualifications be **lower** than those for which the supplied switchboard was ordered and manufactured.

Switchboards may only be operated with the **door closed** (if part of the switchboard).

10. Inspections

Switchboards must be **regularly inspected and revised**. In particular, the individual connections of the main and control circuits. Particular attention must be paid to protective circuits.

A **visual inspection** must be carried out after one week of operation. **Further inspections** according to the maintenance plan compiled in accordance with applicable regulations.

The manufacturer of the switchboard recommends carrying out a **thermal imaging inspection at least once a year and an inspection of connections once every 4 years**, unless the manufacturer of built-in equipment recommends more frequent inspections. Other inspection dates are specified in the operator's internal regulations.

The inspection must also include a **visual check** of the condition of individual pieces of apparatus, and possibly the need to clean the interior of the switchboard. The interior must be cleaned during an inspection.

In the case of long-term, continuous operation, perform regular **measurements** and recording of the surface **temperature** of the circuit-breaker enclosure in places above contact switches.

During inspections, it is necessary to turn **switching elements** that have been **in one state** for a long time on and off several times in order to break the possible oxidation layer on the contacts. Detected defects must be removed in a timely and professional manner.

11. Service inspections

It is recommended that **service inspections** and checks of the function of circuit-breaking and protection elements (circuit breakers, motor starters, guards, etc.) are carried out by a qualified service technician.

Service inspections can also be ordered from the manufacturer.

12. Maintenance plan

The operator is obliged to compile a **maintenance plan**, with which the responsible employees must be provably familiar within their scope of activity.

A **maintenance log** must be kept about the inspections carried out, maintenance, switching off the circuit-breaking and protection elements during short circuits and overcurrent, the operator switching off the circuit-breaking and protection elements, and the replacement of fuses and apparatus; all these data are recorded in the log. Upon request, these records are provided to the switchboard manufacturer or component supplier.

These inspections do not replace the plan of regular inspections of individual switchboards compiled by the operator.

13. Surroundings

The basic characteristics of the supplied switchboards are in line with ČSN 33 2000-5-51 ed. 3+Z1+Z2 (idt HD 60364-5-51:2009 + idt HD 60364-5-51:2009/A11:2013 + idt HD 60364-5-51:2009/A12:2017, mod IEC 60364-5-51:2005) AA4, meaning that the operating **ambient air temperature** must not exceed 40 °C, with an average temperature over 24 hours of 35 °C. The working conditions of the switchboard according to ČSN EN IEC 61439-1 ed. 3, Art. 7.1.2 (idt EN IEC 61439-1:2021 + idt EN IEC 61439-1:2021/AC + idt IEC 61439-1:2020 + IEC 61439-1:2020/COR1:2021) correspond to the pollution degree specified in the production documentation.

14. Circuit breaker shutdown

When the circuit is switched off by a fuse or circuit-breaking and protective element, it is necessary to find out the cause and remove it; only then can it be switched on again. The same must be done in cases when overvoltage is detected. Checks must be carried out on the contacts of the circuit-breaking and protection elements that switched off an overcurrent, or a short circuit.

15. Reserves

Reserves that are installed in individual switchboards according to the project can be used in the values with which they are installed. In accordance with point 17 of these instructions, they **may not** be replaced by apparatus with larger values.

16. Defective apparatus

Defective apparatus must be replaced by faultless apparatus (new or repaired by the apparatus manufacturer) of the same parameters.

17. Interruption of operation, shutting down the switchboard

When **shutting down** the switchboard, it is necessary to undertake an overall inspection before putting it back into operation (the condition of individual pieces of apparatus, their settings, the condition of connections, in particular protective circuits, etc.).

In **the event of a short-term interruption** of operation (e.g. when removing a fault), it is possible to switch on again after checking the work done and the integrity of the protective circuits.

18. Prohibited handling

Apparatus may not be **added** to switchboards, or defective apparatus **repaired**, in particular fuses and circuit-breaking and protection elements. Replacement with new apparatus or repair by the apparatus manufacturer is permitted.

Used apparatus **may not be replaced by apparatus with larger values**.

Switchboards may not be operated in conditions other than those for which they are intended (different voltage and current values, ambient temperature, different environment with regard to enclosure, physical damage).

If the switchboard is live, it is prohibited to handle (in particular) metal or wet objects inside.

For access to switchboards, ČSN 33 2000-4-41 ed.3 (idt HD 60364-4-41:2017, mod IEC 60364-4-41:2005 + mod IEC 60364-4-41:2005/A1:2017) applies to provide protection against electric shock.

19. Switchboard accessories

1 key for espagnolette lock, DOPPELBART 5 mm type
(included as part of the accessories for the MV switchboard).

Operation and maintenance manuals for built-in components, to which these manuals are supplied by the manufacturer of these components as standard, i.e. for protections, frequency converters, power circuit breakers, contactors, etc.