



MV Switchgear for  
Distribution Network Solutions

## **CGM COSMOS**

Fully gas insulated modular  
and compact (RMU) system

Up to 24 kV  
Up to 27 kV

IEC Standards  
ANSI / IEEE Standards

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## CGMCOSMOS-2LV

**New 2013!**

### Circuit-breaker protection and feeder functions

Compact cubicle (RMU) with two feeder functions and one vacuum circuit breaker protection function in a single gas tank. Extensibility: Right, left, both sides or none.

Electrical characteristics	IEC		L	V
Rated voltage	U <sub>r</sub>	[kV]	24	24
Rated frequency	f <sub>r</sub>	[Hz]	50 / 60	50 / 60
Rated current				
General busbar	I <sub>r</sub>	[A]	400 / 630	400 / 630
Feeder	I <sub>r</sub>	[A]	400 / 630	-
Output to transformer	I <sub>r</sub>	[A]	-	250
Rated short-duration power frequency withstand voltage (1 min)				
phase-to-earth and between phases	U <sub>d</sub>	[kV]	50	50
phase-to-earth and between phases	U <sub>d</sub>	[kV]	60	60
Rated lightning impulse withstand voltage				
Phase-to-earth and between phases	U <sub>p</sub>	[kV]	125	125
Across isolating distance	U <sub>p</sub>	[kV]	145	145
Internal arc classification	IAC		AFL[R] 20* kA 1s / 25## kA 1 s	
Circuit-breaker	IEC 62271-100			
Rated short-time withstand current (main circuit)			-	
Value t <sub>k</sub> = 1 s or 3 s	I <sub>k</sub>	[kA]	-	16 / 20* / 25
Peak value	I <sub>p</sub>	[kA]	-	40 / 52* / 62.5
Rated breaking capacity and making capacity			-	
Mainly active current rated breaking capacity	I <sub>1</sub>	[A]	-	400 / 630
Short-circuit breaking capacity	I <sub>sc</sub>	[kA]	-	16 / 20* / 25
Main switch making capacity (peak value)	I <sub>mo</sub>	[kA]	-	40 / 52* / 62.5
Rated operating sequence			-	CO-3 min-CO
Circuit-breaker category			-	
Mechanical endurance (operations-class)			-	2000 (M2)
Electrical endurance (class)			-	E2
Switch-disconnector	IEC 62271-103		IEC 62271-102	
Rated short-time withstand current (main circuit)				-
Value t <sub>k</sub> = 1 s or 3 s	I <sub>k</sub>	[kA]	16 / 20* / 25	-
Peak value	I <sub>p</sub>	[kA]	40 / 52* / 62.5	-
Mainly active current rated breaking capacity	I <sub>1</sub>		400 / 630	-
Main switch making capacity (peak value)	I <sub>mo</sub>		40 / 52* / 62.5	-
Switch-disconnector category				-
Mechanical endurance			1000-M1 (manual) / 5000-M2 (motor)	-
Cycles of operations (Short-circuit making current)- class			5-E3	-
Disconnecter and Earthing Switch	IEC 62271-102		IEC 62271-102	
Rated short-time withstand current (earthing circuit)				
Value t <sub>k</sub> = 1 s or 3 s	I <sub>k</sub>	[kA]	16 / 20* / 25	16 / 20* / 25
Peak value	I <sub>p</sub>	[kA]	40 / 52* / 62.5	40 / 52* / 62.5
Main switch making capacity (peak value)	I <sub>mo</sub>	[kA]	40 / 52* / 62.5	40 / 52* / 62.5
Earthing switch Category				
Mechanical endurance			2000-M1	2000-M1
Cycles of operations (Short-circuit making current)- class			5-E2	5-E2

\* Tests conducted at 21 kA / 52.5 kA.

\*\* Consult availability


### Applications

RMU which includes the features of the feeder and circuit breaker cubicles.

## Configuration

### Cubicle

- ☐ Internal arc IAC AFLR
  - ☐ 20 kA 1 s ☐ 25 kA 1 s\*
- ☐ 1740 mm height cubicle
- ☒ 1300 mm height cubicle

 (\*) Consult availability

### Gas tank

- ☒ Stainless steel tank

Frontal connection:

- ☒ Cable bushing

Side connection:

- ☒ Two side extensibility
- ☐ Left extensibility / right blind
- ☐ Right extensibility / left blind
- ☐ Blind both sides

Type of side connection:

- ☐ Female bushing
  - ☐ Right ☐ Left ☒ Both
- ☐ Cone bushing
  - ☐ Right ☐ Left ☐ Both

### Driving mechanism

- ☒ Actuating levers
- ☒ B type switch mechanism
- ☐ BM type motorized mechanism
- ☒ AV type manual mechanism
- ☒ Capacitive voltage presence indicator ekorVPIS
- ☐ Capacitive voltage presence / absence indicator ekorIVDS
- ☐ Other capacitive voltage indicators

Additional interlocks:

- ☐ Electrical interlocks
- ☐ Key lock interlocks
- ☐ Pad locks

### Cable compartment

- ☒ Screw type IEC bushings
- ☒ Cover for one cable connector per phase

### Pressure Relief Duct

- ☐ Rear chimney

### Control box

- ☐ Other voltage indicators
- ☐ Other protection relays
- ☐ Other metering and automation components

## Options

### CGMCOSMOS-2L2V\*

2 feeders + 2 CB protection functions

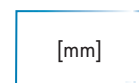
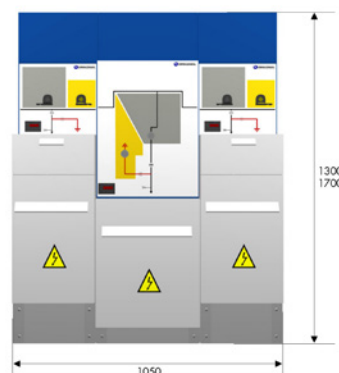
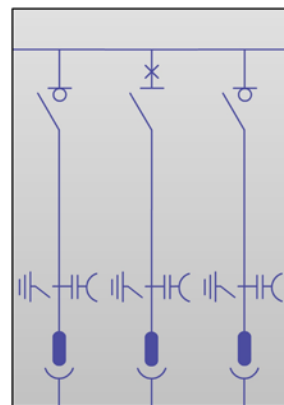
 (\*) Consult availability

### CGMCOSMOS-2LV (SANS type)

According to SANS standards available.

 Consult [www.ormazabal.com](http://www.ormazabal.com)

## Dimensions



420 kg



## Other components and accessories

### HRC Fuses

#### 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



#### Protection with 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.

In accordance with the IEC 62271-105 standard, the switch-fuse combination may be either the "associated" or "combined" type. In the latter case, the tripping of each of the fuses is indicated on the front mimic diagram of the cubicle.

#### Protection with fuses and tripping coil

The combined switch-fuse option enables the opening of the switch-disconnector caused by an external signal, as for example that sent by the transformer thermostat in the event of overheating.



### Fuse selection according to IEC standards

U <sub>r</sub> Network [kV]	U <sub>r</sub> Fuse [kV]	Rated transformer power without overload [kVA]																
		25	50	75	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000
		Rated fuse current IEC 60282-1 [A]																
10	6 / 12	6.3	10	16	16	20	20	25	31,5	40	50	63	63	80	100	160	200	-
13,5	10 / 24	6.3	6,3	10	16	16	20	20	25	31,5	40	50	63	63	80	100	-	-
15	10 / 24	6.3	6,3	10	16	16	16	20	20	25	31,5	40	50	63	80	80	-	-
20	10 / 24	6.3	6,3	6,3	10	16	16	16	20	20	25	31,5	40	50	50	63	80	125

### Fuse selection according to IEEE standards

U <sub>r</sub> Grid [kV]	U <sub>r</sub> Fuse [kV]	Rated Transformer Power without overload [kVA]																
		25	50	75	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000
		Rated fuse current [A]																
7.2	6 / 12	6.3	16	16	20	20	25	40	40	50	63	80	100	160	200	250	-	-
12.5	10 / 24	6.3	6.3	16	16	16	20	20	25	31.5	40	50	63	80	80	125	-	-
13.2	10 / 24	6.3	6.3	10	16	16	20	20	25	31.5	40	50	63	63	80	100	-	-
14.4	10 / 24	6.3	6.3	10	16	16	16	20	20	25	40	40	50	63	80	80	-	-
25	10 / 24	6.3	6.3	6.3	6.3	10	16	16	16	20	20	25	31.5	40	50	50	80	80

#### Remarks:

- Fuses recommended: SIBA brand with medium type striker, conforming to IEC 60282-1 (low power loss fuses).
- The values for combined fuses are given in blue.
- The fuse-switch assembly has been temperature-rise tested under normal service conditions in accordance with IEC 62271-1.
- A fuse holder carriage adapted for 292 mm (12.49 inches) 6 / 12 kV fuses is available.
- For ratings marked in bold the length is 442 mm (17.40 inches).
- If any of the fuses blow, we recommend changing all three.
- For overload conditions in the transformer or other brands of fuse, please consult **Ormazabal**.

## Indicators

### ekorSAS acoustic alarm

The ekorSAS earthing (grounding) prevention acoustic alarm unit is an acoustic indicator that works in association with the earthing (grounding) switch shaft and the voltage presence indicator, **ekorVPIS**.

The alarm is activated when the earthing (grounding) switch actuation shaft access handle is operated while there is voltage in the cubicle's Medium Voltage incoming line. Then an acoustic alarm warns the operator that a short-circuit may be caused in the network if the operation is carried out, resulting in greater safety for individuals and equipment and the continuity of supply.



### ekorVPIS voltage presence indicator

**ekorVPIS** is a self-powered indicator incorporated into the cubicles that displays the presence of voltage in the phases via three permanent light signals, designed in accordance with the IEC 62271-206 standard.

It has easily accessible test points for performing the phase balance test.

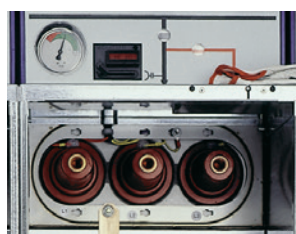
Ormazabal's **ekorSPC** phase comparator and **ekorIVDS** voltage presence / absence detector can be supplied on request.



## Cable connections

### Bushings EN 50181 & IEEE 396

- Manufactured in epoxy resin, they conform to the dielectric and partial discharge tests.
- There are three types:
  - Plug-in up to 250 A (IEC) & 200 A (IEEE)
  - Plug-in up to 400 A
  - Screw-in up to 630 A (IEC) & 600 A (IEEE)
- Located in the cable compartment. Optionally, they may be placed on the side of the cubicles for direct supply to the main busbar.



Bushing

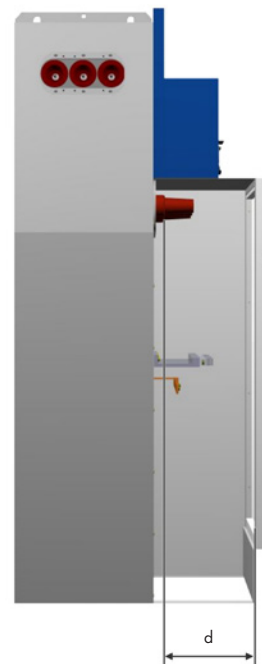
### Cable connectors

#### Features:

- For single-core or three core cables.
- For dry cable or impregnated cable.
- Shielded or unshielded.
- Elbow or straight.
 

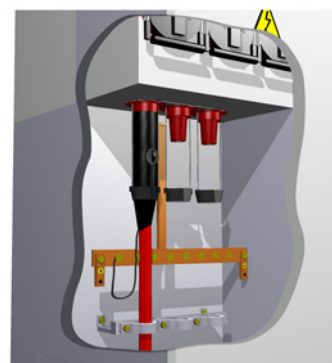
Detailed information:

  - Direct connection to the bushings located in the cable compartment or on the side via plug-in or screw-in connectors (rated current greater than 400 A or short-circuit current equal to or higher than 16 kA).
  - 250 A plug-in connectors (straight or elbow type for rear exit of cable) in outputs to transformer (cable compartment) for fuse protection functions.
  - Shielded connectors for circuit-breaker protection functions.



#### Distance (d)

CGMCOSMOS-L / RB	[mm] (In)	[310] (12.2)
CGMCOSMOS-V	[mm] (In)	[500] (19.68)
CGMCOSMOS-P		Vertical



CGMCOSMOS-P Bushing position

### Accessories

- Plug-in shunt in T
- Plug-in shunt in cross formation
- Insulating plugs
- Reducers
- Connection terminals
- Surge arresters

➔ For other types and values, please consult **Ormazabal**.

## Spare parts

### Metal enclosure

- Covers



- Auxiliary profiles for uneven floors



- Lateral incoming box (CGMCOSMOS-CL)



### Operating levers

- Switch-disconnector general lever



- Antireflex lever for BR mechanism



- Levers for Circuit Breaker



### Connectivity

- Ormalink connecting set  
It includes the earthing bar, bolts and nuts, instructions and other elements required for the correct assembly of two modules



- End assembly kit  
It includes end plugs, metal cover to be mounted on the side of one cubicle, instructions and other elements required for assembly.



### Fuse protection

- 12 kV fuse holder carriage
- 24 kV fuse holder carriage
- Carriage adaptor for 292 mm 6 / 12 kV fuses



# Handling, installation and after sales

## Handling

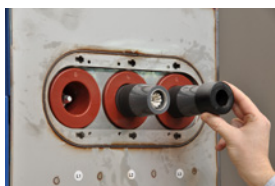
- Reduced size and weight make easier manipulation and installation tasks
- Safe cubicle delivery:
  - Upright position on a pallet, wrapped in protective plastic with polystyrene corner pieces



- Handling methods (up to 5 functional unit assemblies):
  - Lifting: Forklift truck or hand-operated pallet jack
  - Alternative methods: rollers or rods underneath
  - Raising: Slings & lifting beams



- Ergonomic design for easy cubicle connection and floor fastening



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

## Inside buildings

- Easy handling with pallet jack (go through standard doors and elevators)
- Small dimensions: minimum room occupation
- Operation, extensibility and removal in reduced space
- No gas manipulation on site
- Optionally, installation on auxiliary profiles in case of uneven floors or to avoid cable trench works

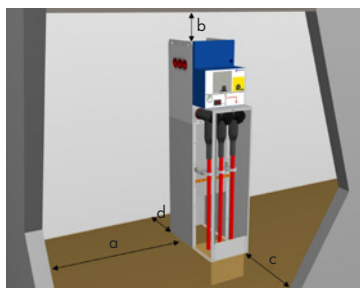
### Installation minimum distances [mm] (inches)

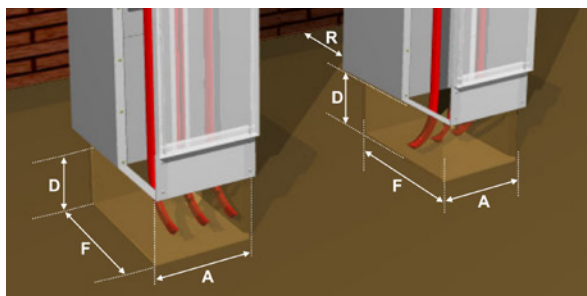
Side wall (a)	[100] (4)
Ceiling (b)	[500] (20)
Front clearance (c)	[500] (20)
Rear wall (d)	[>100] [>4]**

\*\* Except for CGMCOSMOS-V (> 50 mm / 4 inches) and CGMCOSMOS-M (0 mm / inches).

In case of rear chimney = 0 mm / inches

The space required to extend the assembly with an additional cubicle is 150 mm / 5.90 inches plus the width of the new cubicle.





### Maximum trench dimensions for cubicles internal arc tested

#### In gastank up to 20 kA 0.5s. Dry cable

Function	Cubicle height [mm] (inches)	A [mm] (inches)	F [mm] (inches)	(1) D [mm] (inches)		(2) D [mm] (inches)	
				Single Core	3-core	Single Core	3-core
L, RB & RC	[1300] (51) [1740] (68)	[285] (11)	[590] (23)	[400] (15) [600] (23)	[350] (13) [600] (23)	[400] (15) [250] (9.8)	[350] (13) [250] (9.8)
P	[1300] (51) [1740] (68)	[390] (15)	[590] (23)	[500] (19) (R*) [300] (11) (R*)	Ask	[500] (19) (R*) [300] (11) (R*)	Ask
V	[1740] (68)	[520] (20)	[590] (23)	[500] (19)	[850] (33)	[600] (23)	[850] (33)

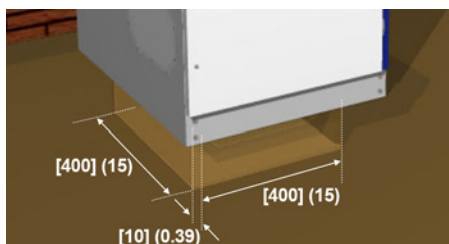
(R\*) For rear cable exit R = 500 mm (16.6 in)

#### IAC class + in gastank up to 20 kA 1 s. Dry cable

Function	Cubicle height [mm] (inches)	A [mm] (inches)	F [mm] (inches)	(1) D [mm] (inches)		(2) D [mm] (inches)	
				Single Core	3-core	Single Core	3-core
L, RB & RC	[1300] (51) [1740] (68)	[285] (11)	[590] (23)	[600] (23) [600] (23)	[600] (23) [600] (23)	[600] (23) [600] (23)	[600] (23) [600] (23)
P	[1300] (51) [1740] (68)	[390] (15)	[590] (23)	[500] (19) [300] (11)	Ask	[500] (19) [300] (11)	Ask
V	[1740] (68)	[520] (20)	[590] (23)	[500] (19)	[850] (33)	[600] (23)	[850] (33)

### Trench dimensions [mm] (inches) for metering cubicle

The depth of the trench, suitable for all cable types, is [800 mm] (31 inch)



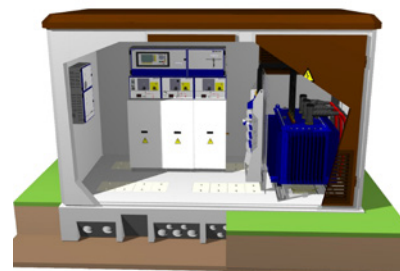
→ The dimensions of the trench depend on the minimum curvature radius of the cables used.

The dimensions given below are for the largest trench.

To dimension the trench with optimum proportions (minimum trench dimensions) for a particular type of cable, please consult **Ormazabal**.

## Inside mobile or prefabricated transformer substations

- Turn-key solutions (fully assembling, testing and transportation from factory)
- Uniform quality
- Significant reduction of installation costs and time
- Possibility of cubicle on-site installation
- Wide range of **Ormazabal's** TS: Walk-in, underground, kiosk, compact...
- Availability of having an operational Transformer Substation in short time



## Inside wind turbines

- Off-shore & On-shore wind farms
- Since 1995 supplying MV GIS cubicles for RES commercial generation
- Over 10 years of experience in the offshore wind sector





## 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.

**CGMCOSMOS** 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<sub>6</sub> 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<sub>6</sub> 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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