




 GENERI, s.r.o. Uničovská 50 787 01 ŠUMPERK Tel.: +4220583221500, Fax: +420583214183	USER'S MANUAL EXPLOSION-PROOF SWITCHGEAR BOX TYPE: X450DA2	Page: 1 of 3 N740078 – 5th edition Valid from: 20.1.2020

GENERAL

This User's Manual has been drawn up in accordance with:

- *Technical requirements for equipment and protective systems intended for use in potentially explosive atmospheres (2014/34/EU).*
- *Technical requirements for products from the point of their electromagnetic compatibility (2014/30/EU).*

SAFETY GUIDELINES AND IMPROPER USE

Do not leave this User's Manual in the box during operation!

- When handling the switchgear box, **avoid causing mechanical damage!**
- Explosion-proof switchgear boxes X450DA2 **are not designed for non-professional use.** Installation, start up and any service whatsoever must be performed by workers with professional expertise and in conformance with safety regulations.
- **Do not operate** X450DA2 switchgear boxes in **Zone 0** explosive areas according to ČSN EN 60079-10-1, **Zone 20** according to ČSN 60079-10-2 and in **dangerous atmospheric conditions 1** according to ČSN EN 1127-2.
- Always install switchgears so that the **distance** between the joint of the X450DA2 flame-proof enclosure and any solid **obstacles** is **at least 30 mm.**
- **The instrument part** (Ex d) can contain parts with hot surfaces, i.e. **with dangerous temperature. Open this part only in the absence of explosive atmospheres** or in a **non-voltage state** after a sufficient time since its deactivation to allow the hot parts to cool.
- **Operate** X450DA2 switchgears in accordance with **the following operating conditions, technical and label data.**
- **Do not replace the existing internal equipment** of the switchgear with equipment inconsistent with the documentation supplied with the product (e.g. replacement of an existing 6A circuit breaker with a 10A circuit breaker).
- If the switchgear contains **current protectors**, regularly verify their function **at least every 6 months** using the test button (while observing applicable safety regulations).
- Some **mining cables** (e.g. type CBEH) have individual wires provided with a semi-conductive removable layer. **Always remove this layer** before connecting the wires!
- **Switching and protective devices** inside switchgears may produce **short-term electromagnetic interference** and therefore have to be used in industrial zones, where they do not have a negative impact on other equipment.
- Carry out storage, transport, assembly, installation, revision and preventive maintenance, repairs and service in accordance with the instructions stated hereunder.

1. USE

Switchgears are primarily designed for installation in underground mines with the presence of methane or in areas with a risk of explosion of flammable gases, vapours, dust and explosives.

2. OPERATING CONDITIONS

2.1. **External influences** in accordance with ČSN 33 2000-5-51 – Cat. A: **ENVIRONMENT**

Code	Description of external influence	Specification
AA	Ambient temperature Ta	-20°C to +49°C
AB	Atmospheric humidity	up to +30°C .. 100% to +40°C ... 70%
AD4	Presence of water	Spraying water
AE5	Presence of foreign solid particles	Moderate dustiness
AF4	Presence of corrosive substances or contaminants	Permanent
AG3	Impact	Strong (20J)
AH	Vibrations	see Article 6 – Revision

2.2. **External influences** in accordance with ČSN 33 2000-5-51 – Cat. B: **USE**

Code	Description of external influence	Specification
BE3N1	Risk of explosion of combustible dust	see section 2.4
BE3N2	Risk of explosion of flammable gases and vapours	see section 2.4
BE3N3	Risk of explosion of explosives	see section 2.4
BA5	Skills of persons	Knowledgeable persons
BC3	Contact of persons with earth potential	Frequent

2.3. **Unspecified external influences are normal** in accordance with ČSN 33 2000-5-51.

2.4. **Use in areas and atmospheres in accordance to installation regulations**

Areas	Name of standard	Standard
Explosive atmospheres (hazardous conditions 2)	Explosive atmospheres – Explosion prevention and protection – Part 2: Basic concepts and methodology for mining. (version I M2)	ČSN EN 1127-2
ZONE 1 and 2 IIA, IIB	Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres (version II 2G)	ČSN EN 60079-10-1
ZONE 21 - IIIA ZONE 22 - IIIB	Explosive atmospheres – Part 10-2: Classification of areas – Explosive dust atmospheres (version II 2D, II 3D)	ČSN EN 60079-10-2
V1, V2	Regulations for electrical equipment in areas with a risk of fire or explosion of explosives	ČSN 33 2340

2.5. **Work position:**

Vertical

3. TECHNICAL DATA

Name	Specification	Standard, note
Explosion-proof design	Ex db eb I Mb Ex db eb IIB T6 Gb Ex tb IIIA T85°C Db Ex tc IIIB T85°C Dc	ČSN EN 60079-0 ČSN EN 60079-1 ČSN EN 60079-7 ČSN EN 60079-31
Degree of protection	IP 54	ČSN EN 60529
Group and category	I M2 II 2G III 2D / II 3D	2014/34/EU
Certification	FTZÚ 02 ATEX 0197	ČR, FTZÚ NB 1026
Switchgear design	LV switchgear LV power switchgear	ČSN EN 61439-1 ČSN EN 61439-2
Nominal voltage and nominal current	See company label	
Nominal short-time current	Max. 10 kA	ČSN EN 61439-1
Electromagnetic compatibility	switchgear without built-in electronic equipment resistant to interference emitting short-term interference	according to ČSN EN 60439-1 no further verification required
	switchgear with built-in electronic equipment resistant to interference not emitting interference	according to harmonized ČSN IEC for EMC
Box material	steel 11 373	pressure-welded
Surface finish	Powder baking paint	Standard yellow RAL 1018
Outer terminal PE	16 mm ²	2 x M5 screw with a liner



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TYPE: **X450DA2**

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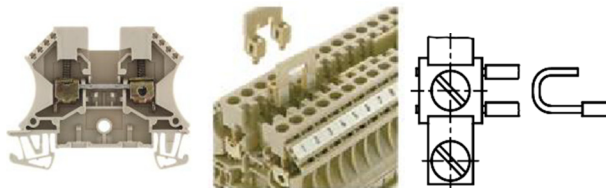
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Protection class	I	ČSN EN 61140
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4.0mm² terminal block.

4.3.2. Screw terminal blocks



Connect the wires to the side of the terminal block and tighten the connection properly.

When **interconnecting screw terminal blocks**, tighten the screw terminals properly. If the box contains a **PE** or **FE** rail, then when connecting only one conductor to the terminal, bend the end of the stripped wire into the U-shape, in order for the liner compressing the wire to be in a plane and thus not reducing the functioning of the flexible washer between the liner and the screw head.

4.4. General requirements

Always equip stranded wires with end ferrules. We recommend placing end ferrules also on solid copper wires that do not have surface protection and are exposed to an **aggressive atmosphere**. Ending stranded wires with soft solder only is not permitted!

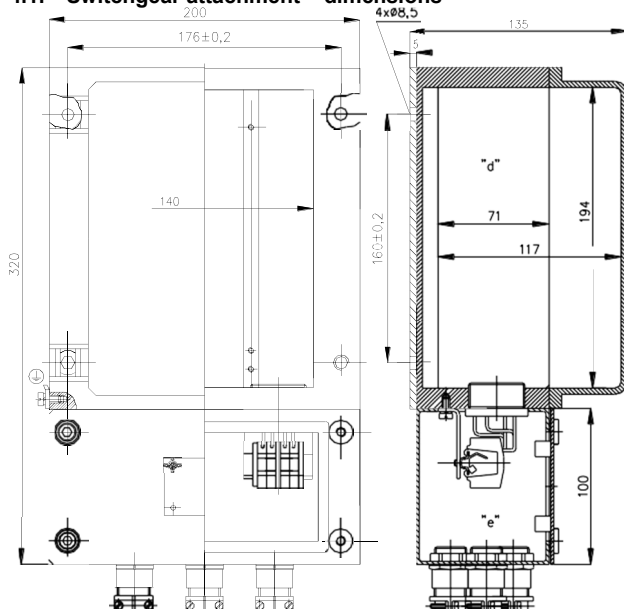
The following applies to both types of terminal blocks: **only one wire** may be inserted into **one outlet** and its maximum cross-section must not be larger than the nominal cross-section of the terminal block. Wire insulation must reach as close as possible to the actual current-carrying connection. The wire must not be damaged.

We recommend treating **protective conductor connection points** (or other metal surfaces subject to corrosion) regularly with lubricating grease at least once per year (depending on the operating environment). Connect **unused wires** without voltage into empty terminals (including protective ones) or end them with in an appropriate manner according to effective regulations.

The use of Al-wires with a cross-section < 16 mm² is not permitted.

4. INSTALLATION INSTRUCTIONS

4.1. Switchgear attachment – dimensions



4.2. Cable entries

Cable glands for cable entry are located on the Ex "e" connection part in the secured design.

Each cable gland seals only a certain range of cable diameters. In the case of a larger number of cable glands on the box flange, always insert and seal the cable in the cable gland gradually from one side (e.g. from left to right) and always start with the cable glands on the bottom row and then continue with the cable glands right above them.



For easier installation of cable glands, you can request special tightening pliers – see fig. In order to achieve reliable ingress protection, tighten the cable glands with the specified tightening torques.

Blank unused holes with certified plugs meeting ingress protection of IP54 and Ex design.

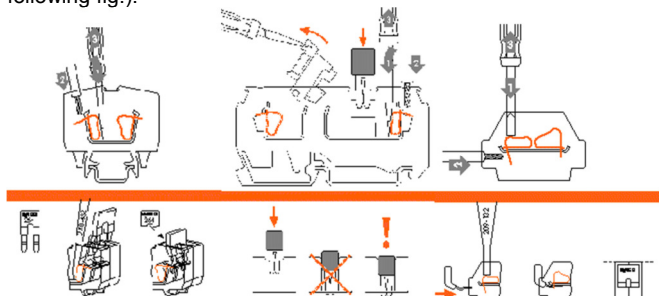
4.3. Connecting wires to terminals

Wires can be connected using spring-cage terminal blocks or screw terminal blocks.

4.3.1. Spring-cage terminal blocks

By compressing the spring-cage (1) e.g. with a suitable screwdriver (or special WAGO screwdriver, which is supplied only upon customer request), release the window for attaching the wire. Insert the wire (2) and release the spring cage (3), which will lead to a perfect current-carrying connection.

When **interconnecting two neighbouring terminals with a spring-cage** using special knife terminals, press this terminal with strength into both terminals so that it does not overlap the terminal (see following fig.).



In the case of some types of spring-cage terminal blocks, connecting a wire with a ferrule requires the use of a terminal block with a connection cross-section one grade higher than the wire cross-section. E.g. a 2.5mm² wire with a ferrule requires the use of a

5. INSTALLATION ACCORDING TO APPLICABLE REGULATIONS

The decision to use a given type of equipment in the areas considered must be in accordance with the above **operating conditions** (see section 2.), **local operating regulations**, **ČBÚ Decree No. 75/2002 Coll.** (for Group I equipment) or **ČSN EN 60 079-14** (for Group II equipment) and other applicable regulations.

Apart from the above stated regulations, **protection against injury due to electric shock** is also stipulated by **ČSN 332000-4-41**, **ČSN EN 61140** and other related regulations. Safety regulations for **operation and work on electrical equipment** are stipulated by **ČSN EN 50110-1**. **Professional competence** of workers in electrical engineering is stipulated by Decree No. **50/1978 Coll.**, as amended.

6. REVISION AND PREVENTIVE MAINTENANCE

Revision and preventive maintenance of explosion-proof electrical equipment are stipulated by **ČBÚ Decree No. 75/2002 Coll.**, (for Group I equipment) and **ČSN EN 60079-17** (for Group II equipment), unless specified otherwise by e.g. a decree, local regulations, etc.

Open X450DA2 switchboard boxes only in the absence of explosive atmospheres or in a non-voltage state after a sufficient time since its deactivation to allow the hot parts to cool. Before closing the **flat enclosure surface** of the steel box and lid, always **clean it and coat it with a thin layer of graphite lubricant BELLEVILLE** – blue series against corrosion (supplied by GENERI, s.r.o.). Cleaning of enclosure surfaces can only be performed with non-metal scrapers and corrosion-free liquid.

Re-lubricate the enclosure surface at least once a year. X450DA2 switchgear boxes must have **all electrical and mechanical connections secured against self-release**. However, vibration tests are not conducted on the device (external influences of AH1, 2, 3 character pursuant to ČSN 332000-5-51) in relation to classes of climate conditions pursuant to ČSN EN 60721-3-3 and ČSN EN 60721-3-4).

For Group I mobile equipment, it is therefore recommended to perform regular revisions according to Annex 2 to ČBÚ Decree No. 75/02 Coll., and for Group II equipment according to ČSN EN 60079-17 at least twice a year at the level of detailed inspection. Cable glands and plugs may only be replaced with those with the corresponding explosion-proof design and ingress protection (see Technical data) and certified by the respective notified body.



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Where it is not possible to secure **fixed installation** of cables, cable glands must be also in the version **protected against tension** (with a clamp) – this especially applies to **mobile equipment**.
For other spare parts, see Article 10.

7. REPAIRS AND GENERAL INSPECTIONS, SERVICE

Repairs and general inspections of explosion-proof electrical equipment are specified by ČBU Decree No. 74/2002 Coll., (Group I equipment) and ČSN EN 60079-19 (for Group II equipment).

Repairs should preferably be entrusted to the **manufacturer** or its authorized organization which, in the case of repairs of explosion-proof mining equipment, must have valid authorization according to the aforementioned ČBU decree.

The following parts are deemed irreparable:

- Ex terminal blocks, cable glands and plugs
- non-losable stainless steel screws in the box lid
- all electrical components installed inside the box

These parts must be replaced when damaged!

During all repairs and renovations, maintain the original explosion-proof design and ingress protection!

In case of any problems related to GENERI, s.r.o. products (e.g. loss of accompanying documentation, technical defect, etc.), all you need to do is note down the following two pieces of information on the company label:

- 1) **EQUIPMENT TYPE**
- 2) **SERIAL NUMBER (No.)**

With the help of these two pieces of data, you can find all accompanying and technical documentation for the specific product at the manufacturer.

8. STORAGE, PACKAGING AND TRANSPORT

Switchgears are to be **stored** at ambient temperatures of +5 °C to +40 °C, in non-aggressive indoor areas without exposure to UV radiation and the weather, in which the quality will not worsen (climate conditions 1K2, biological conditions 1B1, chemical active substances 1C2, mechanically active substances 1S1 and mechanical conditions 1M2 in accordance with ČSN EN 60 721-3-1).

Switchgears are **packed** in protective foil and shipped in cardboard boxes (larger boxes may be fixed on pallets).

Transport is generally provided by an express service within 24 hours, or according to the demands of the customer. C.O.D. is also possible.

Transport conditions are 2K2, 2B1, 2C2, 2S1, 2M2 in accordance with ČSN EN 60721-3-2.

9. DELIVERY TERMS AND CONDITIONS

The price of goods, delivery terms, payment method, and transport mode are stated in the purchase agreement, which the Sales Department sends out after obtaining an order form.

10. SPARE PARTS

Each switchgear contains a wiring diagram exactly specifying individual electrical components.

11. DISPOSAL OF THE PRODUCT



Dispose of unnecessary products in accordance with effective regulations.
!!! All components and parts may release harmful vapours when burning!!!

12. DOCUMENTATION PROVIDED WITH THE PRODUCT

- EC Declaration of Conformity
- Wiring diagram inserted in the box
- This User's Manual including the warranty
- Delivery note

The certificate is available at www.generi.cz or on request.

WARRANTY

Product TYPE: **X450DA2**

Serial number No.: from: to:

This product is provided with a 12-month warranty (unless stated otherwise in the purchase agreement), commencing on the day it was accepted. We guarantee the quality of work and materials. Nevertheless, defects may arise as a result of storage, transport or use, which are undetectable in the production plant. If such defects have been incurred by defective material or production, we shall render the product into a perfect state at our own expense. The warranty does not apply to defects incurred by improper use, mechanical damages and by not adhering to the instructions for assembly and maintenance.

FINAL INSPECTION

Authorised worker: Result: Stamp and signature:

OK



ISO 9001



WE WISH YOU MAXIMUM SATISFACTION WITH OUR PRODUCTS AND SERVICES