User manual

Xiria 630

IEC medium-voltage switchgear up to 24 kV - 630 A - 21 kA

Powering Business Worldwide

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Notation guide

This manual uses the following warning boxes to alert the user to possible dangers while operating or maintaining the equipment:

⚠ WARNING

(1) ONLY QUALIFIED ELECTRICAL PERSONNEL SHOULD BE PERMITTED TO WORK ON THE EQUIPMENT.

(2) DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON THE EQUIPMENT WHILE ENERGIZED. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING.

(3) ALWAYS DE-ENERGIZE PRIMARY AND SECONDARY CIRCUITS BEFORE REMOVING CIRCUIT BREAKER. FAILURE TO FOLLOW THESE STEPS FOR ALL PROCEDURES DESCRIBED IN THIS INSTRUCTION LEAFLET COULD RESULT IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.

⚠ CAUTION

SPECIFIC OPERATING PROCEDURES MUST BE DEVELOPED BY THE RESPONSIBLE PARTY, BECAUSE OF THE UNIQUE APPLICATION AND VAST VARIETY OF SYSTEM AND USER REQUIREMENTS. FAILURE TO DEVELOP SPECIFIC PROCEDURES COULD LEAD TO IMPROPER USE OR OTHER MORE SERIOUS CONSEQUENCES.

⚠ DANGER

HAZARDOUS VOLTAGE. WILL CAUSE SEVERE INJURY OR DEATH. DO NO OPEN SHUTTER IF THE EQUIPMENT IS ENERGIZED.

NOTE

IMPORTANT NOTE FOR CLARIFICATION.

REMARK

USEFUL ADVICE.

This manual applies to Xiria 630 release 4.0

Administrative data

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1. General

To perform switching operations, the user must be qualified by local guidelines, government laws, and company regulations for medium-voltage switchgear installations. It is mandatory to follow all legal and regulatory requirements to prevent accidents and ensure personal safety and environmental protection. Only authorized personnel from Eaton, or under their responsibility, should conduct any necessary repairs. Therefore, information concerning these repairs is not included in this manual.

1.1 Safety relating to medium-voltage installations

⚠ DANGER

WORKING ON MEDIUM-VOLTAGE INSTALLATIONS WITHOUT FOLLOWING PROCEDURES CAN BE LIFE-THREATENING.

Always ensure proper precautions are taken before working on a medium-voltage installation. All personnel engaged in operations with or near electrical installations must be instructed in the relevant safety requirements, rules and instructions for working with the installation. Personnel must wear well-fitting, appropriate clothing. The person in charge of the operations must comply with all requirements, regulations, and instructions. The Xiria 630 unit has been designed to ensure it exceeds relevant IEC standards. Furthermore, primary component enclosures are arc-resistant, and interlocks have been fitted to prevent dangerous operations.

The Xiria 630 unit has been designed to ensure that it exceeds applicable regulations. Furthermore, primary component enclosures are arc-resistant and interlocks have been fitted to prevent dangerous operations.

Operations on the isolated unit

Switching off before carrying out operations on an isolated system is subject to several essential requirements:

1. Switching off
2. Complete isolation
3. Protection from reactivation
4. Checking whether the unit is dead
5. Provide short-circuit proof protective earthing and a visible work-in-progress earth where needed
6. Protecting against active components nearby

Work area safety

Ensure access and escape routes are always accessible. Do not store flammable materials in or near access and escape routes or arc-affected areas.

Fire safety

Never extinguish a fire on the primary and secondary switchgear unit until it is completely inactive. Never use water to extinguish a fire. Prevent water from getting into the unit.

1.2 Tools, aids and protection equipment

Tools, aids, and protection equipment must meet the requirements of national and international standards where applicable.

Drawings and documents

Actual electrical installation documents must be available to understand the switchgear unit's schematic layout clearly.

Warning signs

Suitable warning signs must be placed on the switchgear unit during operations to indicate potential hazards. The warning signs must comply with the applicable standards.

Performing measurements

Suitable and safe measuring equipment must be used for measuring safely on the unit. These instruments must be checked before and after use and inspected periodically in line with applicable regulations.

1.3 Standards and guidelines

Table 1. Current product standards used

Standard	Title
IEC 62271-1	Common specifications for high-voltage switchgear and control gear standards
IEC 62271-100	High-voltage alternating-current Circuit breakers
IEC 62271-102	Alternating current disconnectors and earthing switches
IEC 62271-103	High-voltage switches
IEC 62271-105	High-voltage switch-fuse combinations
IEC 62271-200	A.C. metal-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV
IEC 62271-304	Additional requirements for enclosed switchgear and control gear from 1 kV to 72.5 kV to be used in severe climatic conditions
IEC 62271-213	Voltage detecting and indicating system
IEC 62271-215	Phase comparator used with VDIS
IEC 60529	Degrees of protection provided by enclosures
IEC 61869-1	Instrument transformers - Part 1: General requirements
IEC 61869-2	Instrument transformers - Part 2: Current transformers
IEC 61869-3	Instrument transformers - Part 3: Inductive voltage transformers
EN 50181	Plug-in type bushings above 1 kV up to 36 kV
ISO 9001	Quality
ISO 14001	Environmental management
ISO 45001	Health and safety management system

1.4 Product information

Nameplates are on the front or inside walls of the cable connection compartments and provide the following information (see figure 1-1 to figure 1-6):

- Switching device type
- Technical specifications
- Serial number and year of manufacture

Eaton Industries (Netherlands) BV Medium Voltage P.O. Box 23, 7550 AA Hengelo, The Netherlands			EATON Powering Business Worldwide
M.V. SWITCHGEAR LSC2			IEC 62271-200
System: XIRIA r4.0 Air-GIS			w.o. no.: 539660
Serial no: 843113551			Year of man.: 2024
U_r 24 kV	U_p 125 kV	U_d 50 kV	f_r 50 Hz
I_r 630 A	I_k 21 kA	I_p 52,5 kA	t_k 3 s
IAC AFLR	I_A 21 kA	t_A 1s	U_a 24 VDC
ref 6140731 G01 04			

Figure 1-1: Example system nameplate

GENERAL PURPOSE SWITCH				IEC 62271-103	
Type: SVR14AA-2406R4.0					
U_r	24 kV	U_p	125 kV	I_r	630 A
I_k	21 kA	t_k	3 s	I_{ma}	21 kA
I_{cc}	31,5 A	I_{ef1}	240 A	I_{ef2}	55 A
				U_a	24 VDC
Classification E3, C2					
For more information, refer to the main nameplate					

Figure 1-2: Example load-break switch nameplate

CIRCUIT BREAKER			IEC 62271-100
type: NVR62BA-2406 R4.0			I_r 630 A
U_r 24 kV	U_d 50 kV	U_p	125 kV
f_r 50 Hz	I_k 21 kA	t_k	3 s
I_{sc} 21 kA	k_{pp} 1,3 / 1,5	$DC_{component}$	35%
I_c 31,5 A		U_a	24 VDC
Classification M2, E2, C2			
Operating sequence 0-3 min-CO-3 min-CO			
For more information, refer to the main nameplate			

Figure 1-3: Example circuit breaker nameplate

CURRENT TRANSFORMER		IEC 61869-2
Type: *Brand type*		Make: *Brand*
75 / 5A 5 VA Cl. 0,2 ext. 120%		L1 - L2 - L3
/ A VA Cl. 0,2 ext. 120%		
/ A VA Cl. 0,2 ext. 120%		
I_p 50 kA	I_k 20 kA	t_k 3 s

Figure 1-4: Example rating plate for current transformer for metering

CURRENT TRANSFORMER		IEC 61869-2
Type: *Brand type*		Make: *Brand*
S1 – S2	28,8/0,075 A 0.1 VA Cl. 5P80	L1 – L2 – L3
C-D Test winding	28,8/0,288 A 10 A 3 s.	L1 – L2 – L3
For system information refer to main plate		

Figure 1-5: Example rating plate for current transformer for protection

VOLTAGE TRANSFORMER			IEC 61869-3	
Type: *Brand type*			Make: *Brand*	
A-N 10000/√3				
a1-n	100/√3	7,5 VA	Cl. 0,2	Sth. 400 VA
da-dn	100/3	30 VA	Cl. 3P	Sth. 100 VA
12-28-75 kV			1,9 U_r - 8 h	

Figure 1-6: Example voltage transformer rating plate

Technical data

General								
Rated voltage	kV	3.6	7.2	12	12	12	17.5	24
Impulse withstand voltage	kV	40	60	75	95	95	95	125
Power frequency withstand voltage	kV-1 m	10	20	28	38	42	38	50
Rated frequency	Hz	50				60		
Degree of protection in service	IP3XD							
Degree of protection with doors/covers open	IP2X							
Classification according to IEC 62271-200								
Loss of service continuity	LSC2							
Partition class	PM							
Internal arc classification (IAC)	AFL / AFLR							
Internal arc resistance with or without arc absorber chimney[1)]	kA-s	21-1				20-1		
Ambient air temperature range	˚C	-25 up to +40						
Maximum altitude without derating	m	1000						
Average watt losses per panel	W	100						
Sound emission during service	dB(A)	<70						

[1)] For the metering panel contact Eaton

Busbar system						
Rated normal current	A			630		
Rated short-time withstand current	kA-s		21-3		20-3	
Rated peak withstand current	kA			52,5		
Earthing circuit						
Rated short-time phase-to-earth withstand current	kA-s		21-3		20-3	
Rated peak phase-to-earth withstand current	kA			52,5		
Circuit breakers						
Rated continuous current	A			250, 630		
Rated breaking current	kA		21		20	
Rated short-circuit making current	kA			52.5		
Rated capacitive switching current class				C2		
Rated cable charging breaking current	A			31.5		
DC time constant	ms			45		
DC component	%			35		
Mechanical endurance class as circuit breaker				M1 / M2		
Mechanical endurance class as earth switch				M1		
Mechanical endurance class as disconnector				M1		
Electrical endurance class				E2		
Electrical endurance class as earth switch				E2		
Rated short-time withstand current	kA-s		21-3		20-3	
Minimum tripping time, K7 controller	ms			80		
Minimum tripping time, E1 controller	ms			35		
Rated operating sequence				0 - 3 min - CO - 3 min - CO*		
Closing time, motorized	s			+/- 15		
Closing time, motorized for synchronized remote closing	s			< 0,05		
Load-break switches						
Rated normal current	A			630		
Rated active load break current	A			630		
Rated short-circuit making current	kA			52,5		
Rated short-time withstand current	kA-s		21-3		20-3	
Rated cable charging breaking current	A			31,5		
Mechanical endurance class load-break switch				M1 / M2		
Mechanical endurance class as earth switch				M1		
Mechanical endurance class as disconnector				M1		
Electrical endurance class, IEC 62271-103				E3		
Electrical endurance class as earth switch, IEC 62271-102				E2		
Fused load-break switches						
Rated voltage	kV	3.6	7.2	12	17.5	24
Rated normal current	A	60	60	60	60	36
Fuses in accordance with IEC 60282-1	kV	10 / 12	10 / 12	12	20 / 24	24
Rated short-time and peak withstand current of cable earthing set in fuse holder	kA-s kÂ-s	3-1 7,5-1				
Remote control options						
Standard auxiliary voltage				24 V DC		
Auxiliary voltage with voltage converter				36-72 V DC, 100-353 V DC, or 100-240 V AC		
Auxiliary voltage tolerances				+10% / -15%		
Watt losses K7 controller				5 W continuous when idle		
Watt losses E1 controller				0,5 W continuous when idle		
Power supply for motor spring charge for closing				55 W 15 seconds		
Power supply for trip coil				40 W 100 msec.		

* Time used during testing 3 minutes. Operating time depends on specific usage.

Table 2. Explanation of nameplate information in accordance with the IEC 62271 series:

Variable	Description	Unit
IEC 62271-1	**Common specifications for alternating current switchgear and controlgear**	
System	Name of switchgear	
r.	Release	
ref	Instruction book reference	
IEC	Reference to specific IEC standard	
type	Type switching device	
no.	Serial number	
year of man.	Year of manufacturing	
w.o.no.	Works order number	
U_r	Rated voltage	kV
U_d	Rated short-duration power-frequency withstand voltage	kV
U_p	Rated lightning impulse withstand voltage	kV
U_s	Rated switching impulse withstand voltage	kV
f_r	Rated frequency	Hz
I_r	Rated continuous current	A
I_k	Rated short-time withstand current	kA
I_p	Rated peak withstand current	kA
t_k	Rated duration of short-circuit	s
U_a	Rated supply voltage of auxiliary circuits	V
IEC 62271-200 additions	**AC metal-enclosed switchgear and control gear, 1 - 52 kV**	
$U_{ct\,(AC)}$	Rated power-frequency cable test voltage	kV
$U_{ct\,(DC)}$	Rated DC cable test voltage	kV
$t_{ct\,(DC)}$	Rated duration for DC cable test	min
I_{ke}	Rated short-time phase-to-earth withstand current	kA
I_{pe}	Rated peak phase-to-earth withstand current	kA
t_{ke}	Rated duration of phase-to-earth short-circuit	s
LSC	Loss of service continuity category	
IAC	Internal arc classification	
A, B	IAC type of accessibility	
F, L, R	Internal arc classified sides, Front (F), Lateral (L), Rear (R)	
I_a, t_a	Arc fault current and duration	kA, s
I_{Ae}, t_{Ae}	Single-phase-to-earth arc fault current and duration	kA, s
IEC 62271-102 additions	**Alternating current disconnectors and earthing switches**	
M0, M1, M2	Mechanical endurance class	
E0, E1, E2	Short-circuit making capability class (electrical endurance class)	
IEC 62271-100 additions	**Alternating-current circuit breakers**	
I_{sc}	Rated short-circuit breaking current	kA
T	DC time constant of the rated short-circuit breaking current	ms
k_{pp}	Rated first pole-to-clear factor	
I_d	Rated out-of-phase breaking current	kA
I_c	Rated cable-charging breaking current	A
Rated operating sequence	O - t – CO - t - CO	

IEC 62271-103 additions	**Alternating current switches, 1 - 52 kV**	
M1, M2	Mechanical endurance class	
E1, E2, E3	Electrical endurance class	
C1, C2	Capacitive switching class	
I_{ma}	Rated short-circuit making current	kA
I_{load}	Rated mainly active load-breaking current	A
I_{loop}	Rated closed-loop breaking current	A
I_{cc}	Rated cable-charging breaking current	A
I_{ef1}	Rated earth-fault breaking current	A
I_{ef2}	Rated cable- and line-charging breaking current under earth-fault conditions	A
IEC 62271-105 additions	**Alternating current switch-fuse combinations, 1 – 52 kV**	
I_r	See chapter 7 for applicable fuses	
IEC 61869-2	**Additional requirements for current transformers**	
IEC 61869-3	**Additional requirements for inductive voltage transformers**	
$U_{r.t}$	Rated voltage factor and corresponding rated time	Vs
Insulation level	Rated insulation level	kV
VA	Rated output	VA
CL	Accuracy class	

2. Xiria 630 system description

2.1 Xiria 630 system description

The Xiria 630 switchgear panels are available for applications up to 630 A and 24 kV.

The system is fully metal-enclosed (PM) and highly compact. Maximum safety is ensured by using high-quality internal insulation.

All live primary components and the drive mechanisms are housed in a sealed for life tank with natural air (Air-GIS). This closed tank concept prevents dust, moisture and other environmental factors from affecting the system's proper operation.

The enclosure is arc-resistant and thus provides optimum safety conditions for the operator. The cable compartments are (as an option) available in arc-proof configuration.

Different panel versions are available, for example:

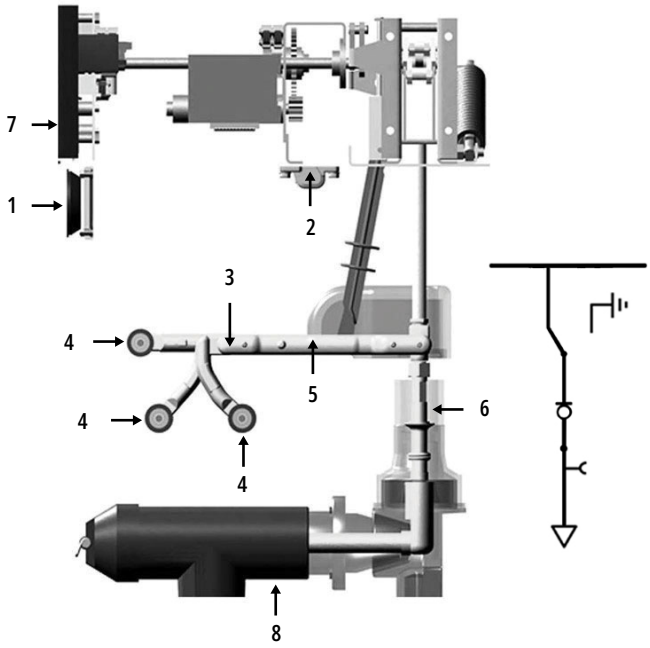
1. Load-break switch (LBS) for ring cable connections.
2. Fused load-break switch (FLBS) with high voltage fuses to protect main transformers and cable connections.
3. Circuit breaker to protect the main transformers and cable connections.
4. Metering panels for cast-resin insulated block-type current and voltage transformers.

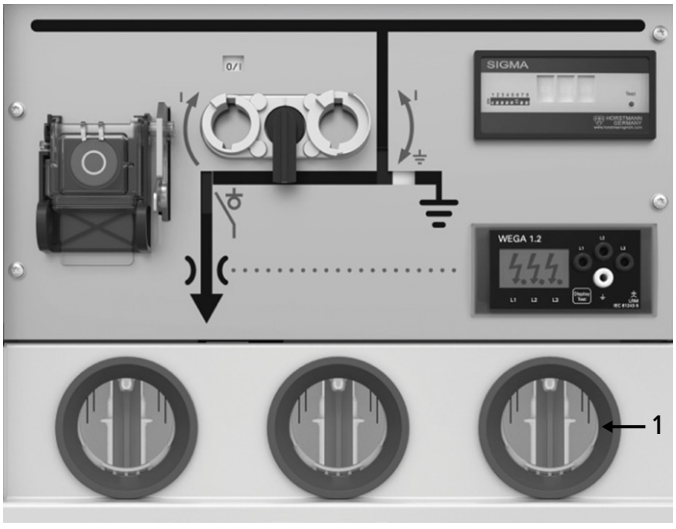
The panel versions can be supplied in any combination and sequence.

The Xiria 630 panels have in addition to reliable position indicators inspection windows (1) on the control panel providing direct visible position indication; see figure 2-1. The separation between cable and busbar system (2 position change-over switch) and the position of the vacuum interrupter (VI) (Open or Closed) is directly visible through the inspection windows. This also provides safe, visible, and integrated earthing in combination with the short-circuit proof load-break switch or circuit breaker.

Cables are connected to cable connection cones suitable for use with plug connectors.

2.2 Cross-section, single-line diagram and list of functions





The cable connected to the busbar

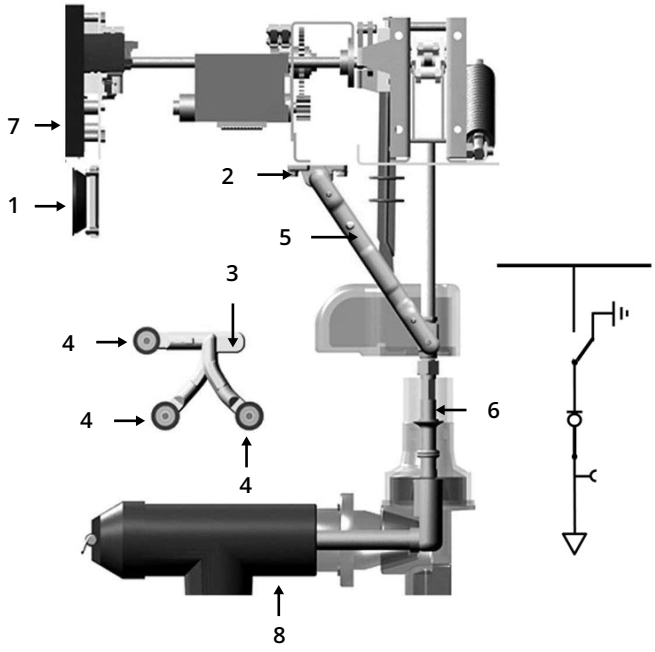
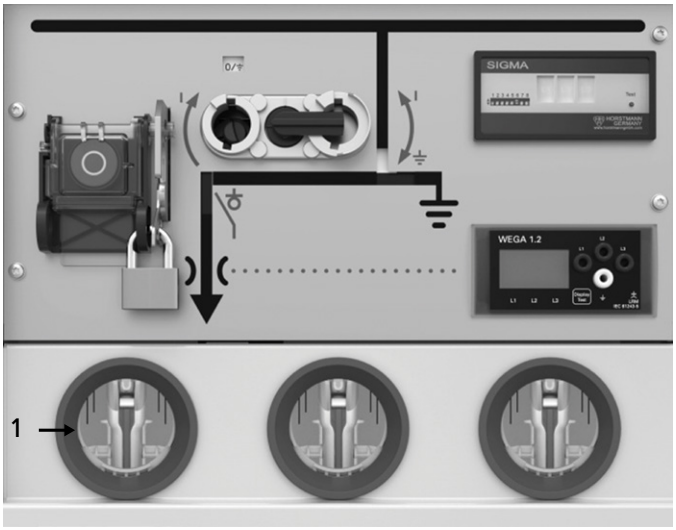


Figure 2-1: Panel cross-sections and single-line diagrams



The cable connected to the earth (padlocked)

1. Inspection window
2. Earth contact change-over switch
3. Busbar contact change-over switch
4. Main busbars
5. Change-over switch
6. Vacuum interrupter
7. Control panel
8. Cable connection

The position of the vacuum interrupter and change-over switch can be viewed via the inspection windows (1).

Functions, load-break switch panel

- Connect cable to the busbar
- Disconnect cable
- Connect cable to earth
- Test cable

Functions, fused load-break switch panel

- Connect cable to the busbar
- Disconnect cable
- Connect cable to earth with take-over earth kit
- Protect outgoing feeder from overcurrent with fuses
- Test cable

Functions, circuit breaker panel

- Connect the cable to the busbar
- Disconnect cable
- Connect cable to earth
- Protect outgoing feeder from overcurrent with relay
- Test cable

2.3 General technical specifications

Xiria 630 dimensions and weight		Width (mm)	Height (mm)	Depth (mm)	Weight (kg)	Refer to the floor plan in Appendix 1
1 panel	Extendable type	500	1325	600	145	Appendix 1
	Extendable type with 250 mm frame	500	1575	600	165	"
2 panels	Block type	760	1305	600	280	"
	Block type with 250 mm frame	760	1555	600	340	"
	Extendable block type	850	1325	600	285	"
	Extendable block type with 250 mm frame	850	1575	600	345	"
3 panels	Block type	1110	1305	600	385	"
	Block type with 250 mm frame	1110	1555	600	475	"
	Extendable block type	1200	1325	600	390	"
	Extendable block type with 250 mm frame	1200	1575	600	480	"
4 panels	Block type	1460	1305	600	490	"
	Block type with 250 mm frame	1460	1555	600	610	"
	Extendable block type	1550	1325	600	495	"
	Extendable block type with 250 mm frame	1550	1575	600	615	"
5 panels	Block type	1810	1305	600	595	"
	Block type with 250 mm frame	1810	1555	600	745	"
	Extendable block type	1900	1325	600	600	"
	Extendable block type with 250 mm frame	1900	1575	600	750	"
Metering panel	Including VTs and CTs	850	1325	760	400	"
	Including VTs and CTs with 250 mm frame	850	1575	760	460	"
	Excluding VTs and CTs	850	1325	760	250	"
	Excluding VTs and CTs with 250 mm frame	850	1575	760	310	"

Xiria 630 dimensions and weight including packaging		Width (mm)	Height (mm)	Depth (mm)	Weight (kg)	Refer to the floor plan in Appendix 1
1 panel	Extendable type	500	1600	800	175	N/A
	Extendable type with 250 mm frame	500	1850	800	195	N/A
2 panels	Block type	1200	1600	800	310	N/A
	Block type with 250 mm frame	1200	1850	800	370	N/A
	Extendable block type	1200	1600	800	315	N/A
	Extendable block type with 250 mm frame	1200	1850	800	375	N/A
3 panels	Block type	1200	1600	800	415	N/A
	Block type with 250 mm frame	1200	1850	800	505	N/A
	Extendable block type	1200	1600	800	420	N/A
	Extendable block type with 250 mm frame	1200	1850	800	510	N/A
4 panels	Block type	1555	1600	800	530	N/A
	Block type with 250 mm frame	1555	1850	800	650	N/A
	Extendable block type	1555	1600	800	535	N/A
	Extendable block type with 250 mm frame	1555	1850	800	655	N/A
5 panels	Block type	1860	1600	800	645	N/A
	Block type with 250 mm frame	1860	1850	800	795	N/A
	Extendable block type	2270	1600	800	640	N/A
	Extendable block type with 250 mm frame	2270	1850	800	790	N/A
Metering panel	Including VTs and CTs	1200	1600	800	430	N/A
	Including VTs and CTs with 250 mm frame	1200	1850	800	490	N/A
	Excluding VTs and CTs	1200	1600	800	280	N/A
	Excluding VTs and CTs with 250 mm frame	1200	1850	800	340	N/A

Additional dimensions and weight for options	Additional Width (mm)	Additional Height (mm)	Additional Depth (mm)	Additional weight (kg)	Refer to the floor plan in Appendix 1
Top unit	0	400 / 600[1)]	0	85	
Transformers for metering	0	0	0	75	N/A
Chimney with arc absorber (16 kA), 2 panel configuration	0	0	326	150	
Chimney with arc absorber (16 kA), 3 to 5 panel configuration	0	0	177	150	
Chimney with arc absorber (16 kA), single panel configuration	0	0	185	150	
Chimney with arc absorber (21 kA)	0	425	250	150	
Fused load-break switch panel	0	0	138	50	
Cable compartment door +20 mm deep	0	0	20	1	
Cable compartment door +100 mm deep	0	0	100	5	
Deepened instrument compartment (belly)	0	0	50 / 115	1	

[1)] 600 mm height only available for single extendable panels of 500 mm width

Facilities	
Lifting and transport facilities	The unit is fitted with special lifting fixtures. The unit may only be lifted by using these fixtures; see section 3.2.1
Facilities to secure the Xiria 630 to the floor	The base frame of the unit has openings to secure the unit to the floor, see section 3.2.7

3. Unit installation

3.1 Environmental requirements

3.1.1 Transport, assembly and storage conditions

If the temperature and humidity conditions specified in the order cannot be guaranteed during the unit's transport, assembly and storage, taking preventive measures in consultation with Eaton is mandatory.

Be careful not to damage the unit inside the packaging because it is only intended to prevent minor damage.

During shipment, all switches must be switched to the **Earthed position** (switch closed and change-over switch in earth position).

Take special preventive measures to avoid moisture absorption in the packaging due to rain, snow, condensation, vibrations during transport, or damage to the pressure relief valves.

If the unit is shipped by air, it should be carried in a cargo bay where the air pressure is maintained at 1 atmosphere ±10% throughout the flight.

3.1.2 Room requirements

Item	Condition
Requirements for the floor and wall of the building	• Minimum permissible floor loading of 500 kg/m². • The floor must be leveled and have a smooth finish to ensure that the carrier frame of the unit is evenly supported. • Provide cable recesses according to the floor plan (see Appendix 1). • The cable recesses in the floor can be sealed to prevent rising damp. Polyurethane with a compact cellular structure can be used for this.
Requirements for clearances around the Xiria 630:	• At least 60 mm between the top and ceiling. For a Xiria 630 without LV top unit, this is equivalent to a minimum height of 1365 mm for the operating area. • Left and right-hand side minimal 50 mm. • Sufficient space should be available at the front and along the entire unit length for operational purposes and to work safely with the normal test equipment. • When the IAC classification is applied according to IEC62271-200, an arc channel or chimney shall be considered; see section 3.2.4.
Requirements for escape routes	• When the unit is installed in an accessible area, escape routes shall be provided according to the local requirements
Ambient conditions (IEC 62271-1)	-25 °C / +40 °C indoor.
Cable support	Cables must be sufficiently supported to avoid too high forces on the Xiria 630 cable clamps and cable connections during installation; see section 3.3.2.

3.1.3 Floor flatness:

The flatness of the floor should comply with NEN 2747 class 1 or equivalent:

Distance between measurement points:	Maximum allowed deviation:
500 mm	1,5 mm
1000 mm	2,0 mm
2000 mm	3,0 mm
4000 mm	6,0 mm

In case of floor unevenness this should be compensated by using shims under the Xiria 630 switchgear with an appropriate thickness to avoid bending of the switchgear.

3.2 Installation

The unit supplied is packaged on a wooden pallet. At the top of each unit is a provision for lifting (see figure 3-1). The unit is secured to the pallet with bolts. Leave the unit on the pallet until it reaches the assembly location.

For safe handling of the unit, use standard lifting equipment.

The installation of the unit includes the following actions:

1. Lifting
2. Transportation
3. Pre-installation preparation
4. Unit installation
5. Securing unit to the floor

3.2.1 Lifting

⚠ WARNING

THE PERSON IN CHARGE OF LIFTING THE XIRIA 630 UNIT MUST HOLD A CERTIFICATE FROM THE RELEVANT AUTHORITIES CONFIRMING THEIR AUTHORIZATION TO PERFORM THESE OPERATIONS.

After installation, the lifting equipment (1) must remain.

3.2.2 Transportation

The unit arrives packaged on a wooden pallet, which means moving on a pallet truck is easy and safe. Carry the unit on the pallet right up to the assembly location.

Figure 3-1: Lifting equipment

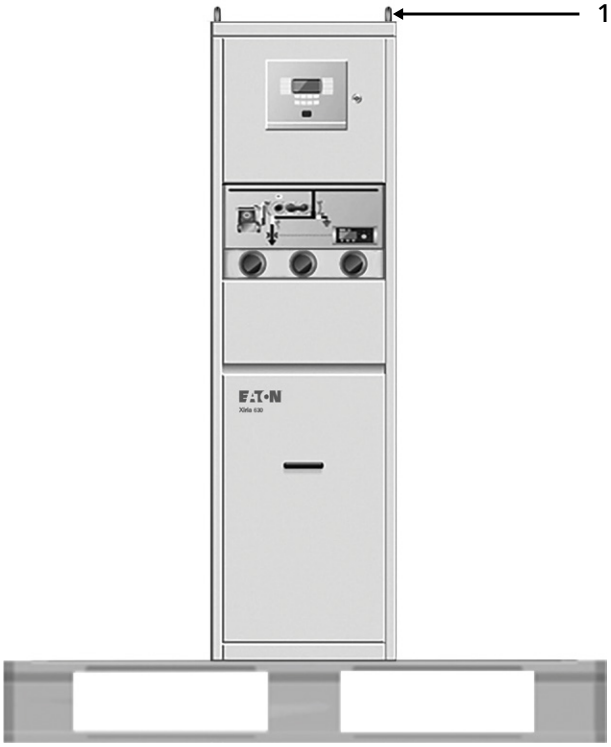


Figure 3-2: Single panel with secondary top unit

Figure 3-3: Metering panel

3.2.3 Pre-installation preparation

The unit's location is required to meet the conditions stated in section 3.1.2.

1. Remove the packaging and check the contents.
2. Remove the doors of the left- and right-hand panels; see figure 3-4.

REMARK

THE DOOR CAN ONLY BE REMOVED IF THE PANEL IS IN THE 'EARTHED' POSITION (NON-PADLOCKED).

See the procedure in section 4.2.2.

3. Remove the four fixing bolts (1) (two on either side), see figure 3-5, and then remove the pallet.
4. When positioning the unit, check that the:
   - The cable openings in the floor are in the correct position;
   - The floor is clean and leveled;
   - The unit is not damaged.
5. If necessary, slide the unit across the floor to its final location. Apply a lever to the base frame only. Take care not to damage the unit.

Figure 3-4: Opening the cable door for access

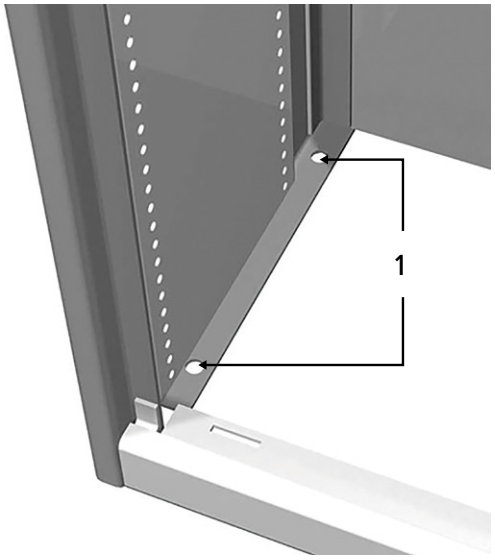


Figure 3-5: Location of fixing bolts

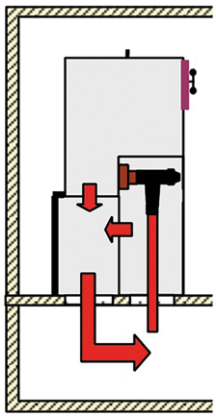
3.2.4 Setting up the unit

The Xiria 630 system has been designed according to the recommendations in IEC 62271-200, which theoretically prevents internal faults from occurring. Moreover, when set up correctly, a Xiria 630 unit will comply with this IEC standard for setting up with an arc channel. The pressure relief area of Xiria 630 switchgear is located at the rear and/or bottom of the unit, and must be connected to the arc channel of the building venting into a cable cellar, adjacent room or to the outside or connected to an arc absorber chimney.

In case of arc venting to the bottom only the pressure relief area at the rear must be sealed using a cover plate. In case of arc venting to the rear the pressure relief area at the bottom must be sealed using a cover plate.

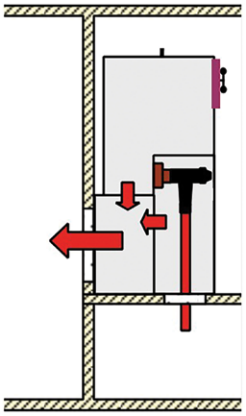
3.2.5 Arc venting options

Venting to bottom only



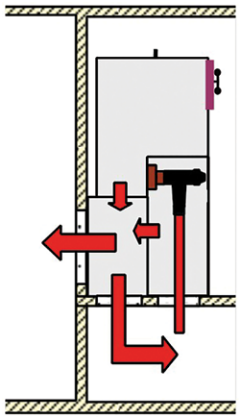
- No rear arc channel mounted
- Rear side provided with cover plate
- Arc channel defined by cable cellar
- Maximum U_r = 24 kV, I_A - t_A = 21 kA - 1s

Venting to rear only



- No arc channel via cable cellar mounted
- Rear arc channel directed to adjacent room
- Maximum U_r = 24 kV, I_A - t_A = 21 kA - 1s

Venting to bottom and rear



- Rear arc channel available to adjacent room
- Arc channel via cable cellar
- Maximum U_r = 24 kV, I_A - t_A = 21 kA - 1s

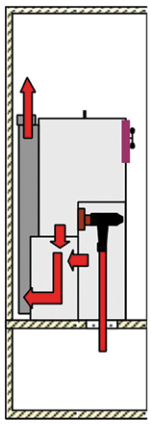
For further information, see also the floor plan drawings in Appendix 1.

The following rules apply to a set-up with an arc channel:

- The channel is to be connected to a location where no danger can occur to persons.
- The bore of the channel is to be a minimum of 0.15 m², and the channel itself is required to be capable of withstanding overpressure of at least 0.5 bar.
- The area the arc channel is connected to must also be capable of withstanding the overpressure created in case of an internal arc.

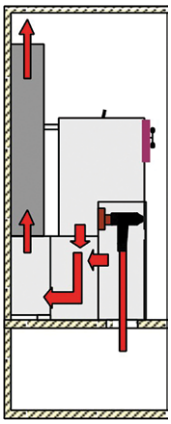
3.2.6 Arc venting options with chimney

Venting with chimney to top, 16 kA – 1s



- No arc channel via cable cellar or adjacent room available
- Arc exhaust via chimney
- Maximum U_r = 24 kV, I_A - t_A = 16 kA - 1s

Venting with chimney to top, 21 kA – 1s



- No arc channel via cable cellar or adjacent room available
- Arc exhaust via chimney
- Maximum U_r = 24 kV, I_A - t_A = 21 kA - 1s

3.2.7 Securing to the floor

- The Xiria 630 unit must be fixed to the floor at four locations.
- The drilling pattern for fixing and cable holes is included in Appendix 1, 'Floor plans'.
- Use washers under bolt heads/nuts.

3.3 Cable connections

3.3.1 Cable types

Single-core cables can be connected to the unit with A-type and C-type cones. Three-core cables can be connected if the dimensions of the associated splitting point fit into the cable compartment.

For determination of space for the cable connection plugs, please contact FrontendAEsupport@eaton.com.

Table 3. Short-circuit capacity in relation to cable cones used

	Cone type EN 50181	I [A]	Maximum short-circuit current	Plug type	Cable type
Load-break switch	C-type	630	3.6 – 24 kV, 21 kA-3s	T-plug (bolted M16)	Cu/Al XLPE Cu/Al XLPE
Fused load-break switch	C-type	Determined by applied fuse	3.6 – 24 kV determined by applied fuse	T-plug (bolted M16)	Cu/Al XLPE Cu/Al XLPE
Circuit breaker	A-type	250	3.6 – 24 kV, 20 kA - 0,4 s; 21 kA - 0,35 s	L - plug	Cu/Al XLPE Cu/Al XLPE
Circuit breaker	C-type	630	3.6 - 24 kV, 21 kA - 3 s	T-plug (bolted M16)	Cu/Al XLPE Cu/Al XLPE

3.3.2 Cable assembly instructions

Strain relief

Strain relief prevents mechanical force transmission to other unit parts via the cable connection point.

Each panel has three single-phase plastic cable clamps (figure 3-6) or one three-phase plastic cable clamp.

Assembly (standard)

⚠ WARNING

EACH CABLE CONE TYPE C IS PROVIDED WITH A "TEMPORARILY" MOUNTED ALLEN KEY TRANSPORT BOLT M16 X 30 AT DELIVERY.

THESE "PROTECTIVE' BOLTS MUST BE REMOVED BEFORE CONNECTING THE CABLE.

- Front plinths can (if needed) be removed for each panel when fitting the cables.
- Connect the cables to ensure no mechanical forces are created at the cable connection point.
- The maximum torque for a C-type cone is 70 Nm. To avoid mechanical load on the cable cone, the cable connector must be aligned with the cone by adjusting the length of the cable.

⚠ WARNING

MAXIMUM FORCE ON THE CABLE CONE CAUSED BY THE CABLE SHOULD NOT EXCEED 300 N ACCORDING IEC 60137 (2017).

The cable clamp blocks on the cable support must absorb the weight of the cable and tensile forces originating from the cable. When needed, the cable has to be supported in the cable cellar with a construction frame to minimize the forces on the cable cones,

- Secure all cables using cable clamp blocks. This enables the short-circuit forces to be absorbed in the event of any short-circuit occurring.
- Seal all cable recesses on the floor properly to protect the system from moisture and dust. Use, for instance, polyurethane with a compact cellular structure. This will protect the cable connection compartment from rising damp and vermin.
- The cable clamp blocks are mounted on an adjustable frame in the cable connection compartment. The bolts through the plastic cable clamps must be tightened with a torque of 20 Nm.

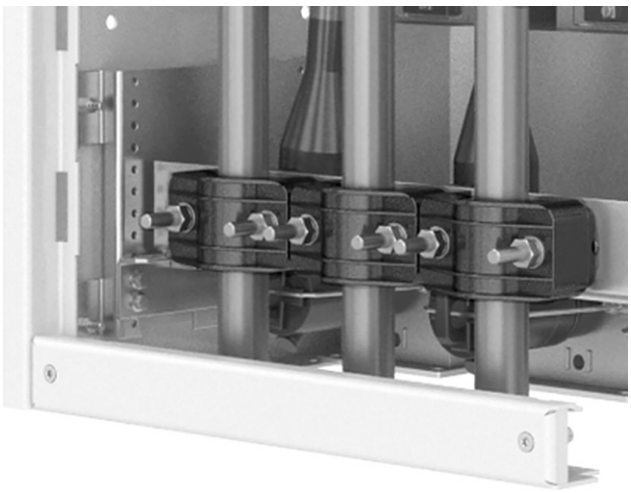


Figure 3-6: Cables are secured with plastic cable clamps

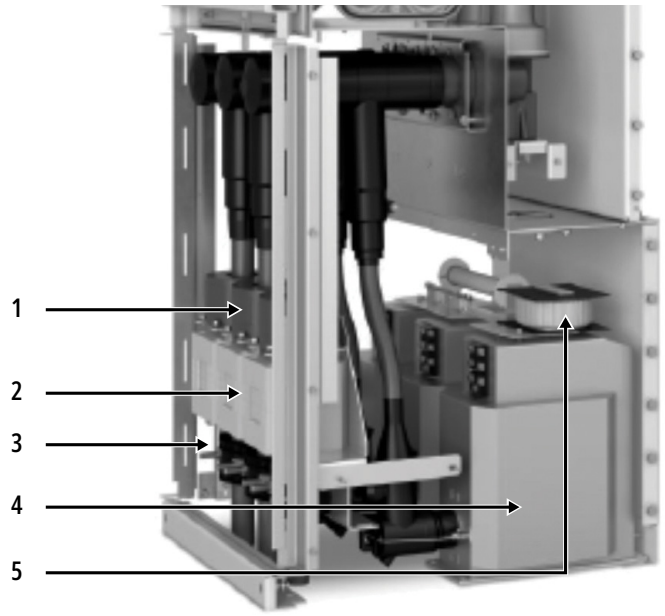


Figure 3-7: Overview cable compartment

1. Current transformers for protection
2. Current transformers for metering
3. Cable clamps
4. Cable side voltage transformers
5. Choke coil and resistor (anti ferro-resonance filter)

Mounting instructions if current transformers are foreseen around the primary cable

The same steps must be followed as described at the standard assembly. The current transformers in the cable compartment can be removed and remounted for easy connection of the primary cables. For this, the following steps should be taken:

1. Open the cable compartment according to the standard instructions.
2. Remove the current transformers for protection (A) by removing the two bolts on the front (B). See figure 3-8. The secondary wiring does not need to be disconnected.
3. Behind these current transformers, a mounting plate fixed with bolts (C) becomes visible. Remove these bolts and remove the mounting plate.
4. The current transformers for metering (D) can now be lifted and removed. See figure 3-8. Remove the ty-rap from the secondary wiring. The secondary wiring does not need to be disconnected.
5. Lead the primary cables through the current transformers and remount the current transformers as described in the steps above.

REMARK

AFTER REMOUNTING THE CURRENT TRANSFORMERS, THE EARTH SCREEN CONNECTIONS OF THE PRIMARY CABLES MUST BE CONNECTED TO THE EARTH VIA THE PRE-MOUNTED EARTH WIRES (F). SEE FIGURE 3-8. IN THIS CASE, ANY EARTH CURRENT THROUGH THESE CONNECTIONS WILL NOT INFLUENCE THE METERING RESULTS.

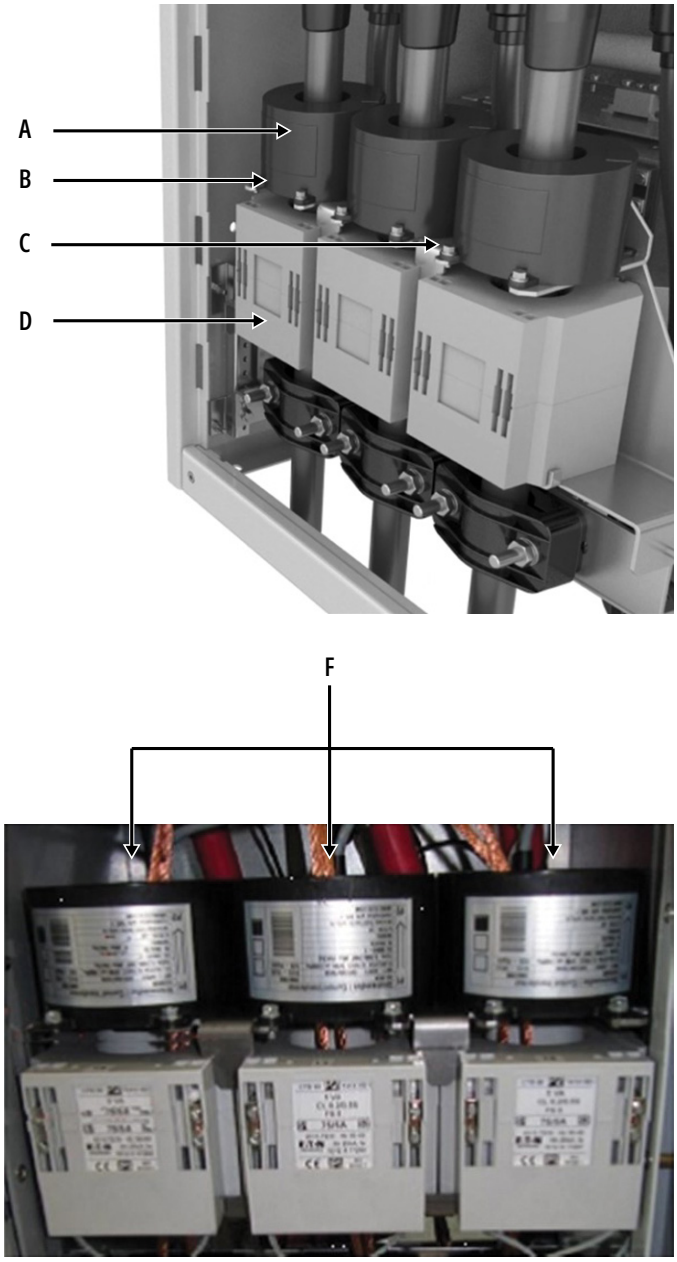


Figure 3-8: Current transformers with pre-mounted earth wires

Connection of the primary cables when cable side voltage transformers are installed

The primary cables and the voltage transformers located in the back are connected with connectors. The connectors and cables for the voltage transformers are pretested and preassembled on the cable cones of the circuit breaker. Parallel to these preassembled connectors the connectors for the primary main cables can be mounted at site.

Eaton offers different options for the connection of voltage transformers

1. VT is connected directly to the cable cone, factory assembled; see figure 3-9.
2. VT is connected on top of the customer cable connection, factory prepared for on site assembly

3.3.3 Replacing the cable connection cone

The Eaton service department can replace cable connection cones on site, a different cone type can also be fitted in the circuit breaker panel. There are A- and C-type cones available according to EN 50181. The C-type cable connection cone is available in a short and long version. Contact Eaton for further details.

3.3.4 Applying test current and test voltage to the cable

If cable-side voltage transformers are directly installed on the cable cone (option 1), ensure the primary cables are disconnected from the pre-assembled connectors for the cable-side voltage transformers.

The unit is suitable as standard for the following test voltages for a maximum of 10 minutes per phase:

System voltage	Test voltage (DC or AC-peak value)
24 kV	60 kV
17.5 kV	45 kV
12 kV	30 kV
7.2 kV	30 kV

⚠ WARNING

TEST ACCESSORIES ARE NEEDED TO APPLY THE TEST CURRENT AND TEST VOLTAGE TO THE CONNECTED CABLES.

1. Earth the unit cables following the procedure in section 4.2.2.
2. Install the specified test accessories according to the instructions of the accessory suppliers.
3. The switch shall only be opened once the responsible person is sure that the earthed connection can be safely disconnected by opening the switch.
4. The unit must be earthed again by section 4.2.2 before the test accessories are removed upon completion.

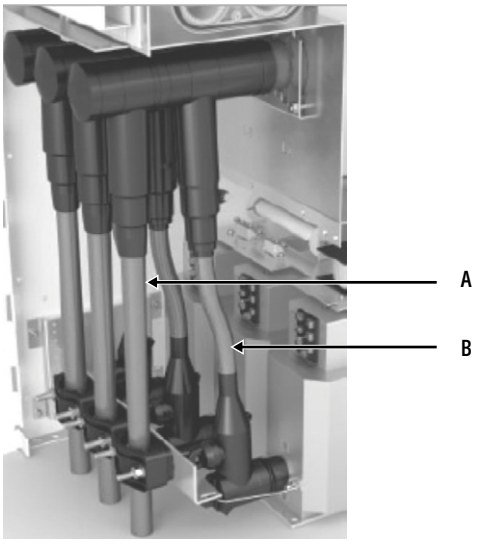


Figure 3-9: Cable connection cone

A. Primary cable
B. Pre-assembled connectors for voltage transformers

5. Safety precautions:

- The unit must be disconnected from any possible regular supply source besides the test device. The main busbar of the unit and the rest of the switchgear can remain in service.
- Under no circumstances the unit must be powered up again by any source other than the external supply used for voltage testing.
- Safety measures must be applied to all personnel present during voltage testing.

Connection of station earthing

The Xiria 630 unit can be connected either at the left or at the right side to the station earthing. An internal earth bar (2) is located at the rear of every cable connection compartment. This earth bar must connect the earth screens of the power cables and the system earth. See figure 3-10.

The earth bar with an extension to the outside (1) (optionally available) has 10 mm holes at both ends outside the unit to connect the system earth.

Three M8 nuts are mounted on the earth bar in each cable compartment to connect the earth screens of the power cables.

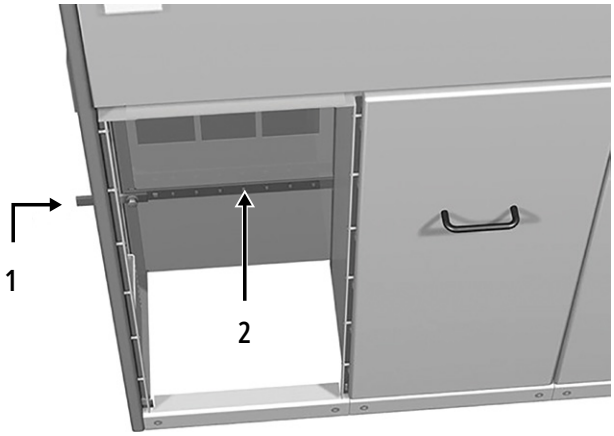


Figure 3-10: Earth bar position

3.4 Access to the secondary compartment

The front cover must be removed to access the front side secondary compartment. The Xiria 630 program comprises a standard front plate and a deepened version.

Procedure (Standard version)

1. Remove the two screws at the bottom of the front cover, see figure 3-11.
2. Move the bottom of the front plate forward, lower it and remove it; see figure 3-12.
3. The frontside secondary compartment is now accessible.

Figure 3-11: Position of front cover fixing screws

Figure 3-12: Removing the front cover

Procedure (Hinged and deepened front cover versions)

1. Unscrew the two thumb screws (A) at the front. See figure 3-13.
2. Tilt the top of the front plate forward.
3. The secondary compartment is now accessible.

Wiring for external metering equipment can be connected through the holes in both side posts (B). The rectangular metal cover plates (B) must be removed to get access. The terminals are located on the right side of secondary compartment (C). See figure 3-14.

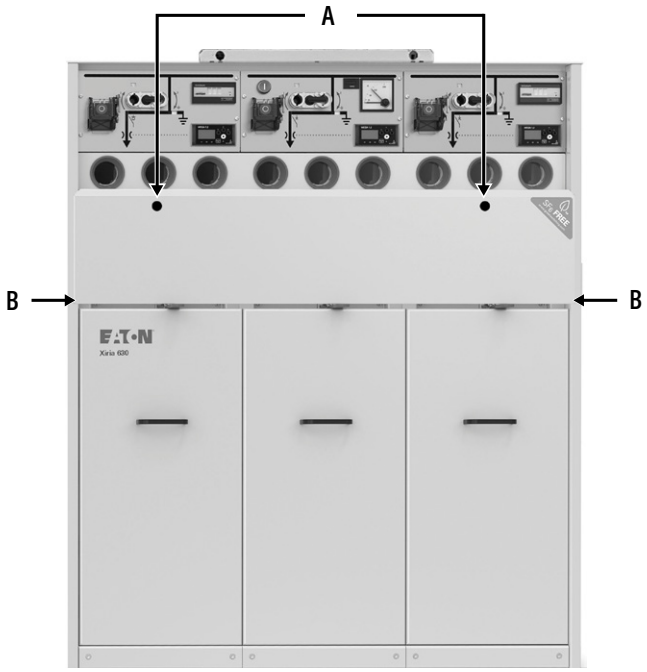


Figure 3-13: Hinged and deepened secondary front compartment

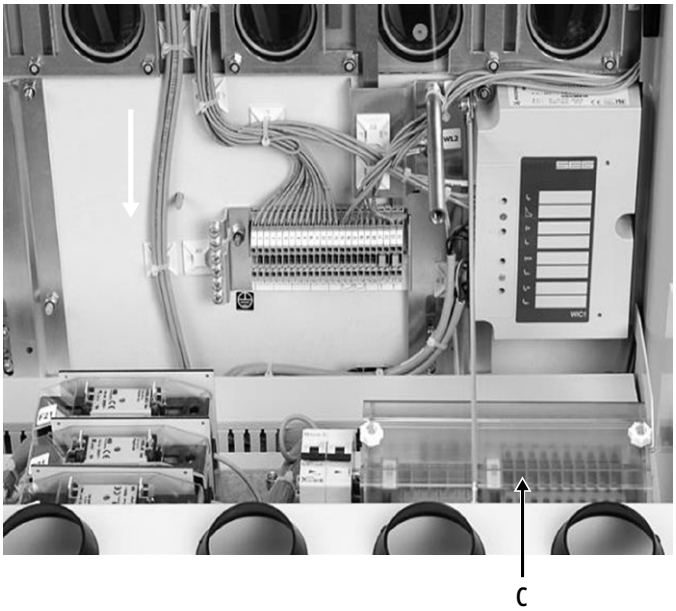


Figure 3-14: Terminals for equipment

Procedure (Xiria 630 top unit)

1. Open the top unit with a key.
2. The top unit compartment is now accessible; see figure 3-15.

Figure 3-15: Top unit

3. For certain secondary equipment, an additional handle is in place on the door to block full door opening. Pull the handle outward to activate the hinge in the door to enable full door opening; see figure 3-16.

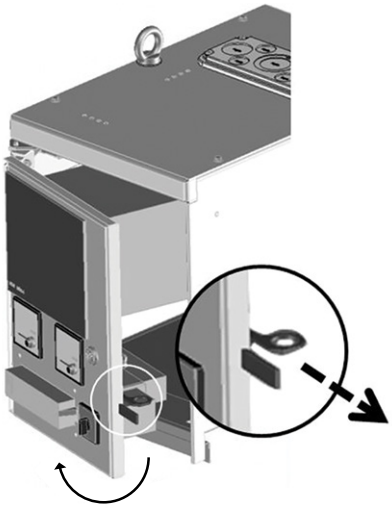


Figure 3-16: Blocking handle

Closing the top unit with the additional hinge requires a press force for closing the hinge, as indicated in figure 3-17.

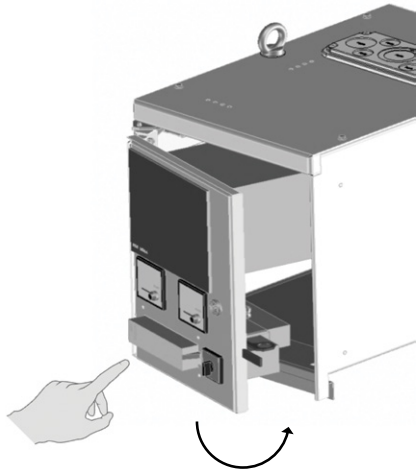


Figure 3-17: Closing top unit

Procedure (Xiria 630 metering panel)

1. Open the integrated low voltage compartment by turning the knobs.
2. The secondary compartment is now accessible; see figure 3-18.

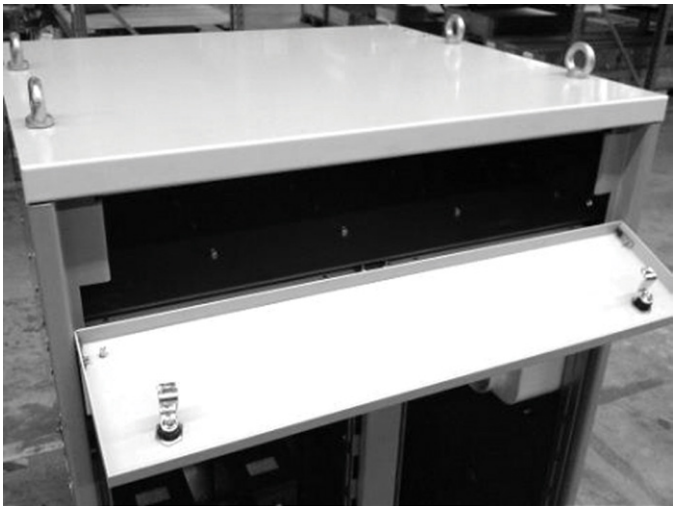


Figure 3-18: Open secondary compartment from a Xiria 630 metering panel

3.5 Coupling Xiria 630 panels

Within the Xiria 630, various panel types can be coupled. The following couplings can be established:

1. Busbars to busbars between Xiria 630 extendable type panels.
2. Busbars to busbars between Xiria 630 extendable type panels with metering panel.
3. Cable cones Xiria 630 (block or extendable type) via a coupling cable with the busbars of the metering panel.

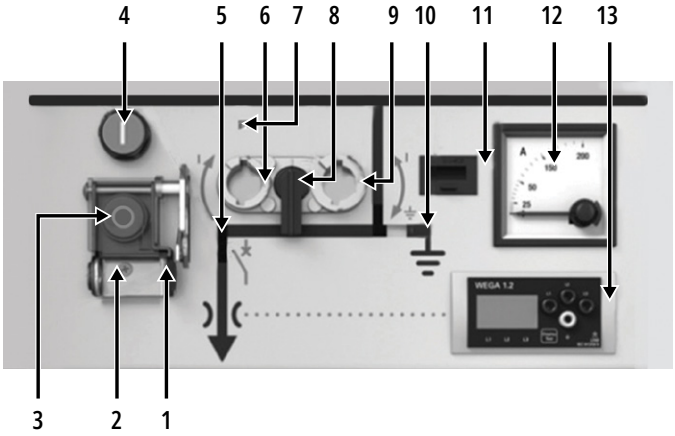
For step-by-step instructions, please request the Manual coupling instructions extendable Xiria 630 (manual no. 6084352).

4. Operation

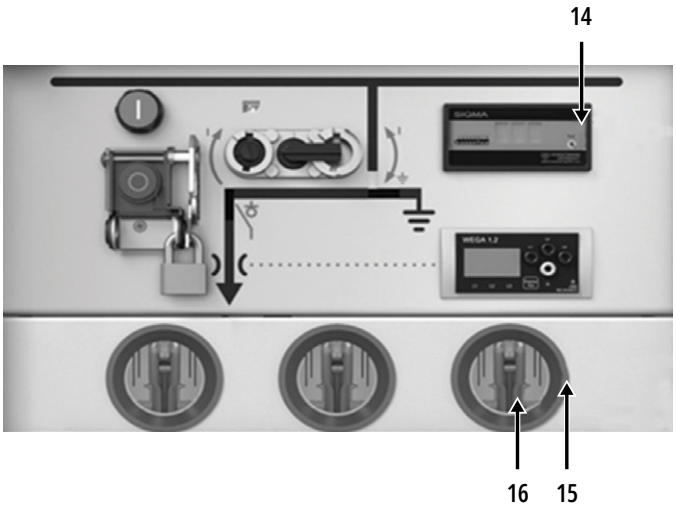
4.1 Control panel types

The Xiria 630 unit can be equipped with three different control panels: for a circuit breaker, load-break switch or fused load-break switch panel. All three panel types have vacuum interrupters as main switching device (MSD). The circuit breaker and load-break switch are operated in the same way. The fused load-break switch has a different operation for the **Earthed position**.

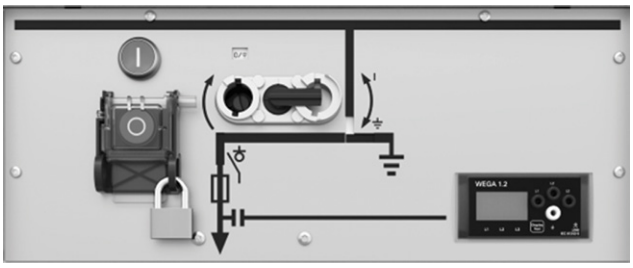
Figure 4-1 summarizes the control panel functions



Control panel for circuit breaker panel



Control panel for load-break switch panel



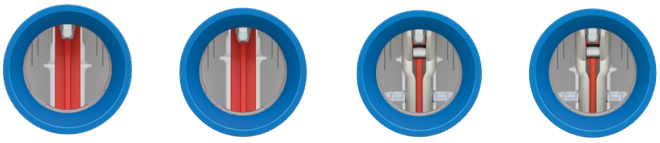
Control panel for fused load-break switch panel

Figure 4-1: Control panels

1. The **Earthed position** interlock for padlock max. 12 mm. **Note:** Not available on fused load-break switch panel
2. Padlock facility for OFF push button
3. OFF push button with anti-reflex flap
4. Electrical closing push button for motor control (option)
5. Switch position indicator
6. Switch control point
7. Switch function indicator
8. Selector control knob
9. Change-over switch control point
10. Change-over switch position indicator
11. Trip indicator CB (option)
12. Ampere meter CB (option)
13. Cable side voltage detection system (VDS)
14. Short-circuit indicator LBS (option)
15. Inspection window
16. Moisture indicator

Visible indication

The position of the load break switch or circuit breaker and the change-over switch will be visible when using a torch to provide additional light.



Service position
Switch or CB ON
Change-over switch in busbar position

Open position
Switch or CB OFF
Change-over switch in busbar position

Neutral position
Switch or CB OFF
Change-over switch in earth position

Earthed position
Switch or CB ON
Change-over switch in earth position

The vertical lines indicating that the circuit breaker or load-break switch is ON or OFF are transparent. In this manual they are colored dark for better visibility.

4.2 Manual switching

4.2.1 Switching Service position ON/OFF

In the **Service position**, the cable is connected to the main busbar of the unit. Here, the switch (5) is ON, and the change-over switch (10) is in the busbar position.

The initial position for procedure description is the **Neutral position**; see figure 4-2:

- The switch is OFF; see switch (5) position indicator.
- The change-over switch is in the earth position; see the change-over switch (10) position indicator.
- The selector control knob (8) is in the central position. This initial position has been selected to ensure that all switching operations can be described. If the selector control knob is in the central position accessing the control points with an operating handle is inhibited.

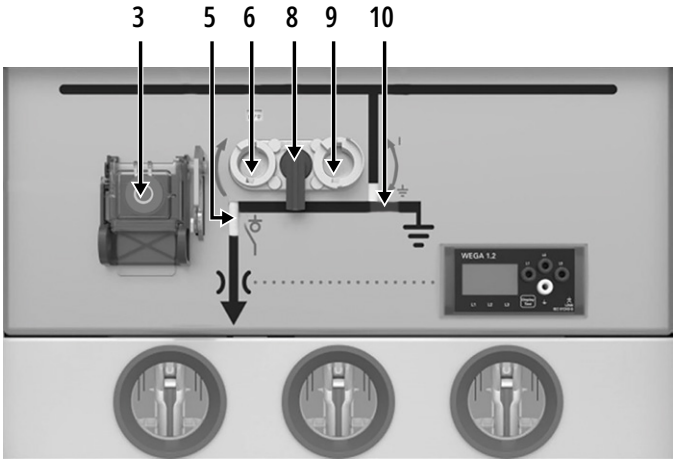


Figure 4-2: Neutral position

Procedure for switching into Service position

1. Turn the selector control knob (8) clockwise until the control point of the change-over switch (9) is revealed.
2. Place the operating handle with the arrow pointing down in the control point of the change-over switch (9). Switch the change-over switch to the busbar position by turning the handle anti-clockwise as far as it will go, i.e. to approximately 190°. Additional resistance will be noticeable towards the end of this rotation. The handle cannot be removed until the busbar position of the change-over switch has been reached.
3. Remove the handle and check that the position indicator (10) of the change-over switch indicates the busbar position which can be verified via the inspection windows.
4. Turn the selector control knob (8) anti-clockwise until the switch control point (6) is revealed.
5. Place the operating handle with the arrow pointing up in the switch control point (6). Switch the cable to the busbar by turning the handle clockwise as far as it will go, i.e. to approximately 190°. The mechanism will switch audibly at that point.
6. Remove the handle and check that the position indicator (5) of the switch indicates the ON position. In the inspection window, the closed operating position is also visible; see figure 4-3.
7. Turn the selector control knob (8) back to the central position. Openings (6) and (9) will be covered and are non-accessible.

NOTE

THE OPERATING HANDLE CONTAINS A SAFETY FEATURE WHICH RESULTS IN DEFORMATION OF THE HANDLE SHAFT UPON INCORRECT OPERATION, TO AVOID DAMAGING THE MECHANISM. DO NOT USE A DEFORMED OPERATING HANDLE.

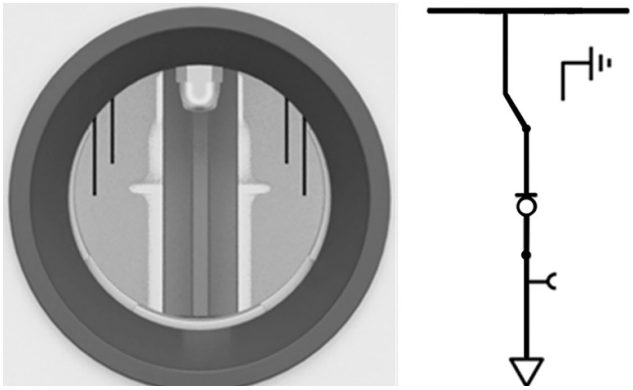


Figure 4-3: Service position - (VI closed and change-over in busbar position)

Procedure for switching off the Service position

1. Press the opening button (3).
2. Check that the switch's position indicator (5) indicates the OFF position. In the inspection window, the opened **Open position** is also visible; see figure 4-4.
3. If the selector control knob is not in the middle position (8) turn it to this position; both openings (6) and (9) will then be covered.

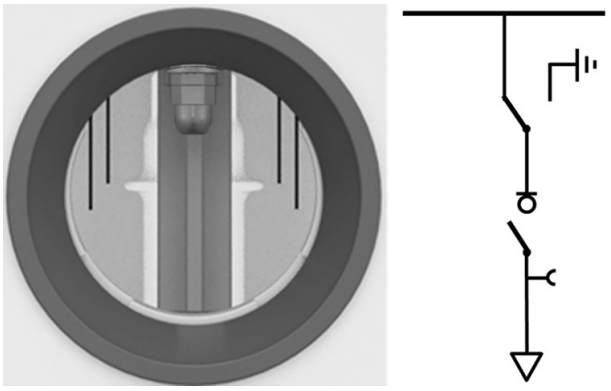


Figure 4-4: Open position (VI open and change-over in busbar position)

Procedure for switching the Service position to the Neutral position

1. Turn the switch off with the opening button (3). Check that the position indicator on the switch (5) indicates the OFF position.
2. Turn the selector control knob (8) clockwise to reveal the control point for the change-over switch (9).
3. Place the operating handle with the arrow pointing up in the control point of the change-over switch (9). Turn the change-over switch in the earth position by rotating the handle 180° clockwise until you feel some resistance. Additional resistance will be noticeable towards the end of this rotation. The handle cannot be removed until the earthing position of the change-over switch has been reached.
4. Remove the handle and check that the position indicator (10) of the change-over switch indicates the earth position.
5. Turn the selector (8) back to the central position; both openings (6) and (9) will then be covered.

4.2.2 Switch cable Earthed position ON/OFF

⚠ DANGER

FOR XIRIA 630 FUSED LOAD-BREAK SWITCH PANEL, EARTHING EQUIPMENT MUST BE INSTALLED TO REACH THE CABLE-EARTHED POSITION. SEE SECTION 4.2.2.1 FOR INSTRUCTIONS.

In the **Service position**, the cable is connected to the main busbar of the unit; the switch is ON, and the change-over switch is in the busbar position.

Initial position for procedure description:

In the **Neutral position**, see figure 4-5

- The switch is OFF; see switch (5) position indicator
- The change-over switch is in the earth position; see position indicator of change-over switch (10)
- Selector control knob (8) is in the central position

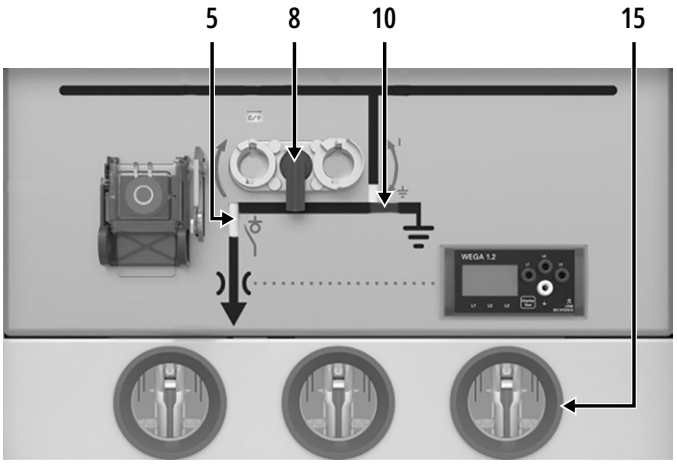


Figure 4-5: Panel in Neutral position

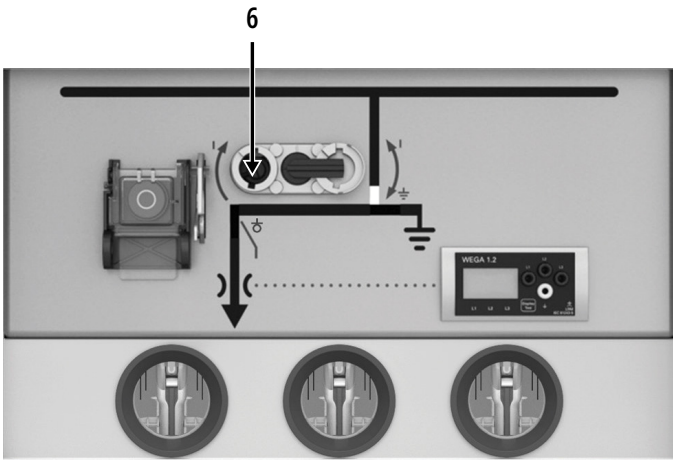


Figure 4-6: Panel in Earthed position

Procedure for switching cable earthing ON

1. Check the position indication to verify that the change-over switch is in the earth position. In addition the earth position can be determined through the inspection windows (15); see figure 4-7. Check the position of all three phases as follows:
   - Use a torch to provide additional light through the inspection window.
   - Check the position of the change-over switch;
   - Figure 4-7 shows the change-over switch in the earth position; figure 4-8 shows the busbar position observed from the inspection window;
   - Repeat this procedure for the other two phases.
2. If the panel is not in a **Neutral position**, put it in this position now; see section 4.2.1.
3. Turn the selector anti-clockwise, the control point of the switch (6) is revealed.
4. Use the built-in voltage detector to check if the cable is dead.

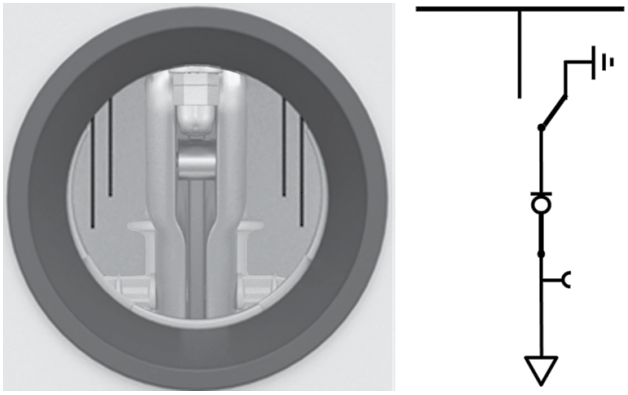


Figure 4-7: Earthed position - change-over switch in the Earth position and VI closed

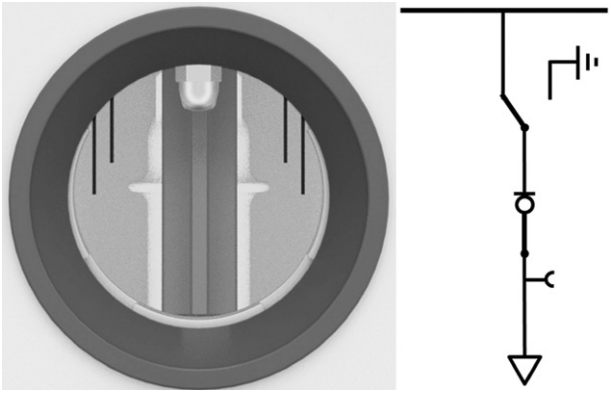


Figure 4-8: Service position - change-over switch in the busbar position and VI closed

5. When the arrows and dots are not visible, check the voltage detection operation using the voltage detection tester (18). See figure 4-9.
   a. Insert the tester plugs in the “earth” and L1 contact sockets. Test the detector by pressing the tester button. The tested phase arrow and dot should now be present;
   b. Repeat the test for L2 and L3.
   c. If one or more arrows and dots do not appear, this might result from a faulty voltage detector. In this case, contact Eaton. Ensure the cable is dead before further switching operations.
6. When the arrows and dots are visible, the functionality of the voltage detector can be tested as follows:
   a. Connect a wire from the tester between the contact sockets “earth” and L1. The arrow and dot indication from this phase must disappear.
   b. Repeat this test with the phases L2 and L3.

NOTE

THE VDS ALSO HAS A TEST BUTTON ON THE FRONT FOR TESTING THE LCD SCREEN ONLY.

7. Earth the cable by closing the switch. Insert the operating handle with the arrow pointing up at the switch control point. Turn the handle 190° clockwise to switch. Remove the operating handle. The cable is now earthed. Attention: the fused load-break switch panel needs additional steps for connecting the cable to earth. See section 4.2.2.1 for instructions.
8. Put the selector in the central position to cover both control openings.

The integrated earthing of the Xiria 630 panel is now ON; the cable is earthed to be short-circuit-proof through the switch.

The **Earthed position** can now be locked, as described in section 4.3.2.

Procedure for switching cable earthing OFF

1. Check whether the cable earthing can be switched off.
2. Remove the padlock from the **Earthed position** interlock (if it is applied), as described in section 4.3.2.
3. Switch OFF the switch of the relevant panel with the push button (3).
4. Check that the position indicator from the switch (5) indicates the OFF position.
5. Rotate the selector control knob (8) back to the central position; both openings will be covered and are non-accessible.

The panel is back in the **Neutral position**:

- VI Open
- Change-over switch in earth position

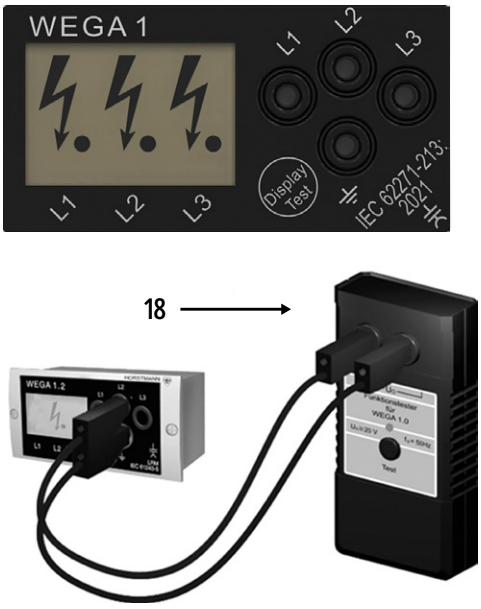


Figure 4-9: Using the tester

4.2.2.1 Earthing the cable of a fused load-break panel

In case of a fused load-break switch, the earthing of the cable cannot be directly realized by the Xiria itself; The fuse shall be taken out and the optional earthing equipment shall be installed.

With the earthing equipment placed into the high-voltage fuse holders, the cables between the fuse and load (transformer) are earthed from the Xiria 630 side.

Required accessories

A set containing earthing equipment consisting of:

1. A single operating rod, see number 1 figure 4-10.
2. Three earthing pins with earth contact and earthing cable (25 mm²) with connecting clamp, see number 2 figure 4-10.

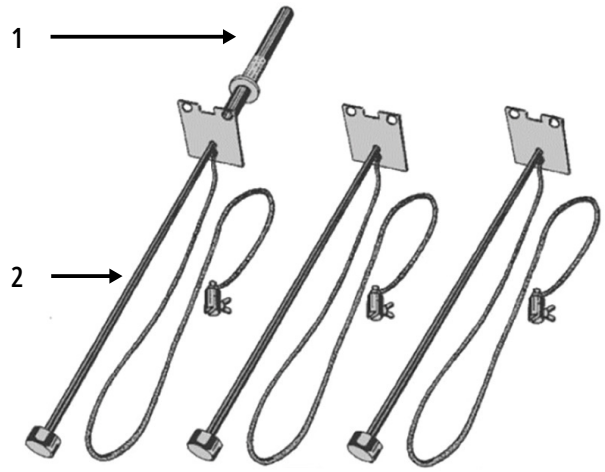


Figure 4-10: Earthing equipment

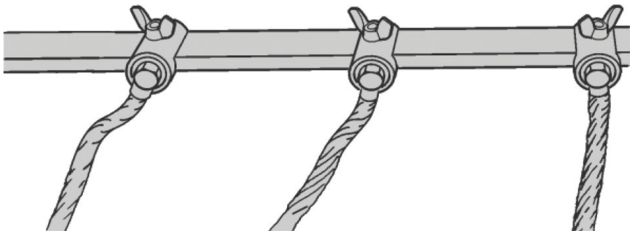


Figure 4-11: Cable clamp connect to earth bar

Figure 4-12: Push the earth pins with an operating rod into the socket contacts

⚠ WARNING

ENSURE THAT THE EARTHING PINS ARE UNDAMAGED, ESPECIALLY ON THE CONTACT AT THE END OF THE ROD. THE FLEXIBLE CABLE, INCLUDING ITS CONNECTIONS ON BOTH ENDS, MUST BE IN GOOD CONDITION.

Interlocks

- The cables can only be earthed if the high-voltage fuses are removed.
- It is only possible to access the high-voltage fuses if the load-break switch is open and the change-over switch is in the earth position.

Installation of earthing equipment

1. Remove the fuses according to the instructions in section 4.4.
2. Ensure that the back supply from the transformer side is prevented.
3. Check that the cables to be earthed are not live by using a single pole voltage detector before attaching the earthing equipment.

⚠ WARNING

THE CABLE TO BE EARTHED MAY STILL CONTAIN A TRAPPED CHARGE, SO A SPARK MAY OCCUR WHEN INSERTING THE EARTHING PINS.

4. Connect the earthing cable clamps to the earth bar of the station using the wing nuts and tighten them firmly; see figure 4-11.
5. Fit the earthing pins one by one using the operating rod; see figure 4-12.

Proceed as follows:

⚠ DANGER

WHEN INSERTING THE EARTHING PINS, NEVER PLACE A HAND BETWEEN THE RED RING ON THE OPERATING ROD AND THE EARTHING PINS OR THE STOP.

1. Mount the operating rod on an earthing pin by turning it clockwise on the earth pin.
2. Insert the earthing pin into the fuse cannister with the operating rod
3. Make sure the metal screening plate of the earthing pin lies flat on the cannister; in this case, the contact of the earthing pin is pushed into the socket contacts of the cable to be earthed.
4. Remove the operating rod from the earthing pin by turning it anti-clockwise. Check if the earthing pin remains in the **Earthed position**. Repeat the above until all three poles are earthed.

Removal of earthing

⚠ DANGER

NEVER PLACE A HAND BETWEEN THE RED RING ON THE OPERATING ROD AND THE EARTHING PINS OR THE STOP WHEN REMOVING THE EARTHING PINS.

1. First use the operating rod as prescribed above, for removing the earthing pins pull them from the socket contacts
2. Then remove the earthing cable clamps from the earth busbar

NOTE

BEFORE PUTTING THE PANEL BACK IN OPERATION (AFTER THE EARTHING EQUIPMENT HAS BEEN REMOVED) INSERTING THE HIGH-VOLTAGE FUSES IS NECESSARY (SEE SECTION 4.4). AFTER THE FUSES HAVE BEEN PLACED, THE PANEL CAN BE CLOSED AGAIN AND OPERATED.

4.2.3 Gaining access to the cable compartment

NOTE

WHEN GAINING ACCESS TO THE CABLE COMPARTMENT, THE FOLLOWING BASIC RULES ALWAYS APPLY:

- **THE PANEL MUST BE IN THE CLOSED EARTHED POSITION.**
- **VERIFY THAT THE CABLE CAN NEVER BE ENERGIZED FROM THE OTHER END.**
- **REMOVAL OF THE CABLE COMPARTMENT DOOR CAN BE BLOCKED BY LOCKING THE INTERNAL EARTHING WITH A PERSONAL PADLOCK**
- **ON REQUEST, A VISIBLE EXTERNAL BACKUP EARTH CAN BE INSTALLED BY THE CABLE PLUG SUPPLIER'S INSTRUCTIONS.**

Procedure

1. Switch on the (integrated) cable **Earthed position** in accordance with the instructions.
2. To open the cable connection compartment:
   - Check, using the mimic diagram indicators on the control panel, whether the panel is in the **Earthed position**;
   - Open the cable connection compartment by lifting the door and moving it forward; see figure 4-13.
3. A “cable earthed” warning sign can be placed.
4. Use a high-voltage tester to verify that the cable is dead. Follow the cable connection supplier's instructions.
5. If required, a visible external backup earth can be installed by:
   - Connecting the external backup earthing equipment to the earth bar in the cable connection compartment, see figure 4-14;
   - According to the cable plug supplier's instructions, fit the earthing equipment to all three phases of the cable connection via the isolated plug, see figure 4-15.

REMARK

IT IS STILL POSSIBLE, HOWEVER, TO OPEN THE SWITCH OR CIRCUIT BREAKER IN THIS SITUATION. THIS MAY BE NECESSARY TO MEASURE THE CABLE. IF THE SWITCH REQUIRES TO BE INTERLOCKED AGAINST BEING SWITCHED ON, THE SCISSOR-TYPE INTERLOCK (SECTION 4.3.4) CAN BE USED TO INTERLOCK MANUAL OPERATION.

Figure 4-13: Opening the cable connection compartment

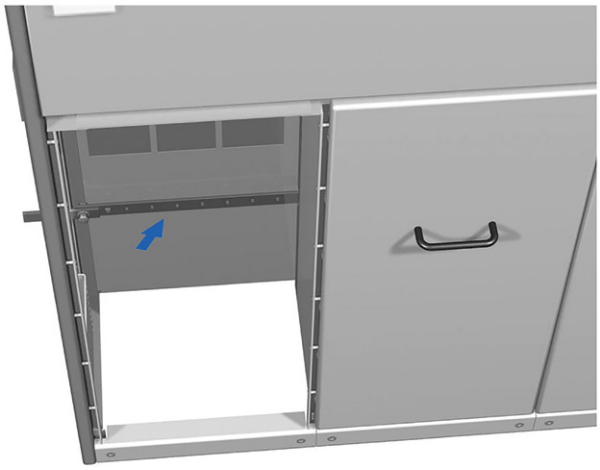


Figure 4-14: Earth bar in cable connection compartment

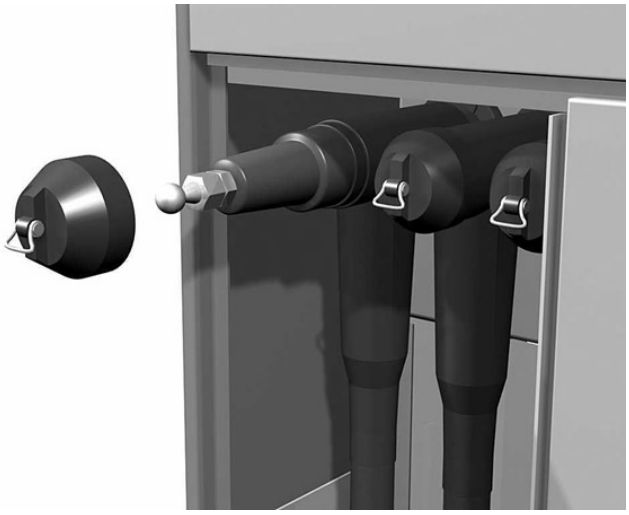


Figure 4-15: Example of an isolated plug with an earthing knob

6. Return to the **Neutral position** after completion of the operations on the panel.

Proceed as follows:

- Remove the (backup) earthing equipment in case this is mounted
- Connect the cable connection plugs, if not already there, according to the supplier's instructions
- Remove any earthing interlocks/padlocks fitted
- Close the cable access door
- Open the switch
- Check the position indicator for verification

REMARK

THE ABOVE SWITCHING OPERATIONS ARE SUMMARIZED FOR EXPERIENCED USERS IN TABLES IN SECTION 4.7.

4.3 Interlocks

The Xiria 630 unit has standard integrated mechanical interlocks to prevent accidental switching operations, ensuring safety during operation.

⚠ DANGER

UNDESIRABLE SWITCHING OPERATIONS COULD LEAD TO:

- **POTENTIAL DANGER TO OPERATING AND SERVICE PERSONNEL**
- **POWER SUPPLY FAILURE**
- **UNIT DAMAGE**

⚠ WARNING

IF A (SWITCHING) ACTION CANNOT BE ACHIEVED WITH NORMAL OPERATING FORCE:

- **REFER TO SECTION 4.7 TO DETERMINE IF THE ACTION IS PERMISSIBLE**
- **CONTACT EATON IF THE ACTION IS PERMISSIBLE ACCORDING TO THE SWITCHING TABLES BUT CANNOT BE ACCOMPLISHED WITH NORMAL OPERATING FORCE**

4.3.1 Integrated interlocks

The following interlocks are applied:

- Interlock to prevent access to cable compartment, in case the cable is not earthed via the unit.
  Note: Once the cable compartment has been opened, the vacuum interrupter can be switched OFF to carry out cable tests; this interrupts the cable-earth link.
- Interlock to prevent operation of the change-over switch when the circuit breaker or load-break switch is ON (closed position).
- To prevent reflex attempts to switch off a short-circuit after switching on, the VI opening button is equipped with an anti-reflex flap, see number 3 of figure 4-1.

Several switching positions can also be interlocked with padlocks, or scissors-type interlocks preventing access to switch control points.

⚠ WARNING

AFTER ANY TEMPORARY ABSENCE, VERIFY THE NECESSARY INTERLOCKS AND IF MOUNTED BACKUP EARTHING EQUIPMENT IS STILL IN PLACE AND HAS NOT BEEN TAMPERED.

4.3.2 Earthed position interlock

The **Earthed position** interlock prevents the cable earthing from being interrupted. Cable earthing is achieved via the load-break/circuit breaker switch; therefore, it must be locked against opening to ensure the cable stays earthed.

Once this interlock has been installed, the following operations are no longer possible:

- Turning off the switch with the opening push button
- Electrical disconnection of the switch by the protective relay
- Opening the door of the cable compartment

The **Earthed position** interlock can be activated if (see section 4.2):

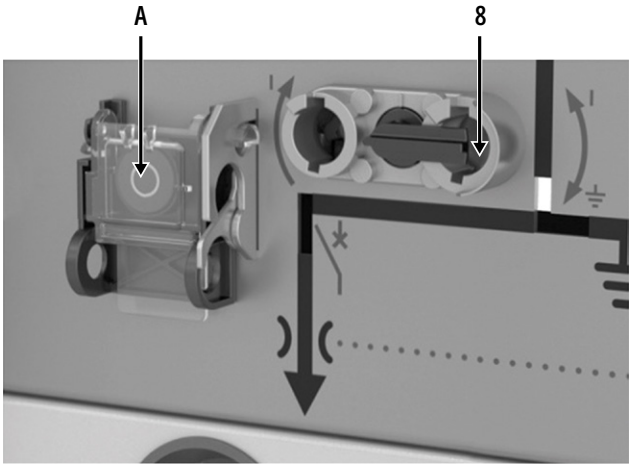
- The change-over switch is in the earth position;
- The switch is ON;
- The cable access door is closed;
- The transparent cover flap in front of the opening button is fully placed in front of this button.

The interlock is used as follows.

1. Turn the selector control knob (8) anti-clockwise.
2. Make sure that the transparent cover flap is fully in front of the opening button (A).
3. Pull part (B) to the front; part (C) will automatically move downward, and part (B) will stay in position
4. Put the hasp of the padlock (D) through the hole on the right The hasp diameter can be 1-12 mm.
5. The **Earthed position** is now interlocked, including access to the cable compartment and the opening button.
6. Put up a “cable earthed” warning sign if needed.

Remove the interlock as follows:

1. Remove the padlock (D).
2. Push part (C) upwards; part (B) will automatically move backwards (C).
3. The **Earthed position** interlock is removed. The cable compartment door can now be opened.



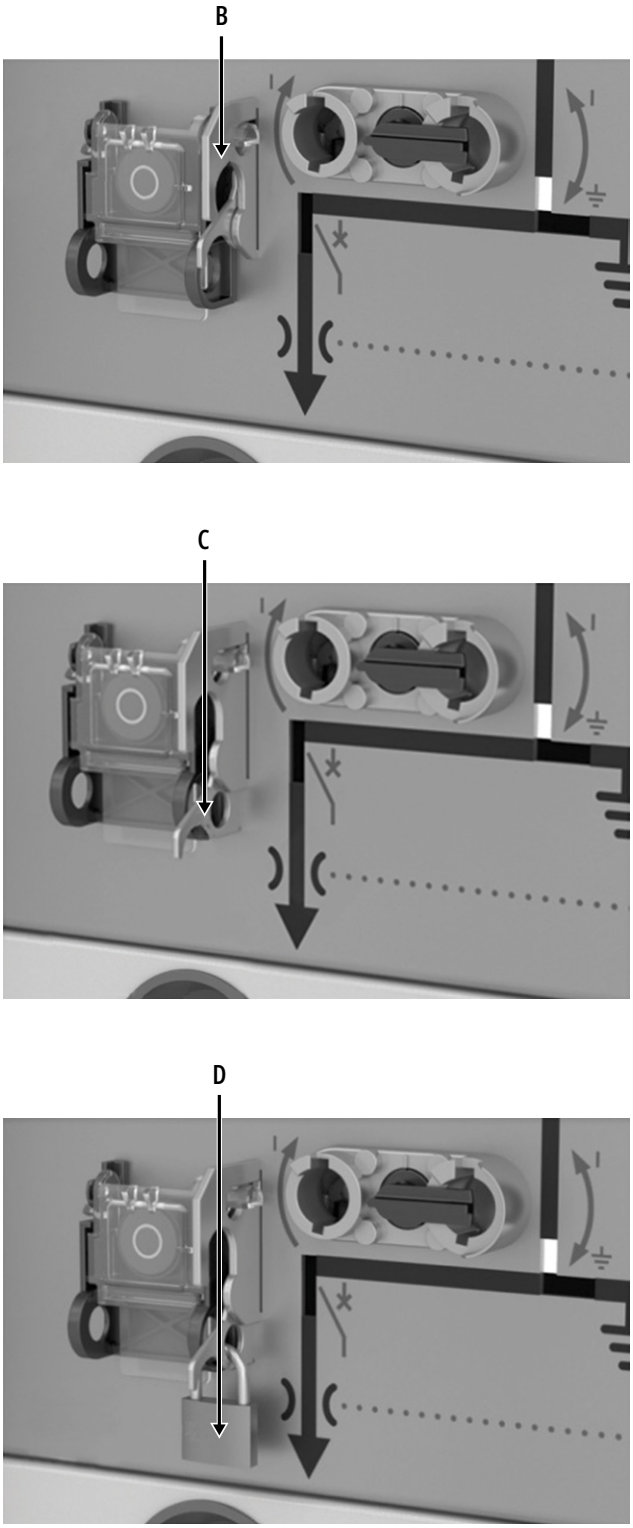


Figure 4-16: Earthed position interlock

4.3.3 Interlock opening button

The interlock on the opening button prevents the switch from being unintentionally opened. Once this interlock is in place, the transparent cover flap in front of the opening button can no longer be lifted. Therefore, the switch can no longer be switched off manually. However, switching OFF by the protective relay, if fitted, or the optional remote control remains possible. This interlock can be applied in every operating position of the panel.

Installation is as follows:

Hook a padlock (19) through the hole below the opening button while the push button is covered by the anti-reflex cap; see figure 4-17.

A padlock with a hasp of 1 – 12 mm can be applied.

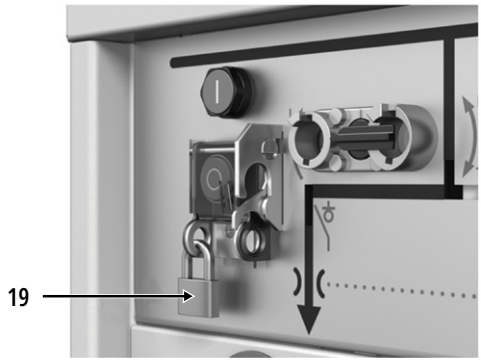


Figure 4-17: Padlock on the opening button

4.3.4 Interlock VI closing and change-over switch operation

This interlock is intended to prevent the unintentional closing of the switch and operation of the change-over switch.

The operating handle cannot be inserted into the control points when the interlock is in place. However, opening the VI via the OFF push button and the protective relay of the circuit breaker remains possible.

Installation is as follows (see figure 4-18):

1. Turn the selector (8) anticlockwise until the switch control point is revealed.
2. Fit the scissor-type interlock (20) in the switch control point.
3. Engage the scissors so that the openings are aligned. Pass a padlock (19) through both holes.

Figure 4-18: Padlock on scissors

4.3.5 Tool-based door interlock

The tool-based interlock is intended to prevent the unintentional opening of the cable compartment door in case a built-in interlock is not foreseen.

The tool-based door interlock can be removed and reinstalled with a standard screwdriver, see figure 4-19.

⚠ WARNING

IN THIS CASE A PROCEDURE FOR SAFELY ACCESSING THE CABLE COMPARTMENT IS NEEDED.

Figure 4-19: Tool-based door interlock

4.3.6 Padlockable door interlock

The padlockable door interlock is intended to prevent the unintentional opening of the cable compartment door when there is no built-in interlock.

The cable compartment becomes accessible once the padlock is removed; see figure 4-20.

⚠ WARNING

IN THIS CASE A PROCEDURE FOR SAFELY ACCESSING THE CABLE COMPARTMENT IS NEEDED.

Figure 4-20: Padlockable door interlock

4.4 Replacing high-voltage fuses

NOTE

THE FUSES (IN CONFORMITY WITH DIN 43625) SHOULD HAVE A STRIKER PIN TO ENSURE THE CORRECT AUTOMATIC OPENING OF THE LOAD-BREAK SWITCH. ALWAYS PLACE THE STRIKER PIN SIDE IN THE HANDLE.

NOTE

XIRIA 630 FUSED LOAD-BREAK SWITCH PANEL CONTAINS INSULATED HANDLES TO SAFELY REMOVE THE FUSE, EVEN WHEN THE FUSE IS STILL ENERGIZED FROM CABLE SIDE; HOWEVER, INTERNATIONAL REGULATIONS REQUIRE NOWADAYS THAT BOTH FUSE BASE CONTACTS ARE AT LEAST DISCONNECTED FROM ALL SOURCES OF SUPPLY.

Procedure:

1. Switch OFF the "load" side of the connected cable to the HV fuse (e.g. at the LV side of the supplied transformer)
2. Switch OFF the load-break switch of the switch-fuse combination,
3. Turn the selector into the full anti-clockwise position; see figure 4-21.
4. Set the change-over switch to the earth position

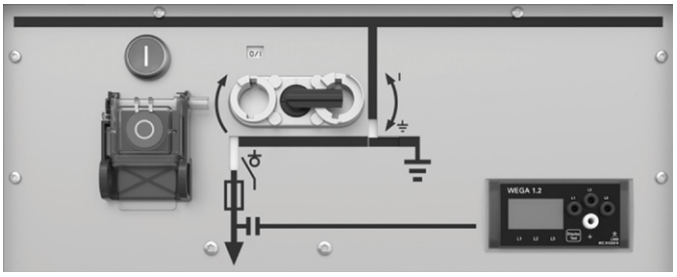


Figure 4-21: Control panel for fused load-break switch

⚠ WARNING

DO NOT CLOSE THE LOAD-BREAK SWITCH.

⚠ WARNING

THERE MIGHT BE A TRAPPED CHARGE ON THE CAPACITANCE TO THE EARTH OF THE HV CABLE, WHICH IS CONNECTED TO THE CONTACT LOWER CONTACT INSIDE THE FUSE HOLDER.

5. Open the combined cable and fuse compartment.
6. Remove the fuse with the handle. See figure 4-22.
7. Pull the contact ring backwards to release the fuse contact clamp in the holder. See figure 4-23.
8. Replace the fuse in the handle. Pull the contact ring backwards to release the fuse contact clamp in the holder; see figure 4-24.

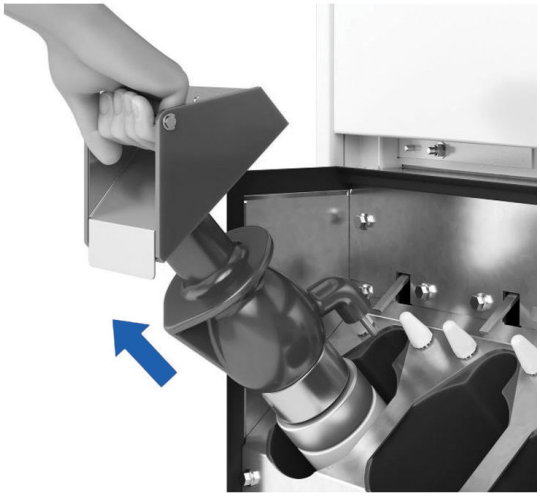


Figure 4-22: Remove the fuse

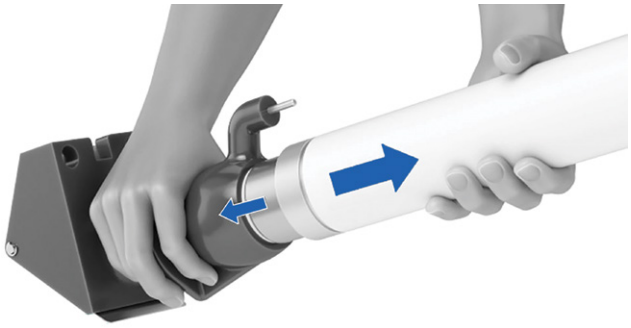


Figure 4-23: Release fuse in the holder

⚠ WARNING

WHEN FITTING THE FUSE, DO NOT REST THE HANDLE AGAINST THE WALL OR THE GROUND TO AVOID DAMAGING THE FUSE INTERNALS. FIT THE FUSE WITH THE STRIKER PIN OUTPUT IN THE HANDLE.

9. Slide the handle with the fuse into the installation. See figure 4-25. Repeat step 6 to 9 for the other phases.

⚠ WARNING

PLACE THE FUSE HOLDERS IN THE DESIGNATED POSITIONS BEFORE CLOSING THE COMBINED CABLE AND FUSE COMPARTMENT.

10. Close the combined cable and fuse compartment.
11. Switch the installation into the **Service position**.

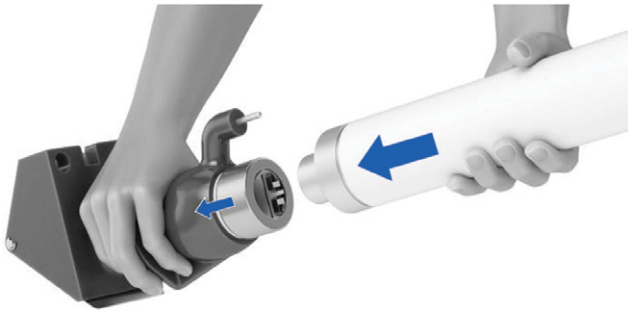


Figure 4-24: Insert fuse in the holder

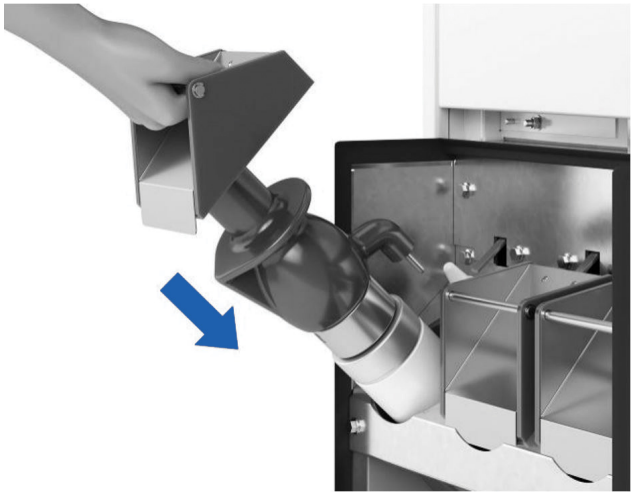


Figure 4-25: Insert fuse

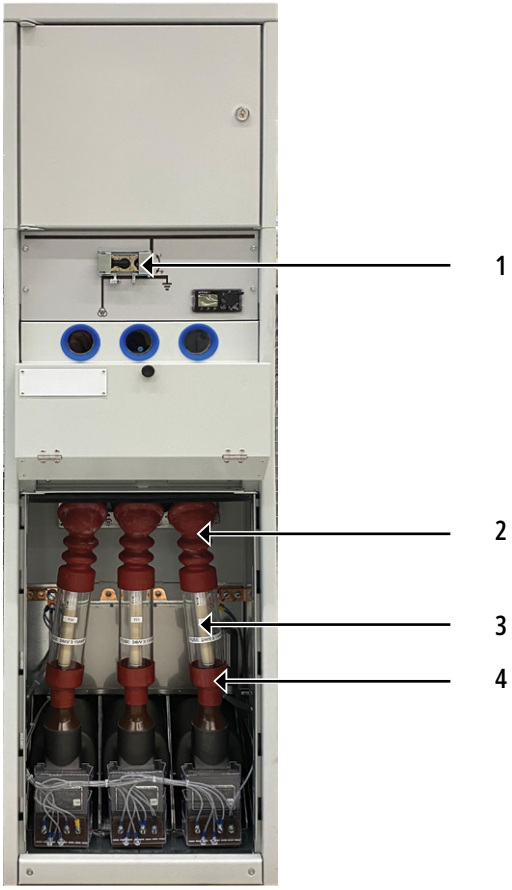


Figure 4-26: Busbar side VT panel with fuses and change over switch

4.5 Replacing voltage transformer high-voltage fuses in busbar side VT panel

The busbar side Voltage Transformer (VT) panel is available in different configurations. Configuration examples are:

- Panel with or without change-over switch (COS). See figure 4-26.
- VT compartment door with a tool-based lock, padlocked or interlocked with change-over switch
- Panel with or without voltage transformer high-voltage fuses

NOTE

THE VOLTAGE TRANSFORMER FUSES MUST BE SUITABLE FOR PROTECTING AUXILIARY TRANSFORMERS (IN CONFORMITY WITH IEC 60282-1). EATON - BUSSMANN SERIES VT FUSE-LINK, MEDIUM VOLTAGE, 3.15 A, AC 24 KV, 359 X 25.4 MM, PART NUMBER 24ABGNA3.15 ARE ADVISED. ALL THREE FUSES NEED TO BE EXCHANGED IN CASE OF AN EVENT.

Figure 4-27: Unlock fuse holder

1. Padlock flaps
2. Top sleeve
3. Fuse and fuse tube
4. Bottom sleeve
5. Unlock button fuse holder

Replacing fuses in busbar side VT panel with change-over switch (COS)

1. For safety reasons it is strongly advised to first de-energize the main busbar by opening the circuit breaker(s) and load-break switch(es) of supplying panels.
   a. Check on the voltage detection system, e.g. WEGA, of an outgoing panel that is kept in service if the busbar is de-energized.
   b. Now the COS of the VT panel can be switched to earth position.
   c. Then the main busbar can immediately be energized again.

   If de-energizing is not feasible, then at least decouple all (secondary) load from the VT's. Then the change-over switch can also be safely set to earth position.
2. With the change-over switch of the VT panel in earth position, the busbar side of the VT fuses is automatically in the **Earthed position** since there is no vacuum interrupter present in the panel.
3. Earth the secondary (LV) side of the VT's.
4. In case the VT compartment door was interlocked with the change-over switch, the lock can now be safely removed.
5. Press on the fuse holder unlock button to release the top sleeve of the fuse holder from the C-cone. The release button is located in the top mid position of the top sleeve. See figure 4-27.
6. Pull the top sleeve from two opposite sides towards you to remove it from the C-cone.
7. Remove the top sleeve from the fuse tube.
8. Remove the clamped fuse from the bottom sleeve and replace it.
9. Replace the top sleeve on the fuse tube.
10. Push back the top sleeve on the C-cone and check if it is locked (by gently pulling).
11. Remove the earthing of the VT LV terminals.
12. Replace the door and mount the locking as applicable.
13. Bring back the COS of the VT panel to busbar position.
14. In case the busbar was still de-energized, it can now be energized again.

Replacing fuses in busbar side VT panel without change-over switch

1. De-energize the main busbar by switching all connected panels to the **Neutral position** by opening from all connected panels the circuit breaker or load-break switch as well as switching their respective change-over switch to the earth position. See chapter 4.7 Short-form instructions.
2. Prevent switching ON from circuit breaker(s) and load-break switch(es) and also operation of the COS's by putting a locked "scissor" in the open COS control point for manual operation, see chapter 4.3.4. In case of padlock flaps in front of the control points padlock both control points. Padlock flaps are shown in figure 4-26.
3. Earth the secondary (LV) side of the VT's
4. Unlock the door of the VT compartment with appropriate means, e.g. tool or key and remove the door
5. Press on the fuse holder unlock button to release the top of the fuse holder from C-cone. The release button is located in the top mid position of the top sleeve. See figure 4-27.
6. Pull with two hands the top sleeve forward to remove it from the C-cone.
7. Remove the top sleeve from the fuse tube.
8. Remove the clamped fuse from the bottom sleeve and replace it.
9. Replace the top sleeve on the fuse tube.
10. Push back the top sleeve on the C-cone and check if it is locked (by gently pulling).
11. Replace the door and mount the locking as applicable.
12. Remove the earthing of the VT LV terminals.
13. Now all supplying panels can be reconnected again.

4.6 Signals

The Xiria 630 unit features integrated voltage detectors on the cable side and can optionally be fitted with overcurrent indicators and trip indicators.

4.6.1 Voltage detectors

The Xiria 630 unit features voltage detectors in the control panel that conform to IEC 62271-213.

The voltage detector, for example the WEGA 1, includes a LCD screen with indication arrows and dots, one for each phase, see position 13 in figure 4-28. These arrows and dots are present when the cable is live.

The voltage detector detects whether the operating voltage is present at the cable connection of the panel concerned.

NOTE

THE VISIBLE DOT SHOWS THAT THE DETECTOR FUNCTIONS CORRECTLY BY THE DEMANDS FOR VOLTAGE-DETECTING SYSTEMS AS DESCRIBED IN IEC 62271-213.

This is a continuous internal function check.

In combination with for example the ORION 3 tester, the voltage detectors can also be used for phase comparison between two adjacent live cables.

See Chapter 7 for references to original manufacturers websites for further information.

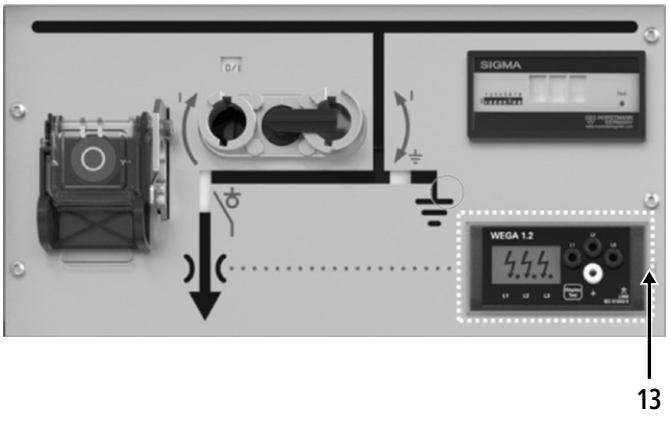


Figure 4-28: Voltage detectors

4.6.2 Overcurrent indicator

The overcurrent indicator (14), see figure 4-29 is activated by an overcurrent.

See Chapter 7 for further information.

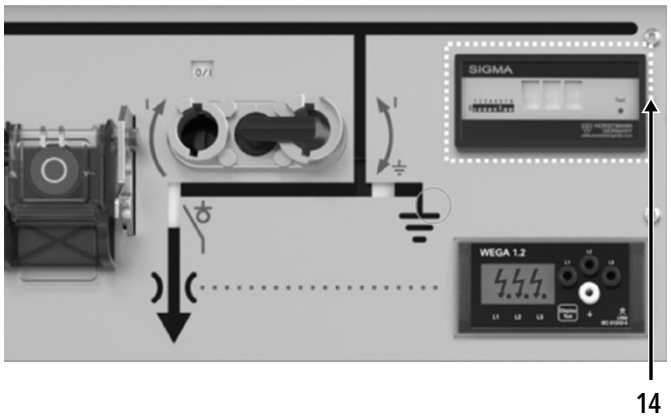


Figure 4-29: Overcurrent indicator

4.6.3 Trip indicator

The trip indicator (11), see figure 4-30, indicates whether the protection relay has switched off the circuit breaker.

Resetting is done manually via the reset button on the front.

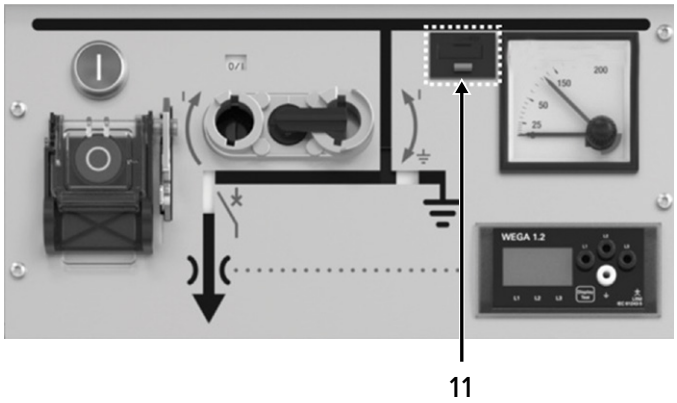


Figure 4-30: Trip indicator

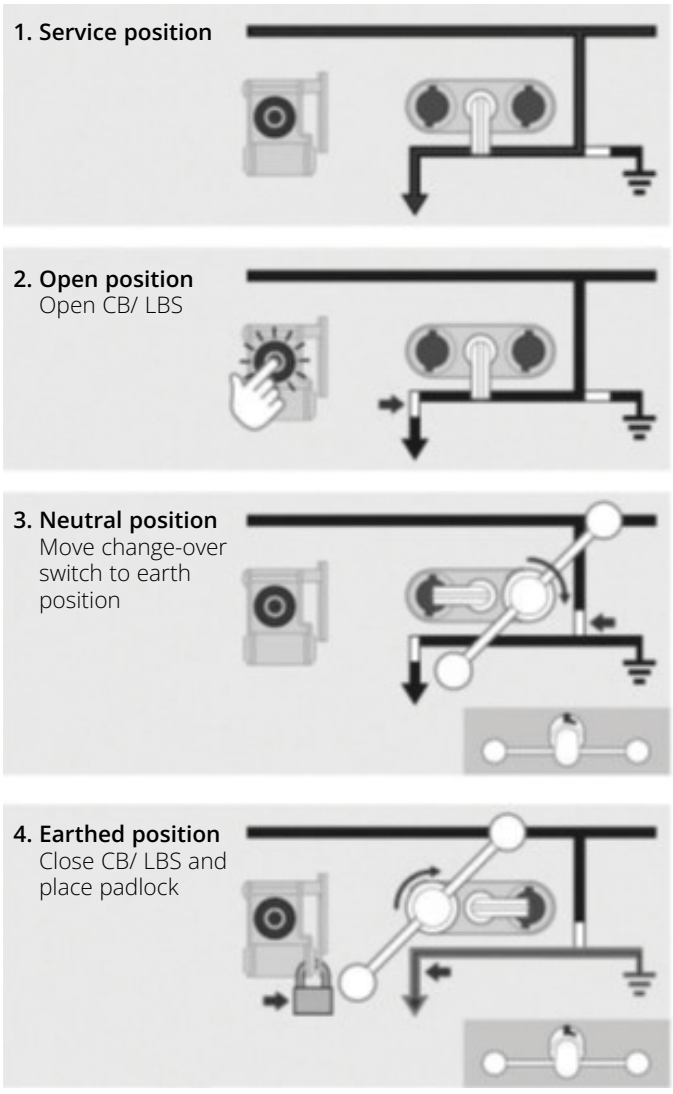
4.7 Short-form instructions

In the short-form instructions different operating steps are described including optional padlocking:

- From **Service position** to padlocked **Earthed position**, figure 4-31 left side illustrations
- From padlocked **Earthed position** to **Service position**, figure 4-31 right side illustrations

The below operation steps account for circuit breaker (CB) and load-break switch (LBS) panels:

From **Service position** to locked **Earthed position**



From locked **Earthed position** to **Service position**

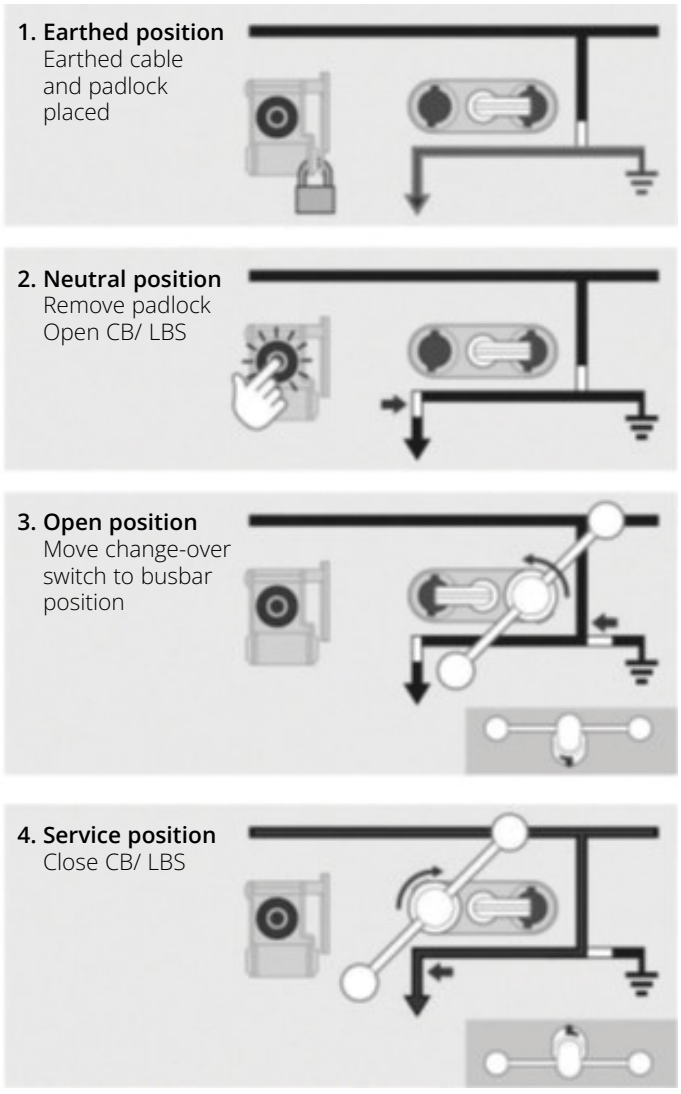
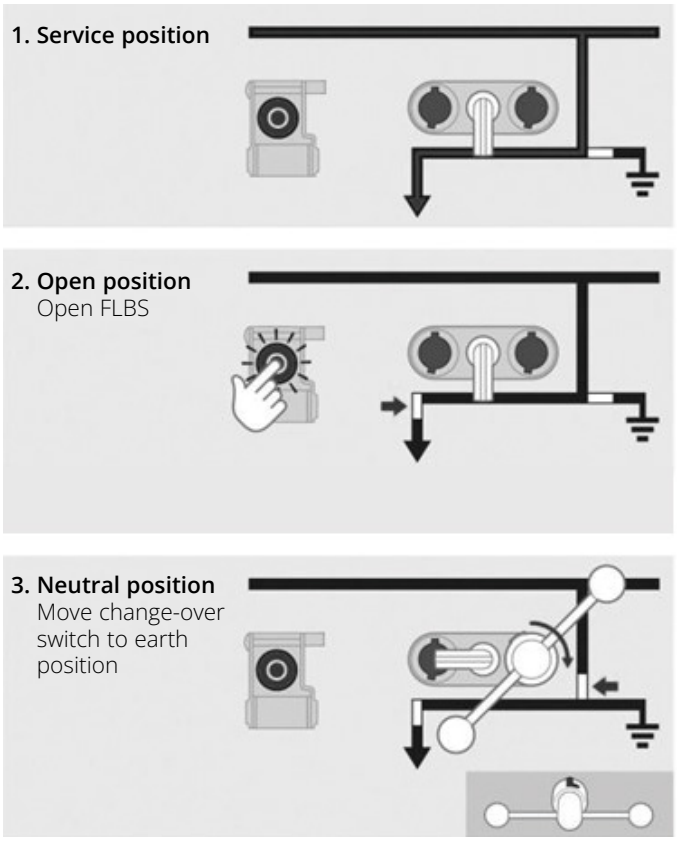


Figure 4-31: Short-form instructions for circuit breaker and load-break switch panels

The interlock is used as follows.

The following operation steps account for fused load-break switch panels:

From **Service position** to **Neutral position**



From **Neutral position** to **Service position**

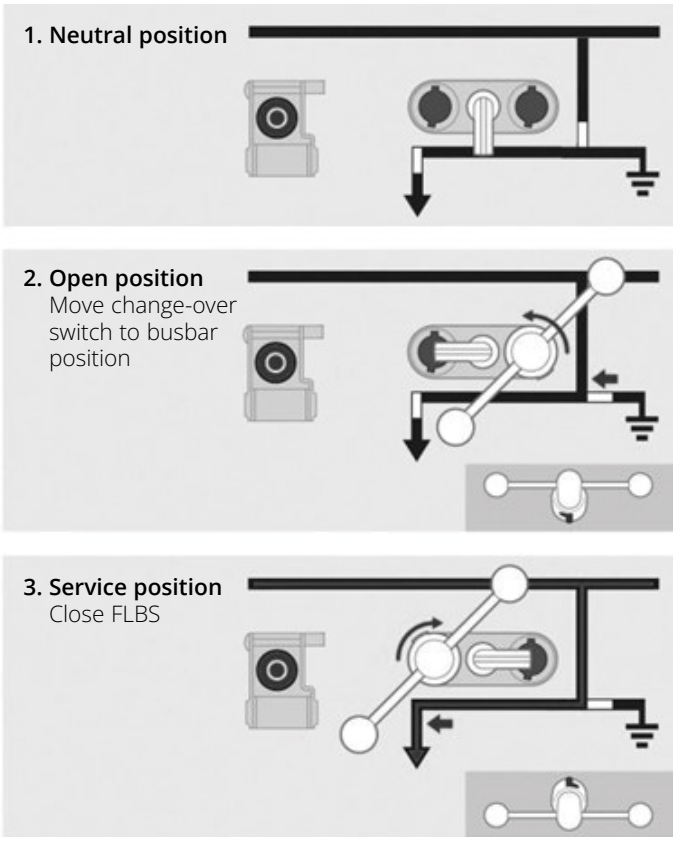


Figure 4-32: Short-form instructions fused load-break switch panels

5. Remote signalling and remote control

REMARK

FOR CORRECT CONNECTION AND OPERATING VOLTAGES SEE THE CIRCUIT DIAGRAMS DELIVERED WITH THE UNIT.

Remote signalling and electric remote control are optional for Xiria 630 switchgear units.

REMARK

REMOTE CONTROL IS INTENDED FOR A MAXIMUM SWITCHING FREQUENCY OF ONCE A MINUTE.

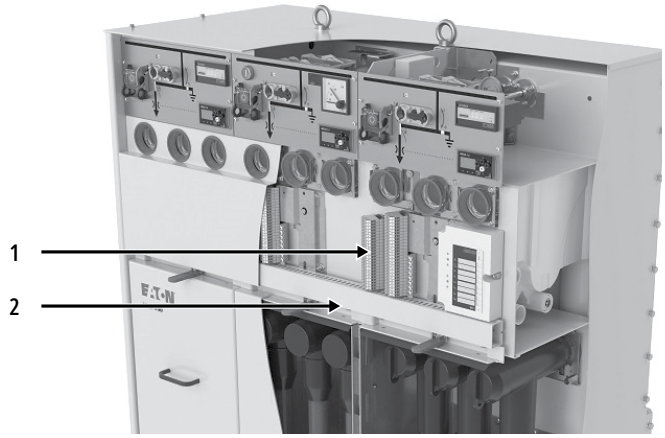


Figure 5-1: Front cover and secondary compartment with cable duct and terminal strips

5.1 Remote signalling

5.1.1 Connection

The secondary compartment is located behind the front cover (see figure 5-1) and includes a cable duct (2) and secondary terminal strip (1). A top unit (see figure 5-2) can be located on top of the switchgear for additional auxiliary components and includes DIN-rails (1) and cable ducts (2).

The wiring to be connected to the terminal strip can be brought in through the side wall either from the left or the right-hand side or via the gland plate (3) in the top plate of the top unit.

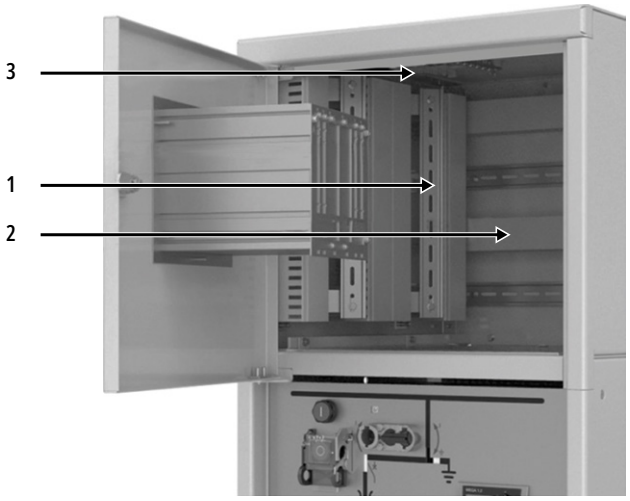


Figure 5-2: Top Unit

5.1.2 Remote signalling (optional)

The positions of the following functionalities are connected to the terminal strip using auxiliary contacts:

- Circuit breaker or (fused) load-break switch
- Change-over switch
- (Optional) trip indicator
- (Optional) overcurrent indicator

5.2 Remote control

5.2.1 Remote tripping at 24 VDC (optional)

The panels concerned are provided with the following:

- Auxiliary contacts as described under remote signalling
- A controller
- A trip coil

An optional voltage converter is mounted if the supply voltage differs from 24 V DC.

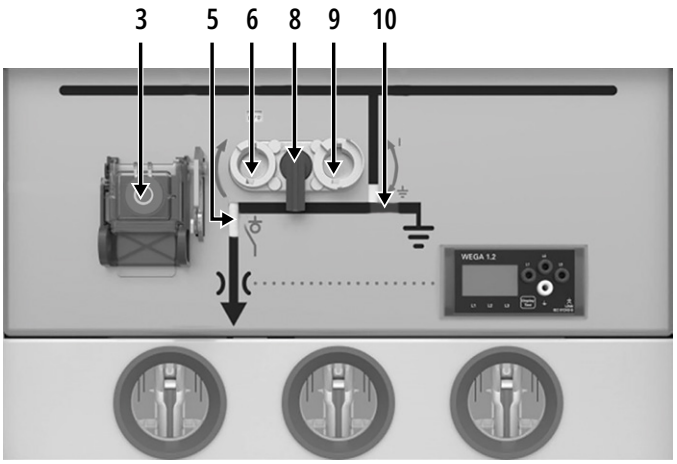


Figure 5-3: Remote control

For on-site commissioning:

1. Check that the power supply is live.
2. Use the position indicator (10) to check whether the change-over switch is fully in the busbar or earth position.
3. Use the position indicator (5) to check whether the load-break switch or circuit breaker is closed.
4. The selector control knob (8) must be in the middle position.
5. Tripping will follow once the respective terminals of the terminal strips are interconnected via a potential free closing contact.

5.2.2 Remote closing at 24 VDC (optional)

The panels concerned are provided with the following:

- Auxiliary contacts as described under remote signalling
- A controller
- A trip coil
- A closing motor
- A closing push button on the front side of the panel

An optional voltage converter is mounted if the supply voltage differs from 24 V DC.

For on-site commissioning:

1. Check that the power supply is live.
2. Use the position indicator (10) to check that the change-over switch is fully in the busbar position.
3. The control knob for the selector (8) should be in the central position.
4. Closing will follow in case the load-break switch or circuit breaker is in the OFF position and the closing command on the relevant terminals of the terminal strip is closed. The closing procedure starts with the spring being charged; the actual closing occurs after approx. 12 seconds.

5.2.3 Tripping for external protection at 24 V DC (optional)

(Only optional available for circuit breaker)

The panels concerned are only provided with a trip coil for 24 V DC. An optional universal voltage converter is not possible in this design.

For on-site commissioning:

1. Check that the supply voltage is live.
2. Use the position indicator (10) to check whether the change-over switch is fully in the busbar position.
3. Close the circuit breaker.
4. Tripping will follow once the tripping contact on the relevant terminals of the terminal strip is closed.

5.3 Local motorized closing

The panels concerned can also be motorized and switched on locally using the local electrical closing push button (4). This is subject to the same conditions as the remote closing cycle, see subsection 5.2.2.

Press the electrical closing push button to close the vacuum interrupter (4).

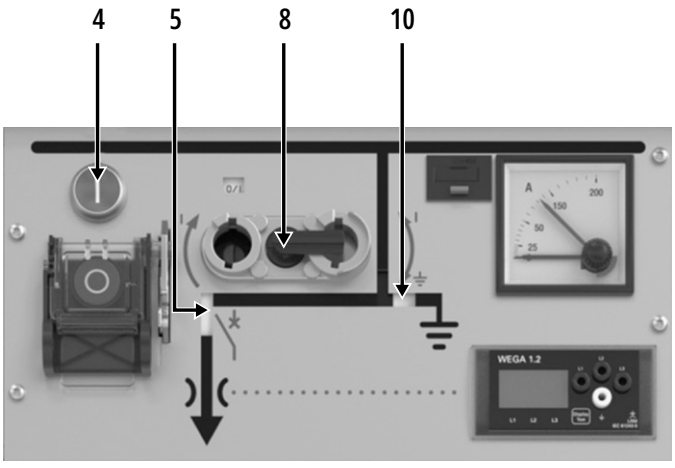


Figure 5-4: Control elements

5.4 Synchronized remote closing

Synchronized remote closing (SRC) is optionally available for Xiria 630 switchgear units. Manual operation of a Xiria 630 panel equipped with a SRC function is still possible. A few deviations should be taken into consideration compared to regular manual operation.

5.4.1 Details of SRC control panel

See figure 5-5:

8. Selector control knob

10. Change-over switch position indicator

21. Closing spring "charged / uncharged" indicator

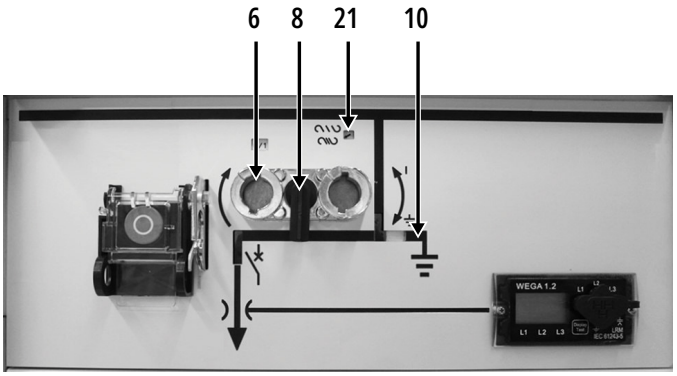


Figure 5-5: SRC control elements

5.4.2 SRC function

The SRC function has a motor-operated spring charging mechanism. The motor circuit is inactive when the change-over switch is in the earth position.

The motor circuit is active when the change-over switch (10) is in the busbar position. In this situation, the motor will start running when the selector control knob (8) is placed in the middle position, and the closing spring is uncharged. The motor will charge the closing spring.

When the closing spring is charged, a remote signal can be given to close the CB/LBS.

When the closing spring is charged (see figure 5-6), only a little turn of the operating handle in the switch control point (6) is enough to switch ON the switch manually. Due to the fact the closing spring is already charged, no resistance will be felt when turning the operating handle until the very last moment.

If the selector control knob (8) is turned 180° clockwise, the motor will run shortly when passing by the remote position. This temporary motor running will charge the closing spring a little but will not impact the further manual operation.

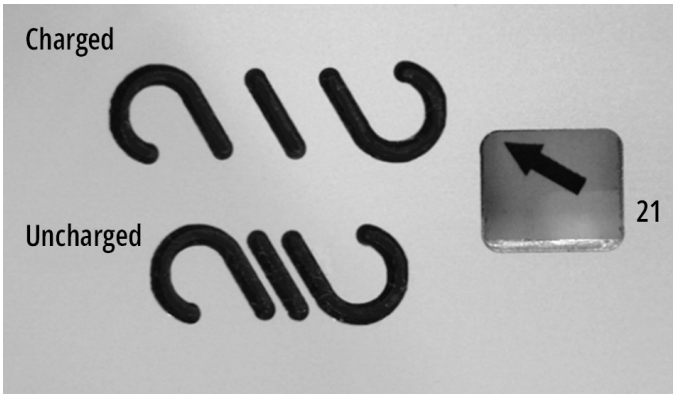


Figure 5-6: Closing spring status

5.5 Under voltage release

Under voltage release (UVR) is optionally available for Xiria 630 switchgear units. UVR functions as follows:

- If the secondary voltage drops below 35% of the rated value (Un), the no-voltage coil trips and opens the switch. With the no-voltage coil tripped, the switch can no longer be closed. Nor by remote operation nor by manual operation.
- If the secondary voltage exceeds 85% of the rated value (Un), the no-voltage coil engages, and the switch can be closed again.

NOTE

IF A XIRIA 630 SWITCHGEAR UNIT HAS UVR FUNCTIONALITY, THE CABLE'S EARTHING IS IMPOSSIBLE WITHOUT AUXILIARY VOLTAGE.

6. Inspection and maintenance

6.1 Introduction

The Xiria 630 unit is designed as a maintenance-free system. Most components don't require maintenance. All primary, live components are maintenance-free and are housed in a sealed-for-live gas-tight enclosure.

However, some of the following can be inspected or tested if needed:

- Cable and earth connections
- Switching functions
- Tank enclosure for damage, humidity conditions and contamination
- Voltage detection
- Protection relay
- The overcurrent indicator

6.2 Inspections

6.2.1 Inspecting cable and earth connections

Inspect the cable connection procedure:

1. Open the cable connection compartment following the procedure described in section 4.2.3.
2. Use a dry cloth to clean the compartment.
3. Check the cable plug connection according to the plug supplier's instructions. Ensure that the cable does not impart any mechanical strain on the plug. The cable support will absorb the cable forces; see 'Strain relief' in section 3.3.2.
4. Check the cable support. The cables must be secure in the cable clamp blocks. Bolts must be tightened to a torque of 20 Nm; see Cable assembly instructions in section 3.3.2.
5. Check the earth connections:
   - Between cables and earth strip
   - Between the earth strip and enclosure
   - Between earth strip and system earth
6. Close the cable connection compartment.

6.2.2 Inspecting switching functions

Inspect the switching functions by the following procedure:

1. Check with the person responsible for the unit whether the relevant unit is disconnected and ready for inspection.
2. Ensure the relevant panel is safely disconnected and check if the cable is dead.
3. Place the switch in the OFF position and the change-over switch in the earth position; see section 4.
4. Complete all switching operations described in section 4.7 Short-form instructions. Verify if the outcomes are correct. Check the control panel position indicators for the change-over switch and the vacuum interrupter position also through the inspection windows; see section 4.1.
5. If the operation doesn't result in the desired action or positions are not matching, shut down the unit and inform Eaton.

6.2.3 Inspection of the moisture-absorbing agent

Check the operation of the moisture absorbing agent in the unit with the color indicator. This is located behind the center inspection window of the right-hand panel (see figure 6-1).

The indicator must be pale blue in color.

Under normal operating conditions the moisture level inside the Xiria 630 unit is <15% due to the Silica Gel bags placed inside before the enclosure was sealed.

When the moisture indicator turned to pink instead of blue the moisture level inside the switchgear unit is more than 40%.

The type testing of the Xiria 630 unit has been carried out with the enclosure flaps open under normal atmospheric humidity conditions of > 50-60%.

When a too high level of humidity is detected by a pink colored indicator (e.g. at annual inspection), then the unit can still be safely switched but arrangements must be made for the unit to be taken out of service.

A first visual inspection can be made to check for damages to the outside of the enclosure, but when there is no visible damage detected, Eaton can assist in a further investigation into the loss of integrity of the enclosure and possible rectification.

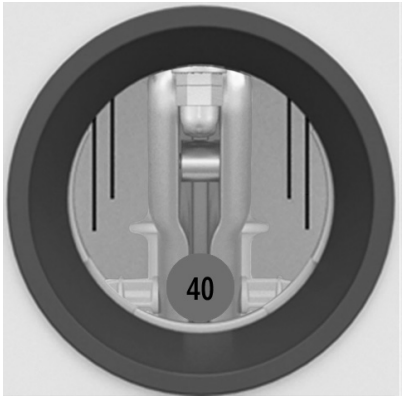


Figure 6-1: Moisture indicator

6.2.4 Testing voltage detection

See chapter 7 of this manual for a reference to the original manufacturers website for further information related to inspection and maintenance of the voltage detection system.

6.2.5 Inspecting the protection relay

See chapter 7 of this manual for a reference to the original manufacturers website for further information related to inspection and maintenance of the protection relay.

6.2.6 Inspecting the overcurrent indicator

See chapter 7 of this manual for a reference to the original manufacturers website for further information related to inspection and maintenance of the overcurrent indicator system.

6.3 Decommissioning the unit

6.3.1 Material processing after dismantling

Eaton prioritizes environmentally friendly design and manufacturing. Xiria 630 adheres to ISO 14001 standards, minimizing environmental impact using materials suitable for recycling and reuse.

Check out local regulations before dismantling old switchgear.

NOTE

EATON CAN MANAGE UNIT DISMANTLING MATERIAL DISPOSAL AND PROCESSING.

7. Protection relays, voltage detection and indicating systems

Depending on the customer requirements the Xiria 630 switchgear will be equipped with customer specific protection relays, voltage detection systems and indicating systems. This chapter is to give an overview of the general applied devices and to provide a reference to the original manufacturers website for further information.

7.1 Protection relays

Protection and control equipment is installed in the instrument front compartment or top unit.

- WIC self-powered relays, www.segelectronics.de/en/
- SIA-B self-powered relays, www.fanox.com
- HighPROTEC protection relays, www.eaton.com

7.2 Voltage detection and indicating systems

Voltage detection and indicating equipment is installed on the control panel.

- Wega voltage detection system, www.horstmanngmbh.com/en/
- CAPDIS voltage detection system, www.kries.com/en

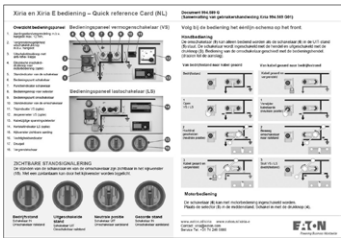
7.3 Short circuit and earth fault indicators

Short circuit and/or earth fault indicators are installed on the control panel.

- Alpha M, Compass B and Sigma short circuit and/or earth fault indicator, www.horstmanngmbh.com/en/
- IKI-23 short circuit indicator, www.kries.com/en

8. Accessories

Accessories

6079156	Operating handle 135 mm deep x 200 mm wide for ON-OFF switching of the circuit breaker and the load break switch and for busbar-earth position selection of the change-over switch.	
6079155	Operating handle 500 mm deep x 200 mm wide needed for operation of a Xiria 630 unit inside a compact transformer station with limited access in the front area.	
324555	Door key for secondary top unit	
1372153	Document & operating handle holder A4 size document & operating handle holder, to be positioned on the side of the switchgear to store documents and the short operating handle.	
	Quick reference card, showing the basic operations for ON-OFF switching, earthing and testing. Available in multiple languages.	
	Operating and maintenance manual, available in multiple languages.	

Options

665417	Scissor-type interlock, used in combination with a padlock inserted in the access hole for the vacuum interrupter. It prevents switching ON manually and it prevents the operation of the change-over switch.	
107926	Padlock 6 x 22 x 24 mm, including 2 keys used in combination with the scissor type interlock and for padlocking the earth interlock on the front.	
107079	Earthing warning sign, Used when a panel is switched ON in **Earthed position** and any further manual operation is not allowed.	
6074526	Main busbar coupling set for 1 side	
6072889	End finish set for extendable Xiria 630 panel for 1 side	
E6055889	Adapter WIC1-PC3 for WIC1 generation 1. Used to connect the WIC1-1PE protection relay to a computer (laptop) via a USB connection for setting the protection parameters or retrieving the data stored in the relay memory. Including connection cables and software.	
E6211026	Adapter WIC1PC4, USB - RJ45 adapter for configuring WIC1 generation 2 via SmartView SE software. USB-C to USB-A cable needed for connection between PC/ laptop and PC4 adapter. The PC4 adapter and WIC1 are both supplied from the 5V USB source during connection. RJ45 cable required between PC4 adapter and WIC1, category 3 as a minimum. Software and cables are not included.	
E6055901	Tester type WIC1-TU. Used for onsite diagnostic test of the WIC1 protection relay.	
E6046006	Phase sequence indicator Horstmann, type Orion 3.1, 50 Hz. Used for voltage, phase sequence and interface test of all types WEGA voltage detecting units (50 Hz).	

Accessories

Options

EK-E6046006-102	Phase sequence indicator Horstmann, type Orion 3.1, 60 Hz. Used for voltage, phase sequence and interface test of all WEGA voltage detecting units (60 Hz).	
E6046005	Phase sequence indicator Horstmann, type Orion Compare. Simplified version of the Orion 3.1. Used for voltage and phase/sequence test of all WEGA types and LED.	
E6054042	Set with wiring for testing LED indicators with Orion Compare. (Not included in Orion Compare delivery)	
E6046007	Functional tester Horstmann for all WEGA voltage detecting units.	
EK-51-026-201	Phase comparator / voltage indicator according to VDE 0682, type Orion M1 for all WEGA types. Including cable set, 2 HR/LMR adapters magnet holder and case.	

Full range fuses

Medium voltage full range DIN fuse with striker pin, Eaton Bussmann series, 88 x 292 mm.
Fuse types for rated voltage up to $U_r \leq 12$ kV

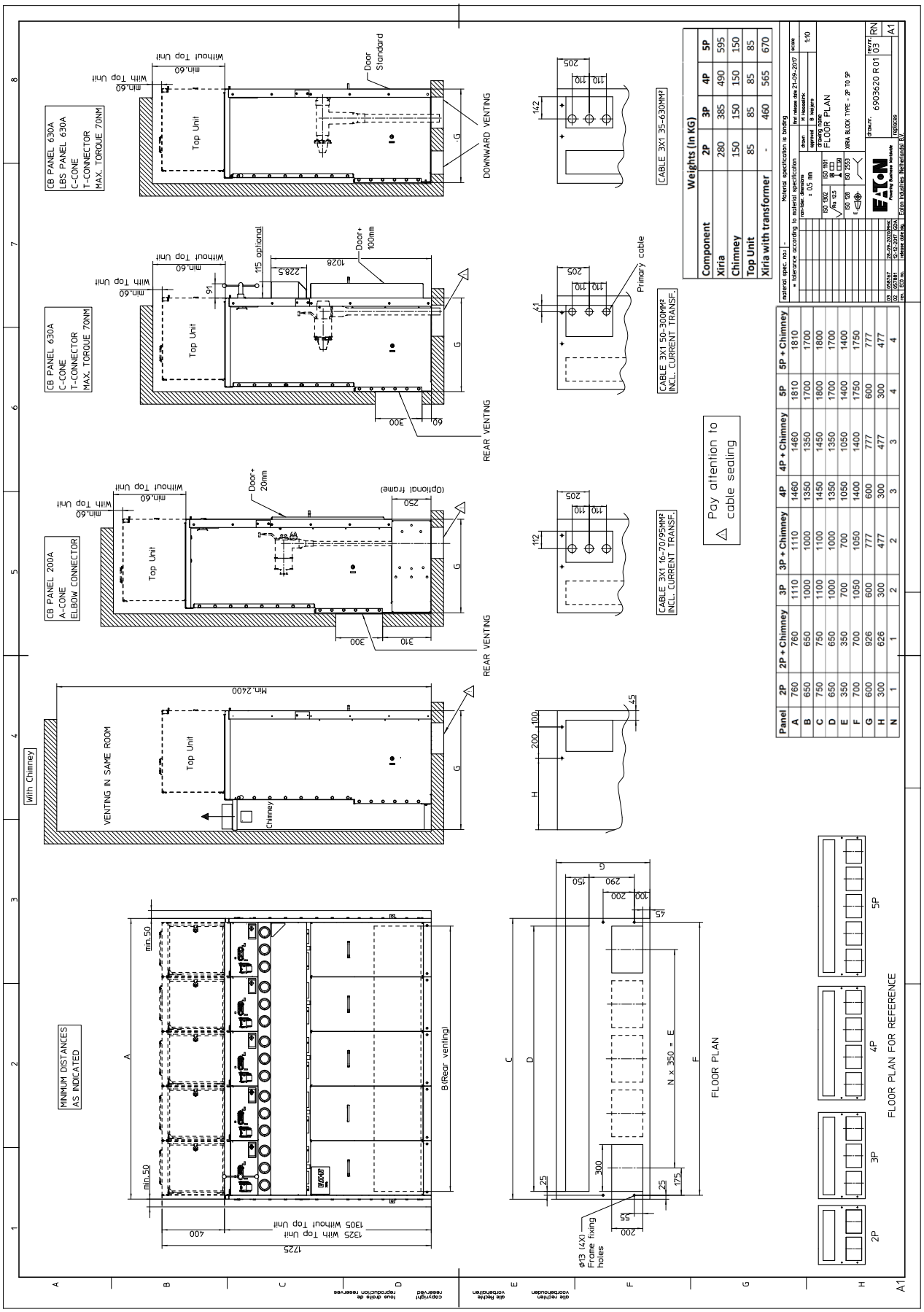
Type	Current rating	Maximum continuous current based on 10 kV transformer
12FDLSJ6.3	6,3 A	2,9 A (50 kVA)
12FDLSJ6.3	6,3 A	3,6 A (63 kVA)
12FDLSJ6.3	6,3 A	4,6 A (80 kVA)
12FDLSJ10	10 A	7,2 A (125 kVA)
12FDLSJ16	16 A	9,2 A (160 kVA)
12FDLSJ16	16 A	11,5 A (200 kVA)
12FDLSJ20	20 A	14,4 A (250 kVA)
12FDLSJ25	25 A	18,2 A (315 kVA)
12FDLSJ31.5	31,5 A	23,1 A (400 kVA)
12FFLSJ40	40 A	28,9 A (500 kVA)
12FFLSJ63	63 A	36,4 A (630 kVA)
12FXLSJ80	80 A	46,2 A (800 kVA)
12FXLSJ100	100 A	46,2 A (800 kVA)
12FXLSJ100	100 A	57,7 A (1000 kVA)

Medium voltage full range DIN fuse with striker pin, Eaton Bussmann series, 51 x 442 mm.
Fuse types for rated voltage up to $U_r > 12$ kV (Optional for ratings ≤ 12 kV)

Type	Amperage rating	Maximum continuous current based on 20 kV transformer
24FDMSJ6.3	6,3 A	1,4 A (50 kVA)
24FDMSJ6.3	6,3 A	1,8 A (63 kVA)
24FDMSJ6.3	6,3 A	2,3 A (80 kVA)
24FDMSJ6.3	6,3 A	3,6 A (125 kVA)
24FDMSJ10	10 A	4,6 A (160 kVA)
24FDMSJ10	10 A	5,8 A (200 kVA)
24FDMSJ16	16 A	7,2 A (250 kVA)
24FDMSJ16	16 A	9,1 A (315 kVA)
24FDMSJ20	20 A	11,5 A (400 kVA)
24FFMSJ25	25 A	14,4 A (500 kVA)
24FFMSJ31.5	31,5 A	18,2 A (630 kVA)
24FFMSJ40	40 A	23,1 A (800 kVA)
24FFMSJ45	50 A	28,9 A (1000 kVA)

9. Appendix 1 - Floor plans

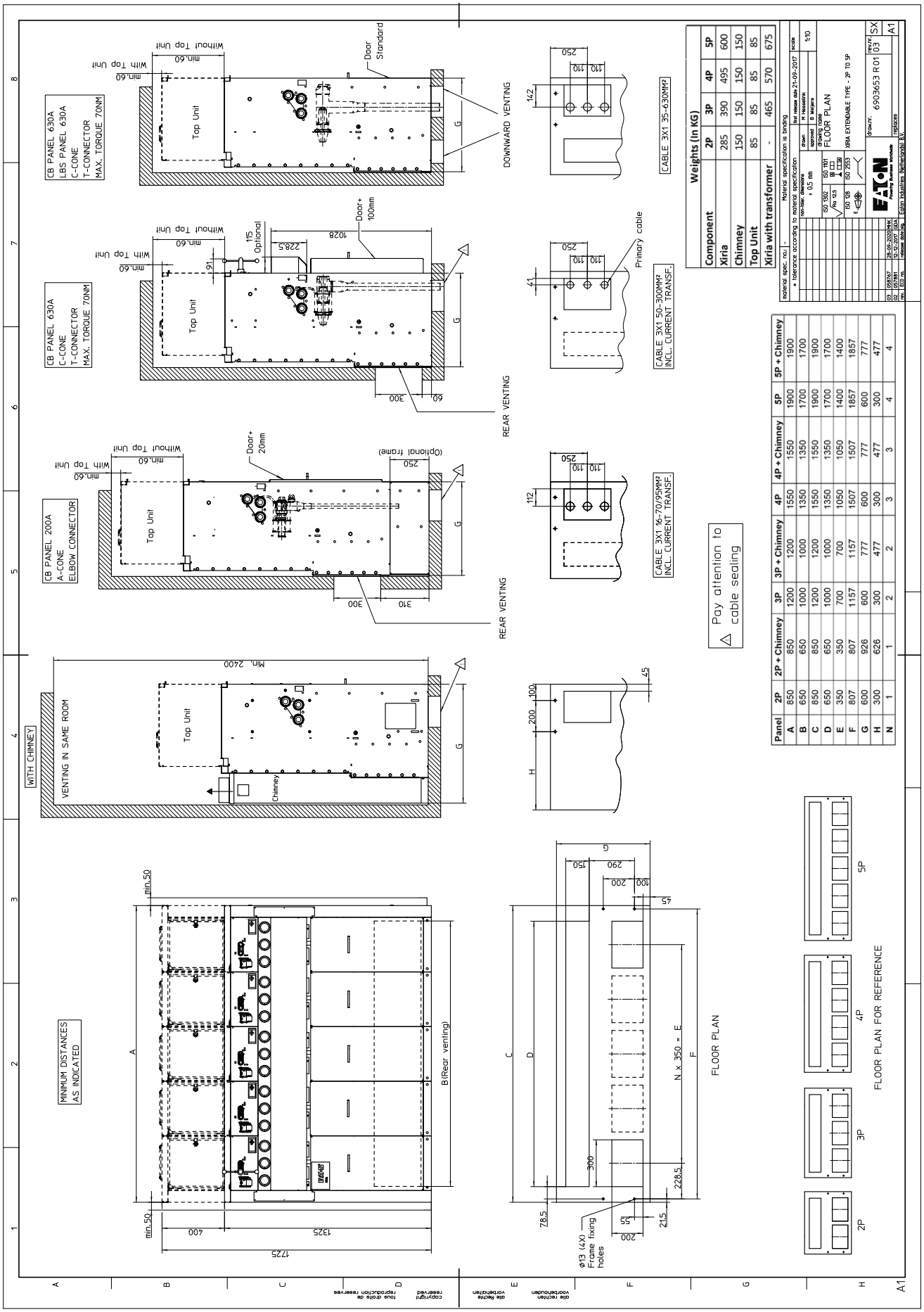
9.1 Xiria 630 block and 16 kA - 1 s chimney



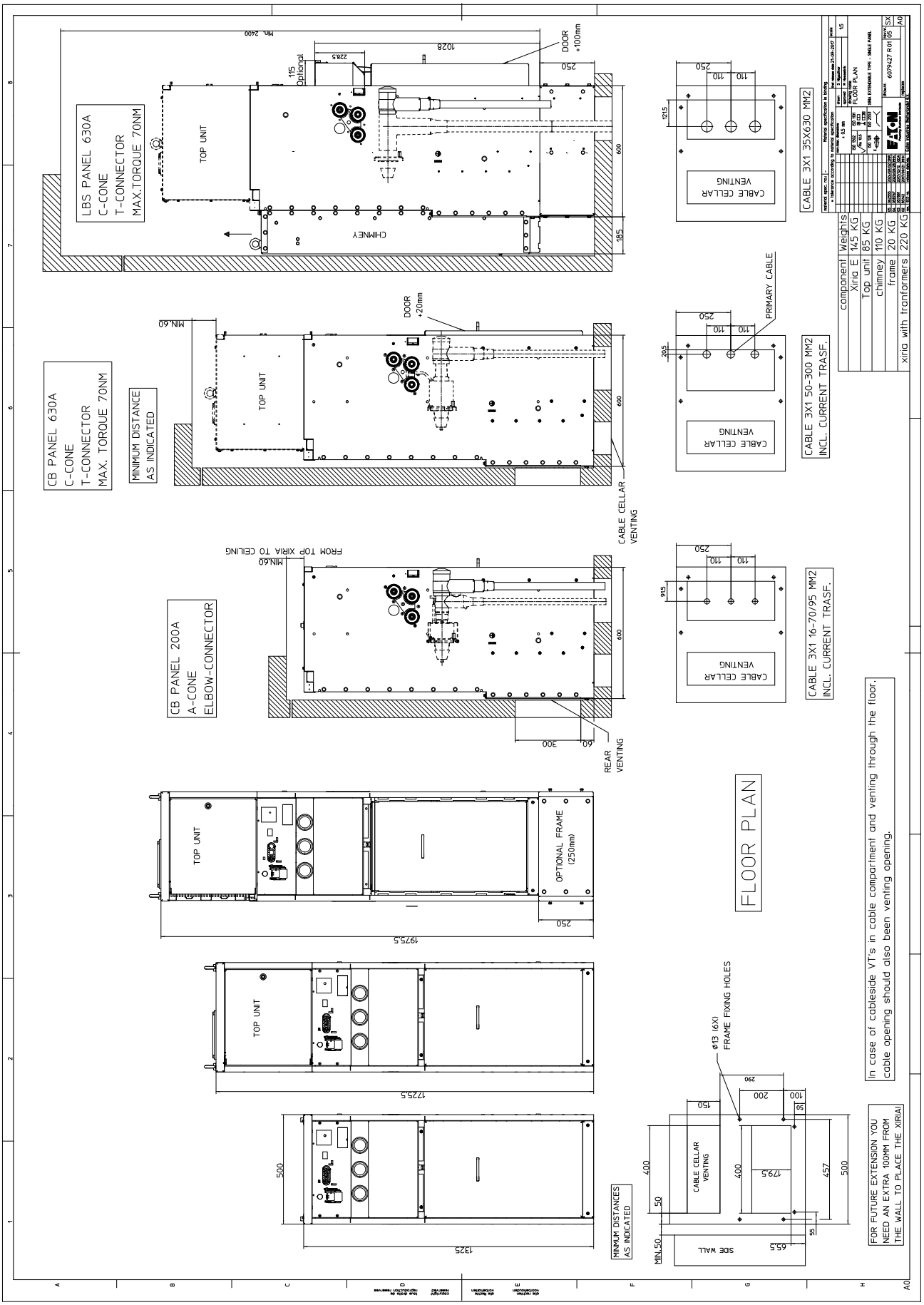
Weights (In KG)				
Component	2P	3P	4P	5P
Xiria	280	385	490	595
Chimney	150	150	150	150
Top Unit	85	85	85	85
Xiria with transformer	-	460	565	670

Panel	2P	2P + Chimney	3P	3P + Chimney	4P	4P + Chimney	5P	5P + Chimney
A	760	760	1110	1110	1460	1460	1810	1810
B	650	650	1000	1000	1350	1350	1700	1700
C	750	750	1100	1100	1450	1450	1800	1800
D	650	650	1000	1000	1350	1350	1700	1700
E	350	350	700	700	1050	1050	1400	1400
F	700	700	1050	1050	1400	1400	1750	1750
G	600	926	600	777	600	777	600	777
H	300	626	300	477	300	477	300	477
N	1	1	2	2	3	3	4	4

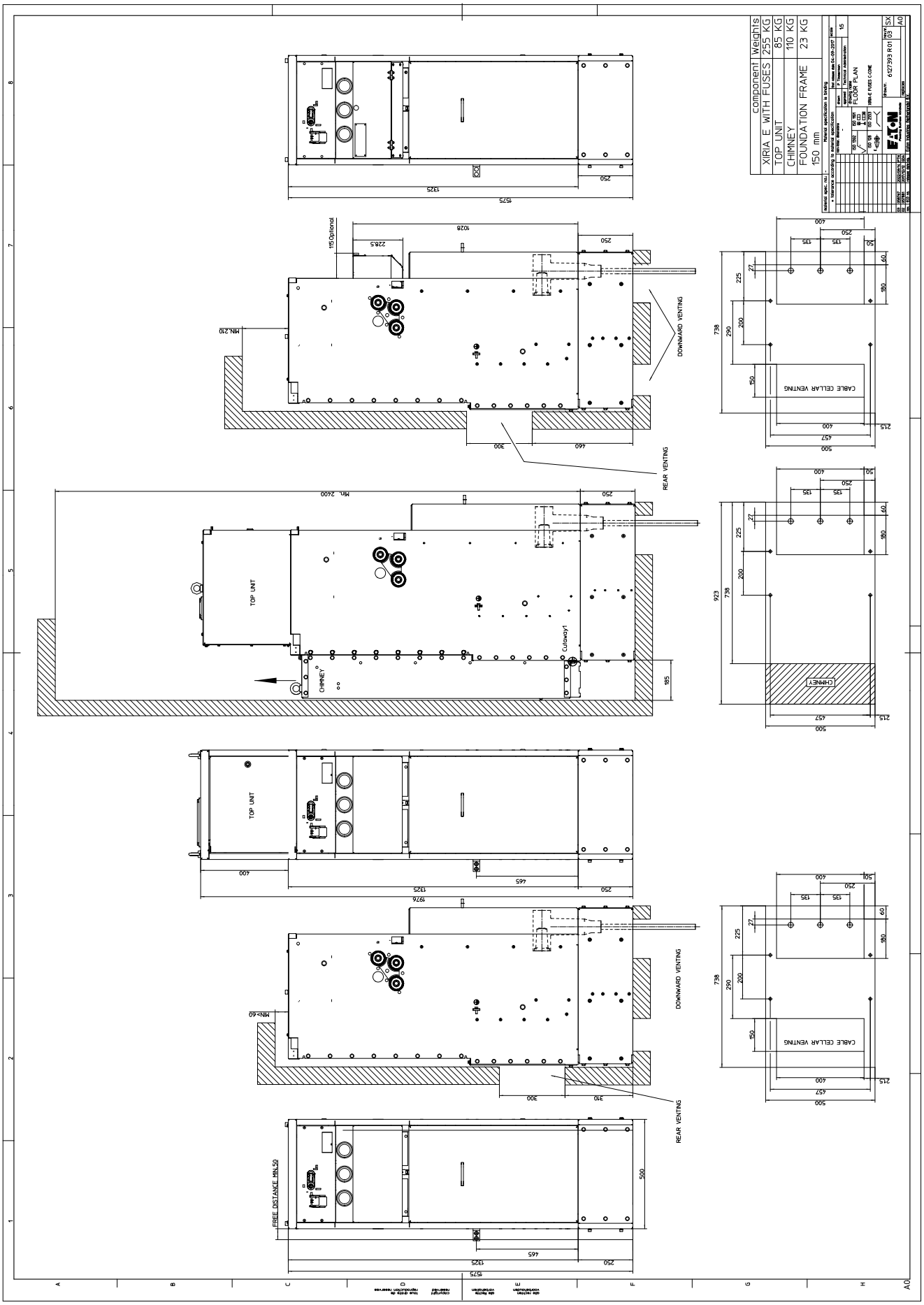
9.2 Xiria 630 extendable block and 16 kA - 1 s chimney



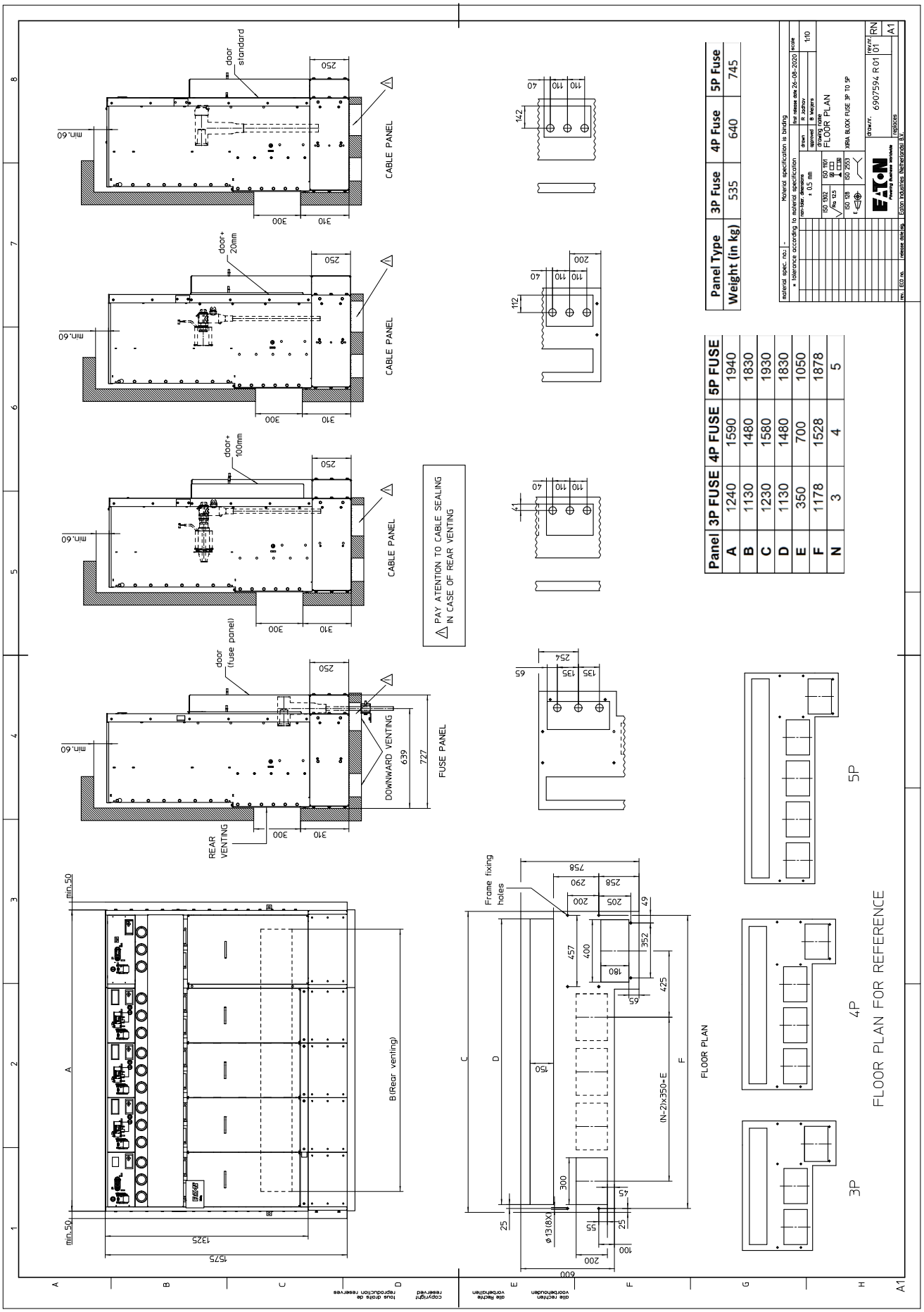
9.3 Xiria 630 single extendable panel and 16 kA - 1 s chimney



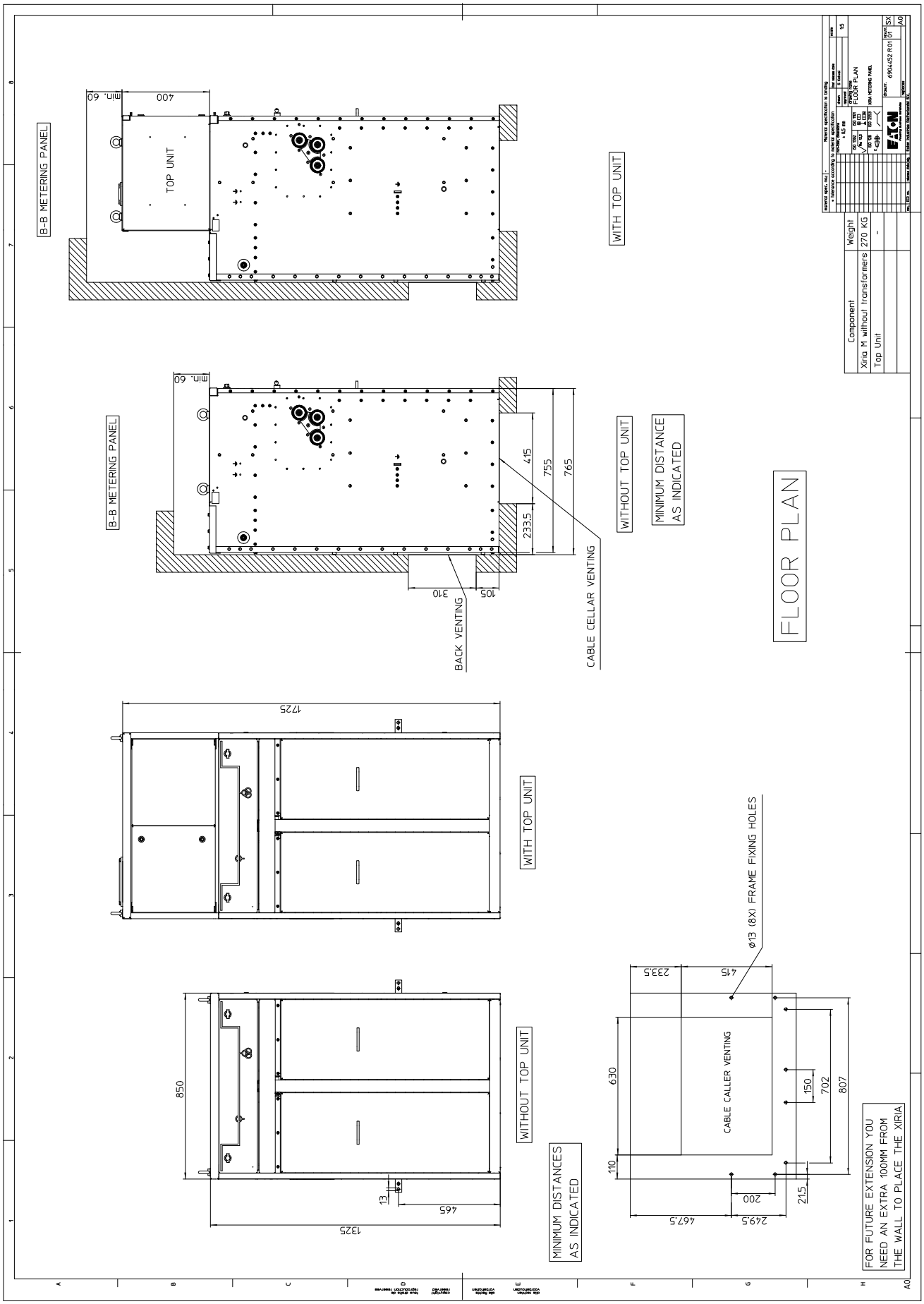
9.4 Xiria 630 single extendable fused load-break switch panel and 16 kA - 1 s chimney



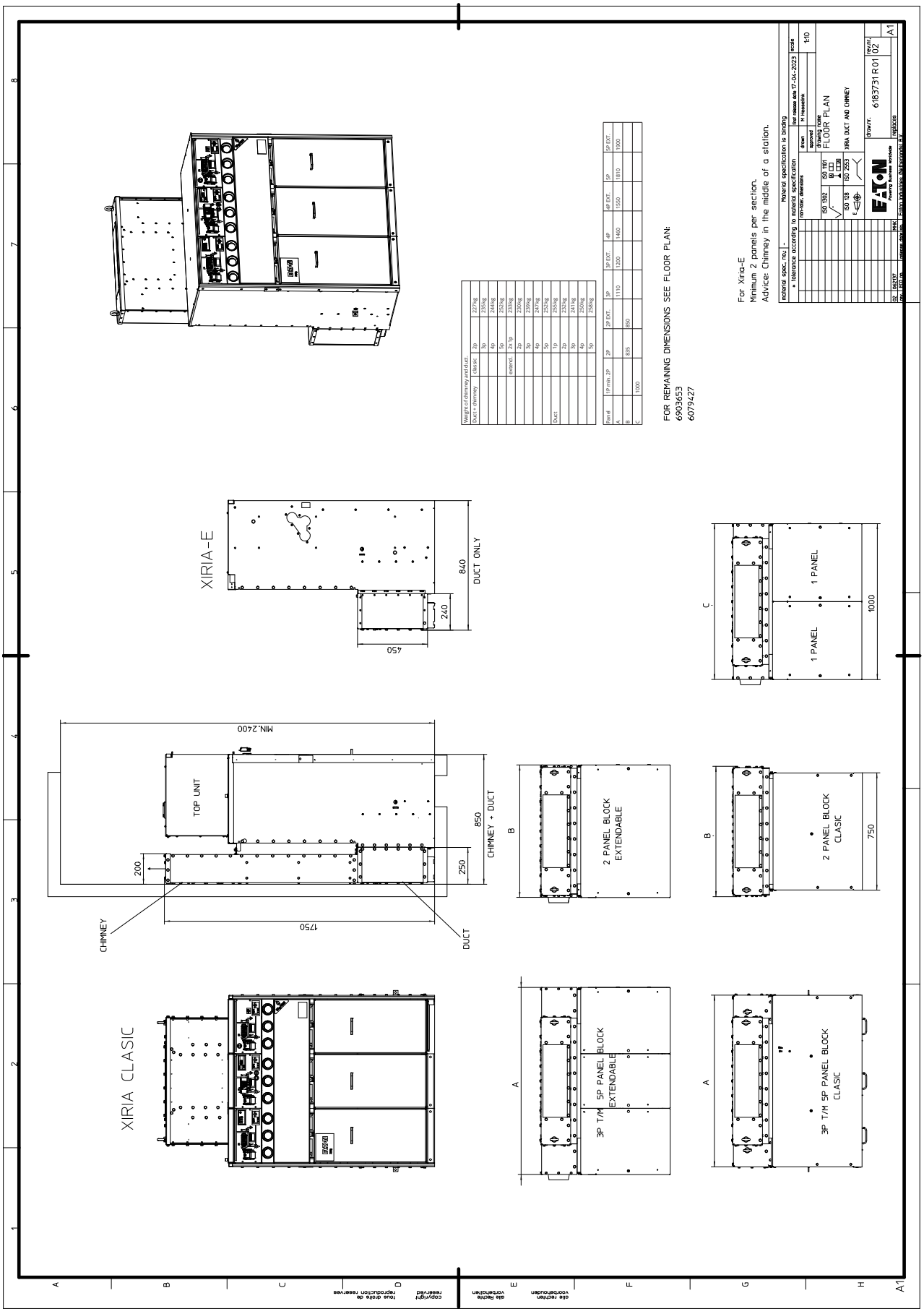
9.5 Xiria 630 block with fused load-break switch panel



9.6 Xiria 630 open metering panel



9.7 Xiria 630 21 kA - 1 s chimney



Notes

Eaton is an intelligent power management company dedicated to protecting the environment and improving the quality of life for people everywhere. We make products for the data center, utility, industrial, commercial, machine building, residential, aerospace and mobility markets. We are guided by our commitment to do business right, to operate sustainably and to help our customers manage power — today and well into the future. By capitalizing on the global growth trends of electrification and digitalization, we're helping to solve the world's most urgent power management challenges and building a more sustainable society for people today and generations to come.

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