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ORMAZABAL
velatia

MV Switchgear for
Substation Solutions

CPG.0 & CPG.1

Single and double busbar panel type GIS system

Up to 36 kV 31.5 kA 2500 A
Up to 38 kV 31.5 kA 2250 A

IEC Standards
IEEE Standards

mediumVOLTAGE AG

Reliable innovation. Personal solutions.

www.ormazabal.com

Contents

The quality of the products designed, manufactured and installed by **Ormazabal** is backed by the implementation and certification of a quality management system, based on international standard ISO 9001:2008.
Our commitment to the environment is reaffirmed with the implementation and certification of an environmental management system as laid down in international standard ISO 14001.
In view of the constant evolution in standards and design, the characteristics of the elements contained in this catalogue are subject to change without prior notification.
These characteristics, as well as the availability of components, are subject to confirmation by **Ormazabal**.

Introduction

Preface

MV/MV and **HV/MV** substations are one of the most critical nodes in any electrical network.

The increasing demand for electricity, and for more power in these substations, requires that **MV** panels have to guarantee maximum reliability and service continuity for rated current levels.

Following the long years of design, development, manufacturing and commissioning experience in gas insulated switchgear (GIS) in secondary distribution, in 2005 **Ormazabal** introduced into the world markets the **CPG** system:

High duty, flexible and extensible single and double busbars GIS panels up to 36 kV.

During the recent years **CPG** has been extended to higher electrical ratings, e.g. up to 2500 A and up to 38 kV.

CPG system has already been integrated into several utility, RES, industry and big infrastructure applications. Currently more than 5,000 functional units of this system have been in service in more than 25 countries.

Ormazabal is the leading provider of personalized solutions to electrical utilities, to energy end users as well as renewable energy systems applications based on our own technology.

We encourage the **development of the electrical sector** concerning the challenges of the future energy needs. We cooperate with the world's leading local, regional and global companies in the electrical sector with a strong commitment to **innovation** for **personal safety, network reliability, energy efficiency**, and **sustainability**.

Our highly qualified and focused team of professionals thrilled by innovation have developed our own products and solutions during our more than a century long consolidated history, always by establishing close relationship with our clients towards achieving mutual long term benefits.

Velatia is an international industrial and technological group which operates in the areas of electrical networks, electronics and communication networks as well as in the consulting, security and aviation sectors, where security, efficiency and reliability are valued.

Grupo Ormazabal is now called Velatia. We have combined our forces to transform ourselves into a stronger group. Made up of companies with more than a hundred years of experience and committed to innovation to meet the present and future needs of our customers, wherever they may be.

The solutions of the companies in Velatia seek to make the world a more connected, more sustainable, smarter, better connected, safer, more humane place.

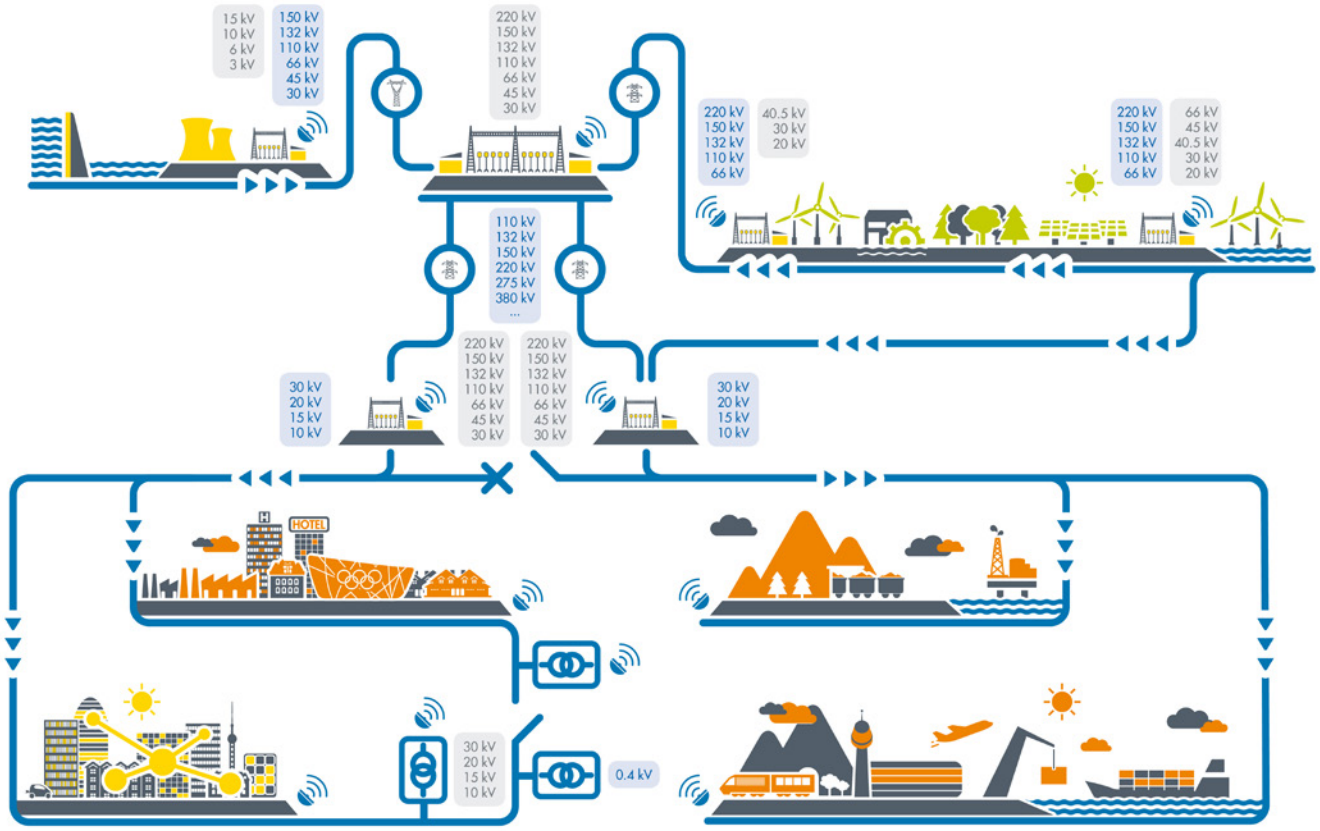
Google data center
(Kuala Lumpur, Malaysia)

UNAM: National university of Mexico
Mexico D.F. (Mexico)

Spanish utility substation
(Spain)

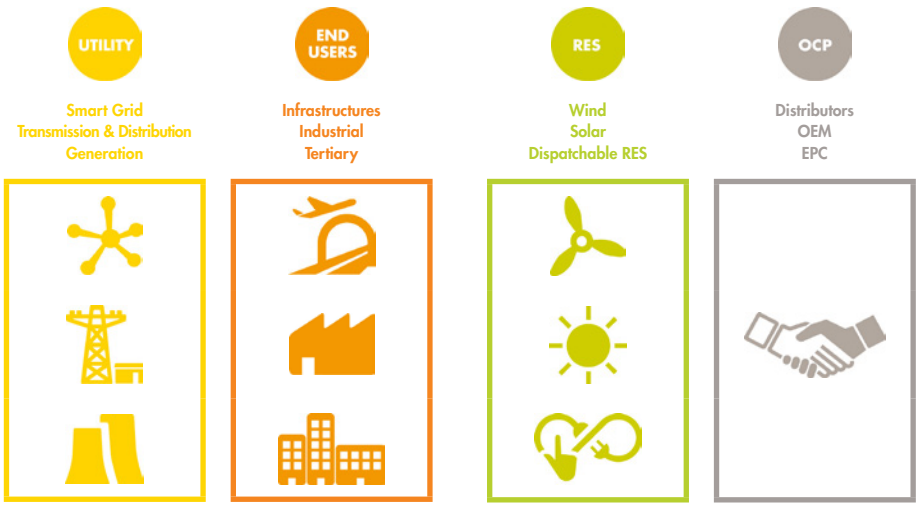
Your Electrical Network

"Your dedicated partner for reliable and intelligent electrical network"



Your Business and SSS Applications

Close relationship with our customers and the **profound knowledge** of the electrical business are the keys to success that enable us to offer **Substation Solutions (SSS)** based on high added value products and services adapted to the needs of the electrical utilities, electrical energy end users and renewable energies.



Our Product Map (SSS & DNS)

We believe that **excellence** does not lie solely in offering **effective products and services**, but also in the ability to respond to **individual requirements** and **demands**.

We provide our clients with personalised projects for efficient energy management via **Primary and Secondary Distribution equipment** and **solutions**.

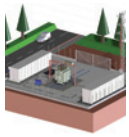
Our Business Lines

SSS: Substation Solution for primary distribution

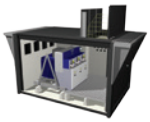
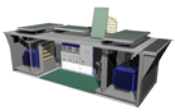
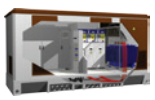
DNS: Distribution Network Solutions for secondary distribution

Our products for your segment

SSS

CPG.1	CPG.0	GAE 1250kMAX	AMC	CiBOR		ORMA-CONTAINER	Prefabricated substations
				A-CiBOR	NVL-CiBOR		
							

DNS

CGM.3	GAE	GA	CGMCOSMOS [IEC - ANSI/IEEE]	CGMCOSMOS [HN]	EA
					
Protection, automation and control		Distribution transformers			Low voltage board
		Conventional oil	ORGANIC	TPC	
					
Concrete prefabricated transformer substations (TS)			Metallic prefabricated TS	CEADS	Switching nodes
Underground	Walk-in	Compact			
					
Concrete enclosure for transformer substations (TS)			Metallic enclosure for TS	Photovoltaic substation	Mobile substation
Underground	Walk-in	Modular			
					

Current® family	ekorSYS family
	
Advanced metering, sensing & analytics and communications	Protection, automation and control

Main features

Safety

Protection for people, environment and your electrical installations.

Special attention paid to the **personal safety** of the operators and the general public, even **under fault conditions.**

Internal arc

The **CPG** panels have been designed to withstand the effects of an internal arc according to IEC 62271-200 (IAC class) / IEEE Std C37.20.7 (1D-S class).

Gas insulated and screened

The breaking and making devices are housed in independent sealed for life stainless steel **gas tanks**. It provides resistance against **harsh environmental conditions** and protection against **indirect contacts**.

The whole power circuit is fully insulated, including the cable terminals, and entirely screened, earthed (grounded) and installed inside a metal enclosure.

Interlocks

CPG panels have mechanical and electrical interlocks as standard in accordance to IEC 62271-200 to enable safe and reliable service.

Interlocks prevent unsafe operations:

- It makes impossible to close the switch-disconnector and the earthing (grounding) switch at the same time.
- It permits the opening of the access cover to the MV cables when the earthing (grounding) switch is closed.

Optional locks, key interlocks and electrical locks based on customers' specifications are available.

Indicators

Additional safety by using:

- **Switchgear position** indicators: Visual indication on the mimic diagram, validated by the **kinematic chain test** in accordance with current standards (IEC 62271-102).
- Capacitive **voltage** presence / absence indicators(IEC 61243-5)
- Permanent indication (multi-LED) and optional contacts for remote display and/or use of electromagnetic interlocks
- Temperature-compensated monitoring of the gas pressure inside each of the panel tanks.

Reliability

Help to maintain uninterrupted supply of your electrical network

Sealed for life insulation

Insulation inside a stainless steel gas tank provides long service life (30 years) and absence of maintenance in live parts.

Installation, assembly on site, extension and replacement **without gas handling**.

Suitable for any environment

Resistance to harsh conditions (humidity, salinity, dust, pollution…). Uninterrupted supply even in case of flooding.

100% Routine tested

All the switchgear is subject to 100% electrical and mechanical routine tests according to the relevant standards. Also gas tightness test has been carried out 100% of our switchgear as a routine test to guarantee the reliability throughout its operational life.

- Gas tightness test
- Power-frequency test
- Measurement of the resistance of the main circuit
- Mechanical endurance test
- Measurement of the partial discharge

Other tests performed:

- Salt & fog tested for 500 hours
- Seismic tested as per Richter

Efficiency

High valuable features that make your task easier

Modularity

CPG design is totally modular. It offers flexible diagram configurations, easy extension to both sides without gas handling.

Extensibility and replaceability

Extensibility on both sides allows a fast and economic installation process, in reduced space, not having to move adjacent panels to remove a central one.

Ergonomics

CPG presents the following user-friendly features:

- Front access to install MV cables and fuses
- Easy connection and testing cables
- Simple interface with operators
- Horizontal fuse holders
- Effortless operation of driving mechanisms
- Optimized dimensions
- Safe access to the control and signalling area
- Reliability of connecting the control and signalling circuits via connectors.

Sustainability

Continuous efforts in gas emission reduction

Commitment to the environment:

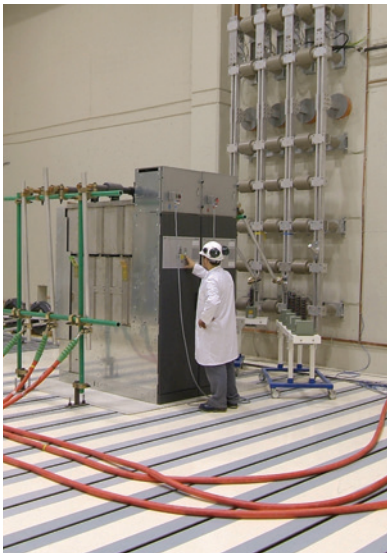
- Incessant decrease in use of greenhouse gases
- Negligible SF_6 emission in manufacturing processes
- Switchgear gas leakage rates reduction
- No SF_6 gas use during installation
- Unceasing measures to reduce our environmental footprint
- End-of-life management
- Use of highly recyclable materials
- Constant research investment in alternative materials and own technology
- Reduction of the panel room dimension, due to its frontal access and design without removable switchgear, clearance.

Continuous innovation

Help to maintain uninterrupted supply of your electrical network

A focused team of professionals dedicated to innovation leads to a constant offer of new developments and upgrades, such as:

- New modules for 2500 A
- Voltage and current sensors for metering and protection
- Integrated in panel own protection and automation units
- Preventive cable fault diagnosis
- Partial discharge (PD) detection for network diagnosis
- Optional monitoring system to watch the switch position inside the gas tank



Technical details

Family

CPG.0 Single busbar

V

Circuit breaker

F

Fuse protection

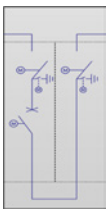
S

Disconnector

RB

Busbar rise

C



Busbar coupling

CPG.1 Single busbar

V1

Circuit breaker

F1

Fuse protection

S1

Disconnector

C

Longitudinal busbar coupling

CPG.1 Double busbar

V2

Circuit breaker

F2

Fuse protection

S2

Disconnector

CL

Longitudinal busbar coupling

CT

Transversal busbar coupling

Applicable electrical standards

IEC	
IEC 62271-1	Common specifications for high voltage switchgear and controlgear standards.
IEC 62271-200	Alternating current metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV.
IEC 62271-103	Switches for rated voltages above 1 kV up to and including 52 kV.
IEC 62271-102	Alternating current disconnectors and earthing switches.
IEC 62271-105	High voltage alternating current switch-fuse combinations.
IEC 62271-100	High voltage alternating current circuit-breakers.
IEEE / ANSI	
IEEE C37.74	IEEE Standard Requirements for Subsurface, Vault, and Pad-Mounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems Up to 38 kV
IEEE C37.20.3	IEEE Standard for Metal-Enclosed Interrupter Switchgear
IEEE 1247	Standard for Interrupter Switches for Alternating Current, Rated Above 1000 Volts
IEEE C37.123	IEEE Guide to Specifications for Gas-Insulated, Electric Power Substation Equipment
IEEE Std C37.20.4	IEEE Standard for Indoor AC Switches (1 kV-38 kV) for Use in Metal-Enclosed Switchgear
IEEE C37.04	IEEE Standard Rating Structure for AC High-Voltage Circuit Breakers
IEEE C37.06	AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis- Preferred Ratings and Related Required Capabilities
IEEE Std C37.09	IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
IEEE Std C37.20.7	IEEE Guide for Testing Medium-Voltage Metal-Enclosed Switchgear for Internal Arcing Faults

Technical data

Electrical characteristics			IEC				ANSI / IEEE			
			CPG.0		CPG.1		CPG.0		CPG.1	
Rated Voltage	U_d	[kV]	**24**	**36**	**24**	**36**	**27**	**38**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60							
Rated normal current	I_r									
Busbars		[A]	Up to 2500	Up to 1250[3]	Up to 2000		Up to 2250[3]	Up to 1250[3]	Up to 2000[3]	
Outgoing line[1]		[A]	Up to 2500	Up to 1250	Up to 2000		Up to 2250	Up to 1250	Up to 2000	
Rated short-time withstand current										
with t_k = 1 s – 3 s	I_k	[kA]	25		25 / 31.5		25		25/31.5	
Peak value (max)	I_p	[kA]	65		65 / 80		65		65/85	
Rated insulation level										
Rated power-frequency withstand voltage [1 min]	U_d	[kV]	50 / 60	70 / 80	50 / 60	70 / 80	50 / 66	80 / 88	60 / 66	80 / 88
Rated lightning impulse withstand voltage	U_p	[kV]	125 / 145	170 / 195	125 / 145	170 / 195	125 / 145	170 / 195	125 / 145	170 / 195
Internal arc classification according to IEC 62271-200	IAC		AFL[R] 25 kA 1 s		AFL 31.5 kA 1 s		AFL[R][2] 25 kA 1 s		AFL[2] 31.5 kA 1 s	
Degree of protection			IP3X							
Loss of service continuity category		LSC	LSC2							
Partition class			PM							

[1] Fuse protection panel = 200 A [2] Equivalent to IEEE C37.20.7 for 1D-S [3] For higher values, please consult Ormazabal

Driving mechanism		Vacuum circuit breaker			Switch-Disconnector	
		CPG.0	**CPG.1 (≤1250 A)**	**CPG.1 (≥1250 A)**	**CPG.0**	**CPG.1**
Auxiliary circuits						
Tripping coil						
Rated voltage	[V]	24 / 48 / 110/ 125 / 220 Vdc 110 / 220 Vac			–	
Max. consumption	[W]	170		288	–	
Minimun voltage coil						
Rated voltage	[V]	24 / 48 / 110/ 125 / 220 Vdc 110 / 220 Vac			–	
Max. peak current	[A]	18			–	
Motorised units						
Rated voltage	[V]	24 / 48 / 110/ 125 / 220 Vdc 110 / 220 Vac			110 / 125 Vdc	24 / 48 / 110/ 125 / 220 Vdc 110 / 220 Vac
Max. consumption	[W]	30		220		50
Motor operation time	[s]	<12			<5	<10
Peak current	[A]	<3		<11	≤5	≤3.5

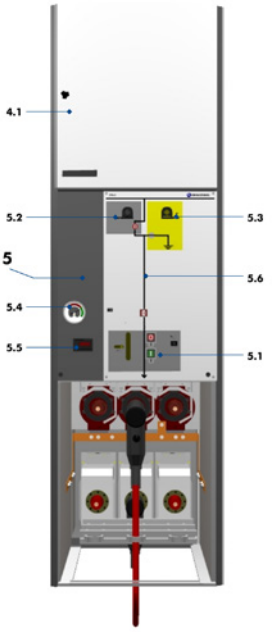
Service conditions	IEC	ANSI / IEEE
Type of switchgear	Indoor	
Ambient temperature		
Minimum | Maximum	-25 °C * | +40 °C**	-13 °F * | 104 °F **
Maximum average ambient temperature, measured over a 24-hour period	+35 °C	95 °F
Relative humidity		
Maximum average relative humidity, measured over a 24-hour period	<95 %	
Maximum height above sea level	1,000 m**	3,250 feet**
Solar radiation	Negligible	
Environmental air pollution (dust, salinity, etc.)	Insignificant	
Vibrations (seismicity)	Negligible**	

* Consult availability and other values. ** For special conditions, altitudes, please consult **Ormazabal**.

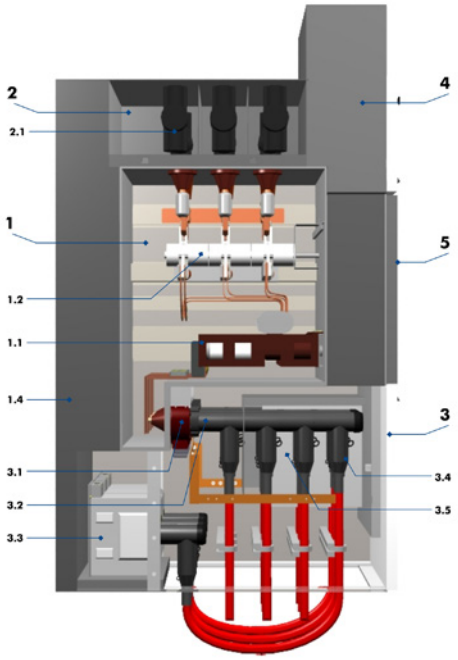
Constructive structure

CPG.0

Front view

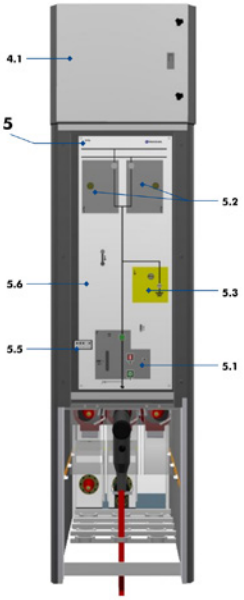


Side view

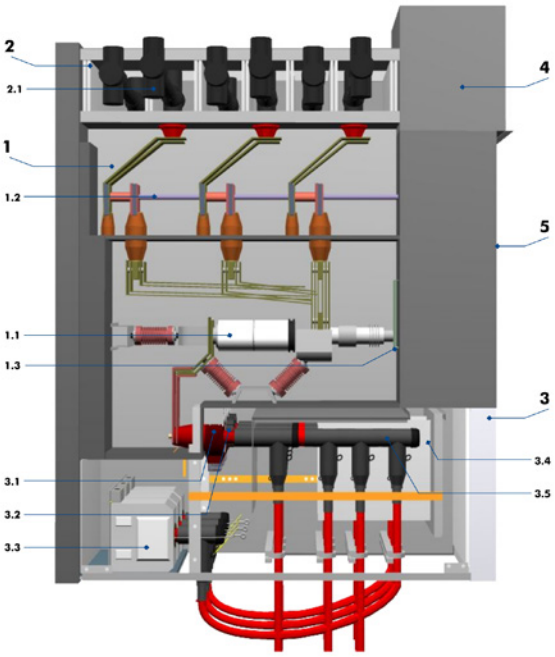


CPG.1

Front view



Side view



1. Gas tank/s
   - 1.1. Vacuum circuit breaker
   - 1.2. Three-position switch-disconnector (CPG.0) / Disconnectors (CPG.1)
   - 1.3. Earthing switch (CPG.1)
   - 1.4. Pressure relief duct
2. Busbar compartment
   - 2.1. Main busbars
3. Base: Cable compartment
   - 3.1. Bushings
   - 3.2. Current transformers
   - 3.3. Voltage transformers
   - 3.4. Phase segregation assembly
   - 3.5. Terminals
4. Low voltage compartment
   - 4.1. Protection, control and signalling devices
5. Operation interface
   - 5.1. Circuit-breaker driving mechanism
   - 5.2. Disconnector/s driving mechanism
   - 5.3. Earthing (grounding) switch mechanism
   - 5.4. Pressure switch (CPG.0)
   - 5.5. Voltage presence/absence indicator
   - 5.6. Mimic diagram

CPG
ANSI / IEEE type

Design characteristics

Key components

Vacuum circuit breaker (VCB)

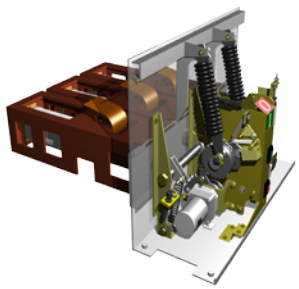
Circuit-breaker with vacuum breaking technology, compact and with excellent reliability, certified in accordance to IEC 62271-100 standard, including extended electrical endurance (class E2) with rapid reclosing cycle and hence maintenance-free during its whole service life.

Circuit-breaker

		CPG.0	CPG.1
Breaking capacity			
Short-circuit (asymmetry)	**[kA]**	25	25 / 31.5
DC		>34%	>45%
No-load cable-charging breaking capacity	**[A]**	31.5 (24 kV) 50 (36 kV)	
Capacitor bank breaking capacity	**[A]**	400	
Electrical endurance		E2	
Reclosing sequence		O-0.3"-CO-15"-CO	
Mechanical endurance		M2 10000	
Rated current	**[A]**	Up to 2500 (24 kV) Up to 2000 (36 kV)	Up to 2000 (24-36 kV)
Rated short-time withstand current	**[kA / 1 s - 3 s]**	25	25 / 31.5
Operatiing time	**[ms]**	<45	

Characteristics:

- Vacuum breaking
  - Manual operation through push-button (lockable with a padlock)
- Motor driving mechanism
  - Spring loading time <15 seconds
- Operating coils:
  - 1 (CPG.0) and 2 (CPG.1) shunt trip opening coils. 2nd optional coil.
  - 1 closing coil
  - 1 undervoltage coil (optional)



Disconnector

Puffer type high dutydisconnector designed and developed by Ormazabal.

The switch-disconnector includes the functions of switch-disconnector and earthing (grounding) switch in a single three-position unit.

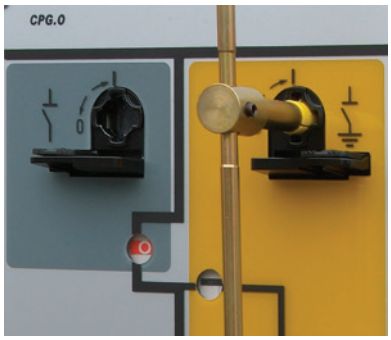
Disconnector and earthing (grounding) switch:

		CPG.0	CPG.1
Mechanical endurance		M0 – 1000	M0-1000
Earthing (grounding) switch			
Making capacity	**[kA]**	63 (50 Hz) / 65 (60 Hz)	63-80 (50 Hz) / 65-85 (60 Hz)
Electrical endurance		E0[1)]	E0 [1)]
Rated current	**[A]**	24 kV: Up to 2500 36 kV: Up to 1250	2000 A
Short-time current	**[kA –1 / 3 s]**	25	25 31.5

[1)]The earthing switch does not have making capacity by itself, as this is transferred to the circuit-breaker.

Characteristics:

- 3 positions (connection - disconnection - earthing)
- Independent actuation and levers for the operations:
  - Connection - disconnection [motor driving mechanism option]
  - Disconnection – earthing (grounding) [motor driving mechanism option]



Main busbars

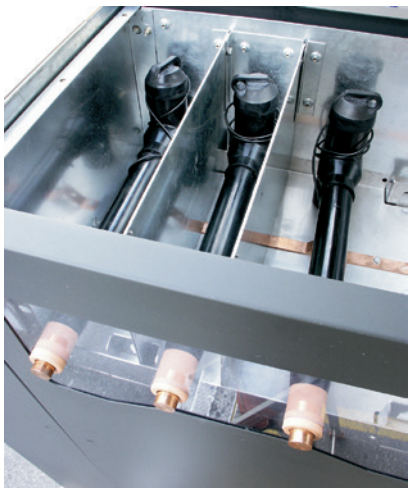
The function of the main busbars is to connect panel-to-panel electrically.

They are single-phase arranged and located outside the sealed gas tank .It allows modularity and future extensibility without gas handling on site or moving adjacent panels.

The upper busbar set consists of three separate cylindrical copper conductors with solid and shielded insulation. Every phase is connected using a busbar segment and "T" or "L" shaped connectors.

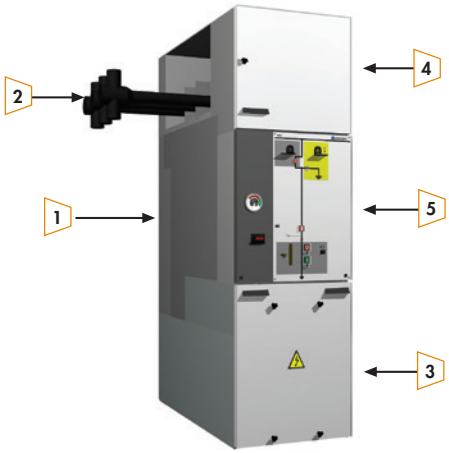
The whole set is protected against dirt and condensation; in addition, it has a metal cover to protect it against impacts.

The busbars are prepared to withstand thermal and dynamic forces of rated short-time currents (CPG.0: 25 kA / 1 or 3 s and CPG.1 up to 25-31.5 kA / 1 or 3 s) and rated continuous current up to 2500 A.

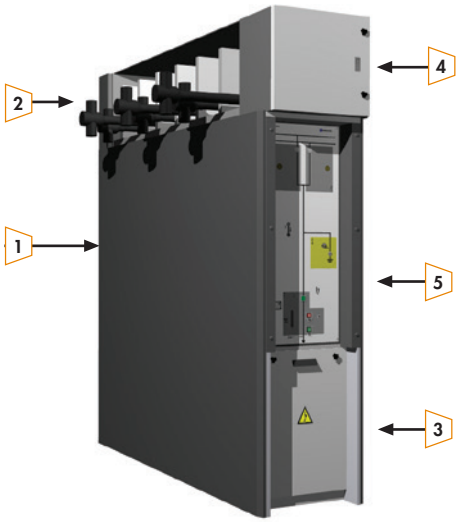


Main compartments

CPG panel system presents a structure divided into independent compartments:



CPG.0



CPG.1

1. Gas tank/s:
   Switch/ CB compartment/s
2. Busbar compartment
3. Base: Cable compartment
4. Low voltage compartment
5. Operation interface

Switch / CB compartment

The **switch compartment**, sealed for life, houses the switching and breaking switchgear, where the insulating medium is SF_6 gas.

CPG.0 contains one single gas tank, whereas **CPG.1** is characterised by having one tank for the Circuit-Breaker and earthing (grounding) switch and one tank for each feeder disconnectors depending on whether it corresponds to single or double busbar.

Built in stainless steel, it is designed to withstand an internal arc. The gas generated as a result of an internal arc is cooled down and can be channelled towards the top of the panel through a relief duct located on the rear side.

The following elements are located inside, depending on the functionality:

- Disconnector and earthing (grounding)switch.
- Vacuum circuit-breaker.
- Fuse holders

This compartment can be connected to the busbar and the medium voltage cables respectively by means of cable bushings at the top and bottom.

The gas pressure is tested by means of a temperature-compensated pressure gauge, with a potential-free contact, allowing it to be used as a remote alarm.

Features:

- **Sealed-for-life** insulation system (30 years)
- **Internal arc** tested
- **Stainless steel** – **IP65** rating
- **Switching, breaking** and **main circuit** devices
- **Outer-cone** bushing **plug-in** type terminal
- **Pressure gauge**
- **Pressure relief diaphragm valve**

Driving mechanism

The **driving mechanism** is used to perform making and breaking operations in the MV circuits.

The front layout of the driving mechanisms and the use of anti-reflex levers permits safe, comfortable, simple operations with a minimum of effort.

The front **mimic diagrams** include the position indicating devices. Maximum reliability verified using the kinematic chain test of the signalling mechanism in accordance with IEC 62271-102.

Features:

- **Mimic diagram** and pushbuttons
- **Position display (Kinematic chain)**
  - Switching devices
  - Fuse tripping
- Capacitive voltage indicator
- **Interlocks (electrical and mechanical)**
- Optimized operator interface

Busbar compartment

Located in the upper part of the panel, it is used to house the busbar (electrical connection between the Medium Voltage panels).

Each one of the phases that make up the busbar has solid and shielded insulation, earthed (grounded) by means of the compartment's specific earthing bar.

Because of this single-phase arrangement, the panel offers excellent reliability in terms of service continuity.

The installation of a phase segregation assembly using earthed (grounded) metal plates, allows this compartment to withstand internal arcs.

Optionally, toroidal-core current transformers and/or plug-in voltage transformers can be installed in this compartment, without needing metering panels.

Features:

- Single-phase arrangement
- Solid and shielded busbars
- Externaly assembled
- Optional: Toroidal-core current transformers and plug-in voltage transformers

Base

Cable compartment

The **cable compartment**, located in the lower front section of the panel, has a cover interlocked with the earthing (grounding) switch, thus allowing front access to the Medium Voltage cables.

The external cone-type bushings allow the installation of toroidal-core current transformers on them and the connection of MV insulated cables.

Features:

- Up to 4* reinforced shielded connection terminals (screw-in) per phase.
- Cable bushings up to 2500 A (CPG.0)
- Cable clamps for the medium voltage cables
- Earthing (grounding) bars.
- Toroidal-core current transformers.
- Plug-in voltage transformers.
- Surge arresters.
- Effortless connections

(*) Up to 6 terminals in CPG.0 (2000/2500 A)

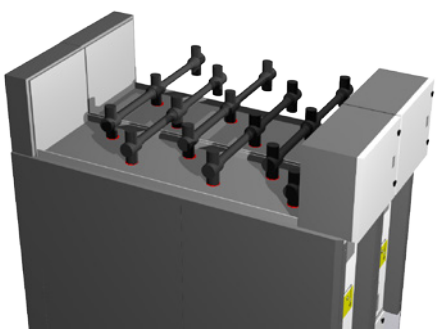
Low voltage compartment

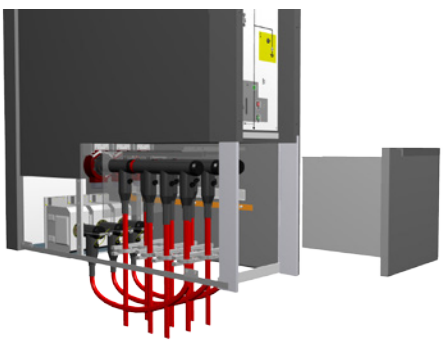
The **low voltage compartment** placed in the upper part of the panel and independent of the MV compartments, is defined for installing protection relays, as well as metering and control devices.

Features:

- **Independent compartment** from MV area
- **Ready** for installing protection relays, control and metering equipment
- **Factory assembled and tested** according to customer needs
- **Standard and compact design** for installing Ormazabal's protection relays and automation units
- **High adaptation** capabilities for other manufacturers' protection relays, control and metering units as well as customers' provided equipment
- **Customized size and design**

Attachable low voltage compartments can be supplied optionally, for the location of signalling elements and the activation of motorised functions.





Protection & Automation

CPG switchgear is used a very wide range of areas in power distribution and mostly includes comprehensive protection and control systems to provide the related functions for the application.

CPG is suitable to utilize in substations with conventional protection relays as well as where complex combination of several protection relays and controls systems are required. The devices are installed in the low-voltage compartment of the panels. Indicators and controls are integrated into the front door of the low voltage compartment.

Protection

- Protection functions such as
  Differential protection
  Distance protection
  Overcurrrent time protection
  Earth fault protection
  Overload protection
  Over/under voltage protection
  Pver/under frequency protection
  Directional power protection
  Load unbalance protection
  Automatic re-starting, etc.
- Substation protection
- Supply to MV customers
- Protection of switching substations and industrial customers
- Generator set protection unit

Automation

- Automation and remote control
- Remote control
- Automatic transfer
- Fault detection

Communication

A wide range of interfaces and protocol structures are available for communication with the control system depending on the device variants used. The connection is made using a data cable or fibre optic cable depending on the system.

ekorSYS Family

ekorSYS family is the generic name of all the protection relays, automation, control and communication components and systems that are designed, developed and manufactured by Ormazabal.

The basic products and systems that can be integrated into CPG panels are as follows:

Protection

ekorRPG

Measurements

- Current: Amperimeter Function

Protection Functions

- Phase overcurrent: 50-51
- Earth overcurrent: 50N-51N
- Ultrasensitive earth leakage protection: 50Ns-51Ns
- Thermometer (external trip): 49T
- Recloser (79)

Communications

- Front port configuration: DB9 RS232
- Rear port remote control RS485 (5kV) –RJ45
- Protocol: MODBUS (RTU)
- Setup and monitoring program ekorSOFT (optional)

ekorRPS-TCP

Communications

- Ports: RS-232, RS-485, FOC
- Protocols: MODBUS, PROCOME, IEC-60870-5-101, IEC-60870-5-103, DNP3.0, IEC-61850

Protection ekorRPS-DC and ekorRPS-DD

- Phase overcurrent: (3 x 50/51)
- Earth overcurrent: (50N/51N)
- Current unbalance/ negative sequence current: (46-46FA)
- Breaker failure: (50BF)
- 2nd harmonic restraint
- Ultrasensitive earth overcurrent: (50Ns/51Ns)
- Ultrasensitive earth overcurrent (3 x 67)
- Directional earth fault and sensitive earth fault: (67N), (67Ns)
- Isolated earth directional function: (67NA)
- Voltage restrained overcurrent: (51V)
- Fuse failure
- Thermal image: (49)

Additional features, see next page

Additional protection ekorRPS-DD

- Maximum frequency / minimum frequency / frequency-derived: (81M / 81m / 81R)
- Directional power: (32)
- Phase overvoltage / phase undervoltage / negative sequence overvoltage (3 x 59 / 3 x 27 / 47)
- Neutral overvoltage: (59N/64)

Control functions

- Three-phase recloser: (79)
- Recloser for single-phase trips due to overcurrent: (79)
- Trip/closure coil supervision: (74)
- Recloser for restart after trip due to frequency trip: (79)
- Synchrocheck: (25)
- Protection status self-diagnosis

Measurements

- Phase, neutral and sensitive neutral currents
- Power factor
- Simple and compound voltages
- Current maximeter
- Energies
- Inverse sequence
- Powers
- Harmonic distortion (THD)

Data acquisition

- Chronological event log
- History log of maximum and minimum measurements
- Chronological fault log
- Oscillography

ekorSYS: Automation and remote control

- Remote control
  - ekorUCT
  - ekorCCP
  - ekorRCI
- Automatic transfer
  - ekorSTP
  - ekorCCP
  - ekorRTK
- Fault detection
  - ekorRCI

Advanced Meter Management and communication

- ekorGID

Dispatching center

Software

- ekorSOFT

For further information, please refer to **Ormazabal** or visit www.ormazabal.com

Type of modules

CPG.0-V

Single busbar circuit-breaker panel

Includes a vacuum circuit-breaker and a three position disconnectorin series with it. Both components are located Both components are located inside the switch compartment.

Electrical characteristics			IEC		ANSI / IEEE	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		60	
Rated current						
General busbar	I_r	[A]	1250 / 1600 / 2000 / 2500	1250(**)	1250 / 1600 / 2250(**)	1250(**)
feeder	I_r	[A]	630 / 1250 / 1600 / 2000 / 2500(*)	630 / 1250	1250 / 1600 / 2250(*)	1250
Rated short-duration power frequency withstand voltage (1 min)						
phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Across isolating distance	U_d	[kV]	60	80	66	88
Rated lightning impulse withstand voltage						
phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Across isolating distance	U_p	[kV]	145	195	145	195
Internal arc classification	IAC		AFL[R] 25 kA 1 s			
Circuit-breaker			**IEC 62271-100**		**IEEEC37.20.3**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	63 (50 Hz) / 65 (60 Hz)		65	
Rated breaking capacity and making capacity						
Mainly active current rated breaking capacity	I_1	[A]	630 / 1250 / 1600 / 2000 / 2500(*)	630 / 1250	1250 / 1600 / 2250(*)	1250
Short-circuit breaking capacity	I_{sc}	[kA]	25			
Capacitive current capacity (50 Hz). Capacitor banks		[A]	400			
Rated operating sequence						
Without reclosing			CO-15 s-CO / CO-3 min-CO			
With reclosing			O-0,3 s-CO-15 s-CO / O-0,3 s-CO-3 min-CO			
Circuit-breaker category						
Mechanical endurance (operations-class)			10000 - M2		10000	
Electrical endurance (class)			E2-C2			
Switch-disconnector			**IEC 62271-103 + IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	65			
Switch-disconnector Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			
Earthing (grounding) Switch			**IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (earthing circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	63 (50 Hz) / 65 (60 Hz)		65	
Main switch making capacity (peak value)	I_{ma}	[kA]	63 (50Hz) / 65 (60 Hz)		65	
Earthing (grounding) Switch Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			

* With forced ventilation ** For higher values, please consult Ormazabal

Applications

Main transformer protection, feeder protection, busbar coupling protection, capacitor bank protection and auxiliary services transformer protection.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 25 kA 1 s (IEC)
- □ IAC AFLR 25 kA 1 s (IEC)

Gas tank

- ■ Pressure gauge with potential-free contact
- ■ Voltage presence indicator
- □ Auxiliary contact
- □ Visual inspection device

Busbar compartment

- □ Up to 2500 A – 24 kV
- □ Up to 1250 A – 36 kV
- □ Up to 2250 A – 27 kV
- □ Up to 1250 A – 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

Three-position disconnector

- □ Disconnector motorization
- □ Earthing (grounding) switch motorization

Vacuum circuit-breaker

- ■ Motor
- ■ Tripping coil
- □ 2ndTripping coil
- ■ Closing col
- □ Undervoltage coil
- ■ Opening/closing push-button blocking

Additional interlocks

- □ Electrical interlocks
- □ Key lock interlocks
- □ Pad locks

Cable compartment

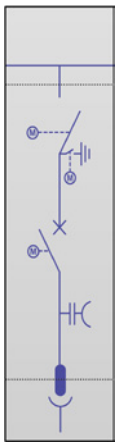
- ■ Up to 4 cables per phase
- □ Toroidal-core current transformers
- □ Plug-in voltage transformer

Low voltage compartment

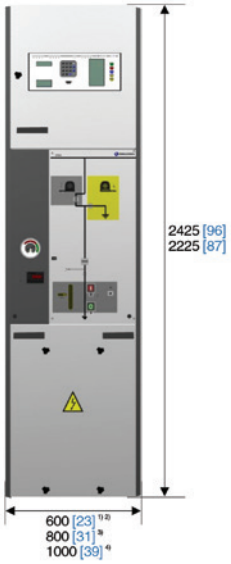
Panel height

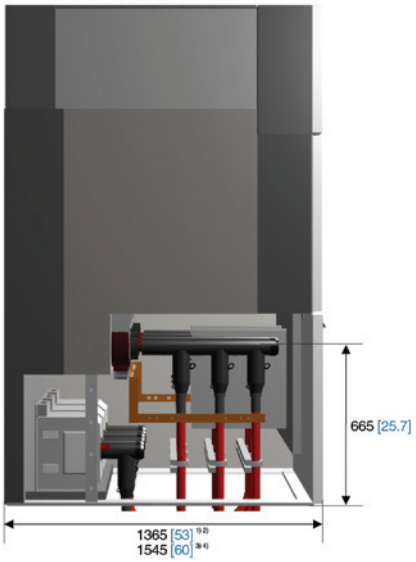
- ■ 2425
- □ 2245
- □ Protection, automation, control and signalling devices

Dimensions



IEC
CPG.0-V





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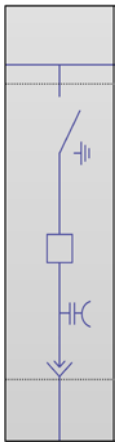
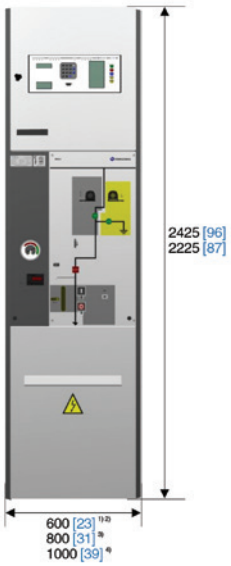
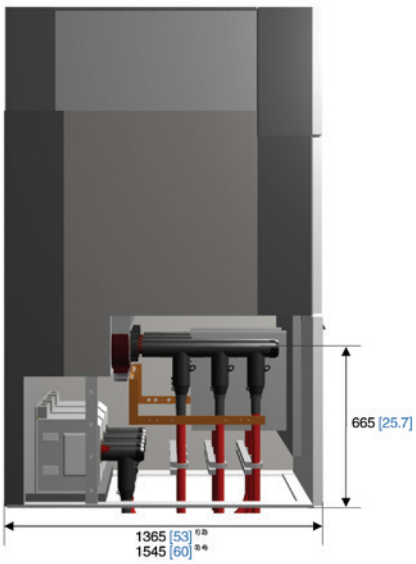


ANSI / IEEE
CPG.0-V





Configuration		Weight Kg	Weight Lbm
1)	24 kV 630 A	<300	–
2)	Up to 38 kV ≤ 1600 A	<750	<342
3)	Up to 27 kV 2000 A	<1100	<500
4)	Up to 24 kV 2500 A Up to 27 kV 2250 A	<1200	<545

CPG.0-F

Single busbar fuse protection panel

It has a three-position switch-disconnector (closed/open/earthing-grounding), including fuse protection. The fuses are housed in sealed fuse holders, which in turn are inside the switch compartment, reinforcing the level of insulation.

The three-pole opening switch with combined actuation by fuse blow is optionally motorisable.

Electrical characteristics			**IEC**		**ANSI / IEEE**	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		60	
Rated current						
General busbar	I_r	[A]	1250 / 1600 / 2000 / 2500	1250(*)	1250 / 1600 / 2250(*)	1250(*)
Output to transformer	I_r	[A]	200			
Rated short-duration power frequency withstand voltage (1 min)						
Phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Across isolating distance	U_d	[kV]	60	80	66	88
Rated lightning impulse withstand voltage						
Phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Across isolating distance	U_p	[kV]	145	195	145	195
Internal arc clasification	IAC		AFL[R] 25 kA 1 s			
Switch-disconnector			**IEC 62271-103 + IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	63 (50 Hz) / 65 (60 Hz)		65	
Mainly active load-breaking current	I_1	[A]	630			
Main switch making capacity (peak value)	I_{ma}	[kA]	63 (50 Hz) / 65 (60 Hz)		65	
Switch Category						
Mechanical endurance			1000-M1			
Cycles of operations (Short-circuit making current)- class			5-E3		E2	
Combined switch-relay take-over current						
Breaking I_{max} acc. $TD_{ltransfer}$			>800			
Earthing (grounding) Switch			**IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (earthing circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	1			
Value	I_p	[kA]	2.5 / 2.6		2.6	
Earthing (grounding) switch making capacity (peak value)	I_{ma}	[kA]	2.5 / 2.6		2.6	
Earthing (grounding) Switch Category						
Mechanical endurance (manual)			1000-M0		1000	
Cycles of operations (Short-circuit making current)- class			E2		E2	

* For higher values, please consult Ormazabal

Applications

Feeder/transformer disconnection, busbar coupling rise and busbar voltage metering.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 25 kA 1 s (IEC)
- □ IAC AFLR 25 kA 1 s (IEC)

Gas tank

- ■ Fuses combined with the switch-disconnector
- ■ Pressure gauge with potential-free contact
- ■ Voltage presence indicator
- □ Auxiliary contact
- □ Visual inspection device

Busbar compartment

- □ Up to 2500 A – 24 kV
- □ Up to 1250 A – 36 kV
- □ Up to 2250 A – 27 kV
- □ Up to 1250 A – 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

Three-position disconnector

- □ Disconnector motorization

Additional interlocks

- □ Electrical interlocks
- □ Key lock interlocks
- □ Pad locks

Cable compartment

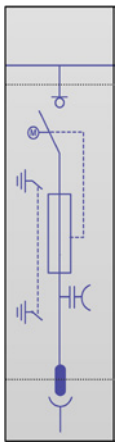
- ■ Up to 4 cables per phase
- □ Toroidal-core current transformers
- □ Plug-in voltage transformer

Low voltage compartment

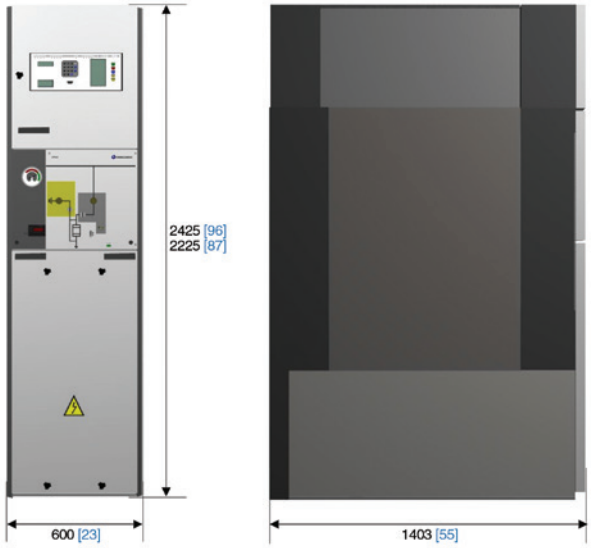
Panel height

- ■ 2425
- □ 2245
- □ Protection, automation, control and signalling devices

Dimensions



IEC
CPG.0-F



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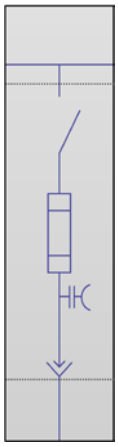


ANSI / IEEE
CPG.0-F

Configuration	Weight	
	Kg	Lbm
	<550	<250

CPG.0-S

Single busbar Disconnector panel

Includes a three-position disconnector without load breaking capacity.

Electrical characteristics			IEC		ANSI / IEEE	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		60	
Rated current						
General busbar	I_r	[A]	1250 / 1600 / 2000 / 2500	1250(*)	1250 / 1600 / 2250(**)	1250(*)
Feeder	I_r	[A]	1250 / 1600	1250	250 / 1600 / 2250	1250
Rated short-duration power frequency withstand voltage (1 min)						
Phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Across isolating distance	U_d	[kV]	60	80	66	88
Rated lightning impulse withstand voltage						
Phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Across isolating distance	U_p	[kV]	145	195	145	195
Internal arc classification	IAC		AFL[R] 25 kA 1 s			
Switch-disconnector			**IEC 62271-103 + IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	63 (50 Hz) / 65 (60 Hz)		65	
Switch-disconnector Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			
Earthing (grounding) Switch			**IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (earthing circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	65			
Main switch making capacity (peak value)	I_{ma}	[kA]	63 (50Hz) / 65 (60 Hz)		65	
Earthing (grounding) Switch Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			

* With forced ventilation ** For higher values, please consult Ormazabal

Applications

Feeder/transformer disconnection, busbar coupling rise and busbar voltage metering.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 25 kA 1 s (IEC)
- □ IAC AFLR 25 kA 1 s (IEC)

Gas tank

- ■ Pressure gauge with potential-free contact
- ■ Voltage presence indicator
- □ Auxiliary contact
- □ Visual inspection device

Busbar compartment

- □ Up to 2500 A – 24 kV
- □ Up to 1250 A – 36 kV
- □ Up to 2250 A – 27 kV
- □ Up to 1250 A – 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

Three-position disconnector

- □ Disconnector motorization
- □ Earthing (grounding) switch motorization

Additional interlocks

- □ Electrical interlocks
- □ Key lock interlocks
- □ Pad locks

Cable compartment

- ■ Up to 4 cables per phase
- □ Toroidal-core current transformers
- □ Plug-in voltage transformer

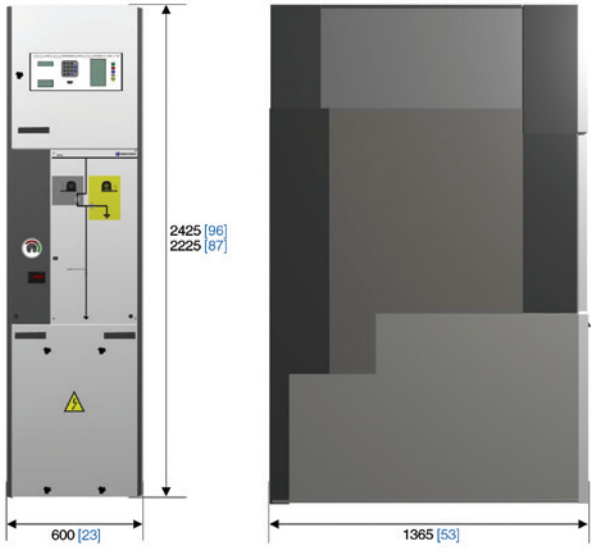
Low voltage compartment

Panel height

- ■ 2245
- □ 2425
- □ Protection, automation, control and signalling devices

Dimensions

IEC
CPG.0-S



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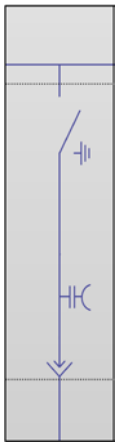
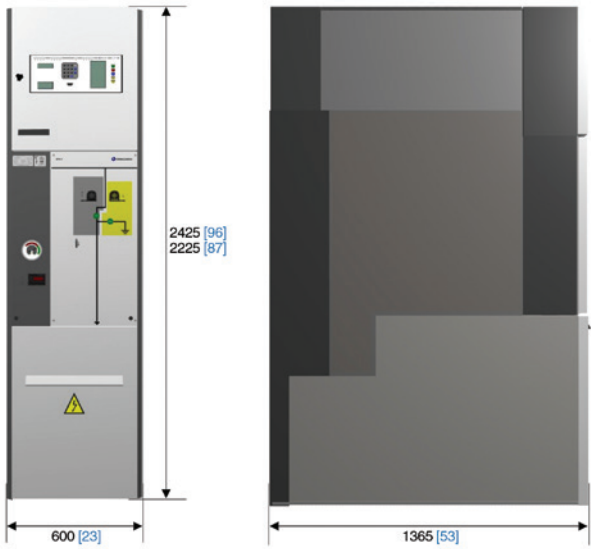


ANSI / IEEE
CPG.0-S



Configuration	Weight	
	Kg	Lbm
	<550	<250

CPG.0-C

Single busbar coupling panel

It includes a vacuum circuit-breaker with two three-position disconnectors in series with it, one upstream and the other downstream from the circuit-breaker.

These elements are located inside the switch compartments.

Electrical characteristics			**IEC**		**ANSI / IEEE**	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		50 / 60	
Rated current						
General busbar	I_r	[A]	1250 / 1600 / 2000 / 2500	1250	1250 / 1600 / 2250	1250
Rated short-duration power frequency withstand voltage (1 min)						
Phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Across isolating distance	U_d	[kV]	60	80	66	88
Rated lightning impulse withstand voltage						
Phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Across isolating distance	U_p	[kV]	145	195	145	195
Internal arc classification	IAC		AFL[R] 25 kA 1 s			
Circuit-breaker			**IEC 62271-100**		**IEEEC37.20.3**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	63 (50 Hz) / 65 (60 Hz)		65	
Rated breaking capacity and making capacity						
Mainly active current rated breaking capacity	I_1	[A]	630 / 1250 / 1600 / 2000 / 2500(*)	630 / 1250	1250 / 1600 / 2250(*)	1250
Short-circuit breaking capacity	I_{sc}	[kA]	25			
Rated operating sequence						
Without reclosing			CO-15 s-CO / CO-3 min-CO			
With reclosing			O-0,3 s-CO-15 s-CO / O-0,3 s-CO-3 min-CO			
Circuit-breaker category						
Mechanical endurance (operations-class)			10000 - M2		10000	
Electrical endurance (class)			E2-C2			
Switch-disconnector			**IEC 62271-103 + IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	63 (50 Hz) / 65 (60 Hz)		65	
Switch-disconnector Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			
Earthing (grounding) Switch			**IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (earthing circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25			
Peak value	I_p	[kA]	63 (50 Hz) / 65 (60 Hz)		65	
Main switch making capacity (peak value)	I_{ma}	[kA]	63 (50Hz) / 65 (60 Hz)		65	
Earthing (grounding) Switch Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			

* With forced ventilation

Applications

Longitudinal busbar coupling.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 25 kA 1 s (IEC)
- □ IAC AFLR 25 kA 1 s (IEC)

Gas tank

- ■ Pressure gauge with potential-free contact
- □ Auxiliary contact
- □ Visual inspection device

Busbar compartment

- □ Up to 2500 A – 24 kV
- □ Up to 1250 A – 36 kV
- □ Up to 2250 A – 27 kV
- □ Up to 1250 A – 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

Three-position disconnector

- □ Disconnector motorization
- □ Earthing (grounding) switch motorization

Vacuum circuit-breaker

- ■ Motor
- ■ Tripping coil
- □ 2nd Tripping coil
- ■ Closing col
- □ Undervoltage coil
- ■ Opening/closing push-button blocking

Additional interlocks:

- □ Electrical interlocks
- □ Key lock interlocks
- □ Pad locks

Cable compartment

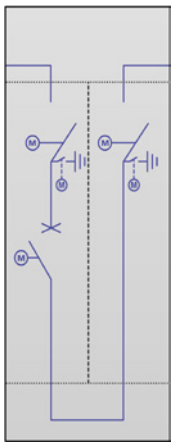
- ■ Lower busbar
- □ Toroidal-core current transformers

Low voltage compartment

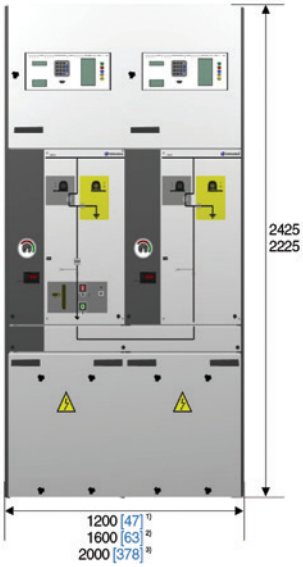
Panel height

- ■ 2245
- □ 2425
- □ Protection, automation, control and signalling devices

Dimensions



IEC
CPG.0-C



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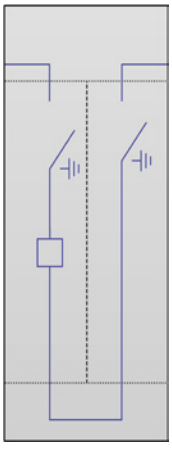
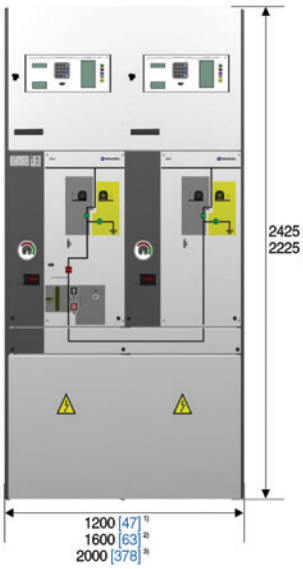


ANSI / IEEE
CPG.0-C



Configuration		Weight Kg	Weight Lbm
1)	Up to 38 kV ≤ 1600 A	<1300	<591
2)	Up to 27 kV 2000 A	<2200	<1000
3)	Up to 24 kV 2500 A Up to 27 kV 2250 A	<2400	<1091

CPG.0-RB

Single busbar rise panel

Allows the lateral cable feeder incoming or outgoing for communication with the busbar of the general cubicle assembly and its earthing (grounding).

Electrical characteristics			IEC		ANSI / IEEE	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		60	
Rated current						
General busbar	I_r	[A]	2500	1250(*)	2250 (*)	1250 (*)
Feeder	I_r	[A]	1250 / 1600	1250	1250 / 1600	1250
Rated short-duration power frequency withstand voltage (1 min)						
Phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Rated lightning impulse withstand voltage						
Phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Internal arc classification	IAC		AFL[R] 25 kA 1 s			

* For higher values, please consult Ormazabal

Applications

Busbar lateral feeder.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 25 kA 1 s (IEC)
- □ IAC AFLR 25 kA 1 s (IEC)

Gas tank

- ■ Pressure gauge with potential-free contact
- ■ Voltage presence indicator
- □ Auxiliary contact

Busbar compartment

- □ Up to 2500 A – 24 kV
- □ Up to 1250 A – 36 kV
- □ Up to 2250 A – 27 kV
- □ Up to 1250 A - 38 kV
- □ Current Transformers
- □ Voltage Transformers

Additional interlocks:

- □ Electrical interlocks
- □ Key lock interlocks
- □ Pad locks

Cable compartment

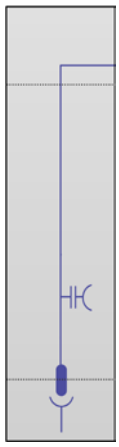
- □ Toroidal-core current transformers

Low voltage compartment

Panel height

- ■ 2245
- □ 2425
- □ Protection, automation, control and signalling devices

Dimensions



IEC
CPG.0-RB

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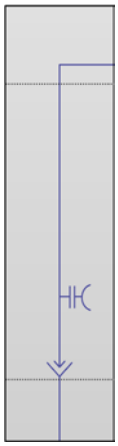


ANSI / IEEE
CPG.0-RB

Configuration	Weight	
	Kg	Lbm
	<500	<227

CPG.1-V

Single (V1) and double (V2) busbar circuit-breaker panel

It includes, in separate compartments, both a circuit-breaker with vacuum breaking technology and an earthing (grounding)switch in series with it, and also feeder disconnectors.

Electrical characteristics			IEC (CPG.1-V1 & V2)		ANSI/IEEE (CPG.1-V1)	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		60	
Rated current						
General busbar	I_r	[A]	1250 / 1600 / 2000		2000	
Feeder	I_r	[A]	630 / 1250 / 1600 / 2000		2000	
Rated short-duration power frequency withstand voltage (1 min)						
Phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Across isolating distance	U_d	[kV]	60	80	66	88
Rated lightning impulse withstand voltage						
Phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Across isolating distance	U_p	[kV]	145	195	145	195
Internal arc classification	IAC		AFL 31.5 kA / 1 s			
Circuit-breaker			**IEC 62271-100**		**IEEEC37.20.3**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25 / 31.5		25/31.5	
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Rated breaking capacity and making capacity						
Mainly active current rated breaking capacity	I_1	[A]	630 / 1250 / 1600 / 2000		2000	
Short-circuit breaking capacity	I_{sc}	[kA]	25 / 31.5			
Capacitive current capacity (50 Hz). Capacitor banks		[A]	400			
Rated operating sequence						
With reclosing			O-0,3 s-CO-15 s-CO O-0,3 s-CO-3 min-CO			
Circuit-breaker category						
Mechanical endurance (operations-class)			10000 - M2		10000	
Electrical endurance (class)			E2-C2			
Switch-disconnector			**IEC 62271-103**		**IEEE C37.74**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25 / 31.5			
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Switch-disconnector Category						
Mechanical endurance			1000-M1		1000	
Cycles of operations (Short-circuit making current)- class			5-E3		3	
Earthing (grounding) Switch			**IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (earthing circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25/31.5			
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Main switch making capacity (peak value)	I_{ma}	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65	
Earthing (grounding) Switch Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			

Applications

Main transformer protection, feeder protection, capacitor bank protection, auxiliary service transformer protection, longitudinal coupling with MV cables.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 31.5 kA 1 s (IEC)

Gas tank

- □ Voltage presence indicator
- □ Visual inspection device

Busbar compartment

- ■ Up to 2000 A - 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

- □ Feeder disconnector motorization
- □ Earthing (grounding) switch motorization

Vacuum circuit-breaker

- ■ Motor
- ■ Tripping coil
- □ 2nd Tripping coil
- ■ Closing col
- □ Undervoltage coil
- ■ Opening/closing push-button blocking

Additional interlocks

- □ Electrical
- □ Key lock
- □ Pad locks

Cable compartment

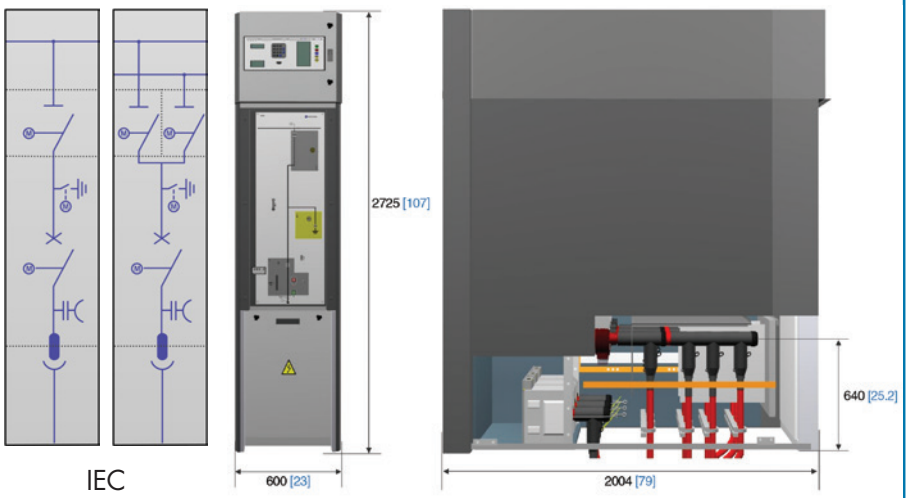
- ■ Up to 4 cables per phase
- □ Up to 3 cables per phase and 1 surge arrester
- □ Toroidal-core current transformers
- □ Plug-in voltage transformer

Low voltage compartment

Panel height

- ■ 2725
- □ Protection, automation, control and signalling devices

Dimensions



IEC
CPG.1-V1 CPG.1-V2

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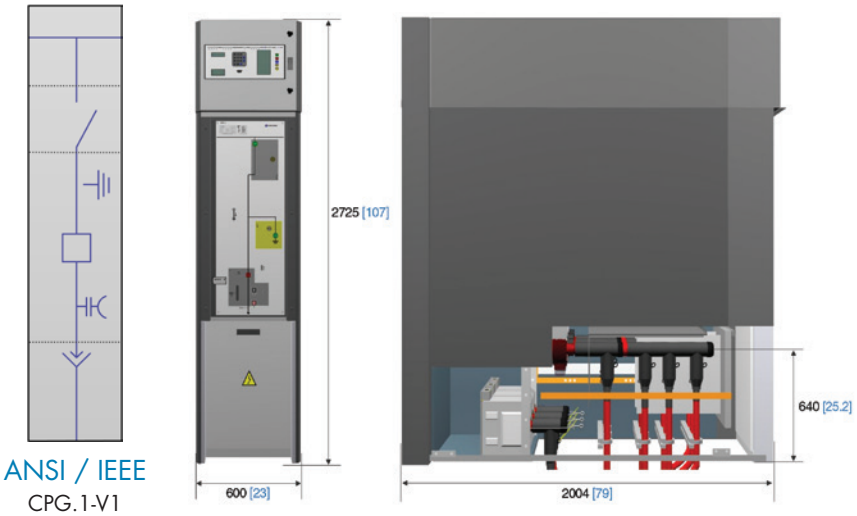


ANSI / IEEE
CPG.1-V1

Configuration	Weight	
	Kg	Lbm
CPG.1-V1	1100	2425
CPG.1-V2	1400	2086

CPG.1-F

Single (F1) and double (F2)fuse protection panel

The single busbar variant is equipped with a switchgear compartment with a three-position switch-disconnector (closed / open / earthing), including fuse protection, whereas the double busbar variant is equipped with another two separate switchgear compartments with feeder disconnectors.

The fuses are housed inside sealed fuse holders, these are housed inside the switchgear compartment, and enhanceits insulation level. The combined fuse blow action enables three-pole opening of the switch.

Electrical characteristics			**IEC (CPG.1-F1 & F2)**		**ANSI/IEEE (CPG.1-F1)**	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		60	
Rated current						
General busbar	I_r	[A]	1250 / 1600 / 2000		2000	
Output to transformer	I_r	[A]	200			
Rated short-duration power frequency withstand voltage (1 min)						
phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Across isolating distance	U_d	[kV]	60	80	66	88
Rated lightning impulse withstand voltage						
phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Across isolating distance	U_p	[kV]	145	195	145	195
Internal arc classification	IAC		AFL 31.5 kA / 1 s			
Switch-disconnector			**IEC 62271-103**		**IEEE C37.74**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25 / 31.5			
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Mainly active load breaking capacity	I_1	[A]	630			
Main switch making capacity (peak value)	I_{ma}	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Switch-disconnector Category						
Mechanical endurance			1000-M1		1000	
Cycles of operations (Short-circuit making current)- class			5-E3		3	
Combined switch-relay take-overcurrent						
Breaking I_{max}acc.TD $i_{transfer}$			>800			
Earthing (grounding) Switch			**IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (earthing circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	1/3			
Peak value	I_p	[kA]	2.5		2.6	
Main switch making capacity (peak value)	I_{ma}	[kA]	2.5/7.5			
Earthing (grounding) Switch Category						
Mechanical endurance			1000-M0		1000	
Cycles of operations (Short-circuit making current)- class			E3		E2	

Applications

Auxiliary service transformer protection.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 31.5 kA 1 s (IEC)

Gas tank

- ■ Fuses combined with the switch-disconnector
- □ Voltage presence indicator
- □ Visual inspection device

Busbar compartment

- ■ Up to 2000 A – 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

- □ Feeder disconnector motorization
- □ Earthing (grounding) switch motorization

Additional interlocks

- □ Electrical
- □ Key lock
- □ Pad locks

Cable compartment

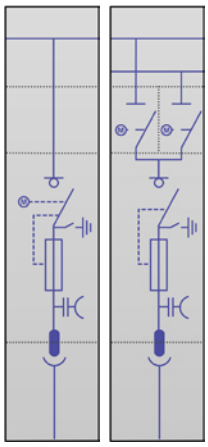
- ■ Up to 4 cables per phase
- □ Toroidal-core current transformers
- □ Plug-in voltage transformer

Low voltage compartment

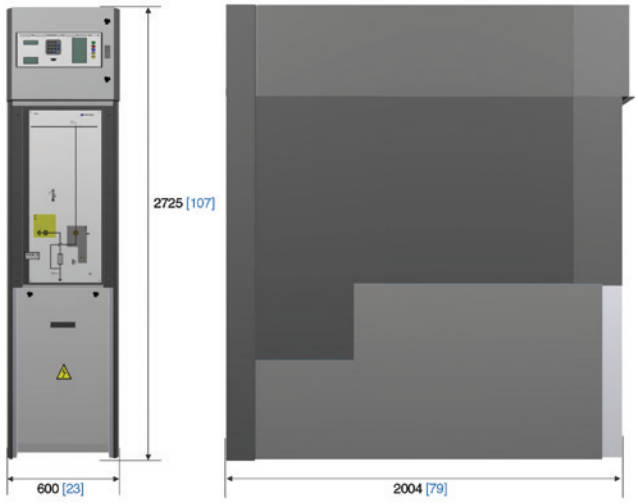
Panel height

- ■ 2725
- □ Protection, automation, control and signalling devices

Dimensions



IEC
CPG.1-F1 CPG.1-F2



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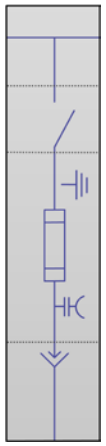
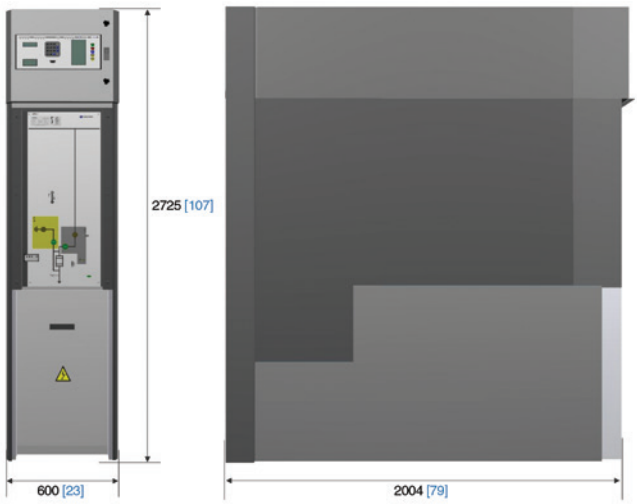


ANSI / IEEE
CPG.1-F1



Configuration	Weight	
	Kg	Lbm
CPG.1-F1	1000	2425
CPG.1-F2	1300	2866

CPG.1-S

Single (S1) and double (S2)disconnector panel

It incorporates feeder disconnectors and earthing (grounding)switches, located in separate compartments.

Electrical characteristics			**IEC (CPG.1-S1 & S2)**		**ANSI/IEEE (CPG.1-S1)**	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		60	
Rated current						
General busbar and cubicle interconnection	I_r	[A]	1250 / 1600 / 2000		2000	
Feeder	I_r	[A]	630 / 1250 / 1600 / 2000		2000	
Rated short-duration power frequency withstand voltage (1 min)						
phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Across isolating distance	U_d	[kV]	60	80	66	88
Rated lightning impulse withstand voltage						
phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Across isolating distance	U_p	[kV]	145	195	145	195
Internal arc classification	IAC		AFL 31.5 kA / 1 s			
Switch-disconnector			**IEC 62271-103**		**IEEE C37.74**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25 / 31.5			
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Switch-disconnector Category						
Mechanical endurance			1000-M1		1000	
Cycles of operations (Short-circuit making current)- class			5-E3		3	
Combined switch-relay (ekorRPT) take-overcurrent						
Earthing (grounding) Switch			**IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (earthing circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25/31.5			
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Main switch making capacity (peak value)		[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65	
Earthing (grounding) Switch Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			

Applications

Longitudinal busbar coupling with MV cables.busbar voltage metering with disconnection of the voltage transformers.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 31.5 kA 1 s (IEC)

Gas tank

- □ Voltage presence indicator
- □ Visual inspection device

Busbar compartment

- ■ Up to 2000 A – 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

- □ Feeder disconnector motorization
- □ Earthing (grounding) switch motorization

Additional interlocks

- □ Electrical
- □ Key lock
- □ Pad locks

Cable compartment

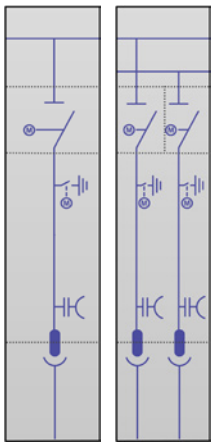
- ■ CPG.1-S1: Up to 4 cables per phase
- □ CPG.1-S1: Up to 3 cables per phase and 1 surge arrester
- ■ CPG.1-S2: Up to 3+3 cables per phase
- □ CPG.1-S2: Up to 1+1 cables per phase and 1+1 surge arrester

Low voltage compartment

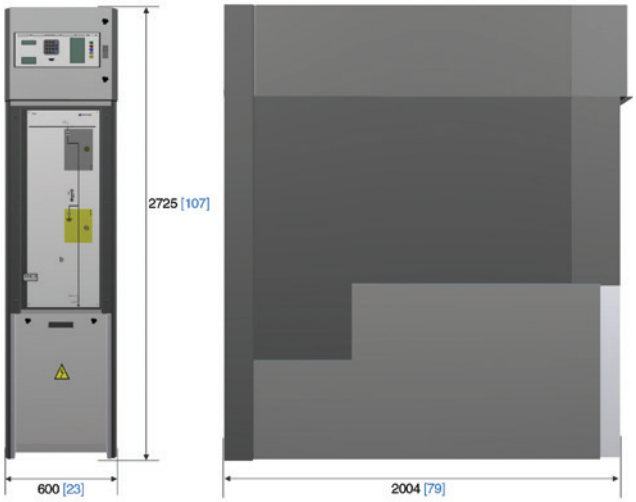
Panel height

- ■ 2725
- □ Protection, automation, control and signalling devices

Dimensions



IEC
CPG.1-S1 CPG.1-S2



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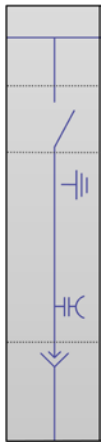
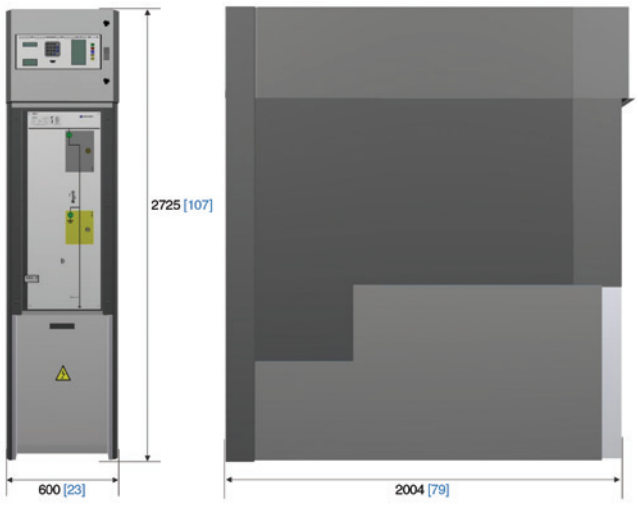


ANSI / IEEE
CPG.1-S1



Configuration	Weight	
	Kg	Lbm
CPG.1-S1	1000	2425
CPG.1-S2	1200	2645

CPG.1-C

Longitudinal single (C) and double (CL) busbar coupling panel

Includes the following components for each busbar in separate compartments: A vacuum circuit-breaker and the earthing (grounding)switches in series with it in a switchgear compartment and two feeder disconnectors in their corresponding compartments.

Electrical characteristics			**IEC (CPG.1-C & CL)**		**ANSI/IEEE (CPG.1-C*)**	
Rated voltage	U_r	[kV]	**24**	**36**	**27**	**38**
Rated frequency	f_r	[Hz]	50 / 60		60	
Rated current						
General busbar	I_r	[A]	1250 / 1600 / 2000		2000	
Feeder	I_r	[A]	630 / 1250 / 1600 / 2000		2000	
Rated short-duration power frequency withstand voltage (1 min)						
Phase-to-earth (ground) and between phases	U_d	[kV]	50	70	60	80
Across isolating distance	U_d	[kV]	60	80	66	88
Rated lightning impulse withstand voltage						
Phase-to-earth (ground) and between phases	U_p	[kV]	125	170	125	170
Across isolating distance	U_p	[kV]	145	195	145	195
Internal arc classification	IAC		AFL[R] 31.5 kA / 1 s			
Circuit-breaker			**IEC 62271-100**		**IEEEC37.20.3**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25 / 31.5			
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Rated breaking capacity and making capacity						
Mainly active current rated breaking capacity	I_1	[A]	630 / 1250 / 1600 / 2000		2000	
Short-circuit breaking capacity	I_{sc}	[kA]	25 / 31.5			
Rated operating sequence						
With reclosing			O-0,3 s-CO-15 s-CO O-0,3 s-CO-3 min-CO			
Circuit-breaker category						
Mechanical endurance (operations-class)			10000 - M2		10000	
Electrical endurance (class)			E2-C2			
Switch-disconnector			**IEC 62271-103**		**IEEE C37.74**	
Rated short-time withstand current (main circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25 / 31.5			
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Switch-disconnector Category						
Mechanical endurance			1000-M1		1000	
Cycles of operations (Short-circuit making current)- class			5-E3		3	
Combined switch-relay (ekorRPT) take-overcurrent						
Earthing (grounding) Switch			**IEC 62271-102**		**IEEE C37.74**	
Rated short-time withstand current (earthing circuit)						
Value t_k = 1 s or 3 s	I_k	[kA]	25/31.5			
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65 / 85	
Main switch making capacity (peak value)		[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)		65	
Earthing (grounding) Switch Category						
Mechanical endurance			2000-M1		1000	
Cycles of operations (Short-circuit making current)- class			E0			
(*) For ANSI/IEEE CPG.1-C type there are two variants: compact type "C" and modular type "M"						

Applications

Longitudinal busbar coupling.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 31.5 kA 1 s (IEC)

Gas tank

- □ Voltage presence indicator
- □ Visual inspection device

Busbar compartment

- ■ Up to 2000 A – 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

- □ Feeder disconnector motorization
- □ Earthing (grounding) switch motorization

Additional interlocks

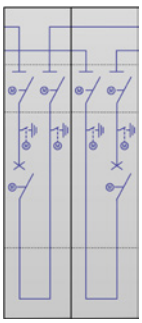
- □ Electrical
- □ Key lock
- □ Pad locks

Low voltage compartment

Panel height

- ■ 2725
- □ Protection, automation, control and signalling devices

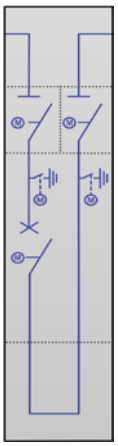
Options



IEC
CPG.1-CL

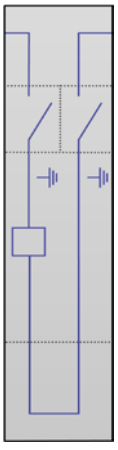
ANSI/IEEE
CPG.1-C (M type)

Dimensions

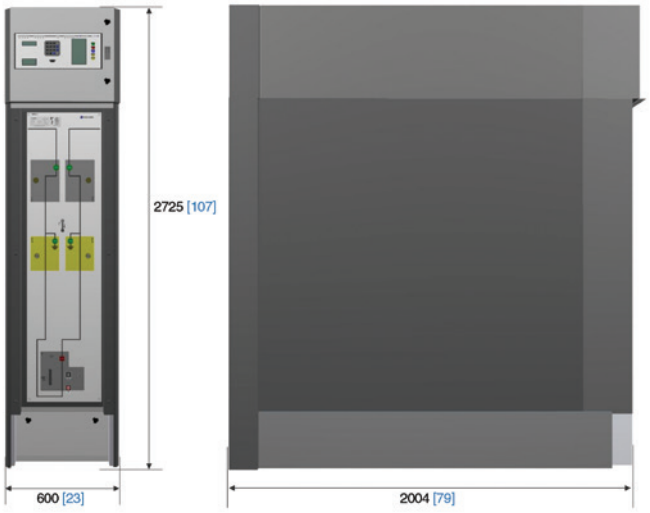


IEC
CPG.1-C

[mm]
[in]



ANSI / IEEE
CPG.1-C
(C type)



Configuration	Weight	
	Kg	Lbm
CPG.1-C CPG.1-C (type C)	1400	3086
CPG.1-C (type M) CPG.1-CL	2800	6172

CPG.1-CT

Transversal busbar coupling panel

Includes the following components in separate switchgearcompartments:

A vacuum circuit-breaker and two earthing(grounding)switches inseries with it in the switchgear compartment, and feederdisconnectors in its corresponding compartments.

Electrical characteristics			**IEC (CPG.1-CT)**	**IEC (CPG.1-CT)**
Rated voltage	U_r	[kV]	**24**	**36**
Rated frequency	f_r	[Hz]	50 / 60	
Rated current				
General busbar and cubicle interconnection	I_r	[A]	1250 / 1600 / 2000	
Rated short-duration power frequency withstand voltage (1 min)				
Phase-to-earth (ground) and between phases	U_d	[kV]	50	70
Across isolating distance	U_d	[kV]	60	80
Rated lightning impulse withstand voltage				
Phase-to-earth (ground) and between phases	U_p	[kV]	125	170
Across isolating distance	U_p	[kV]	145	195
Internal arc classification	IAC		AFL 31.5 kA / 1 s	
Circuit-breaker			**IEC 62271-100**	
Rated short-time withstand current (main circuit)				
Value t_k = 1 s or 3 s	I_k	[kA]	25 / 31.5	25 / 31.5
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)	
Rated breaking capacity and making capacity				
Mainly active current rated breaking capacity	I_1	[A]	1250 / 1600 / 2000	
Short-circuit breaking capacity	I_{sc}	[kA]	25 / 31.5	
Rated operating sequence				
Without reclosing			CO-15 s-CO CO-3 min-CO	
With reclosing			O-0,3 s-CO-15 s-CO O-0,3 s-CO-3 min-CO	
Circuit-breaker category				
Mechanical endurance (operations-class)			10000 - M2	10000
Electrical endurance (class)			E2-C2	
Switch-disconnector			**IEC 62271-103**	
Rated short-time withstand current (main circuit)				
Value t_k = 1 s or 3 s	I_k	[kA]	25 / 31.5	
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)	
Switch-disconnector Category				
Mechanical endurance			1000-M1	1000
Cycles of operations (Short-circuit making current)- class			5-E3	3
Combined switch-relay (ekorRPT) take-overcurrent				
Earthing (grounding) Switch			**IEC 62271-102**	**IEEE C37.74**
Rated short-time withstand current (earthing circuit)				
Value t_k = 1 s or 3 s	I_k	[kA]	25/31.5	
Peak value	I_p	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)	65 / 85
Main switch making capacity (peak value)	I_{ma}	[kA]	63 / 80 (50 Hz) 65 / 85 (60 Hz)	65
Earthing (grounding) Switch Category				
Mechanical endurance			2000-M1	1000
Cycles of operations (Short-circuit making current)- class			E0	

Applications

Transversal busbar coupling.

Configuration

Panel structure

Internal arc

- ■ IAC AFL 31.5 kA 1 s (IEC)

Gas tank

- □ Voltage presence indicator
- □ Visual inspection device

Busbar compartment

- ■ Up to 2000 A – 38 kV
- □ Current Transformers
- □ Voltage Transformers

Driving mechanism

- □ Feeder disconnector motorization
- □ Earthing (grounding) switch motorization

Additional interlocks

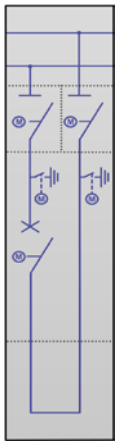
- □ Electrical
- □ Key lock
- □ Pad locks

Low voltage compartment

Panel height

- ■ 2275
- □ Protection, automation, control and signalling devices

Dimensions



IEC
CPG.1-CT

[mm]
[in]

Configuration	Weight	
	Kg	Lbm
CPG.1-CT	2200	4850

Other components and accessories

Indicators

Voltage presence indicator

Each panel includes a voltage presence/absence detector with permanent light indication and an optional free auxiliary contact for remote display of the corresponding indication.

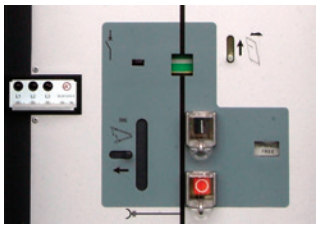
The indicator, with fixed installation, has been designed according to standard IEC 61243-5 and VDE 0682 Part 415.

Pressure switch

The gas pressure in CPG.0 panels is tested by means of a temperature-compensated pressure gauge, with a potential-free contact, allowing it to be used as a remote alarm.

Optionally in CPG.1, pressure switches for each gas tank can be installed.

CPG.0



CPG.1

Cable connectors

Features:

- For single-core or three core cables.
- For dry cable or impregnated cable.
- Shielded
- Elbow
- Up to 4 screw-in terminals per phase (6 for CPG.0 2000 / 2500 A)

CTs and VTs

Current transformers

Transformers designed by **Ormazabal** whose main characteristics are:

- Toroidal type
- Encapsulated
- Installed outside the switch compartment, upstream of the medium voltage connectors
- Protected against environmental conditions
- Simple assembly and free of errors during installation (earths)

Installation:

- Busbar compartment and/or cable compartment

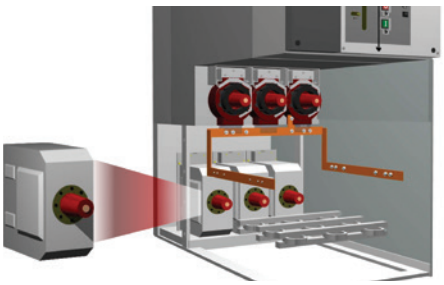
Voltage transformers

Characteristics:

- Plug-in type
- Single-phase
- Insulated
- Shieled
- Inductive operation
- Installed outside the switch compartment
- Protected against environmental conditions

Installation:

- Busbar compartment and/or cable compartment



HRC Fuses

Protection against short circuits in the Medium Voltage network is made by means of the fuse protection functions.

The fuse holder tubes reach a uniform temperature all along the tube when they are placed horizontally inside the gas tank. When the cover is closed, they are fully sealed against floods and external pollution.

Features:

- Horizontal fuse holders
- Front access
- Phase-independent compartments
- Protected within the gas tank
- Insulation and sealing against external agents (pollution, temperature changes, adverse weather conditions, including floods)
- Internal interlocks for a safe access to the fuse holder area

Please, consult **Ormazabal** for further information about fuse selection

Handling, installation and after sales

Spare parts

Metal enclosure

- Lateral cover

- CPG.1 Front door

Operating levers

Fuse protection

- Fuse holder carriage

Handling

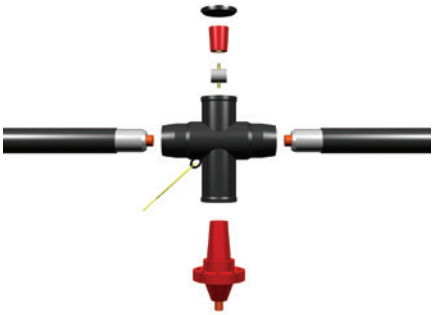
- Reduced size and weight make easier manipulation and installation tasks
- Safe panel delivery:
  - Upright position on a pallet, wrapped in protective plastic with polystyrene corner pieces

- Handling methods:
  - Lifting: Forklift truck or hand-operated pallet jack
  - Raising: Slings & lifting beams

For handling and installation instructions request the corresponding manuals to **Ormazabal**.

Connection between panels

The interconnection between panels is external to the switch compartment and is made with busbars with solid and shielded insulation, designed to allow uninstalling a functional unit without having to move the adjacent units and without gas handling.

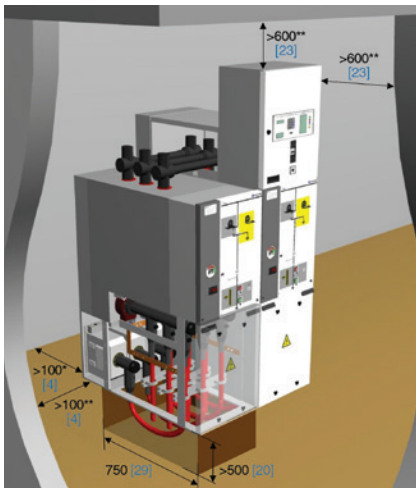


Inside buildings

- Easy handling with pallet jack.
- Reduced dimensions and minimum space required for its location, due to its careful design and use of SF_6 gas as insulating medium.
- Modularity and extensibility on both sides, allowing a fast and economic installation process, in reduced space and without using gas on site, not having to move adjacent panels to remove a central panel.
- Reduction of the panel room dimension, due to its frontal access and design without removable switchgear, and not requiring a rear access space.
- Optimisation of installation and civil work costs due to its reduced dimensions and little need of operation space.

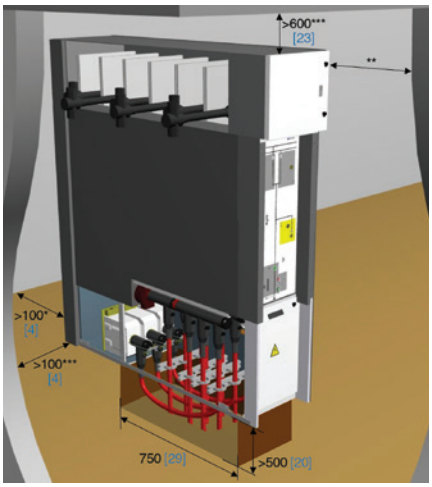
The minimum distances [mm] (inch) recommended for a correct installation, once placed in their final location, are:

For CPG.0:



* Not required with pressure relief duct.
** According to Annex A of standard IEC 62271-200 (Cable trench depth depending on cable bend radius)

For CPG.1



* Not needed with pressure relief duct.
** Removal: >2004.
*** In accordance with Appendix A of standard IEC 62271-200 (Cable trench depth depending on cable bend radius).

For other dimensions, please consult **Ormazabal.**

Inside mobile substations

CPG panels can also be installed inside mobile substations.

Inside wind turbines and wind farm substations

CPG panels can also be installed inside wind turbines and wind farm substations.

Commissioning and After Sales

Services

- Technical assistance
- Engineering
- Procurement
- Contracting
- **Installation**
  - Cubicle connection
  - Earthing (grounding)
  - Cable/busbar connection
- **Commissioning**
  - Relay configuration
  - Phase comparison
  - Energizing
  - Tests
- **After sales support**
- Maintenance
- Training

Recycling and end-of-life

As a part of its after sales services, Ormazabal provides electrical utilities and electrical end users recycling services for its switchgear.

The Ormazabal production centres have introduced the corresponding environmental management systems, conforming to the requirements of the international ISO 14001 standard and endorsed by the Environmental Management Certificate AENOR CGM-00/38 among others.

CPG system cubicles have been designed and manufactured in accordance with the requirements of international standard IEC 62271-200.

By design, and depending on the models, they have a sealed compartment with SF_6 which allows full operation of the equipment throughout its service life, estimated at 30 years (IEC 62271-200).

At the end of the product life cycle, the SF_6 gas content must not be released into the atmosphere. It is recovered and treated for reuse, in accordance with the instructions given in standards IEC 62271-303, IEC 60480 and the CIGRE 117 guide. Ormazabal will provide the additional information required to carry out this task correctly, out of respect for the safety of individuals and that of the environment.

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