Innovative Power Engineering at its best!

HUGHES
POWER SYSTEM

HIGH VOLTAGE VACUUM CIRCUIT BREAKER

FOR 72/126 KV, 1-2-3 POLE GANG OPERATION

OVX720/1100 HIGH VOLTAGE, SOLID INSULATED VACUUM CIRCUIT BREAKER SERIES FOR DIFFERENT APPLICATIONS:

- Railway feeder stations;
- Electrical transmission systems;

ABOUT US

Hughes Power System is a Swedish manufacturer of environmentally friendly equipment for electrification and automation of mass transport and electrical distribution systems. Very high quality standards together with innovative approach result in an advanced range of products, aiming to improve network quality by minimizing the number and duration of faults.

Our product portfolio includes:

- Reclosers
- Vacuum interrupter switches
- Disconnectors
- Motor drives
- Voltage transformers
- D/C power supplies

With its more than 30 years expertise in research, development, manufacturing, marketing and sales the company operates in many countries though cooperation with local partners. As we move towards our goal of being a world class advanced technological company in electrical utility products, we guarantee our commitment to the well known Swedish standards of reliability, safety and quality.

The majority of Hughes Power System's products are designed and built in Sweden.

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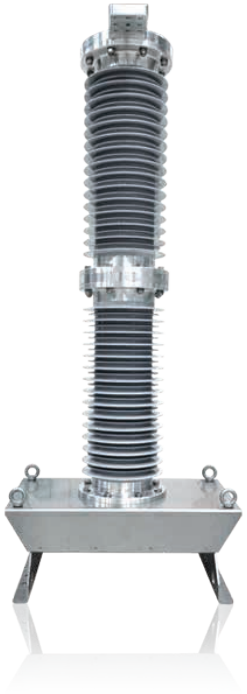
GENERAL DESCRIPTION

OVX720



WHAT IS AN OVX720 MODULARIZED VACUUM CIRCUIT BREAKER

Hughes OVX720 high voltage, solid insulated vacuum circuit breaker for 72kV is designed and manufactured in Sweden for railway feeder station and electrical transmission system applications.

OVX720 SERIES MODEL RANGE

- OVX721 one pole vacuum circuit breaker for railway feeder stations;
- OVX722 two poles vacuum circuit breaker for railway feeder stations;
- OVX723 three pole vacuum circuit breaker for electrical transmission systems;

OVX720 KEY FEATURES:

- Solid insulated;
- 72.5 kV 3-phase;
- 42 kV single or double pole;
- 2500 A, 31.5 kA;
- 365 kV BIL;
- 140 kV PF@ 50 Hz;
- Steel spring mechanical actuator;
- Solutions for 1-phase, 2-phase, 3-phase systems;
- Vacuum interrupter enclosed in a solid insulation;
- Anti-vandalism poles fitted with polymeric insulators as standard;

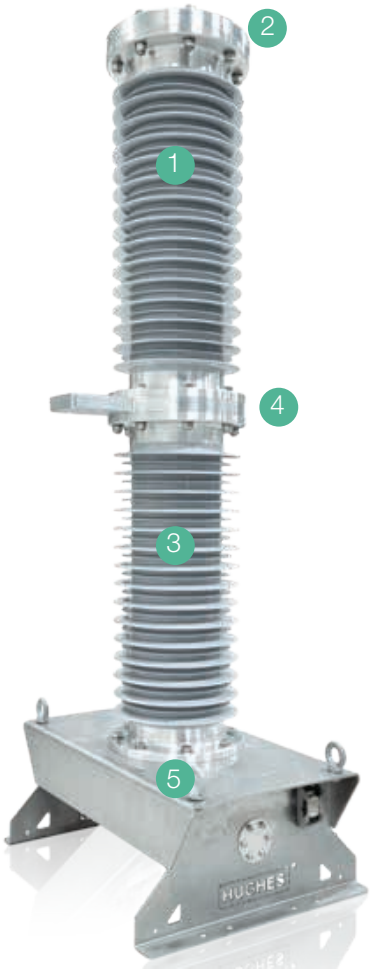
OVX720 ADVANTAGES:

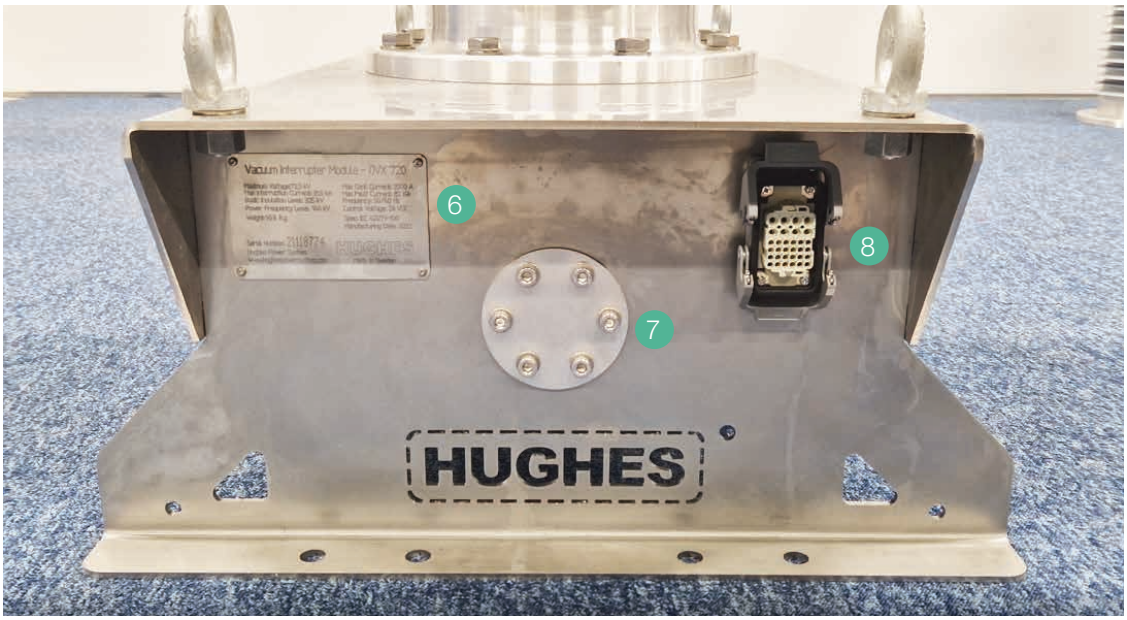
- **Low maintenance.** Hughes vacuum circuit breakers are built to remain in operation for more than 30 years without major maintenance due to the highest quality materials used in its construction;
- **Solid insulated bushings** (1) that exclude risk for SF6 or mix gas leakage and oil leakage;
- **High current vacuum interrupters** (2) that will not produce any harmful switching products and are very easy to replace in comparison to gas insulated interrupters;
- The OVX720 uses **high-level insulated** bushings (3) with polymeric surface that gives superior BIL rating;
- The vacuum interrupter has **innovative design** allowing the unit to be modularized between 1, 2 or 3 poles for different applications. Normally 1 and 2 poles versions are used for railway electrification and 3 poles version is used for electrical transmission systems including renewable energy sectors;
- **Low life cycle cost** is guaranteed due to the combination of extremely high mechanical endurance and outstanding electrical parameters;
- The circuit breaker is **completely prewired** which makes it an easily remote-controlled solution;
- Both connection terminals can be supplied with **hole patterns** (4) in accordance with ANSI or IEC standards.

GENERAL DESCRIPTION

OVX720 COMPONENTS:

- Top solid insulated bushing (1) has upper connection terminal with low internal resistance;
- Thick metal connection terminal (2) that functions also as a heat sink for the vacuum interrupter bottle, that is installed inside the top bushing;
- The lower bushing (3) with the internal operating push-pull rod installed inside;
- The lower connection terminal (4) is a joint point for both bushings;
- The foot of the circuit breaker (5) contains the mandatory rating plate (6) with the electrical data in accordance with ANSI and IEC standards;
- The switch interconnection interface (7) is the connection point for the drive shaft between a switch module and an operating mechanism;
- The IP67 electrical contact (8) is the prewired SCADA interface that provides information about the switch position. It also connects to multiple CAM switches and the heating element;

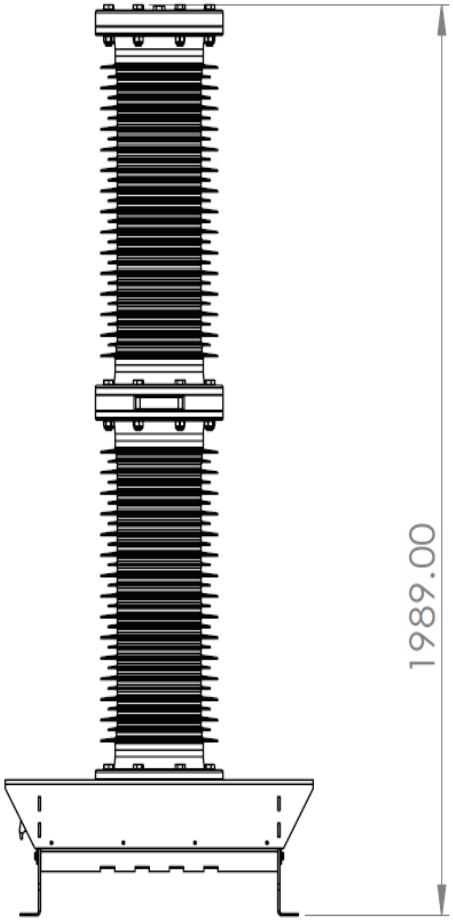


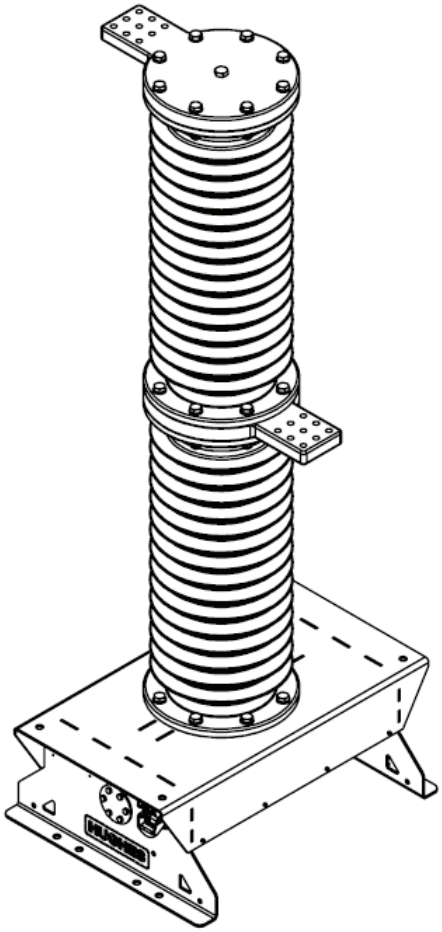


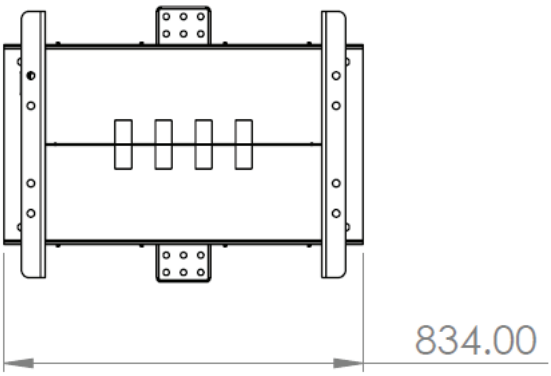
OVX720 foot

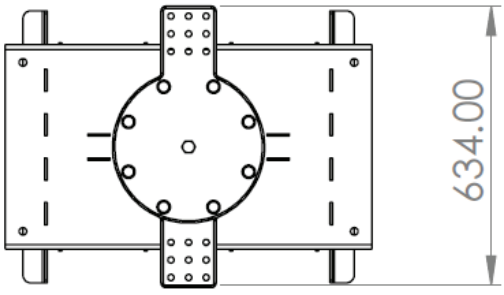
DRAWINGS

OVX720









INSTALLATIONS

OVX720

En example of a 72kV vacuum circuit breaker installation, copnnecting a renewable energy plant with a transmission network.

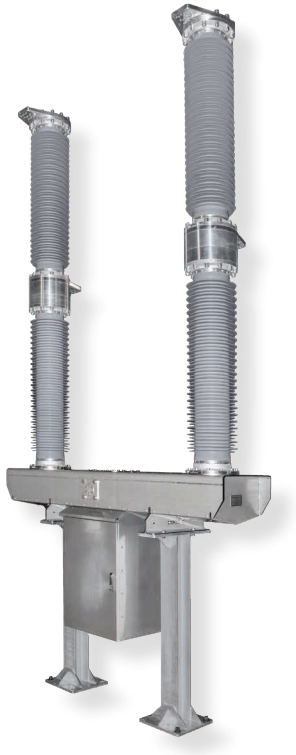
TECHNICAL DATA

OVX720

TECHNICAL PARAMETER	OVX 721	OVX 722	OVX 723
Type	circuit breaker	circuit breaker	circuit breaker
Rated frequency, Hz	50/60	50/60	50/60
Operating voltage (phase to ground), kV	42	42	
Operation voltage (phase to phase), kV			72
Rated power frequency withstand voltage (50 Hz/1 min), kV	140	140	140
Lightning impulse withstand voltage (1.2/50 μs), kV	325	325	325
Rated current, A	2500	2500	2500
Rated short-circuit breaking current, kA	31.5	31.5	31.5
Rated short-circuit making current, kA	80	80	80
Short circuit withstand current, kA/s	31.5	31.5	31.5
Operation mechanism	steel springs	steel springs	steel springs
Number of poles	1	2	3
Opening time, ms	≤ 17	≤ 22	≤ 22
Closing time, ms	≤ 60	≤ 60	≤ 65
Insulators	Polymeric	Polymeric	Polymeric
Operating class (IEC 62271-100	E2	E2	E2
Dimensions (H x L x W), mm	1989 x 834 x 634 per module		
Operation voltage	24 VDC, 110 VDC, 220 VDC, 220 VAC		
Drive voltage	24 VDC, 110 VDC, 220 VDC, 220 VAC		

GENERAL DESCRIPTION

OVX1100



OVX1100 KEY FEATURES:

- Solid insulated;
- 126 kV 1/2/3-phase;
- 3150 A, 31.5 kA;
- 550 kV BIL;
- 265kV PF@ 50 Hz over open contact;
- Steel spring mechanical actuator;
- Solution for 1/2/3-phase systems;
- Vacuum interrupter enclosed in a solid insulation;
- Anti-vandalism poles fitted with polymeric insulators as standard;

WHAT IS AN OVX1100 HIGH VOLTAGE VACUUM CIRCUIT BREAKER

Hughes OVX1100 high voltage, solid insulated vacuum circuit breaker for 126kV is designed and manufactured in Sweden for different applications.

OVX1100 SERIES MODEL RANGE:

- **OVX1101** - one pole vacuum circuit breaker for for electrical distribution systems;
- **OVX1102** - two poles vacuum circuit breaker for railway feeder stations;
- **OVX1103** - three poles vacuum circuit breaker for electrical transmission systems.

The product is built to remain in operation for more than 30 years without major maintenance due to the highest quality materials used in its construction.

Lower connection terminal with multiple cable shoe standard pattern

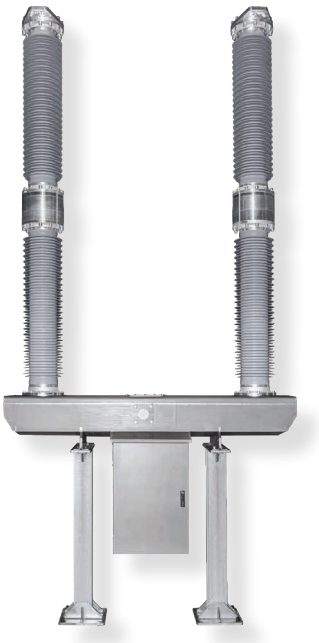
OVX1100 ADVANTAGES:

- **Low maintenance.** Hughes vacuum circuit breakers are built to remain in operation for more than 30 years without major maintenance due to the highest quality materials used in its construction;
- **Solid insulated bushings** that exclude risk for SF6 or mix gas leakage and oil leakage;
- **High current vacuum interrupters** that will not produce any harmful switching products and are very easy to replace in comparison to gas insulated interrupters;
- The OVX1100 uses **high-level insulated** bushings with polymeric surface that gives superior BIL rating;
- The vacuum interrupter has **innovative design** allowing the unit to be modularized between 1, 2 or 3 poles for different applications. Normally 2 poles versions are used for railway electrification and 3 poles version is used for electrical transmission systems including renewable energy sectors;
- **Low life cycle cost** is guaranteed due to the combination of extremely high mechanical endurance and outstanding electrical parameters;
- The circuit breaker is **completely prewired** which makes it an easily remote-controlled solution;
- Both connection terminals can be supplied with **hole patterns** in accordance with ANSI or IEC standards.

OVX1102

OPERATIONAL MECHANISM

PANELS AND INTERNAL PARTS



MAIN PANEL (1) BUTTONS AND INDICATORS:

- Mechanical spring charge indicator (2) shows the status of the stored energy mechanism;
- Switch main mechanical position indicator (3):

  - Red - switch is closed;

  - green - switch is tripped;
- Button (4) is “door open indicator” to the SCADA system, “lamp On” function;
- Switch electrical operation and indicator panel (5);

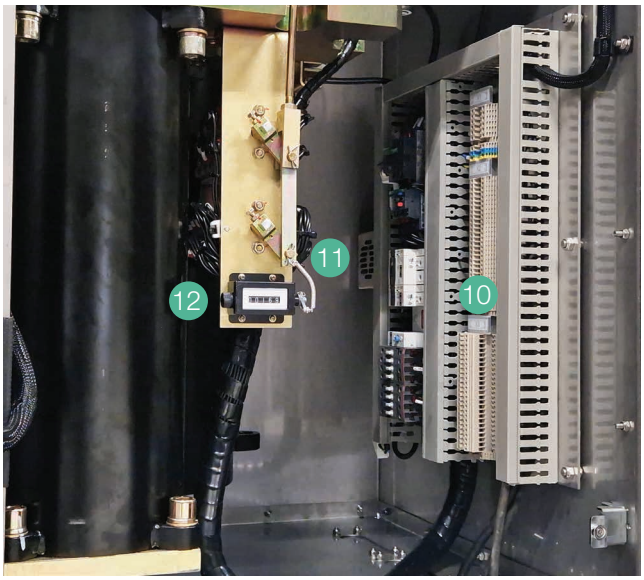
ELECTRICAL OPERATION AND INDICATOR PANEL (5):

- Rotary switch (5) is the Remote – Off – Local switch;
- Green button – indicator (6) operates the switch to Trip and indicates the switch position;
- Red button – indicator (7) operates the switch to Close and indicates the switch position;
- Operation buttons can be suppled with a safety delay timer from 10 - 120 second´s;
- Blue indicator lamp (8), indicates that the spring operation mechanism is fully charged and ready for a momentary Trip – Close - Trip operation;

Electrical operation and indicator panel

INTERNAL PARTS OF THE CABINET:

- The circuit breaker is completely prewired which makes it an easily remote-controlled solution;
- The electrical contact (10) has the prewired SCADA interface that provides information about the switch position and connects to multiple CAM switches and the heating element (11);
- Inside the spring operation mechanism is the mechanical operation counter (12) , control electronics with its automatic fuses;

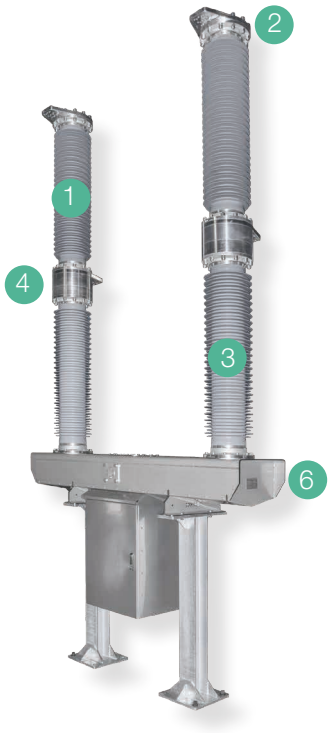


Internal parts of the cabinet

COMPONENTS

OVX1100 CONSISTS OF:

- Top solid insulated bushing (1) has upper connection terminal with low internal resistance;
- Thick metal connection terminal (2) that functions also as a heat sink for the vacuum interrupter bottle, that is installed inside the top bushing;
- The lower bushing (3) with the internal operating push-pull rod installed inside;
- The lower connection terminal (4) is a joint point for both bushings;
- The frame of the circuit breaker (5) contains the mandatory rating plate (6) with the electrical data in accordance with ANSI and IEC standards;



OVX1102 frame with rating plate

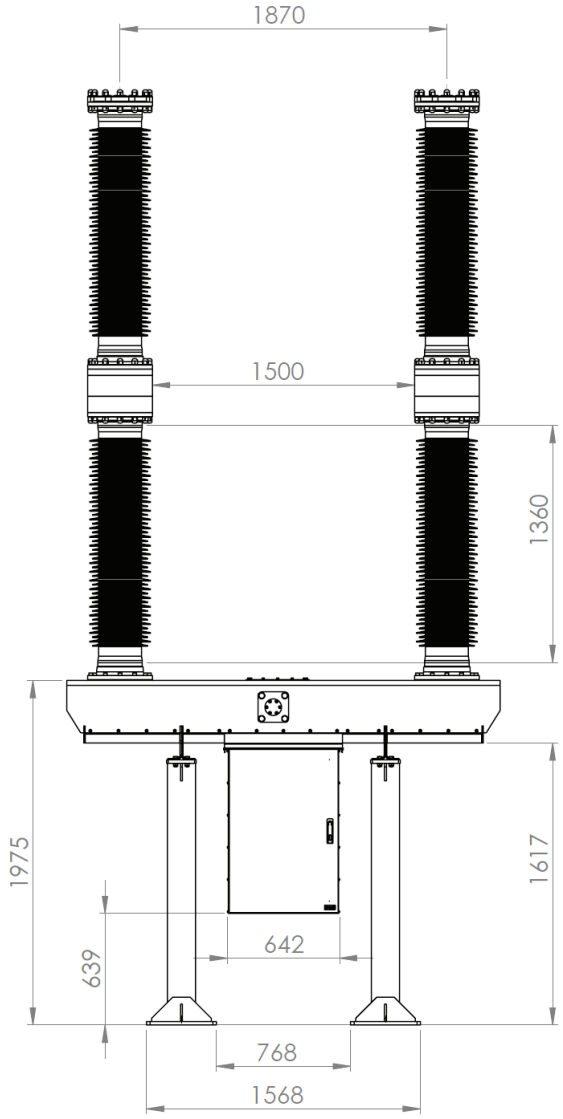
TECHNICAL DATA

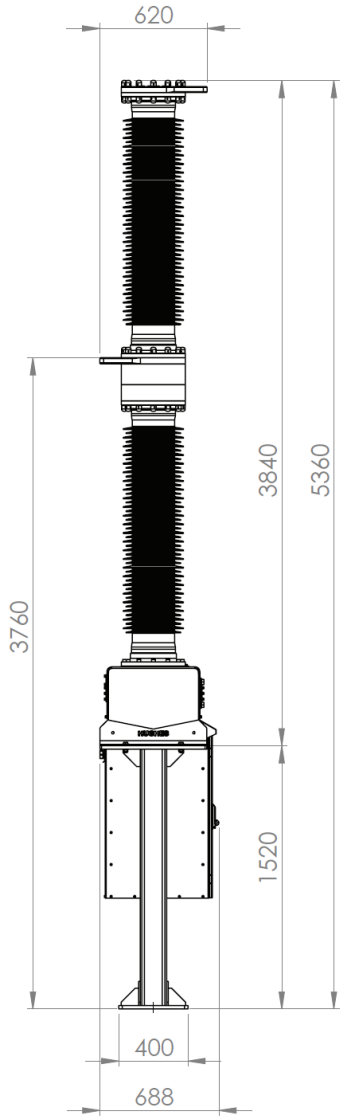
OVX1100

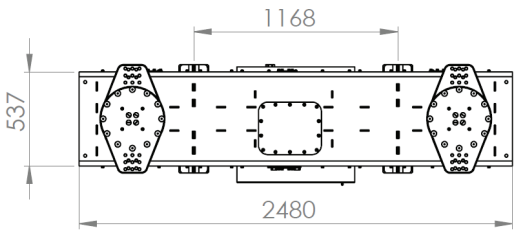
TECHNICAL PARAMETER	OVX1101/1102/1103
Type	outdoor vacuum circuit breaker
Number of phases	1/2/3
Operation mechanism	steel springs
Insulators	polymeric
Rated frequency, Hz	50/60
Maximum altitude, m	2000
Rated voltage, kV	126
Insulating medium of contacts	vacuum
Rated current conformed to the transformer capacity, A	3150
Rated power frequency withstand voltage (50 Hz/1 min) to earth/across open contact, kV	230/265
Lightning impulse withstand voltage (1.2/50 μs), earth/across open contacts, kV	550/630
Rated breaking current, kA	31.5
Rated making current, kA	85
Make-time, ms	≤100
Break-time, ms	≤50
Longitudinal horizontal static stress, N	≥1000
Horizontal static stress of cross section, N	≥700
Vertical static stress, N	≥700
Creep distance, mm	3970
Working sequence	C-0.3-OC-3min-OC
Coil operating voltage, V DC*	110 or 220
Motor operation voltage, V DC*	110 or 220
Rated power of motor, W	600
Number of closing coils	1 x
Power consumption of close coil, W	440
Number of trip coils	2 x
Power consumption of trip coils, W	400
Number of normally open blocking contacts	12 x
Number of normally closed blocking contacts	12 x
Number of switching operations	10,000
Mechanical buttons for closing/opening located in the operating mechanism	Yes
Remote/local control switch(electrical)	Yes
Close open buttons with LED indicators in cabinet (electrical)	Yes
Size (HxLxW), mm	5360 x 2480 x 690
Operation voltage	24 VDC, 110 VDC, 220 VAC
Drive voltage	24 VDC, 110 VDC, 220 VAC

DRAWINGS

OVX1102







UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	DEBUR AND BREAK SHARP EDGES	Date: 04/01/2023 Revision	HUGHES
		Title: 110 kV railway feeder station CB	
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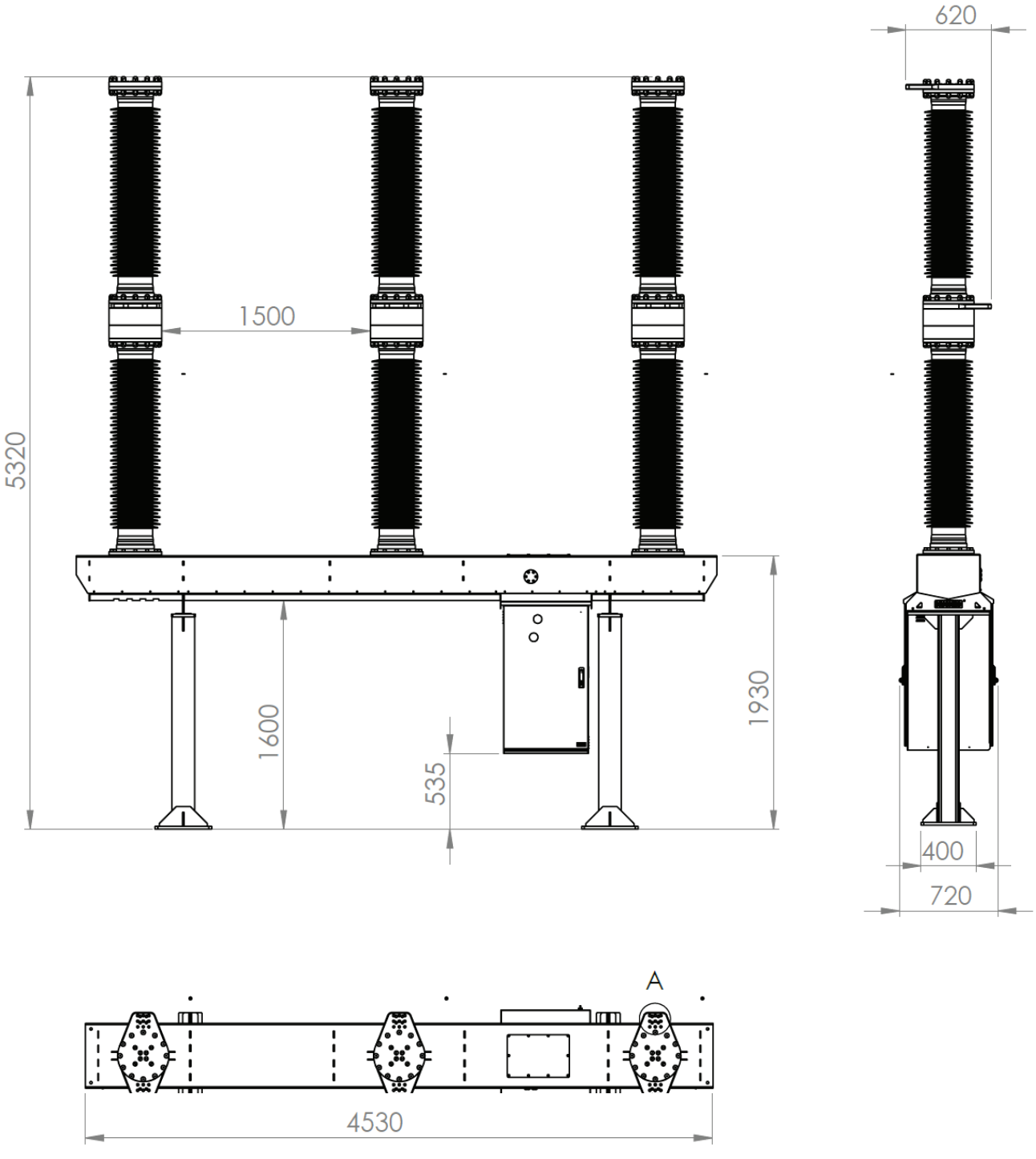
DO NOT SCALE DRAWING	WEIGHT:		SHEET 1 OF 1

OVX1103



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CHECKED			Title: OVX 1103 Installation drawing	
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APPR. PROD.	SCALE:1:40 MATERIAL:		DWG NO. OVX-1103-0000	
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