



E-CABINEL

SF6 FREE SECONDARY DISTRIBUTION SWITCHGEAR

A lush forest scene with a waterfall and sunlight filtering through the trees. The image is a full-page background for a document. It features a dense green forest with a waterfall in the foreground. Sunlight rays are visible, creating a serene and natural atmosphere. The text is overlaid on the upper left and right portions of the image.

Committed to the environment

Inael has been offering specific solutions for the generation and distribution of renewable energy for years, products that respect the environment, as well as sustainable mobility projects that promote the shared use of electric vehicles and encourage a transition towards cleaner and more efficient transportation in cities.

We live in a new era where environmental awareness and sustainability are fundamental pillars. Our products have evolved to adapt to this change, becoming increasingly sustainable in their production, use, and disposal. This transformation reflects our commitment to caring for the planet and the well-being of present and future generations.

Welcome to the new era of Sustainaelbility.

Solution that protects the planet

For a long time, sulfur hexafluoride (SF6) has been extensively used in medium voltage distribution and automation equipment, as it has a high dielectric strength that makes it an excellent electrical insulator and extraordinary conductive properties

Despite this, its impact on the planet and its potential

as a greenhouse gas have motivated us to explore more environmentally friendly options that optimize the performance of our equipment.

The answer is in the air

Considering that the best gas to avoid the release of CO2 into the atmosphere is air itself, we present E-CABINEL, the new SF6-free switchgear for secondary distribution.

We have chosen to use air as the insulating element for medium voltage switchgear, preventing variations in pressure, density, and humidity from adversely and uncontrollably affecting the behavior of traditional solid insulations.

The solution involves confining air, previously treated to achieve its purity, in the Cabel metal enclosure at low pressure, 0.2 bar, reducing the risk of leaks or explosions and avoiding any type of contamination of the solid insulations. At the same time, this alternative cannot be considered pressure equipment due to its low filling pressure, which means there is no need for frequent maintenance and exhaustive periodic inspections.

The use of pure air ensures the correct operation of the equipment, preventing failures or unexpected disconnections, which guarantees highly safe operation. Even in situations of abnormal insulating gas leaks, where other alternatives such as high-pressure air or other gases would require immediate disconnection through general protections.

The low-pressure design provided by INAEL, based on the use of pure air instead of SF6, ensures maximum network availability and reliability.



Designed for a more sustainable world

E-Cabinet represents an important step towards providing increasingly sustainable electrical networks, as the insulation solution, with pure air at low pressure combined with solid insulations, for 24kV and 36kV from INAEL has the same size, safety, and reliability as traditional SF6 solutions.

The installation of E-Cabinet switchgear in existing or new secondary substations will help minimize their global warming potential, while making the operation and maintenance of the switchgear safer for personnel. Any traditional SF6-insulated CABINEL cell can be replaced by a cell with the same characteristics and functionalities, E-CABINEL. The new design of E-Cabinet switchgear features innovative load break switch-disconnectors (LBS) optimized to minimize

their size and maintain the dimensions of SF6 switchgear, using vacuum breaking technology, which has extensive experience in primary and secondary distribution markets for many years, being a very safe and effective breaking system for 24 and 36 kV voltages.

Pure air is the least polluting gas for the environment



The electrical power distribution equipment we present is made up of switchgear manufactured with a metal enclosure insulated with pure air.

The E-Cabinet system offers two types of solutions:

Modular system: The modules can be connected in parallel, seeking the best and most appropriate combination for each customer's needs.

Compact system: Like the modular system, the compact system shares similar characteristics, but is usually more economical compared to the modular one.



Modular or compact switchgear can be extendable on one side, both sides, or neither.

The E-Cabinet switchgear have been tested for internal arc resistance according to IEC 62271-200 standard to ensure the safety of users of these cells.

The quality requirements for the materials used in our products, as well as the care in manufacturing and the high degree of final control, guarantee the excellent quality level of E-Cabinet switchgear.

Medium voltage cells with pure air insulation

The E-Cabinel switchgear, modular or compact with metal enclosure insulated with pure air, in combination with solid insulations, are specially designed for indoor installation in all types of medium voltage distribution networks, both ring and radial, with the possibility of supply from one or several points.

Since their construction is shielded and all active elements are inside a pure air atmosphere, they are insensitive to environmental variations.

They can also be installed in underground transformer stations

Applied standards

Both the E-Cabinel switchgear and their main components are manufactured in accordance with the following standards:

Cells	UNE-EN 62271-200	IEC 62271-200
Vacuum circuit breaker	UNE-EN 62271-103	IEC 62271-103
Circuit breaker + Fuses	UNE-EN 62271-105	IEC 62271-105
Disconnecter associated with circuit breaker	UNE-EN 62271-102	IEC 62271-102
Earth disconnector	UNE-EN 62271-102	IEC 62271-102
Automatic circuit breaker	UNE-EN 62271-100	IEC 62271-100
Bushing	UNE-EN 50181	EN 50181
Fuses	UNE-EN 60282-1	IEC 60282-1
IP protection degrees	UNE-EN 60529	IEC 60529
IK protection degrees	UNE-EN 62262	IEC 62262

Concept	Value	
Rated voltage	24 kV	36 kV
Lightning impulse withstand voltage 1.2/50 microsec. (Peak value)	125 KV	125 KV
Power frequency withstand voltage 50Hz. (1 min)	50 KV	70 KV
Frequency	50/60 HZ	50/60 HZ
Rated current	630 A	630 A
Permissible short-time current (3 s)	20 KA	20 KA
Peak value of permissible short-time current	50 KA	50 KA
Short-circuit making capacity	50 KA	50 KA
Breaking capacity	630 A	630 A
Electrical class	E3	E3
Breaking capacity of mainly active circuits	630 A	630 A
Breaking capacity of lines and cables in vacuum	25 A	25 A
Breaking capacity in case of earth fault	50 A	50 A
Breaking capacity of lines and cables in vacuum in case of earth fault	16 A	16 A
Internal arc resistance A FL	20 KA	20 KA
Mechanical endurance	5000	5000
Tank filling pressure	0.2 bar	0.2 bar
Enclosure IP protection degree	IP2X	IP2X
Degree of protection against mechanical impacts IK	IK08	IK08
Tank IP protection degree	IP 67	IP 67

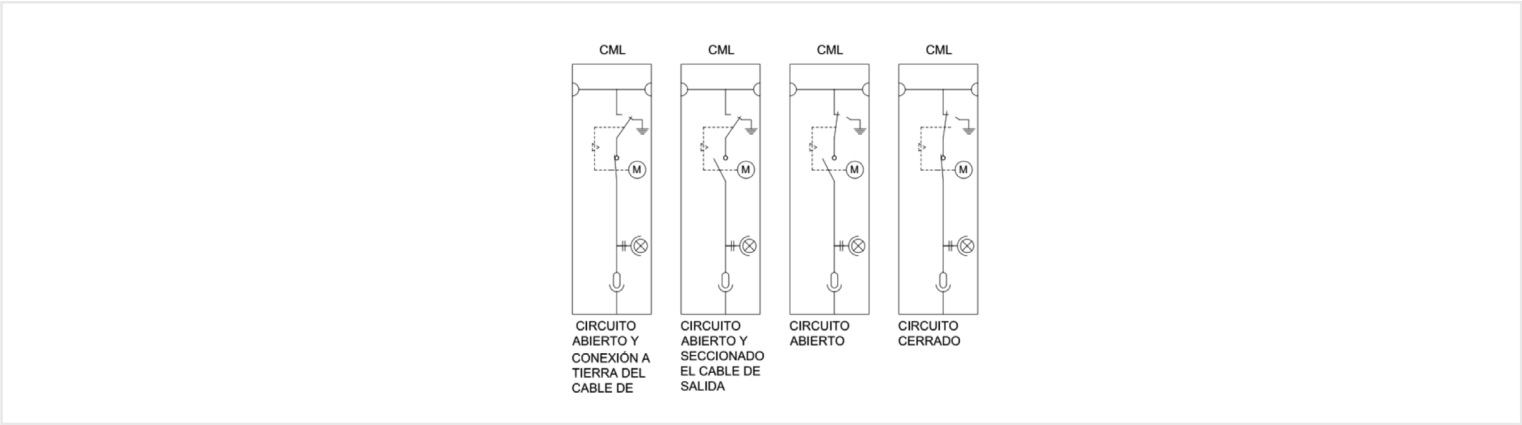
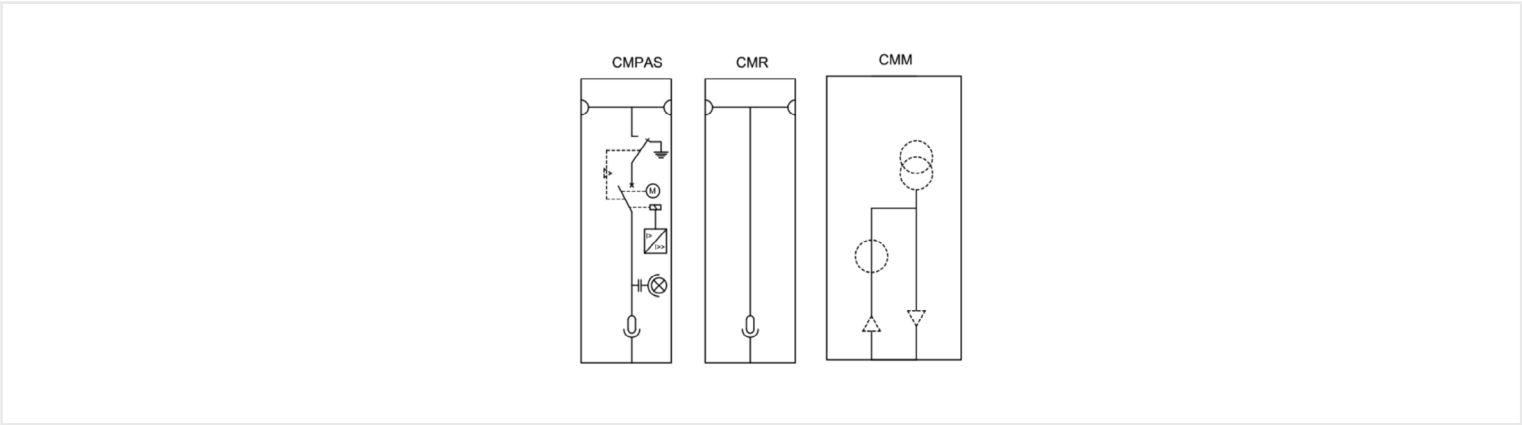
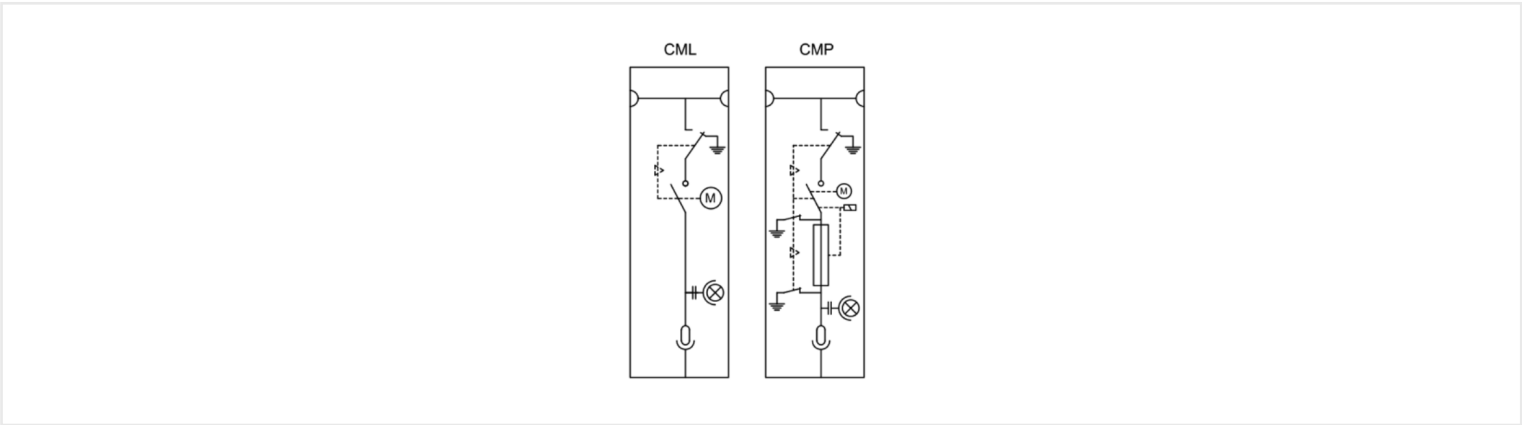
with flood risks, as they have been tested to operate for 24 hours completely covered with water.

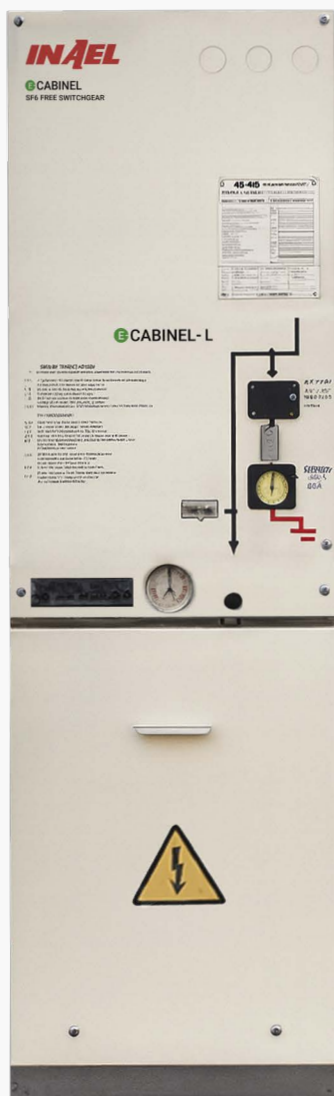
When the installation site is at an altitude above 1,000 m above sea level, and/or the ambient temperature is not between -15°C and +55°C, please consult us.

Dimensions and weights

The coupling dimensions of the E-Cabinel switchgear are the same as those of the Cabinel switchgear insulated with SF6. Height differences are compensated with additional bases.

Designation	Height (mm.)		Depth (mm.)		Depth (mm.)		Depth (mm.)	
Rated voltage	24 kV	36 kV	24 KV	36 KV	24 KV	36 KV	24 KV	36 KV
CML	1600	1800	755	755	400		125	
CMPF				810	440		160	170
CMPAS				755	524		225	250
CMR					600		145	175
CMM			1055	1024	700	965	165	195





Inael Electrical Systems, S.A.
C/ Río Jarama, 7, 45007 Toledo,
Spain

+34 925 233 511
+34 925 231 095
inael@inael.com