Set Series

PIX Standard

Medium Voltage Distribution 12-17-24 kV
Air-insulated Switchgear with Vacuum Switching Devices

User Manual

GEX2563900SWE-00(NORDICS)

03/2025

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Set Series

Featuring outstanding medium-voltage (MV) and low-voltage (LV) switchboards, motor control centers and power distribution solutions for high-performance power applications, Schneider Electric's Set Series provides optimized solutions based on high levels of safety and an optimized footprint. Built on a modular architecture and incorporating smart connected devices for maximum safety, reliability, performance and energy efficiency, the Set Series is delivered to customers directly from our Schneider Electric plants or via a global network of licensed partner panel builders, who are trained and audited to provide quality equipment and support.

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Safety Information

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety message indicates that an electrical hazard exists which will result in death or serious injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages with this symbol to avoid possible injury or death.

⚠DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

Failure to follow these instructions will result in death or serious injury.

⚠WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

Failure to follow these instructions can result in injury or equipment damage.

NOTICE

NOTICE is used to address practices not related to physical injury.

Failure to follow these instructions can result in equipment damage.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and its installation and has received safety training to recognize and avoid the hazards involved.

Safety Precautions

Safety Rules

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate Personal Protective Equipment (PPE) and follow safe electrical work practices. Refer to standards or local equivalent.
- This EvoPacT HVX Vacuum Circuit Breaker (VCB) and the PIX equipment must only be installed and serviced by qualified electrical personnel.
- Perform work only after reading and understanding all of the instructions contained in this guide.
- Turn off all the power sources before working on or inside the equipment.
- Turn off or trip the VCB and discharge the mechanism.
- Always use a properly calibrated voltage sensing device to confirm power is off.
- Use only Schneider Electric specific tools (operating crank, extraction table, and so on).
- Check all devices, covers, and doors are in correct position before turning on the power.
- Beware of potential hazards and carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Do not modify the mechanical or electrical parts.
- Do not bypass the interlocks before operation.
- Do not operate with protective barriers removed.

Failure to follow these instructions will result in death or serious injury.

NOTICE

HAZARD OF INAPPROPRIATE HANDLING OR STORAGE CONDITIONS

- Comply with the handling rules and avoid causing any shocks to the device.
- If the equipment is stored before its final installation, observe the storage conditions.

Failure to follow these instructions can result in equipment damage.

Cleaning Instructions

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Do not use solvents or alcohol for cleaning the equipment.
- Do not use high-pressure cleaner for cleaning the equipment.

Failure to follow these instructions will result in death or serious injury.

About the Document

Intended Use

This User Manual describes operation and maintenance of air-insulated medium-voltage switchgear units of the series PIX Standard.

It is exclusively intended for use by the manufacturer's staff or by persons certified for the PIX series (training certificate).

Read instructions before operating, servicing, or doing maintenance of the equipment.

This User Manual is an integral part of the product and should be stored so that it is readily accessible at all times for and can be used by persons who are to work on the switchgear. If the switchgear is relocated to another site, this User Manual must be passed on to the new operators along with the unit.

As our products are subject to continuous development; we reserve the right to make changes regarding the standards, illustrations and technical data described in this User Manual.

This User Manual cannot describe every imaginable individual case or every customer-specific version of the product. For information which is not included in this manual, contact the manufacturer.

All dimensional data in this manual is in millimetres.

Related Documents

The following additional documents must be complied with:

- Purchase agreement with the stipulations regarding the switchgear-specific equipment and the legal details
- The appropriate switchgear-specific circuit diagrams/documentation
- The operating manuals of the low-voltage devices installed in the switchgear (for example, voltage presence detecting systems, devices in low-voltage cabinet)
- The assembly drawings supplied with the equipment
- The assembly instructions of the manufacturer of the cable connection systems to be connected to the switchgear
- The operating instructions of the trucks being used:

Title of Document	Reference Number
EvoPact HVX Vacuum Circuit Breaker 12–24 kV, Ir ≤ 2500 A	AGS531301-01
Metering Truck EvoPact MTX and Disconnector Truck EvoPact UTX up to 24 kV	AGS 531361-01
Vacuum Contactor CVX	NTV 133
Voltage Transformer Truck in Cable Compartment (can be Racked Out)	AGS 531505-02
PIX Additional Equipment	AMTNoT 077-02
Motor Control Center with Ur ≤ 7.2 kV	AGS 531500-02

Safety Provisions

Read the following instructions carefully before you work on the switchgear, and perform the work detailed in them as described. Do not perform any work which is not described in this guide.

Applicable Standards and Regulations

- IEC 62271-1: Common regulations for high-voltage switchgear and controlgear
- IEC 61936-1/HD 637 S1
- EN 50110-1: Operation of electrical equipment
- The locally applicable standards and regulations related to accident prevention, operating and work instructions. These national standards must be compliant with the above international standards

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before starting work on the earthing and testing trolley/cubicle, de-energize the system, verify it for zero voltage and earth the system according to the applicable safety rules pursuant to EN50110-1.
- After removal of covers, isolate the appropriate part of the switchgear unit from the power supply, for the operator safety in accordance to IEC 62271-200.
- Before performing work on the drive mechanism, switch off the supply voltage which helps prevent it from reclosing.
- Before starting work, release the energy-storing device by: an OFF–ON–OFF operating sequence for the circuit breaker and a closing via the make-proof earthing switch.

Failure to follow these instructions will result in death or serious injury.

Design and Description

Panel Design

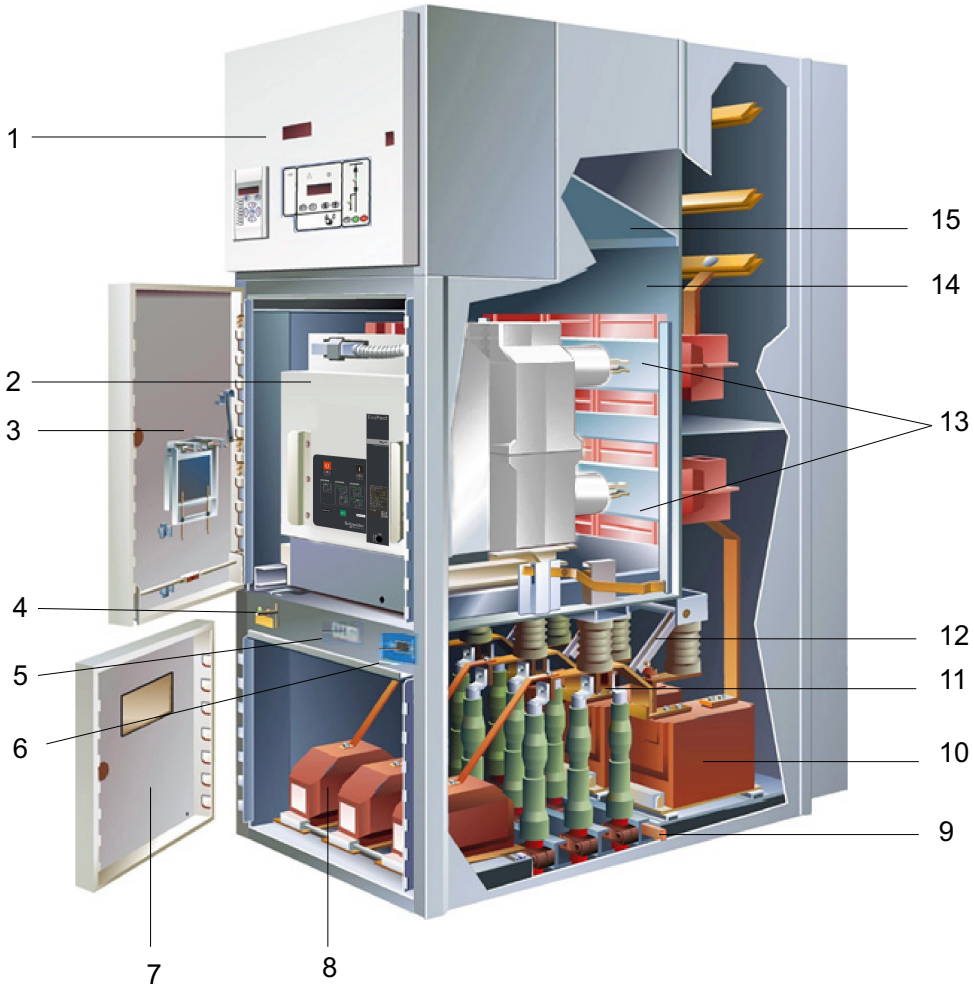


Figure 1
Feeder panel PIX 12 with circuit breaker truck EvoPact HVX (for rated currents ≤ 2500 A)

1	Low-voltage compartment	9	Earth bar
2	Circuit breaker truck EvoPact HVX	10	Current transformer
3	Front door	11	Cable connections
4	Earthing switch control element	12	Make-proof earthing switch
5	Voltage indicator	13	Shutter
6	Position indicator of earthing switch	14	Busbars
7	Cable compartment cover	15	Pressure relief flap of switching device compartment
8	Voltage transformer (optional)		

NOTE: Image is for representation purpose. Actual color of component/ product may differ from document.

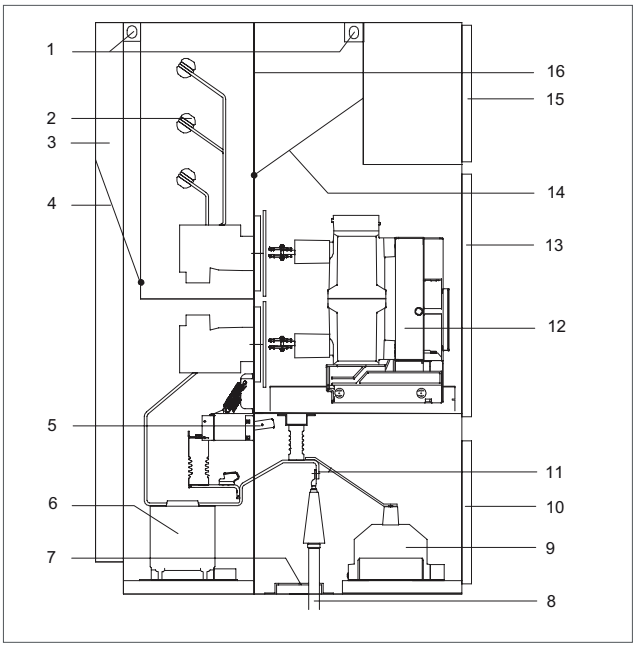


Figure 2
Feeder panel with circuit breaker truck EvoPact HVX (for rated currents ≤ 2500 A)

1	Jack rings for transport harness	9	Voltage transformer (optional)
2	Busbars	10	Cable compartment cover
3	Pressure relief duct	11	Cable connection
4	Pressure relief flap of cable compartment	12	Circuit breaker truck EvoPact HVX
5	Earthing switch	13	Front door
6	Current transformer	14	Pressure relief flap of switching device compartment
7	Cable fastening	15	Door of low-voltage compartment
8	High-voltage cable	16	Pressure relief flap of busbar compartment

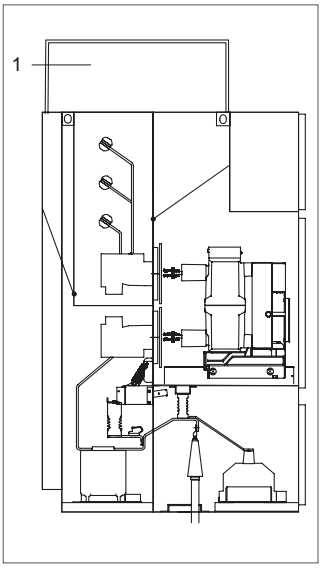


Figure 3
Panel with Internal Arc Classification (IAC)

1	Pressure relief duct

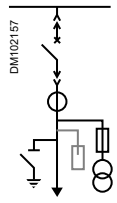
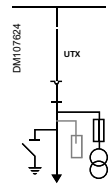
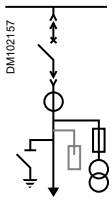
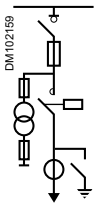
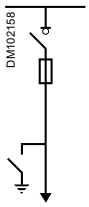
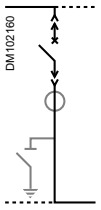
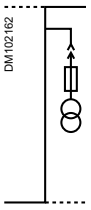
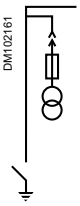
Panel Variants

The sub-chapters always show panel types with the appropriate basic equipment. Customized models with additional equipment are described in the switchgear-specific documentation.

Functional Overview

PIX has a comprehensive range of functions to suit all requirements for many applications.

The table below can be used to link requirements to functional units and gives basic information on the general composition of each unit.

Panel Architecture	**Feeder**					**Bus coupler**	**Bus riser**	**Busbar metering & busbar earthing**	
Application	**Line transformer generator**	**Line**	**Line transformer motor capacitor**	**Motor capacitor**	**Auxiliary transformer**	**Bus section coupler**	**Bus section riser**	**Voltage transformer**	**Earthing switch**
Main device	Circuit breaker	Disconnector or fix copper bar	Circuit breaker	Contactor with fuse	Load break switch with fuse	Circuit breaker	Voltage transformer, disconnector or fix copper bar	Voltage transformer	Earthing switch
Type of device	EvoPact HVX	EvoPact UTX	EvoPact HVX	CVX	LTRI	EvoPact HVX	EvoPact MTX, UTX or copper bar	EvoPact MTX	Earthing switch
Panel function	Incomer	Direct incomer	Feeder			Bus sectioning		bb voltage metering	Busbar earthing
Panel name, code	**F**	**F**	**F**	**FC (PIX-M)**	**FS**	**BSC**	**BSR**	**BME**	
Single line diagram									

Feeder Panels with Switching Devices

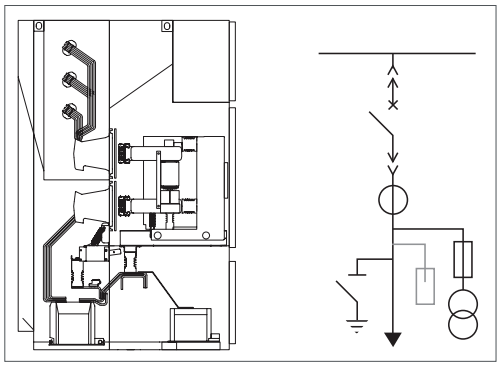


Figure 4
Feeder panel with circuit breaker truck EvoPact HVX for rated currents > 2500 A and voltage transformer (optional)

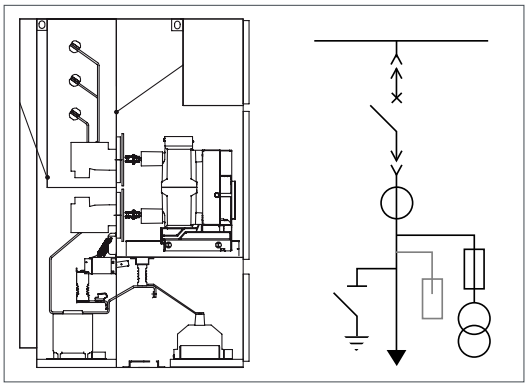


Figure 5
Feeder panel with circuit breaker truck EvoPact HVX for rated currents ≤ 2500 A and voltage transformer (optional)

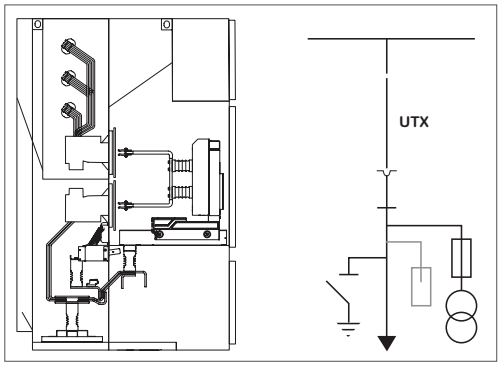


Figure 6
Panel with disconnector truck EvoPact UTX

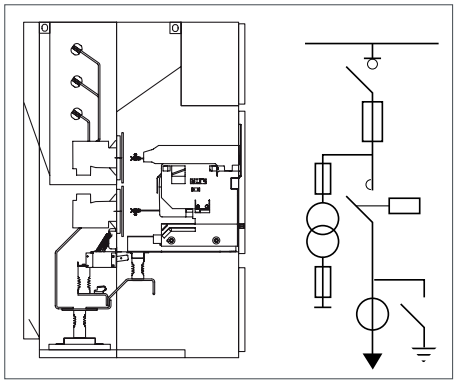


Figure 7
Motor Control Center panel with vacuum contactor CVX (only 12 kV)

Panels for Bus Section

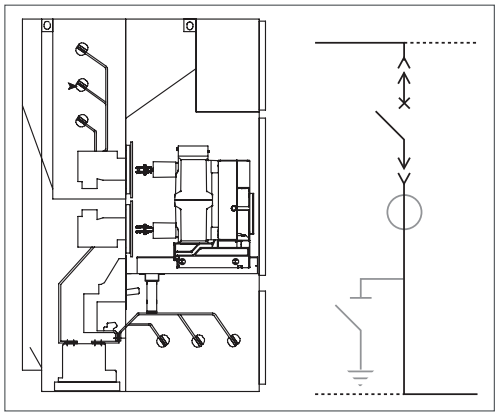


Figure 8
Bus section coupler **Circuit breaker panel with earthing switch**

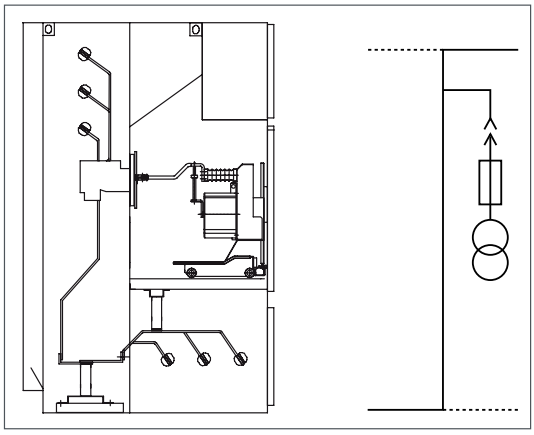


Figure 9
Bus section coupler **Bus riser panel with metering truck EvoPact MTX**

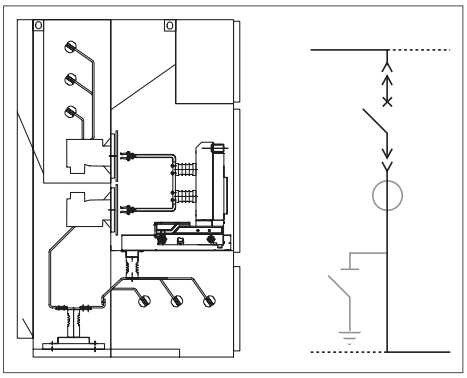


Figure 10
Bus section coupler **Bus riser panel with disconnector truck EvoPact UTX**

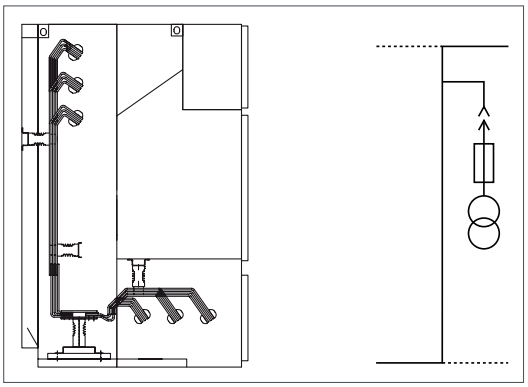


Figure 11
Bus section coupler **Bus riser panel**

Panels with Busbar Voltage Transformer and Earthing Switch

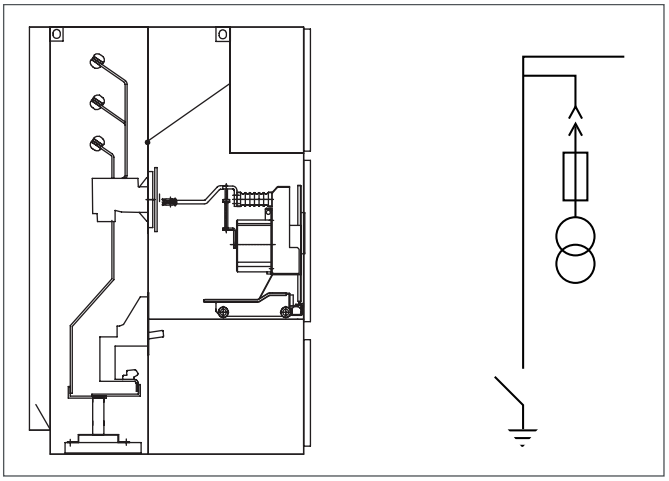


Figure 12
Metering panel with metering truck and busbar earthing switch

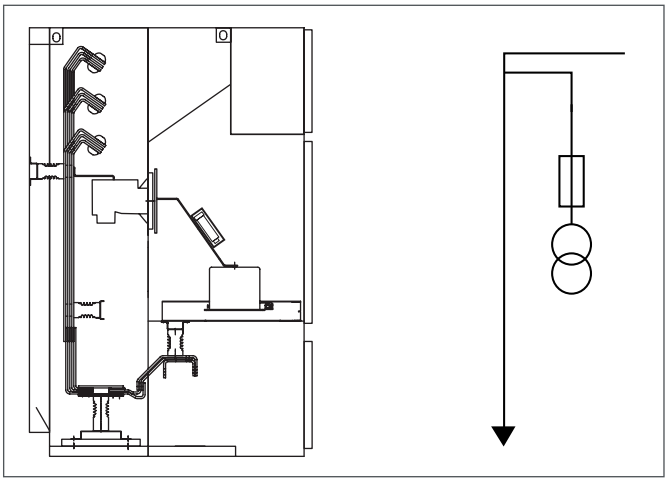


Figure 13
Bus riser panel, optionally available with fixed voltage transformer

Dimensions and Weights (Without Packaging)

For the precise panel dimensions, refer to the switchgear-specific documentation. These depend on:

- The rated voltage
- The rated normal current
- The rated short-time current and
- Additional equipment:
  - Busbar or fan attachments
  - Rear high voltage cable connection

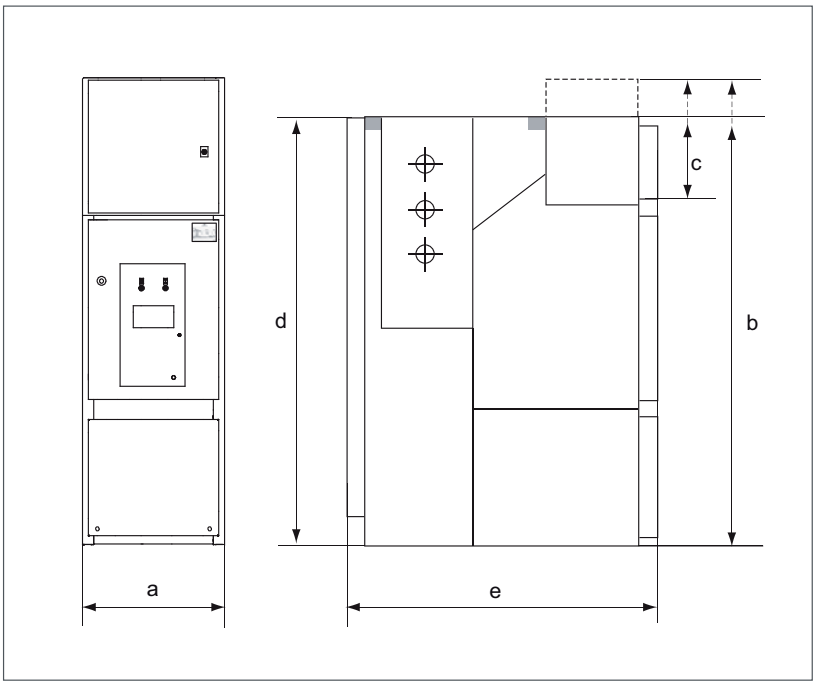


Figure 14
Dimensions of PIX panels

a	Panel width
b	Panel height (depending on height of low-voltage compartment)
c	Height of low-voltage compartment
d	Panel height without low-voltage compartment and attachments
e	Panel depth

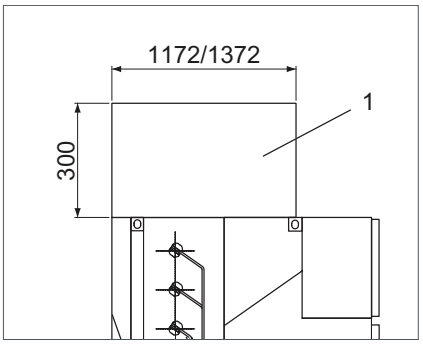


Figure 15
Dimensions of pressure relief duct and deflector

1	Pressure relief duct

PIX 12

F type characteristics		PIX 12						
Rated voltage	Ur	12 kV						
Rated short-circuit breaking current	Isc	25–31.5 kA						
Rated short-time withstand circuit	Ip@ 50 Hz	63–100 kA						
	Ip@ 60 Hz	65–104 kA						
Rated duration of short-circuit	tk	3 s						
Rated current busbar, max	Ir bb	up to 3150 A(1)						
	Rated current circuit breaker	Ir	630 A	1250 A	1600 A	2000 A	2500 A	3150 A(1)
Dimensions	H	2130 mm						
	D	1605 mm(2)						
	W	650 mm/800 mm(3)		800 mm/1000 mm(3)		1000 mm		
Approximate mass		820 kg		850 kg		870 kg		

(1) Higher ratings for forced cooling can be provided on request.

(2) 2 set of CT or 31.5 kA.

(3) Wider panel on request.

PIX 17

F type characteristics		PIX 17						
Rated voltage	Ur	17.5 kV						
Rated short-circuit breaking current	Isc	25–31.5 kA						
Rated short time withstand circuit	Ip@ 50 Hz	63–100 kA						
	Ip@ 60 Hz	65–104 kA						
Rated duration of short-circuit	tk	3 s						
Rated current busbar, max	Ir bb	up to 3150 A(1)						
	Rated current circuit breaker	Ir	630 A	1250 A	1600 A	2000 A	2500 A	3150 A(1)
Dimensions	H	2200 mm						
	D	1605 mm						
	W	750 mm/1000 mm(2)				1000 mm		
Approximate mass		850 kg				870 kg		

(1) Higher ratings for forced cooling can be provided on request.

(2) Wider panel on request.

PIX 24

F type characteristics		PIX 24						
Rated voltage	Ur	24 kV						
Rated short-circuit breaking current	Isc	25–31.5 kA						
Rated short time withstand circuit	Ip@ 50 Hz	63–80 kA						
	Ip@ 60 Hz	65–82 kA						
Rated duration of short-circuit	tk	3 s						
Rated current busbar, max	Ir bb	up to 2500 A(1)						
		Rated current circuit breaker	Ir	630 A	1250 A	1600 A	2000 A	2500 A(1)
Dimensions	H	2330 mm						
	D	1605 mm/1805 mm (2)						
	W	800 mm/1000 mm(3)				1000 mm		
Approximate mass		850 kg				870 kg		

(1) Higher ratings for forced cooling can be provided on request.

(2) 2 set of CT.

(3) Wider panel on request.

Applied Standards

Series PIX switchgear units with vacuum switching devices are:

- Metal-enclosed; loss of service continuity category accordance IEC 62271-200: 2011 LSC 2B-PM
- Type-tested
- Optional: tested for internal faults (qualification IAC)
- Dimensioned for indoor installation.

The PIX switchgear units meet the following standards and regulations:

Designation	IEC/EN-Standard
Switchgear	IEC 62271-200: 2011 IEC 62271-1: 2017
Internal arc classification (IAC)	IEC 62271-200: 2011
Circuit breaker	IEC 62271-100: 2017
Vacuum contactor	IEC 60470
Earthing switch	IEC 62271-102: 2018
Disconnector truck	IEC 62271-102: 2018
Current transformer	IEC 61869-2: 2012
Voltage transformer	IEC 61869-3: 2011
Voltage presence Indicating systems (VPIS)	IEC 62271-206: 2011
Voltage detection indication system (VDIS)	IEC 62271-213: 2021
Protection against accidental contact, foreign bodies and water	IEC 62271-200: 2011 IEC 60529: 2013

Designation	IEC/EN-Standard
Installation	IEC 61936-1
Operation of electrical equipment	EN 50110-1
High-voltage fuse link	IEC 60644: 2009 IEC 60282-1: 2009

Degrees of protection against accidental contact and foreign objects

Degrees of protection against accidental contact and foreign objects according to IEC 60529: 2013	
External enclosure of panel	IP3X(1)
Between the compartments of the panel	IP2X
(1) Optional IP4X; other values available on request.	

Environmental and Operating Conditions

PIX is an indoor switchgear and may only be operated under normal conditions in accordance with IEC 62271-1: 2017.

Operation under conditions deviating from these is only admissible subject to consultation with and written approval from the manufacturer.

Ambient conditions in accordance with IEC 62271-1: 2017	
Temperature class	-5 °C Indoors(1)
Ambient temperature minimum/maximum	-5 °C/+40 °C(1)
Average value over 24 hours	≤ 35 °C
Mean relative air humidity: 24 hours/1 month	≤ 95%/≤ 90%
Installation altitude above sea-level	≤1000 m
(1) Higher values available on request.	

Ratings of the PIX Series

Switchgear Panel		PIX 12	PIX 17	PIX 24
Rated voltage U_r		12 kV	17.5 kV	24 kV
Rated lightning impulse withstand voltage U_p		75 kV	95 kV	125 kV
Rated power frequency withstand voltage U_d		28 kV	38 kV	50 kV
Rated normal current I_r	Busbar	≤ 3150 A(1)		≤ 2500 A(1)
	Circuit breaker			
	Vacuum contactor	200–400 A	–	
Rated peak withstand current I_p(2)		≤ 100 kA		≤ 80 kA
Rated short-time current I_k(2)		≤ 31.5 kA		≤ 31.5 kA
Rated frequency f_r		50/60 Hz		
(1) Higher ratings for forced cooling can be provided on request. (2) The short-circuit capability of the current transformers must be considered separately.				

The applicable panel-specific technical data are indicated on the nameplate (refer to the Nameplate, page 18) and in the switchgear-specific documentation.

The technical data of the switching device (EvoPact HVX, UTX) are indicated on the nameplate and in the operating manual of the device concerned.

Nameplate

The type designation on the nameplates on the front of the panels (refer to Figure 16) informs about essential technical data. When submitting enquiries to the manufacturer or ordering spare parts, the following information is required:

- Type designation
- Serial number
- Year of construction

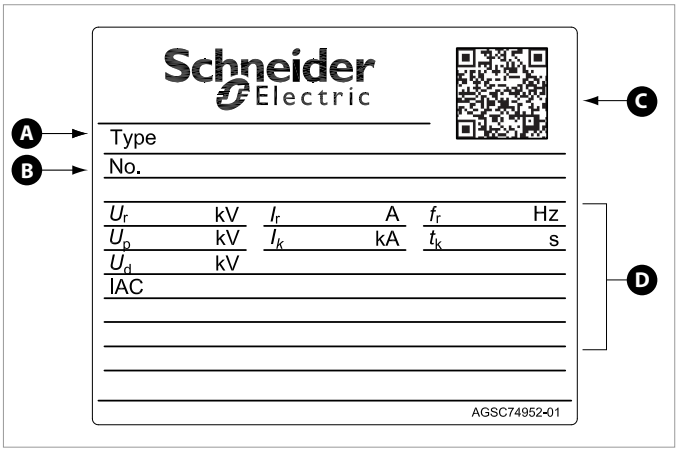


Figure 16
Nameplate on panel front

A	Type designation
B	Serial number
C	Year of construction
D	Technical data

Technical Data of Electrical Control and Operating Devices

The switchgear panels have been designed on principle so as to permit manual operation.

The drive mechanisms of the individual switching devices can be equipped, depending on the specific customer‘s model, with additional electrical control and operating devices. These are defined in the switchgear-specific circuit diagram, refer to the switchgear documentation.

Component fitting options:

- Motor-operated drive mechanism for the earthing switch control element
- Blocking coil

  The blocking coil helps to prevent manual actuation of the earthing switch. If the supply voltage has failed or is shut off, all blocking coils are in **blocked** position.

- Auxiliary switches

  Auxiliary switches are always actuated directly by the truck or by the switch shaft via an intermediate linkage. Their position always corresponds to that of the main contacts. The switching functions have been set in the factory according to the circuit diagram.
- Micro-switches are used depending on the customized panel models.

Overview of rated supply voltages

	Overview of rated supply voltages					
Direct voltage DC	24 V	48 V	60 V	110 V	125 V	220 V
Alternating voltage AC	(110)/120 V			(220)/230 V		

Power consumption

Device	**Rated power consumption**	
	DC approx. [W]	**AC 50/60 Hz approx. [VA]**
Blocking coil	12	
Motor for earthing switch	150	

Information about the power consumption of solenoids and the motor is available in the related user guides, for example EvoPact HVX and CVX.

Trucks

Electrical control and operating devices of trucks are described in the appropriate Technical Manuals, refer to the Reference documents, page 7:

- Circuit breaker EvoPact HVX with 12–24 kV, Ir ≤ 2500 A, refer to the *Technical Instruction* (AGS 531301-01)
- Disconnector truck EvoPact UTX/Metering truck EvoPact MTX up to 24 kV, refer to the *Technical Instruction* (AGS 531361-01)
- Vacuum contactor CVX, refer to the Technical Instruction NTV 133

Utilization in Line with the Intended Purpose

PIX series air-insulated medium-voltage switchgear units are designed exclusively for switching and distributing electrical power. They may only be used in the scope of the specified standards and the switchgear-specific technical data. Any other utilization constitutes improper use and may result in dangers or damage of equipment.

⚠WARNING

HAZARD OF INCORRECT ASSEMBLY, USE AND OPERATION

- Only use the PIX series air-insulated medium-voltage switchgear units in the scope of the specified standards and the switchgear-specific technical data.
- Operate the PIX series air-insulated medium-voltage switchgear unit according to its intended use.
- Assemble, connect or operate the PIX series air-insulated medium-voltage switchgear unit properly.
- Use accessories or spare parts which have been approved by the manufacturer.
- Do not convert the switchgear or attach inadmissible parts without the manufacturer's approval.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Disposal After the End of the Useful Life

A material and recycling data sheet can be provided on request for the disposal of series PIX switchgear at the end of its service life.

Disposal is performed as a service by the manufacturer's Service Center which to payment.

Voltage Indicators

Voltage Detection Systems (VDS)

> **⚠CAUTION**
>
> **HAZARD OF INCORRECT OPERATION**
>
> All three phases L1, L2 and L3 to be checked.
>
> **Failure to follow these instructions can result in injury or equipment damage.**

Pluggable Voltage Detection System

The operating voltage or the zero voltage state of the feeders is detected via a separate voltage detection system according to IEC 61243-5.

Socket-contacts for the indicator units are located on the panel front (Figure 18). Capacitive voltage indicators of all the approved manufacturers can be used (Figure 17).

NOTE: All three phases L1, L2 and L3 to be checked.

Close non-used socket-contacts using caps.

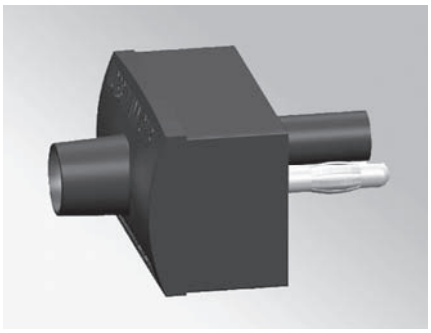


Figure 17
Voltage indicator (Type HR-ST, Horst-mann GmbH)

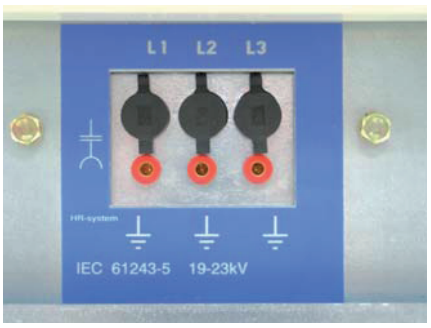


Figure 18
Socket-contacts for HR system on the panel front

Integrated Voltage Detection System IVIS

IVIS (Figure 19) is an integrated voltage detection system with display unit used to determine zero voltage according to IEC 61243-5.

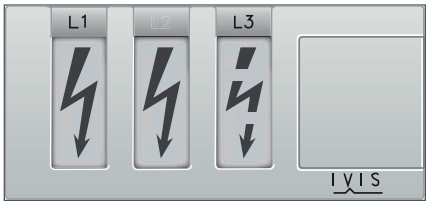


Figure 19
Integrated Voltage Detection System IVIS

The IVIS system has been designed for maximum operating reliability. It does not require supply from an external source. It features climateproof encapsulated electronics and is maintenance-free, due to permanent monitoring of the indication thresholds.

Flash arrow symbols on the indicators display the operating voltage still existing within the defined response thresholds (Figure 19). The IVIS system does not require the electrical repeat tests common for voltage detection systems.

For a description of all functions and messages of the IVIS system, refer to the *separate Operating Manual IVIS* (AGS 531757-01).

Voltage Present Indicating System VPIS

VPIS is a capacitive voltage indicator in accordance with IEC 61958. It is exclusively used to display the specified operating voltage.

The Voltage Presence Indicating System cannot be used to verify zero voltage.

⚠⚠DANGER

HAZARD OF INCORRECT OPERATION

- Use voltage indicators in accordance with IEC 61243-5 to determine zero voltage.
- Before opening the switchgear or before performing work on live components, these areas must always be earthed by means of a make-proof earthing switch.

Failure to follow these instructions will result in death or serious injury.

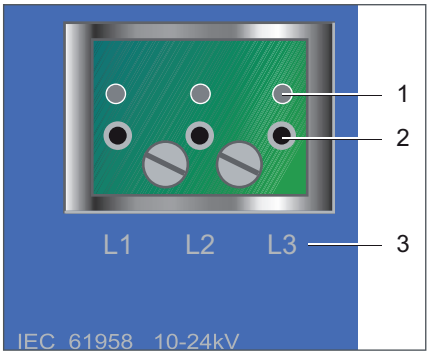


Figure 20
Voltage Present Indicating System VPIS

1	Indicator lamps
2	Connection points
3	Phases

In operation, each of the 3 phases L1, L2 and L3 (C) is displayed by its own flashing indicator lamp.

For each phase, a connection point is available below each indicator lamp for connection of the phase comparator. Only approved phase comparators may be used for this VPIS system.

Phase Comparators

Phase comparators are optionally available and not included in the scope of supplies.

Check phase coincidence before connecting different supply lines for the first time.

Phase Comparators for VDS Systems

If IVIS is used, phase comparison can be performed by means of the phase comparator MS 100 (Figure 21). For more information, refer Voltage Detection Systems (VDS), page 21.

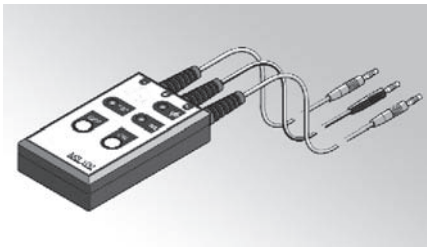


Figure 21
Phase comparator MS 100

Phase Comparator for VPIS System

This phase comparator may only be used for the VIPS system in Voltage Present Indicating System VPIS, page 22.

Rated voltage Ur [kV]	VPIS item number
5–7.2	AMT150384-01
10–24	AMT150384-02

Figure 22
Phase comparator for HR system (Type ORION 3.0, Horstmann GmbH)

Check the device before each operation:

- Connect the two plugs of the phase comparator to the two connection points of a VPIS device (Figure 23).
- The lamp must light up: The phase comparator is working properly.

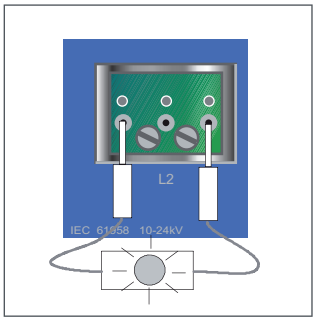


Figure 23
No phase coincidence: indicator lights up

Checking phase coincidence of two panels:

- Connect the plugs of the phase comparator to the same phase connection points of two different VPIS devices (panels) (Figure 24).
- The indicator must not light up. If the phases do not coincide, check the cable connection and, if necessary, exchange.
- After each operation, check the device once more (see item 1).

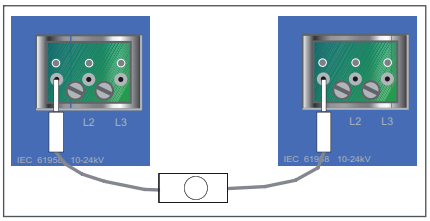


Figure 24
No phase coincidence: indicator lights up

Voltage Detecting and Indicating System (VDIS)

Description of VDIS Unit

The VDIS unit is a self-powered voltage detecting and indicating system.

The VDIS unit is integrated into Schneider Electric cubicles, flush-mountable and designed according to standard IEC 62271-213: 2021. The VDIS unit is fitted with a three LED display and detects the **operating** voltage presence/absence on the Cubicle main circuit.

> **NOTE:** VDIS is not intended to distinguish between voltage not present (that is U < 10% of nominal voltage) and dead circuit state (that is U = 0 V).

The VDIS receives the information through the capacitive sensor installed inside the insulator in PIX.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- You must use the VDIS unit to detect and indicate the presence or absence of operating voltage.
- You must not use the VDIS unit to distinguish between voltage not present (that is U < 10% of nominal voltage) and dead circuit state (that is U = 0 V).

Failure to follow these instructions will result in death or serious injury.

Range of VDIS Unit Variants

For each version of VDIS unit, there are several variants (depending if it includes Voltage Output option or not). These variants can be identified as follows:

VDIS unit variant	Reference
Standard VDIS	VDIS003STD, VDIS004STD, VDIS005STD, VDIS006STD, VDIS007STD, VDIS008STD and VDIS009STD

Variants are required to be selected according to the following criteria:

- The range of MV for the selected PIX product
- The value of capacitor used inside the bushings of cubicle system
- The network frequency
- Associated devices.

Identifying Unit Parts

The VDIS unit consists of two sub-assemblies:

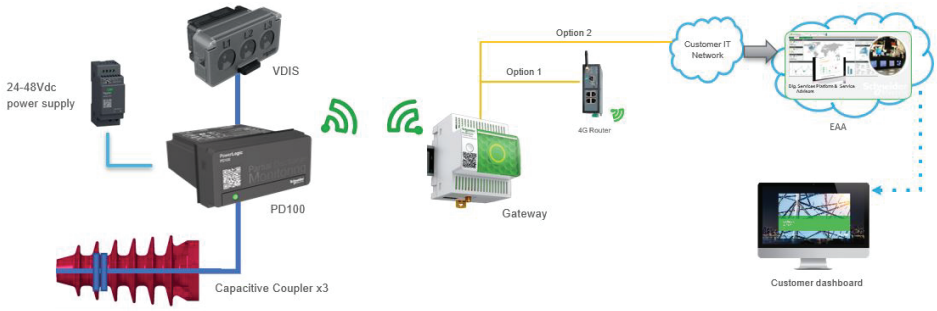
- A protection sub-assembly with open seal
- An indication sub-assembly

Keep the wiring set that is currently inserted in the existing unit. Disassembling the existing unit is required to recover the wiring set and assemble it into the new VDIS unit.

PowerLogic PD100

The PowerLogic PD100 measures the partial discharge signals broadcast on the MV network through a capacitive coupler. The measurement is performed 24 hours a day, 7 days a week. The PowerLogic PD100 sends relevant data through a wireless communication network (Zigbee PRO) to a Zigbee PRO concentrator.

The PowerLogic PD100 is designed to be installed in the cubicle and connected to all three phases of the Medium Voltage supply of the cubicle. The PowerLogic PD100 is connected via the same capacitive connection as the one used for the VDIS unit. The PowerLogic PD100 can use the existing capacitive interfaces provided that the capacitive value is between 13 pF to 128 pF.



Operation

Operator Interfaces of Panels

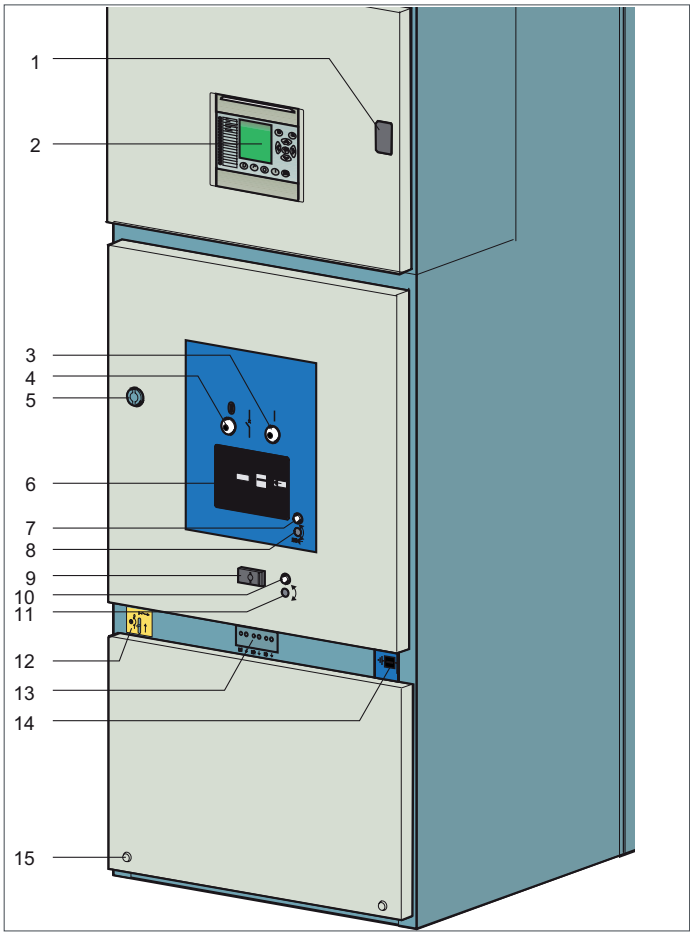
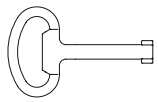
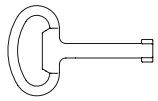
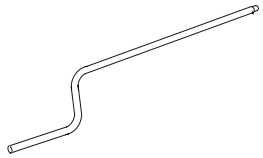
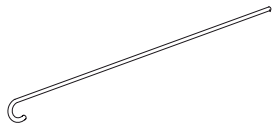


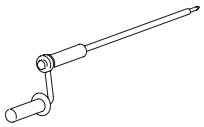
Figure 25
Operator interface of PIX panels (shown in conjunction with the circuit breaker EvoPact HVX)

1	Lock to open and close the door of the low-voltage compartment	9	Lock permitting locking and unlocking of the front door
2	Protection and control device	10	Knob for releasing the opening for racking the truck in/out manually
3	Circuit breaker ON	11	Opening for racking the truck in/out manually
4	Circuit breaker OFF	12	Earthing switch operating element
5	Insertion opening for handle to open and close the front door	13	Voltage indicator
6	Inspection glass for indications and position of the circuit breaker	14	Position indicator of earthing switch
7	Knob for releasing the opening, for manual charging of the circuit breaker's energy storing device	15	Securing bolts of the cable compartment cover
8	Opening for manual charging of the circuit breaker's energy storing device		

Operation Accessories

NOTE: These accessories are supplied together with the panel. The panel may only be operated by means of these accessories.

Designation	Item no.	Illustration
Handle for opening and closing the front door	SEM101120-01	
Double-bit key for the front door	SEM101137-01	
Double-bit key for the low-voltage compartment	SEM101137-02	
Crank to charge the circuit breaker's energy-storing device	AGS H30498-01	
Operating rod to switch the circuit breaker on and off	AGS H35446-01	

Designation	To be used for:	Rated value	Connector design	Item no.	Illustration
Operating lever for earthing switch	Cable feeder	Short-circuit current ≤ 31.5 kA	square	AMT000223-08 (motorized)	
			square	AMT000223-09	
		Short-circuit current 31.5 kA	hexagonal	AMT000223-10	
	Busbar	Short-circuit current ≤ 31.5 kA	square	AMT000223-05	
		Short-circuit current 31.5 kA	hexagonal	AMT000223-07	
Crank for truck	Truck EvoPact HVX/ UTX/MTX	Rated current I_r < 2500 A	hexagonal	AGSH31601-01 (manual drive)	
	Truck EvoPact HVX/ UTX	Rated current I_r ≥ 2500 A	square	AGSH32532-01	
			—	AGSH31674-01	

Circuit Breakers for PIX Panels

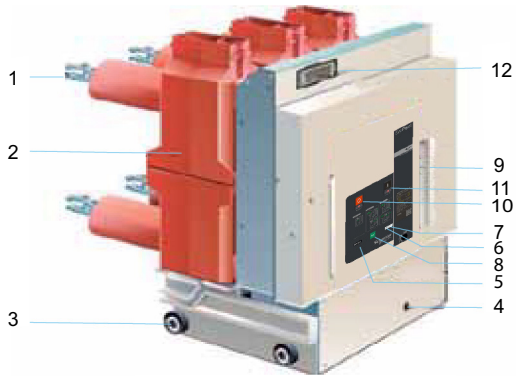


Figure 26
EvoPact HVX circuit breaker ≤ 24 kV/≤ 2500 A

1	Moving contacts
2	Pole casing with vacuum interrupter chamber
3	Truck rollers
4	Opening for racking the truck in/out manually
5	Operations counter
6	Insertion opening for manual charging of the energy storing device
7	Indicator, energy-storing device (charged/released)
8	Indicator, circuit breaker ON/OFF
9	Handles for racking the circuit breaker in/out
10	Circuit breaker OFF
11	Circuit breaker ON
12	Sockets for low-voltage connector

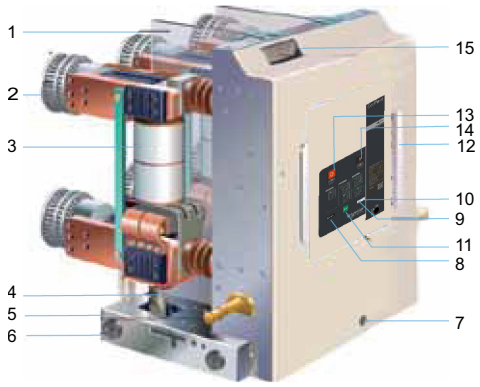


Figure 27
EvoPact HVX circuit breaker ≤ 17.5 kV/> 2500 A

1	Pole partitions
2	Moving contacts
3	Vacuum interrupter chambers
4	Press rod (transmission of ON/OFF switching movement)
5	Shutter actuation
6	Truck rollers
7	Opening for racking the truck in/out manually
8	Operations counter
9	Insertion opening for manual charging of the energy storing device
10	Indicator, energy-storing device (charged/released)
11	Indicator, circuit breaker ON/OFF
12	Handles for racking the circuit breaker in/out
13	Circuit breaker OFF
14	Circuit breaker ON
15	Sockets for low-voltage connector

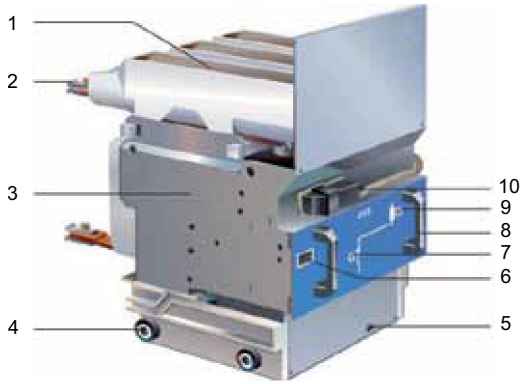


Figure 28
Vacuum contactor CVX

1	H.V.H.R.C. fuses
2	Moving contacts
3	Vacuum interrupter chambers with magnetic drive
4	Truck rollers
5	Opening for racking the truck in/out manually
6	Operations counter
7	Indicator, vacuum contactor ON/OFF
8	Handles for racking out/in
9	Fuse status indication
10	Low-voltage connector

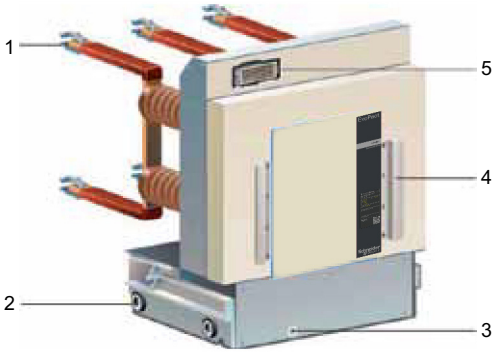


Figure 29
Vacuum contactor CVX

1 Moving contacts
2 Truck rollers
3 Opening for racking the truck in/out manually
4 Handles for racking out/in
5 Sockets for low-voltage connector

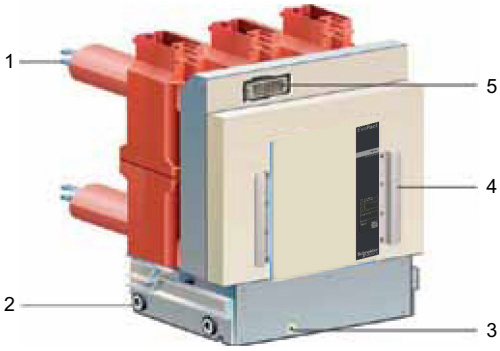


Figure 30
Disconnector truck EvoPact UTX 17.5/24 kV with pole casing

1 Moving contacts
2 Truck rollers
3 Opening for racking the truck in/out manually
4 Handles for racking out/in
5 Sockets for low-voltage connector

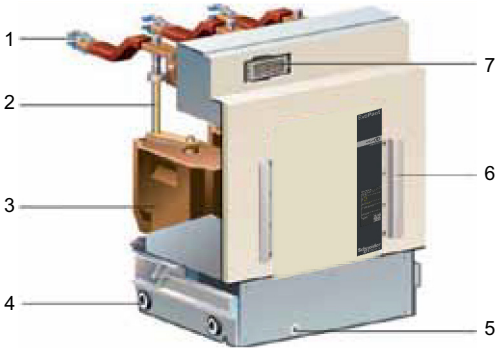


Figure 31
Metering truck EvoPact MTX

1 Moving contacts
2 High-voltage fuse for voltage transformer
3 Voltage transformer
4 Truck rollers
5 Opening for racking the truck in/out manually
6 Handles for racking out/in
7 Sockets for low-voltage connector

Interlocks

⚠CAUTION

HAZARD OF INAPPROPRIATE OPERATION

Make sure that all the interlocks of the switchgear are locked correctly.

Failure to follow these instructions can result in injury or equipment damage.

PIX panels have mechanical basic interlocks which help avoid operating errors. You must be familiar with these interlocks before operating panels.

Mechanical Interlocks

Interlock	Function of interlock	Method of operation of interlock
Between truck and low-voltage connector	The truck cannot be actuated unless the low-voltage connector is inserted .	The opening for the moving crank handle is locked.
Between truck and earthing switch	The truck cannot be racked in if the earthing switch is ON.	The moving crank handle is uncoupled automatically.
	The earthing switch can no longer be switched on if the truck has left its disconnected position.	The rotary movement of the earthing switch lever is blocked. Do not apply force!
Between the circuit breaker and the truck	Circuit breaker cannot be racked in or racked out while it is switched on.	The opening for the moving crank handle is locked.
	Circuit breaker cannot be switched on unless • it is completely in its disconnected or service position and • the operating crank for the rack in mechanism has been removed	The circuit breaker cannot be switched on or off
Between the cable compartment cover and the earthing switch (optional)	The cable compartment cover can only be removed if the earthing switch is ON.	The cable compartment cover is locked mechanically by means of a sheet metal plate.
Between the truck and the front door (optional)	The front door can only be opened if the truck is in its disconnected position.	The front door cannot be lifted via the opening handle unless the truck is in disconnected position.
	If the front door is opened, the truck cannot be moved into service position.	The crank of the truck cannot be inserted if the front door is open.

Electromagnetic Interlocks (Optional)

Electromagnetic blocking coils can be used for inter-panel as well as intra-panel interlocks:

- The circuit-breaker ON and OFF pushbuttons are blocked.
- Manual actuation of the disconnector truck is blocked.
- Manual actuation of the earthing switch is blocked.

⚠WARNING

HAZARD OF IMPROPER OPERATION

Locking of the switchgear interlocking must be complete to avoid malfunctions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE:

- In case of failure of the supply voltage, all electrical interlocks are in the ”locked” position. Measure: Re-establish supply voltage.
- Note the purchase contract and the switchgear specific circuit diagram as regards the design of the interlocking systematics.

NOTICE
HAZARD OF INCORRECT OPERATING CONDITIONS If no blocking coils are being used for the locking devices, a mechanical lock-out with cylinder or U lock must be provided. **Failure to follow these instructions can result in equipment damage.**

Padlocks (not Included in Scope of Supplies)

The bore holes are provided for padlock yokes of Ø 8 mm.

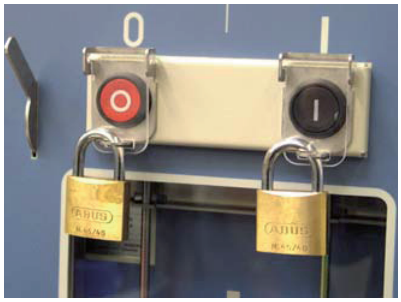


Figure 32
Cover flaps on ON/OFF pushbutton for the circuit breaker can be locked by means of a padlock (optional)

Figure 33
Mechanical lock-out of earthing switch via padlock

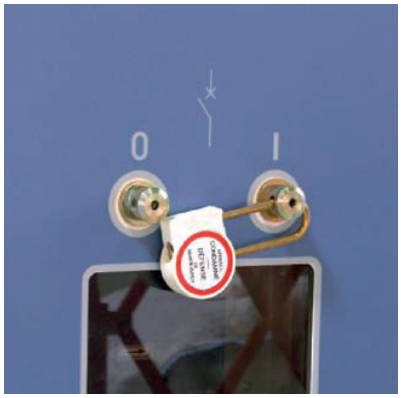


Figure 34
Manual switching ON of circuit breaker locked by padlock

Figure 35
Manual switching OFF of circuit breaker locked by padlock

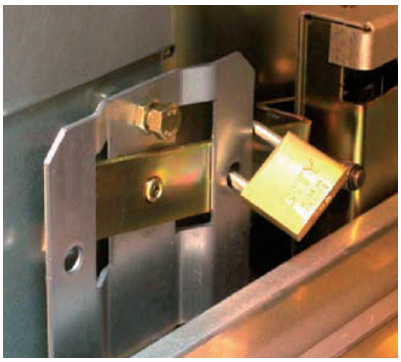
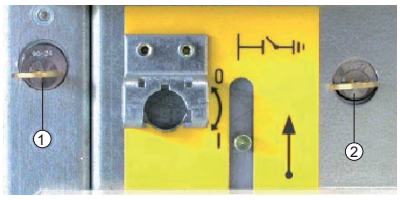
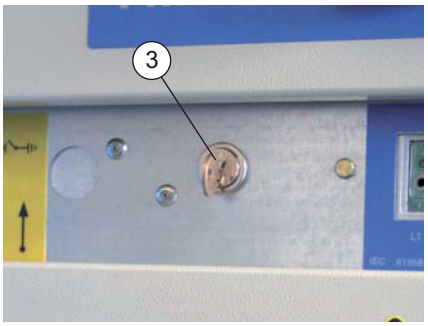


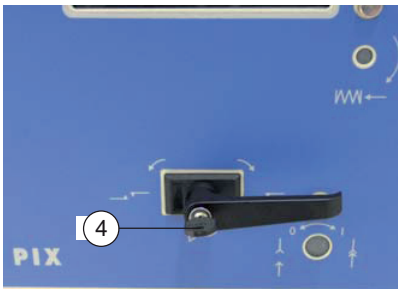
Figure 36
Mechanical lock-out for shutter (same principle for left-hand and right-hand sides)

Figure 37
Interlock of truck (optional)

Interlocks by Means of Cylinder Locks (Optional)







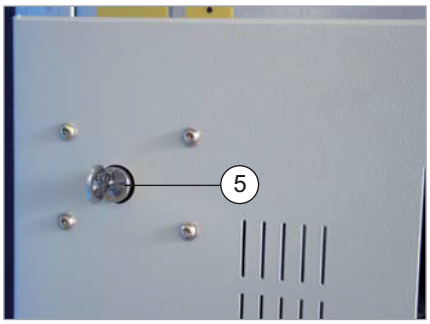


Figure 38
Interlocks

1	Interlocking of earthing switch in closed condition
2	Interlocking of earthing switch in open condition
3	Interlock of truck
4	Interlocking of front door
5	Interlocking of cable compartment cover

Supplementary Interlocks

Further mechanical lock-outs and additional interlocks can be provided as specified in the contract.

Operating Specifications

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The switchgear unit may only be operated by specialist electricians who have proven experience (training certificate) in conjunction with the PIX Standard series and all the relevant safety standards. Refer to the Safety Provisions, page 8.
- To rule out incorrect switching operations, the operating sequences described below must be complied with.
- Complete each switching operation.
- Check whether the supply voltage is ON.
- After each switching operation for which you have used a crank or a lever, remove this tool and store it in the tool board.

Failure to follow these instructions will result in death or serious injury.

⚠CAUTION

HAZARD OF INCORRECT OPERATION

In case supply voltage is not available:

- Check if blocking coils (locking the interrogation slides and circuit breaker pushbuttons, depending on design) are in “locked” position.
- Check if an undervoltage release (optional) has dropped out.
- Re-establish the supply voltage.

Failure to follow these instructions can result in injury or equipment damage.

Operating the Circuit Breaker

Charging the Circuit Breaker’s Energy Storing Device

Initial situation:

- Circuit breaker: OFF
- Energy storing device: released

Charging by hand

1. Open cover (Figure 39, 1) and insert crank (2).
2. Turn clockwise (3), until the charge drive mechanism is uncoupled (sound). The energy storing device indicates the **charged** condition (4).

3. Remove crank.

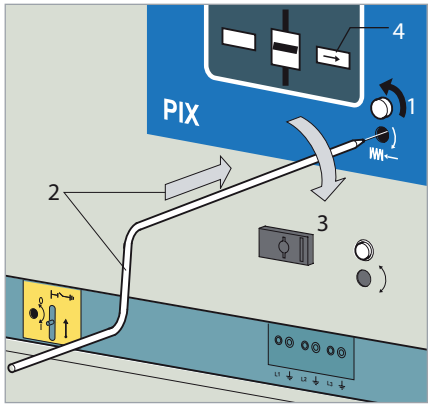


Figure 39
Charge energy storing device of circuit breaker manually

1	Open cover
2	Insert crank
3	Turn clockwise
4	Position indicator, energy-storing device (charged)

Charging via motor

The energy-storing device is charged automatically as soon as the motor's supply voltage is applied.

The position indicator of the energy storing device indicates the **charged** condition (Figure 39, 4).

Operating the Circuit Breaker Manually

Switching ON via the Operating Rod

Insert the operating rod into the right-hand guide of the front door and press it right to the back (Figure 40, 1). The circuit breaker is switched ON; the position indicator indicates **ON** (2).

The energy storing device can be charged again immediately after switching ON (by hand or by motor). If supply voltage is present, the energy storage device is charged automatically.

Switching OFF via the Operating Rod

Insert the operating rod into the left-hand guide of the front door and press it right to the back (Figure 41, 3). The circuit breaker is switched OFF. The position indicator indicates **OFF** (4).

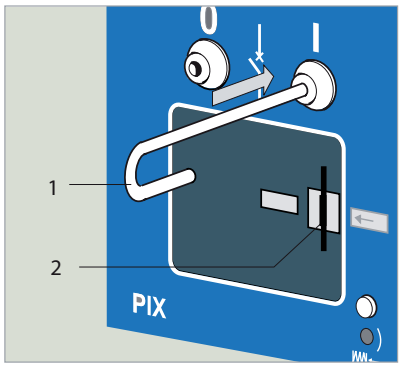


Figure 40
Switching the circuit breaker ON via the operating rod

1 Operating rod

2 Position indicator reads: Circuit breaker ON

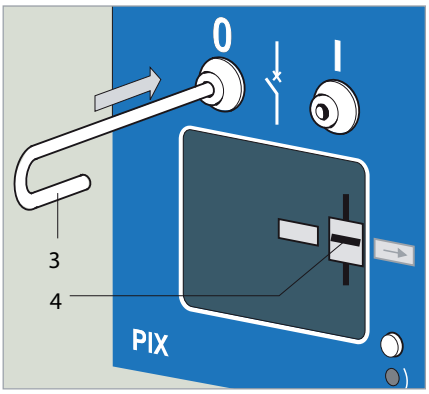


Figure 41
Switching the circuit breaker OFF via the operating rod

1 Operating rod

2 Position indicator reads: Circuit breaker OFF

Switching ON via Pushbutton (Optional)

Press the left-hand lever down (Figure 42, 1). To switch ON, press the black pushbutton (right-hand - 2). The circuit breaker is switched ON. The position indicator indicates **ON** (3).

The spring can be charged immediately after switching ON (by hand or by motor). If supply voltage is present, the spring is charged automatically.

Switching OFF via Pushbutton (Optional)

Press the left-hand lever down (Figure 43, 4). To switch OFF, press the red pushbutton (left-hand - 5). The circuit breaker is switched OFF. The position indicator indicates **OFF** (6).

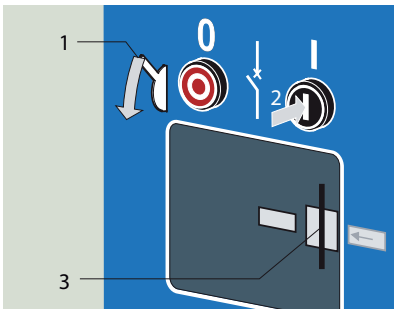


Figure 42
Switching circuit breaker ON via pushbutton

1 Press lever down

2 Press pushbutton I

3 Position indicator reads: Circuit breaker ON

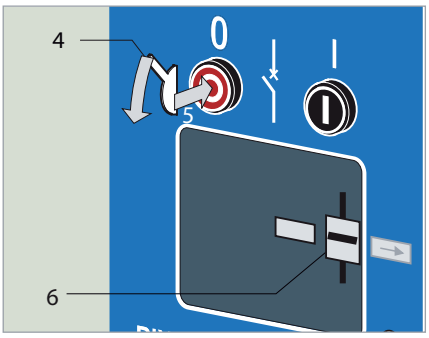


Figure 43
Switching circuit breaker OFF via pushbutton

1 Press lever down

2 Press pushbutton O

3 Position indicator reads: Circuit breaker OFF

Switching the Circuit Breaker Electrically

Switching ON (Closing)

Actuate closing release via bay computer or remote control.

The energy storing device can be charged immediately after switching ON (by hand or by motor). If voltage is applied to the motor, charging is performed automatically.

Switching OFF (Opening)

- Actuate the opening release via the bay computer or the remote control
- By undervoltage release or
- By secondary release.

Position Indicators on Circuit Breaker and Possible Operating Sequences

Item	Position indicator for energy-storing device (spring mechanism)		Position indicator for circuit breaker ON/OFF		Possible operating sequence
1	Discharged	released	OFF	OFF	none
2	Charged OK	charged	OFF	OFF	C–O
3	Discharged	released	ON	ON	O
4	Charged OK	charged	ON	ON	O–C–O

C = Switching ON (Closing)

O = Switching OFF (Opening)

Move Truck into Service/Disconnected Position

Trucks may on principle only be moved into service or disconnected position when de-energized.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Switch circuit-breaker and vacuum contactor OFF or, in case of disconnector truck EvoPact UTX, isolate the feeder.
- Do not pull the crank out before the truck in question has reached its end position.
- Do not pull the crank out in an undefined intermediate position.

Failure to follow these instructions will result in death or serious injury.

Initial situation:

- Circuit breaker OFF
- Earthing switch OFF

Racking-In the Truck from Disconnected into Service Position

Follow the below steps to racking-in the truck from disconnected into service position:

1. Open cover (Figure 44, 1) and insert crank (2).
2. Turn crank clockwise (3) until the truck has been racked in. Remove crank.
3. Check position of truck (Figure 45) through the inspection glass.

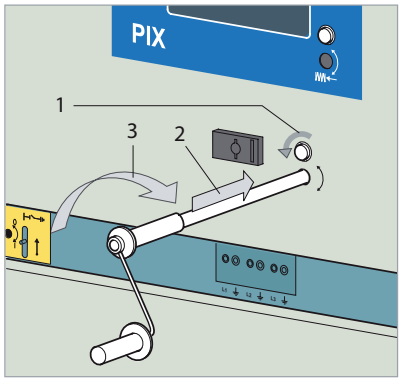


Figure 44

1 Open cover

2 Insert crank

3 Turn crank clockwise

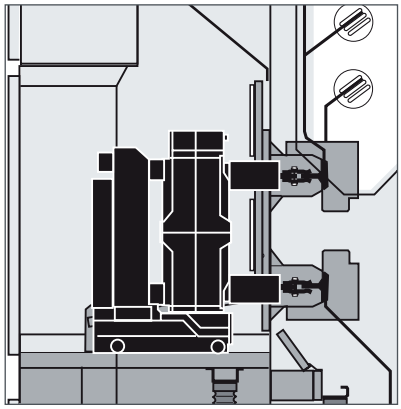


Figure 45
Truck in service position

Racking-Out the Truck from Service into Disconnected Position

Follow the below steps to racking-out the truck from service into disconnected position:

1. Open cover (Figure 46, 1) and insert crank (2).
2. Turn crank counter-clockwise (3) until the truck has been racked out. Remove crank.
3. Check position of truck (Figure 47) through the inspection glass.

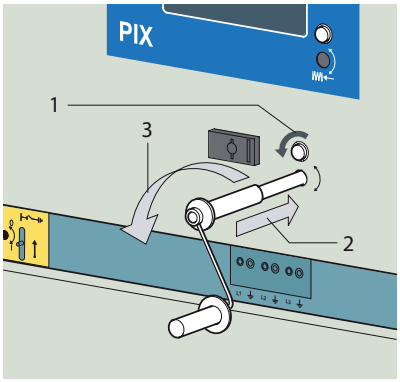


Figure 46

1 Open cover

2 Insert crank

3 Turn crank counter-clockwise

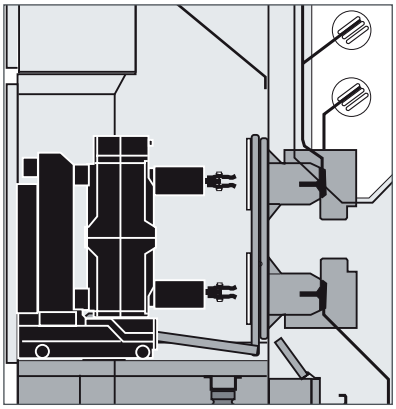


Figure 47
Truck in disconnected position

Vacuum Contactor CVX

Switching the Vacuum Contactor CVX

Switching Electrically

The vacuum contactor CVX can be switched on and off by a remote control device such as protection relay.

Switching OFF Manually (Optional)

The vacuum contactor CVX is switched on or off is indicated directly on the device (Figure 48 and Figure 49).

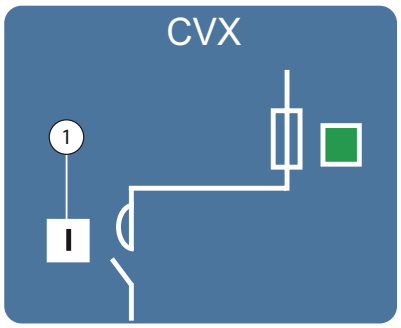


Figure 48

1 Vacuum contactor ON

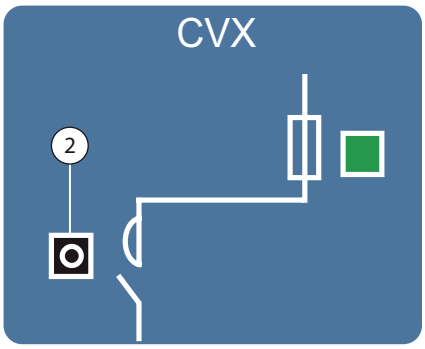


Figure 49

2 Vacuum contactor OFF

Switching OFF Manually (Optional)

This feature is only available for mechanically latched vacuum contactors CVX. In this case, the vacuum contactor CVX can be switched off directly on the panel (Figure 50 and Figure 51).

Follow the below steps to switch OFF the vacuum contactor CVX:

1. Insert operating rod through the guide hole in the front door until the vacuum contactor switches OFF (Figure 50). Check the position indicator (Figure 49).
2. Alternatively: Switching off by means of a pushbutton (Figure 51). To this effect, move the lever (1) downwards to its stop and press the OFF pushbutton (2).
3. Check the position indicator (Figure 49).

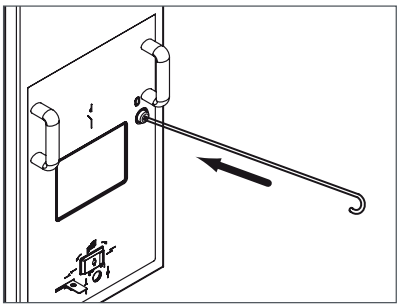


Figure 50
Switching OFF the vacuum contactor CVX by means of an operating rod

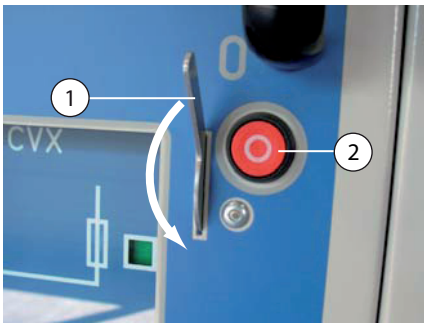


Figure 51
Switching OFF the vacuum contactor CVX by means of a push-button

1 Press lever down

2 Press pushbutton O

Fuse Tripping

The inspection port of the vacuum contactor on the panel front indicates the fuse tripping status:

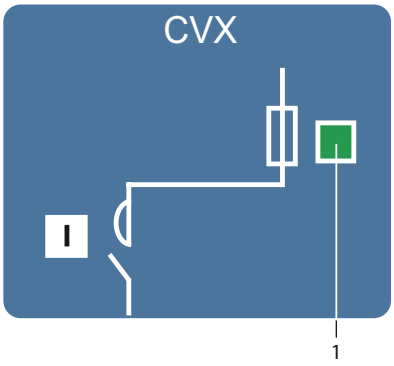


Figure 52

1 Indicator green: no fuse tripped

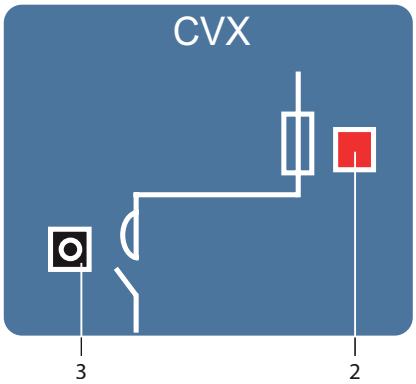


Figure 53

2 Indicator red: one or several fuses have tripped

3 Switch position indicator: vacuum contactor has switched off automat-ically

Measures to be Taken in Case of Fuse Tripping

Follow the below steps during fuse tripping:

1. Put vacuum contactor to disconnected position and move it out of the panel. This approach corresponds to the description in *Access to the Main Circuit Compartments and Removing the circuit breaker from the panel, Installation Manual* (GEX2564100SWE-00(NORDICS)) with the EvoPact HVX truck.
2. Always exchange all three fuses. Fuse replacement is described in the Operating Manual of the vacuum contactor CVX (no. NTV 132).

Operating the Earthing Switch Manually

Initial situation:

- Circuit breaker: OFF
- Truck: In disconnected position

Switching ON the Earthing Switch

Follow the below steps to switching ON the earthing switch:

1. Push the slide (Figure 54, 1) upwards and insert the control lever of the earthing switch with the lever rod pointing upwards (2).
2. Turn the lever clockwise by approx. 95° (3).
3. Check position indicator. It must indicate that the earthing switch is ON (4). Remove the lever.

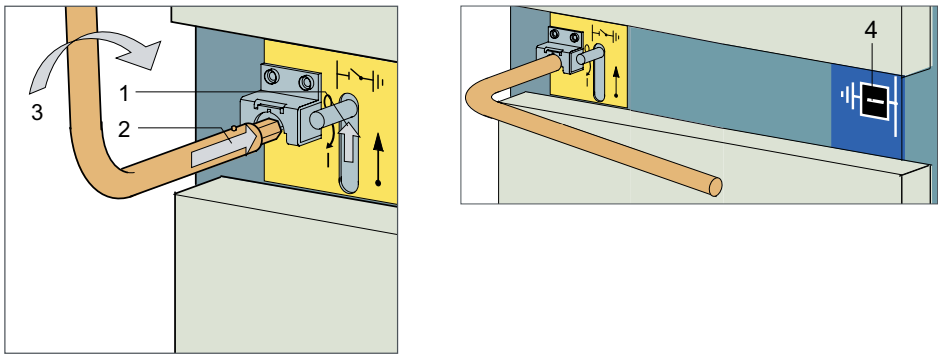


Figure 54
Switch earthing switch ON

1 Push slide upwards

2 Insert the operating lever

3 Turn operating lever clockwise

4 Position indicator reads: Earthing switch is turned ON

Switching Earthing Switch OFF

Follow the below steps to switching OFF the earthing switch:

1. Push the slide (Figure 55, 1) upwards and insert the control lever of the earthing switch with the lever rod pointing to the right (2).
2. Turn the lever counterclockwise by approx. 95° (3).
3. Check position indicator: It must indicate that the earthing switch is OFF (4). Remove the lever.

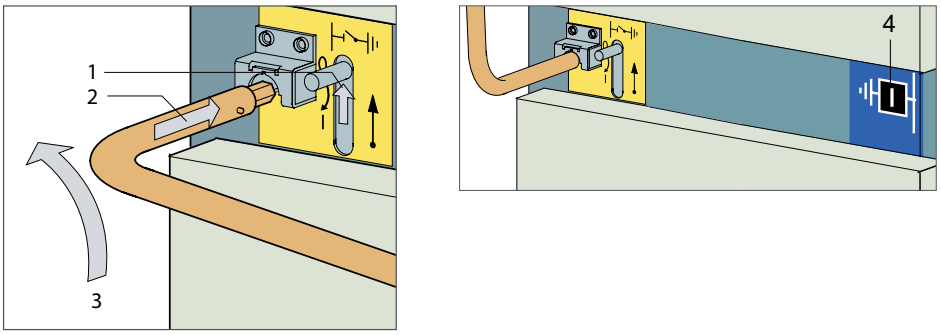


Figure 55
Switch earthing switch OFF

1 Press slide upwards

2 Insert the operating lever

3 Turn operating lever counterclockwise

4 Position indicator reads: earthing switch is OFF

Standard Switching Operations

NOTE: Observe the switching provisions, refer to the Operating Specifications, page 34 and the interlocking conditions, refer to the Interlocks, page 31.

Switching a Feeder

Initial situation:

- Circuit breaker: OFF
- EvoPact HVX truck: In disconnected position
- Earthing switch: OFF

Switch feeder cable ON

Follow the below steps to switch feeder cable ON:

1. Move the truck to the service position (Figure 56, 1).
2. Switch circuit breaker ON (2).

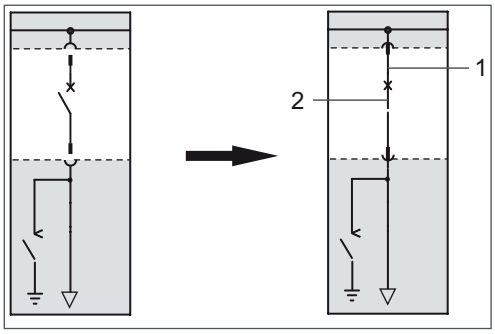


Figure 56
Switch feeder cable ON

Switch feeder cable OFF

Follow the below steps to switch feeder cable OFF:

1. Switch circuit breaker OFF.

2. Move the truck to the disconnected position.

Earthing the Feeder Cable

Initial situation:

- Circuit breaker: OFF
- EvoPact HVX truck: In disconnected position
- Earthing switch: OFF

Earthing feeder cable:

1. Check the feeder is de-energized.
2. Switch the earthing switch ON (Figure 57,1).

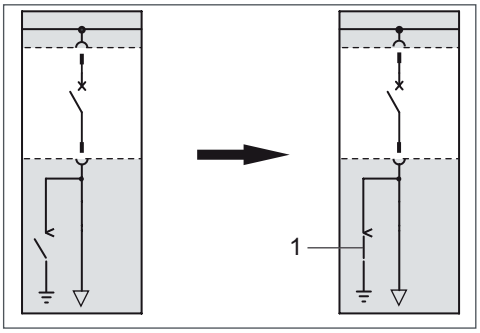


Figure 57
Earthing feeder cable

De-earthing

Switch the earthing switch OFF.

Coupling Busbar Sections via Bus Section Coupler

With EvoPact HVX and EvoPact UTX truck

Initial situation:

- Circuit breaker: OFF
- EvoPact HVX truck: In disconnected position
- Earthing switch: OFF

Coupling the sections

Follow the steps for coupling the sections:

1. Move both the trucks to the service position (Figure 58, 1).
2. Switch circuit breaker ON (2).

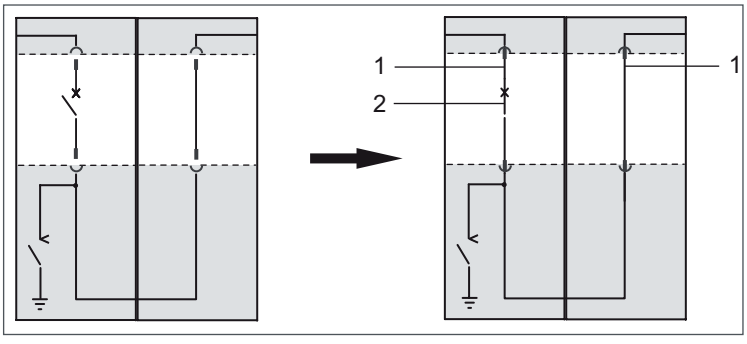


Figure 58

Coupling busbar sections via bus section coupler and EvoPact HVX and EvoPact UTX trucks

Uncoupling

Follow the steps for uncoupling the sections:

1. Switch circuit breaker OFF.
2. Move both the trucks to the disconnected position.

With EvoPact HVX truck

Initial situation:

- Circuit breaker: OFF
- EvoPact HVX truck: In disconnected position

Coupling the sections

Follow the steps for coupling the sections:

1. Move the truck to the service position (Figure 58, 1).
2. Switch circuit breaker ON (2).

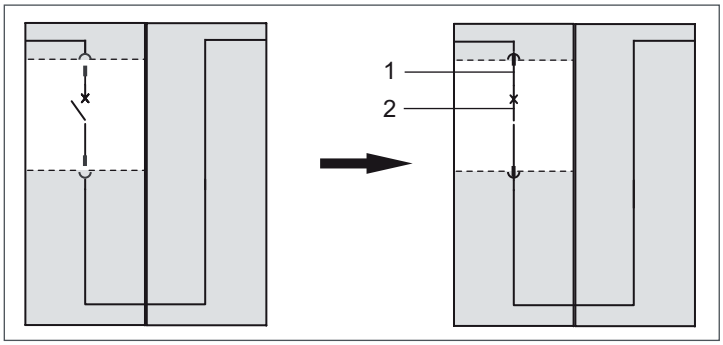


Figure 59
Coupling busbar sections via bus section coupler and EvoPact HVX and EvoPact UTX trucks

Uncoupling

Follow the steps for uncoupling the sections:

1. Switch circuit breaker OFF.
2. Move the truck to the disconnected position.

Earthing the Busbar

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Trucks (EvoPact HVX and EvoPact UTX) in the appropriate busbar sections must be in disconnected position.
- Observe the conditions of Operating Specifications, page 34 and Interlocks, page 31.

Failure to follow these instructions will result in death or serious injury.

Earthing the Busbar with the Circuit Breaker of a Feeder Panel

The earthing device can be connected to a free cable terminal in the cable compartment access, refer to the *Access to the Main Circuit Compartments and Access to the cable compartment, Installation Manual* (GEX2564100SWE-00(NORDICS)). If necessary, remove cable. The earthing device and the earthing adapter are not included in the scope of supplies.

NOTICE
HAZARD OF INCORRECT OPERATION Comply with the specifications of the manufacturer of the earthing device and, if applicable, the earthing adapter. **Failure to follow these instructions can result in equipment damage.**

Initial situation:

- Feeder cable: OFF
- Earthing switch: ON
- Circuit breaker: OFF
- EvoPact HVX truck: in disconnected position

Earthing the busbar

Follow the below steps to earthing the busbar:

1. Connect the earthing device to the cable compartment (Figure 60, 1).
2. Switch the earthing switch OFF (2).
3. Move the truck to the service position (3).
4. Switch circuit breaker ON (4).

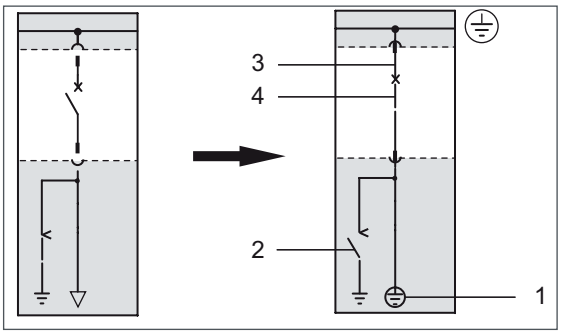


Figure 60
Earthing the busbar with the circuit breaker of an feeder panel

De-earthing:

Follow the below steps to de-earthing the busbar:

1. Switch circuit breaker OFF.
2. Move the truck to the disconnected position.
3. Switch the earthing switch ON.
4. Remove the earthing device.

Earthing the Busbar with Busbar Earthing Switch in the Metering Panel

Initial situation:

- Earthing switch: OFF
- Metering truck EvoPact MTX: in service position

Earthing the busbar

Switch the earthing switch ON (Figure 61, 1).

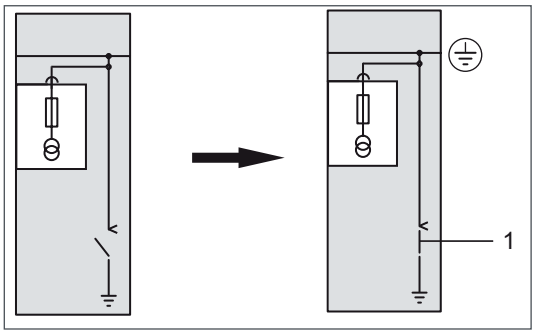


Figure 61
Earthing the busbar with busbar earthing switch in the metering panel

De-earthing

Switch the earthing switch OFF.

Earthing the Busbar with Busbar Earthing Switch

Initial situation:

- Busbar earthing switch: OFF

Earthing the busbar

Switch the earthing switch ON (Figure 62, 1).

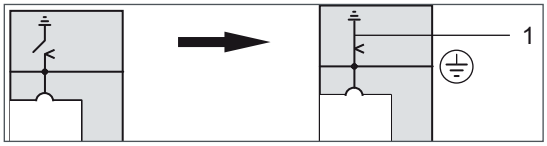


Figure 62
Earthing the busbar with busbar earthing switch

De-earthing

Switch the earthing switch OFF.

Maintenance

Safety provisions for Maintenance

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Only specialist electricians certified by the manufacturer for maintenance work and who have the required knowledge regarding handling of medium-voltage switchgear of the PIX Standard and all the relevant safety provisions are permitted to perform maintenance and cleaning work.
- Comply with the Safety Provisions, page 8.

Failure to follow these instructions will result in death or serious injury.

Servicing Schedule

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

In case of humidity and condensation or air pollution (dust, smoke, or corrosive gases), the maintenance intervals must be adapted to the actual conditions.

Failure to follow these instructions will result in death or serious injury.

We recommend performing a visual inspection of the panels at least every four years, depending on the strain to which they are subjected during operation and the operating conditions.

For cleaning and maintenance work, refer to the *Access to the Main Circuit Compartments, Access to the cable compartment, Switching device compartment and the busbar compartment, Installation Manual* (GEX2564100SWE-00(NORDICS)).

In case of ambiguities or irregularities, contact the manufacturer's Service Center immediately.

Fuse - Contactor Cubicle/Mainly recommended for maintenance activities

Preventive maintenance activities	Minimal frequency(1)/Performance level									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
LV Compartment										
Checking of connections	•	•	•	•	•	•	•	•	•	•
Checking of wiring	•	•	•	•	•	•	•	•	•	•
Cubicle										
Cleaning cubicle/internal equipment	•	•	•	•	•	•	•	•	•	•
Inspection of the position indicators and signalling micro switches	•	•	•	•	•	•	•	•	•	•
Inspection of locking + interlocking mechanism function		○		○		○		○		○
Inspection of the shutters		○		○		○		○		○

Cleaning/checking switch line operating mechanism				◙				◙		
Cleaning/checking of isolators (tightening, chalking, cracking, signs of heating)				◙				◙		
Cleaning/checking of earthing switch operating mechanism				◙				◙		
Cleaning/checking/greasing of earthing switch plugs				◙				◙		
Cleaning/checking/greasing of shutter locking system				◙				◙		
Cables compartment										
Inspection of cables (tightening, chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Inspection of isolators (tightening, chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
CT/VT compartment										
Cleaning/inspection of isolators (tightening, chalking, cracking, signs of heating)				◙				◙		
Cleaning/inspection of TPs (tightening, chalking, cracking, signs of heating)				◙				◙		
Busbar compartment (power off)										
Inspection of busbars (cleaning, tightening, chalking, cracking, signs of heating)				◙				◙		
Inspection of isolators (cleaning, tightening, chalking, cracking, signs of heating)				◙				◙		
Contactor										
Inspection of enclosure (chalking, cracking, signs of heating)	●	●	●	●	●	●	●	●	●	●
Inspection of connections (tightening, chalking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Inspection/check of auxiliaries contacts (signaling contacts, coils, wiring)	○	○	○	○	○	○	○	○	○	○
Inspection/checking/adjustment of latching system				◙				◙		
Inspection/adjustment of coil contact insertion				◙				◙		
Checking wearing and simultaneity of arcing contacts				◙				◙		
Cleaning/checking/greasing of all linkages				◙				◙		
Check LV electrical wiring connections				◙				◙		
Tests										
Mechanical (manual on/off)	●	●	●	●	●	●	●	●	●	●
Electrical (remote on/off)	●	●	●	●	●	●	●	●	●	●
Fuses										
Inspection of fuse (chalking, color, cracking, corrosion)	○	○	○	○	○	○	○	○	○	○
Inspection of fuse fixing	○	○	○	○	○	○	○	○	○	○
Inspection of fuse signaling microswitch	○	○	○	○	○	○	○	○	○	○
Inspection of fuse signaling striker	○	○	○	○	○	○	○	○	○	○
Associated protection										
Inspection of protection relay (setting, tripping functions)				◙				◙		
Inspection of upstream/downstream selectivity				◙				◙		
Schneider Electric Proprietary Diagnosis services offers										
Diagnosis to detect drifts from the initial state and significant trends, to anticipate on the corrective action (future failures) required to check the equipment safety and continuity of service, and plan the action for the most convenient time for customer operations.										
ProDiag Breaker Monitors opening/closing/spring-loading operations drifts				◙				◙		
Checking of opening/closing times and speeds				◙				◙		
Checking of contact synchronization				◙				◙		
Checking of safety to close (overtravel and stabilisation)				◙				◙		
Checking of safety to open (overtravel and stabilisation)				◙				◙		
ProDiag Corona Surface/internal partial discharges detection.				◙				◙		

ProDiag Fuse Mesurement of fuses internal impedance/comparison with manufacturer's data				◙				◙		
Spare Parts										
Secure: Parts commonly used in corrective maintenance interventions										
Relay, LV Fuse	Light maintenance									
Auxiliary contact	Light maintenance									
Tripping coil	Light maintenance									
Prevent: Parts whose condition are checked in preventive maintenance interventions										
Earthing switch clusters		Advanced maintenance								
Pressure switch (gas version)		Advanced maintenance								
Electromagnetic coil				Exclusive maintenance						

(1) Recommended under optimal operating conditions. However this recommended frequency should be increased according to
a) the level of criticality (low, major, critical) and
b) the severity of environment conditions (for example, corrosive, naval, offshore) following the prescriptions of manufacturer’s services.

◙ Exclusive maintenance conducted by ED equipment manufacturer only.

○ Advanced maintenance, preferably conducted by ED equipment manufacturer or manufacturer certified partner.

● Light maintenance, conducted by ED equipment manufacturer or customer competent technician.

Schneider Electric ranges covered by this Maintenance guide: MCset, PIX, SM6, Fluokit, VM6, Fluair, DNF, Alliance.

Does not supersede the information provided in the product user guide.

Circuit Breaker Switch Cubicle/Mainly recommended for maintenance activities

Preventive maintenance activities	Minimal frequency(1)/Performance level									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
LV Compartment										
Inspection of auxiliaries equipment	●	●	●	●	●	●	●	●	●	●
Inspection of wiring connections (tightening, fixing)	●	●	●	●	●	●	●	●	●	●
Cubicle										
Cleaning cubicle/internal equipment	●	●	●	●	●	●	●	●	●	●
Inspection of the position indicators and signalling micro switches	●	●	●	●	●	●	●	●	●	●
Inspection of locking + interlocking mechanism function		○		○		○		○		○
Inspection of withdrawal mechanism		○		○		○		○		○
Inspection of the shutters		○		○		○		○		○
Cleaning/checking switch line operating mechanism				◙				◙		
Cleaning/checking of isolators (tightening, chalking, cracking, signs of heating)				◙				◙		
Cleaning/checking of earthing switch operating mechanism				◙				◙		
Cleaning/checking/greasing of earthing switch plugs				◙				◙		
Cleaning/checking/greasing of shutter locking system				◙				◙		
Cables compartment										
Inspection of cables (chalking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Inspection of wiring connections (tightening, fixing)	○	○	○	○	○	○	○	○	○	○
CT/VT compartment										
Cleaning/inspection of isolators (chalking, cracking, signs of heating)				◙				◙		

Cleaning/inspection of TPs (tightening, chalking, cracking, signs of heating)				◙				◙		
Busbar compartment										
Inspection of busbars (cleaning, tightening, chalking, cracking, signs of heating)				◙				◙		
Inspection of isolator switches (cleaning, tightening, chalking, cracking, signs of heating)				◙				◙		
Circuit breaker										
General state: visual checking, cleanliness, insulator condition, oxidation, no corrosion of supporting structure	•	•	•	•	•	•	•	•	•	•
Checking of number of operation	•	•	•	•	•	•	•	•	•	•
Cleaning of resin bodies	•	•	•	•	•	•	•	•	•	•
Inspection of state of the auxiliaries contact (on/off, rack in, rack off etc.)	•	•	•	•	•	•	•	•	•	•
Inspection of functional and safety interlock on device	•	•	•	•	•	•	•	•	•	•
Cleaning/checking/greasing of the power contacts (plugs, sliding contact, light greasing)				◙				◙		
Measurement of main contact resistance (microhmeter)				◙				◙		
Cleaning/checking/greasing of the moving withdrawable parts				◙				◙		
Checking of coupling rods				◙				◙		
Cleaning/checking/greasing of the operating mechanism				◙				◙		
Cleaning/checking/greasing of the latching mechanism				◙				◙		
Cleaning/checking/greasing of the closing and opening springs				◙				◙		
Cleaning/checking/greasing of the motor and reduce				◙				◙		
Cleaning/checking/greasing of all linkages				◙				◙		
Check LV electrical wiring connections				◙				◙		
Tests										
Mechanical (manual on/off)	•	•	•	•	•	•	•	•	•	•
Electrical (remote on/off)	•	•	•	•	•	•	•	•	•	•
Associated protection										
Inspection of protection relay (setting, tripping functions)				◙				◙		
Inspection of upstream/downstream selectivity				◙				◙		
Schneider Electric Proprietary Diagnosis services offers										
Diagnosis to detect drifts from the initial state and significant trends, to anticipate on the corrective action (future failures) required to check the equipment safety and continuity of service, and plan the action for the most convenient time for customer operations.										
ProDiag Breaker Monitors opening/closing/spring-loading operations drifts				◙				◙		
Checking/adjusting of condition ot the damper and/or stop device				◙				◙		
Checking of opening/closing times and speeds				◙				◙		
Checking of charging time				◙				◙		
Checking of contact synchronization				◙				◙		
Checking of safety to close (overtravel and stabilisation)				◙				◙		
Checking of safety to open (overtravel and stabilisation)				◙				◙		
ProDiag Corona Surface/internal partial discharges detection.				◙				◙		
Spare Parts										
Secure: Parts commonly used in corrective maintenance interventions										
Relay, LV Fuse	Light maintenance									
Auxiliary contact	Light maintenance									
Tripping coil	Light maintenance									

Mitop for switch	Light maintenance			
Undervoltage coil		Advanced maintenance		
Motor		Advanced maintenance		
Prevent: Parts whose condition are checked in preventive maintenance interventions				
Gear motor				Exclusive maintenance
Operating mechanism				Exclusive maintenance
Life extension: Parts to extend the life of the equipment				
Capacitive insulator		Advanced maintenance		
Earthing clusters		Advanced maintenance		
(1) Recommended under optimal operating conditions. However this recommended frequency should be increased according to a) the level of criticality (low, major, critical) and b) the severity of environment conditions (for example, corrosive, naval, offshore) following the prescriptions of manufacturer's services.				
◙ Exclusive maintenance conducted by ED equipment manufacturer only.				
○ Advanced maintenance, preferably conducted by ED equipment manufacturer or manufacturer certified partner.				
● Light maintenance, conducted by ED equipment manufacturer or customer competent technician.				
Schneider Electric ranges covered by this Maintenance guide: MCset, PIX, SM6, Fluokit, VM6, Fluair, DNF, Alliance. Does not supersede the information provided in the product user guide.				

Switch Cubicle/Mainly recommended for maintenance activities

Preventive maintenance activities	Minimal frequency(1)/Performance level									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
LV Compartment										
Checking of connections	●	●	●	●	●	●	●	●	●	●
Checking of wiring	●	●	●	●	●	●	●	●	●	●
Cables compartment										
Inspection of cables (tightening, chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Inspection of isolators (tightening, chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Cleaning/checking/greasing of the earthing switch connection contacts				◙				◙		
Equipment compartment										
Cleaning/checking of active part and enclosure (chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Cleaning/checking of isolators (chalking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Checking of lock and inter-lock system	○	○	○	○	○	○	○	○	○	○
Checking of auxiliaries contacts position indicator	○	○	○	○	○	○	○	○	○	○
Cleaning/Checking of operating mechanism				◙				◙		
Cleaning/checking of the earthing switch operating mechanism				◙				◙		
Busbar compartment (power off)										
Inspection of busbars (signs of heating)				◙				◙		
Inspection of isolator switches (chalking, signs of heating)				◙				◙		
CT/VT (optional)										
Cleaning/inspection of isolators (tightening, chalking, cracking, signs of heating)				◙				◙		
Cleaning/inspection of TPs (tightening, chalking, cracking, signs of heating)				◙				◙		
Tests										

Mechanical (manual on/off)	●	●	●	●	●	●	●	●	●	●
Electrical (remote on/off)	●	●	●	●	●	●	●	●	●	●
Schneider Electric Proprietary Diagnosis services offers										
Diagnosis to detect drifts from the initial state and significant trends, to anticipate on the corrective action (future failures) required to check the equipment safety and continuity of service, and plan the action for the most convenient time for customer operations.										
ProDiag Corona Surface/internal partial discharges detection.				◙				◙		
Spare Parts										
Secure: Parts commonly used in corrective maintenance interventions										
Relay, LV Fuse	Light maintenance									
Auxiliary contact	Light maintenance									
Tripping coil	Light maintenance									
Mitop for switch	Light maintenance									
Undervoltage coil		Advanced maintenance								
Motor		Advanced maintenance								
Prevent: Parts whose condition are checked in preventive maintenance interventions										
Gear motor				Exclusive maintenance						
Operating mechanism				Exclusive maintenance						
Life extension: Parts to extend the life of the equipment										
Capacitive insulator		Advanced maintenance								
Earthing switch clusters		Advanced maintenance								
(1) Recommended under optimal operating conditions. However this recommended frequency should be increased according to a) the level of criticality (low, major, critical) and b) the severity of environment conditions (for example, corrosive, naval, offshore) following the prescriptions of manufacturer's services.										
◙ Exclusive maintenance conducted by ED equipment manufacturer only.										
○ Advanced maintenance, preferably conducted by ED equipment manufacturer or manufacturer certified partner.										
● Light maintenance, conducted by ED equipment manufacturer or customer competent technician.										
Schneider Electric ranges covered by this Maintenance guide: MCset, PIX, SM6, Fluokit, VM6, Fluair, DNF, Alliance. Does not supersede the information provided in the product user guide.										

Fuse Switch Cubicle/Mainly recommended for maintenance activities

Preventive maintenance activities	Minimal frequency(1)/Performance level									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
LV Compartment										
Inspection of connections	●	●	●	●	●	●	●	●	●	●
Checking of wiring	●	●	●	●	●	●	●	●	●	●
Cables compartment										
Inspection of cables (tightening, chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Inspection of isolators (tightening, chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Cleaning/checking/greasing of the earthing switch connection contacts				◙				◙		
Equipment compartment										
Cleaning/checking of active part and enclosure (chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Cleaning/checking of isolators (chalking, signs of heating)	○	○	○	○	○	○	○	○	○	○

Checking of lock and inter-lock system	○	○	○	○	○	○	○	○	○	○
Checking of auxiliaries contacts position indicator	○	○	○	○	○	○	○	○	○	○
Cleaning/Checking of operating mechanism				◍				◍		
Cleaning/checking of the earthing switch operating mechanism				◍				◍		
Fuses										
Inspection of fuse (chalking, color, cracking, corrosion)	○	○	○	○	○	○	○	○	○	○
Inspection of fuse fixing	○	○	○	○	○	○	○	○	○	○
Inspection of fuse signaling microswitch	○	○	○	○	○	○	○	○	○	○
Inspection of fuse striker	○	○	○	○	○	○	○	○	○	○
Busbar compartment (power off)										
Inspection of busbars (signs of heating)				◍				◍		
Inspection of isolator switches (chalking, signs of heating)				◍				◍		
CT/VT										
Cleaning/inspection of isolators (tightening, chalking, cracking, signs of heating)				◍				◍		
Cleaning/inspection of TPs (tightening, chalking, cracking, signs of heating)				◍				◍		
Tests										
Mechanical (manual on/off)	•	•	•	•	•	•	•	•	•	•
Electrical (remote on/off)	•	•	•	•	•	•	•	•	•	•
Schneider Electric Proprietary Diagnosis services offers										
Diagnosis to detect drifts from the initial state and significant trends, to anticipate on the corrective action (future failures) required to check the equipment safety and continuity of service, and plan the action for the most convenient time for customer operations.										
ProDiag Corona Surface/internal partial discharges detection.				◍				◍		
ProDiag Fuse Mesurement of fuses internal impedance/comparison with manufacturer's data				◍				◍		
Spare Parts										
Secure: Parts commonly used in corrective maintenance interventions										
Relay, LV Fuse	Light maintenance									
Auxiliary contact	Light maintenance									
Tripping coil	Light maintenance									
Mitop for switch	Light maintenance									
Undervoltage coil		Advanced maintenance								
Motor		Advanced maintenance								
Prevent: Parts whose condition are checked in preventive maintenance interventions										
Gear motor				Exclusive maintenance						
Operating mechanism				Exclusive maintenance						
Life extension: Parts to extend the life of the equipment										
Capacitive insulator		Advanced maintenance								
Earthing and fuses cluster		Advanced maintenance								
MV Fuse (ProFusion maintenance)		Advanced maintenance								
(1) Recommended under optimal operating conditions. However this recommended frequency should be increased according to a) the level of criticality (low, major, critical) and b) the severity of environment conditions (for example, corrosive, naval, offshore) following the prescriptions of manufacturer’s services.										
◍ Exclusive maintenance conducted by ED equipment manufacturer only.										
○ Advanced maintenance, preferably conducted by ED equipment manufacturer or manufacturer certified partner.										

● Light maintenance, conducted by ED equipment manufacturer or customer competent technician.
Schneider Electric ranges covered by this Maintenance guide: MCset, PIX, SM6, Fluokit, VM6, Fluair, DNF, Alliance. Does not supersede the information provided in the product user guide.

Metering Cubicle/Mainly recommended for maintenance activities

Preventive maintenance activities	Minimal frequency(1)/Performance level									
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
LV Compartment										
Inspection of connections	●	●	●	●	●	●	●	●	●	●
Checking of wiring	●	●	●	●	●	●	●	●	●	●
Equipment compartment										
Cleaning/checking of active part and enclosure (chalking, cracking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Cleaning/checking of isolators (chalking, signs of heating)	○	○	○	○	○	○	○	○	○	○
Checking of lock and inter-lock system	○	○	○	○	○	○	○	○	○	○
Checking of auxiliaries contacts position indicator	○	○	○	○	○	○	○	○	○	○
Cleaning/Checking of operating mechanism				◙				◙		
Cleaning/checking of the earthing switch operating mechanism				◙				◙		
Fuses										
Inspection of fuse (chalking, color, cracking, corrosion)	○	○	○	○	○	○	○	○	○	○
Inspection of fuse fixing	○	○	○	○	○	○	○	○	○	○
Inspection of fuse signaling microswitch	○	○	○	○	○	○	○	○	○	○
Inspection of fuse striker	○	○	○	○	○	○	○	○	○	○
Busbar compartment (power off)										
Inspection of busbars (signs of heating)				◙				◙		
Inspection of isolator switches (chalking, signs of heating)				◙				◙		
CT/VT										
Cleaning/inspection of isolators (tightening, chalking, cracking, signs of heating)				◙				◙		
Cleaning/inspection of TPs (tightening, chalking, cracking, signs of heating)				◙				◙		
Tests										
Mechanical (manual on/off)	●	●	●	●	●	●	●	●	●	●
Electrical (remote on/off)	●	●	●	●	●	●	●	●	●	●
Schneider Electric Proprietary Diagnosis services offers										
Diagnosis to detect drifts from the initial state and significant trends, to anticipate on the corrective action (future failures) required to check the equipment safety and continuity of service, and plan the action for the most convenient time for customer operations.										
ProDiag Corona Surface/internal partial discharges detection.				◙				◙		
ProDiag Fuse Mesurement of fuses internal impedance/comparison with manufacturer's data				◙				◙		
Spare Parts										
Secure: Parts commonly used in corrective maintenance interventions										
Auxiliary contact	Light maintenance									
Prevent: Parts whose condition are checked in preventive maintenance interventions										
Operating mechanism				Exclusive maintenance						

Life extension: Parts to extend the life of the equipment		
Capacitive insulator		Advanced maintenance
Earthing and fuses cluster		Advanced maintenance
MV Fuse (ProFusion maintenance)		Advanced maintenance
(1) Recommended under optimal operating conditions. However this recommended frequency should be increased according to a) the level of criticality (low, major, critical) and b) the severity of environment conditions (for example, corrosive, naval, offshore) following the prescriptions of manufacturer's services.		
■ Exclusive maintenance conducted by ED equipment manufacturer only.		
○ Advanced maintenance, preferably conducted by ED equipment manufacturer or manufacturer certified partner.		
● Light maintenance, conducted by ED equipment manufacturer or customer competent technician.		
Schneider Electric ranges covered by this Maintenance guide: MCset, PIX, SM6, Fluokit, VM6, Fluair, DNF, Alliance. Does not supersede the information provided in the product user guide.		

Cleaning

⚠WARNING

HAZARD OF INCORRECT CLEANING

- Make sure that the specified insulating level, the insulating components must be clean and dry. On principle, cleanliness deserves utmost attention.
- When deposited dirt or humidity is detected, the panels must be cleaned in an expert fashion.
- When performing cleaning, make sure that the lubrication in the drive mechanisms is not removed.
- If the drive mechanisms are no longer sufficiently lubricated, new lubrication must be applied.
- The drives must not be disassembled for service and maintenance work.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Slight contamination

Clean using a dry, lint-free cloth.

Depending on the degree of soiling, replace cloth as often as necessary.

Serious contamination

Use cleaning agent, 1 litre can, refer to the Auxiliary Products, page 60. The use of other cleaning agents is not admissible.

- Wear protective gloves
- Use cleaning agent according to manufacturer's instructions
- Soak the cloth thoroughly and wipe the insulating components. Keep duration of exposure as short as possible.
- Expose the cleaned surface to the air for at least two hours.

Avoid Condensation

⚠⚠DANGER

HAZARD OF ELECTRICAL ARC, EXPLOSION, AND FIRE

Make sure that the switchgear is provided with sufficient heating performance during installation and/or inspection of to help prevent condensation on the panel.

Failure to follow these instructions will result in death or serious injury.

Check that the specified insulating level, the switchgear panel – especially its insulating components – must not be exposed to condensation.

Measures to take in case of condensation

- Should condensation be detected in or on the panel, clean the panel in accordance with Cleaning, page 56.

Corrosion Protection

Drive mechanisms and covers have a long-term protection against corrosion.

Any damage to the paint, scratches and other damage are required to be repaired immediately to avoid corrosion.

Contact the manufacturer's Service Center.

Replacement of Components and Panels

The drive mechanisms, current transformers and voltage transformers as well as the testing and monitoring systems can be replaced if necessary. Also, entire panels can be replaced.

The following data on the nameplate are relevant for replacement of components or panels or in case of any queries, refer to the Ratings of the PIX Series, page 17:

- Type designation
- Serial number
- Year of construction

Should you have any queries regarding replacement of components or panels, contact the manufacturer's Service Center.

Lubrication Instructions

⚠WARNING

HAZARD OF INCORRECT MAINTENANCE

- Do not disassemble circuit-breakers and drives for lubrication.
- Only approved lubricants may be used. Refer to Auxiliary products, page 60.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠CAUTION

HAZARD OF INCORRECT MAINTENANCE

The following elements must not be lubricated:

- Motor
- Ball bearings
- Auxiliary releases
- Push switches
- Blocking coils
- Auxiliary switches

Failure to follow these instructions can result in injury or equipment damage.

Preparation

- Remove truck from the panel, refer to the *Access to the Main Circuit Compartments and Removing the circuit breaker from the panel, Installation Manual* (GEX2564100SWE-00(NORDICS)).
- To get access to the fixed contacts behind the shutters, use a shutter lift (Figure 63).
- Handling of the shutter lift corresponds to that of standard trucks (Evopact HVX and EvoPact UTX).
- Clean lubrication points using a lint-free cloth; use cleaning agent in case of serious contamination, refer to the Annex, page 60.

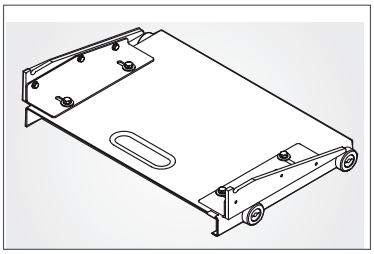


Figure 63
Shutter lift

For a panel width of 650 mm, refer item number ADM I25 125-01.

For panel width 800/1000 mm, refer item number ADM I25 126-01.

Lubrication

Points of lubrication	Lubricant	Lubrication procedure
Sliding contact surfaces	KL	Clean by means of lint-free cloth; use cleaning agent in case of serious contamination. Apply a thin and uniform film of lubricant.
All accessible friction points and sliding surfaces	KL	Clean lubricating points using a lintfree cloth or a soft paint-brush, if necessary using cleaning agent (use sparingly, just moisten points of lubrication). Apply a thin coat of lubricant (using e.g. a paintbrush).
Bearings and joints	FL	Pour drops of liquid lubricant (oil can, drip feed lubricator) into the bearing gap. Liquid lubricant gets between the bearing surfaces due to the capillary effect. In case of inaccessible lubrication points, use an extension tube or spray.

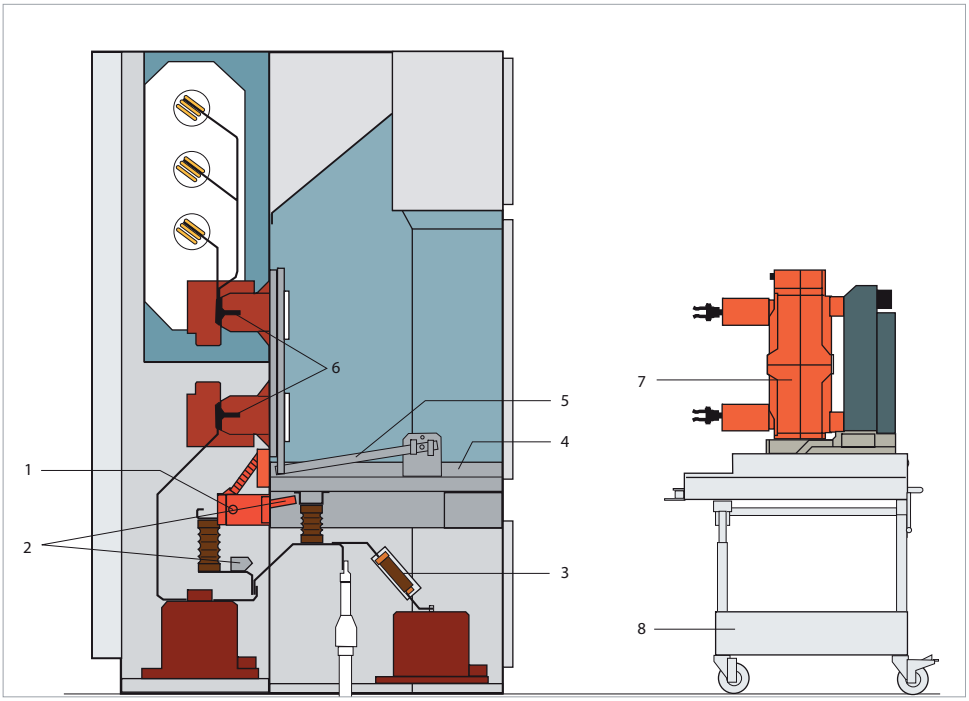


Figure 64
Points of lubrication/maintenance

1	Earthing switch operating mechanism	2	Earthing switch contacts
3	Fuse of voltage transformer (optional)	4	Tracks for truck
5	Shutter mechanism	6	Fixed contacts for the truck
7	Switching device (lubricate in accordance with lubricating instructions in the appropriate operating manual EvoPact HVX/UTX/MTX)	8	Trolley, handling: refer to the Operation Accessories , page 63

Once maintenance work is complete:

- Remove all the tools and auxiliary equipment used.
- Reinsert truck into the panel, refer to the *Access to the Main Circuit Compartments and Inserting the circuit breaker into the panel, Installation Manual* (GEX2564100SWE-00(NORDICS)).
- Reposition covers, close doors and check switching functions, refer to the *Commissioning, Installation Manual* (GEX2564100SWE-00(NORDICS)).

Replacing Fuse of Voltage Transformer

Voltage transformer in feeder cable

1. Switch ON the panel's earthing switch.
2. Remove cable compartment cover, refer to the *Access to the Main Circuit Compartments and Access to the cable compartment, Installation Manual* (GEX2564100SWE-00(NORDICS)).
3. Pull fuse (Figure 66, item 3) carefully out of the clamping contact.
4. Check contact surfaces for cleanness and, if necessary, clean, refer to the Cleaning, page 56.
5. Insert new fuse.
6. Remount cable compartment cover.

Voltage transformer on metering truck EvoPact MTX

Refer to the *Operating Manual* (AGS 531361-01).

Annex

Auxiliary Products

⚠WARNING

HAZARD OF INCORRECT USE OF AUXILIARY PRODUCTS

- Only use the following auxiliary products, which can be obtained from the manufacturer, for mounting or maintenance. The use of other auxiliary products is not admissible.
- The auxiliary products must be handled properly and according to the safety data sheets of the auxiliary products.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Auxiliary product	Order number
Cleaning agent	S008152
Lubricant KL, 0.5 kg can	ST312-111-835
Liquid lubricant FL, 0.5 kg can	S008153
Repair paint, 500 g can, RAL 7044, silk-grey	S009 492

The auxiliary products are available from the manufacturer. The use of alternative auxiliary products is not permissible.

Treatment of Firmly Screw-Connected Contact Surfaces

⚠WARNING

HAZARD OF INCORRECT CONTACT AREA TREATMENT

- Caution when handling bars insulated by heat-shrinkable sleeves: the heat-shrinkable sleeve must not get into contact with lubricant (swelling).
- Contact areas coated with lubricant KL should not be touched, if possible.
- Contact areas must be subjected to preliminary treatment before screw fastening (refer to the table below).
- Immediately after the preliminary treatment, coat contact surfaces completely with a thin and uniform film of lubricant KL.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Follow the below steps for treatment of firmly screw-connected contact surfaces:

1. Contact areas must be subjected to preliminary treatment before screw fastening (refer to the Table).
2. Immediately after the preliminary treatment, coat contact surfaces completely with a thin and uniform film of lubricant KL.

Material of contact surfaces	Pre-treatment
Silver-plated contact surfaces	Clean(1)
Nickel-plated contact surfaces	Remove passivation layer(4)
Copper or copper alloy	Clean(1), expose metallic surface(2)
Aluminium	Clean(1), expose metallic surface(2)

Material of contact surfaces	Pre-treatment
Steel	Clean(1), expose metallic surface(2)
Zinc-plated steel	Remove passivation, not the zinc layer(3)
Hot-galvanized sheet-metal	Clean(1), passivation need not be removed

(1) Clean by means of lint-free cloth; use cleaning agent in case of serious contamination (see above).

(2) Expose metallic surface.

a) by treating the entire surface with emery cloth or a rotating grinding tool (grain-size 100 or 80) or.

b) using a wire brush which is clearly marked for use exclusively for aluminium or exclusively for copper.

(3) Using a brass brush, steel brush.

(4) Rub slightly by hand using Scotchbrite abrasive agent (Ni layer must not be reduced).

Screw Fastenings

⚠CAUTION

HAZARD OF INAPPROPRIATE ASSEMBLY

Comply with the specified torque values for the installations that are covered in this guide.

Failure to follow these instructions can result in injury or equipment damage.

The following elements are required to be used for all screw fastenings:

- Screws and bolts: Grade ≥ 8.8
- Nuts: Grade 8

NOTE: Do not grease screws or nuts.

Hex. bolts and socket-head capscrews (except slotted screws) and nuts (except self-locking nuts)

Thread size	Tightening torque [N.m]	
	min.	max.
M5	3.8	4.7
M6	7	9
M8	16	24
M10	36	44
M12	63	77

Screw fastening with casting nuts in cast resin parts (transformer and post insulator)

Thread size	Tightening torque [N.m]	
	min.	max.
M6	5	7.5
M8	12	18
M10	24	38
M12	36	54

Screw fastening for current transmission, conductor material: copper

Thread size	Tightening torque [N.m]	
	min.	max.
M6	5.5	7.5
M8	15	19
M10	30	40
M12	60	76
M12	63	77

Required Tools (not Included in the Scope of Supplies)

Cutter	
Nail puller	
Approved torque wrenches with different bits for hexagon socket screws and socket-head screws and nuts; bits for screw and nut grades M5, M6, M8, M10, M12	
Screwdriver and Philips screwdriver	
Cutting pliers	
4 Crane straps/chains of L ≥ 2000 mm	
Lint-free, clean rags	

Operation Accessories

Transport Trolley for Circuit Breaker

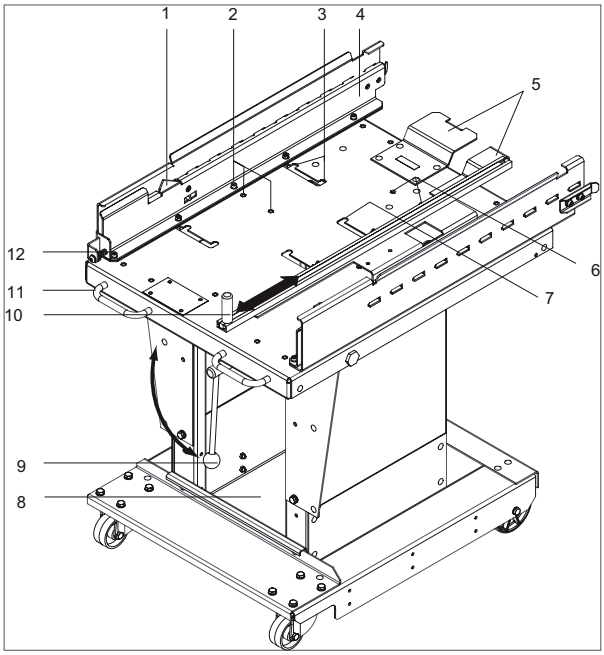


Figure 65
Transport trolley for truck

1	Autonomous interlocking of the racked-in truck on the trolley	7	Positioning of unlocking bar to match various panel versions
2	Variable screw fastening of track	8	Tray for accessories (lever, keys, handle)
3	Positioning of track to adjust the various track widths	9	Lever to lock/unlock the transport trolley on the panel. Table of trolley is lifted or lowered.
4	Track	10	Unlocking bar. The truck is unlocked in the panel.
5	Interlocking with panel	11	Handles of trolley
6	Variable screw fastening of unlocking bar	12	Slide to unlock the truck from the trolley

Rated volt-age Ur of the panel [kV]	Panel width [mm]	Truck	Item number of trolley
≤ 12	650/800	EvoPact HVX/UTX/MTX and CVX	EIB AE1 148-01(1)
	1000	EvoPact HVX/UTX (I_r = 2500 A)	EIB AE1 148-02
		EvoPact HVX/UTX (I_r = 3150 A)	AGS C74 125-01
≤ 17.5	750	EvoPact HVX/UTX/MTX and CVX	EIB AE1 148-01(1)
	1000	EvoPact HVX/UTX (I_r = 2500 A)	EIB AE1 148-02
		EvoPact HVX/UTX (I_r = 3150 A)	AGS C74 125-01(1)
24	800	EvoPact HVX/UTX/MTX and CVX	EIB AE1 148-01(1)
	1000	EvoPact HVX/UTX (I_r = 2500 A)	EIB AE1 148-02
(1) The trolley can be used for panel widths of 650, 750 and 800 mm.			

Adjusting the track width

Follow the steps to adjusting the track width:

1. Release three screws on each track (Figure 65, 2).
2. Adjust the two tracks to the appropriate panel track width and check them. Remount the six screws.
3. Adapt position of unlocking bar (10) also to the appropriate panel (same procedure).

Handling Crane for Circuit Breaker (Optional)

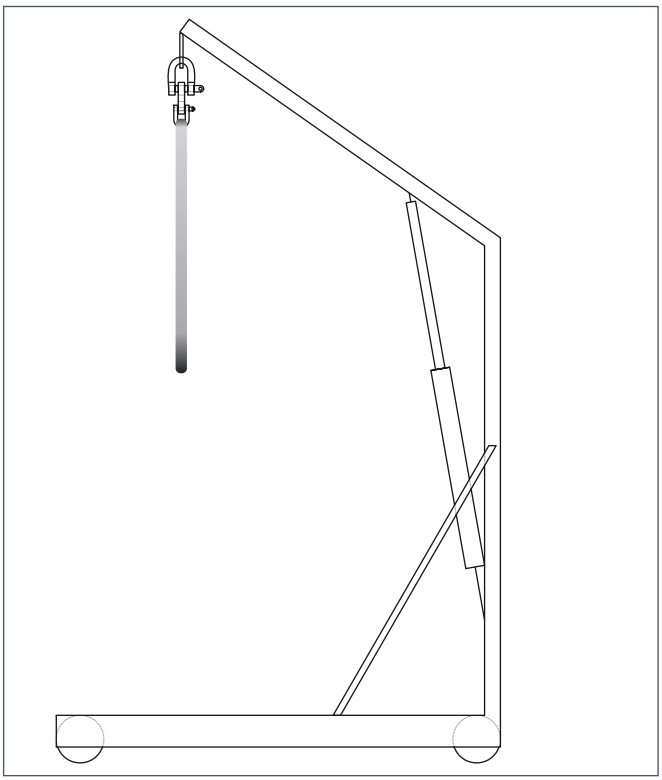


Figure 66
Handling crane for trucks Item no. AGSC73258-01

List of the Assembly Drawings

List of all assembly drawings specified in this manual. This does not apply to special modules or customer-specific special designs.

According to the switchgear configuration in question, only such drawings from the list are supplied by the factory as are actually required.

Description	Assembly drawing Chapter	Chapter
Panel fastening on concrete foundations	SEM102173-01	5.5
Screw-fastening the panels to one another	SEM102056-01	5.7
Mounting the low-voltage compartments	AGS C73 180-01	7.2
Mounting an additional cable duct	AMT 000 376-01	7.4.2

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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

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