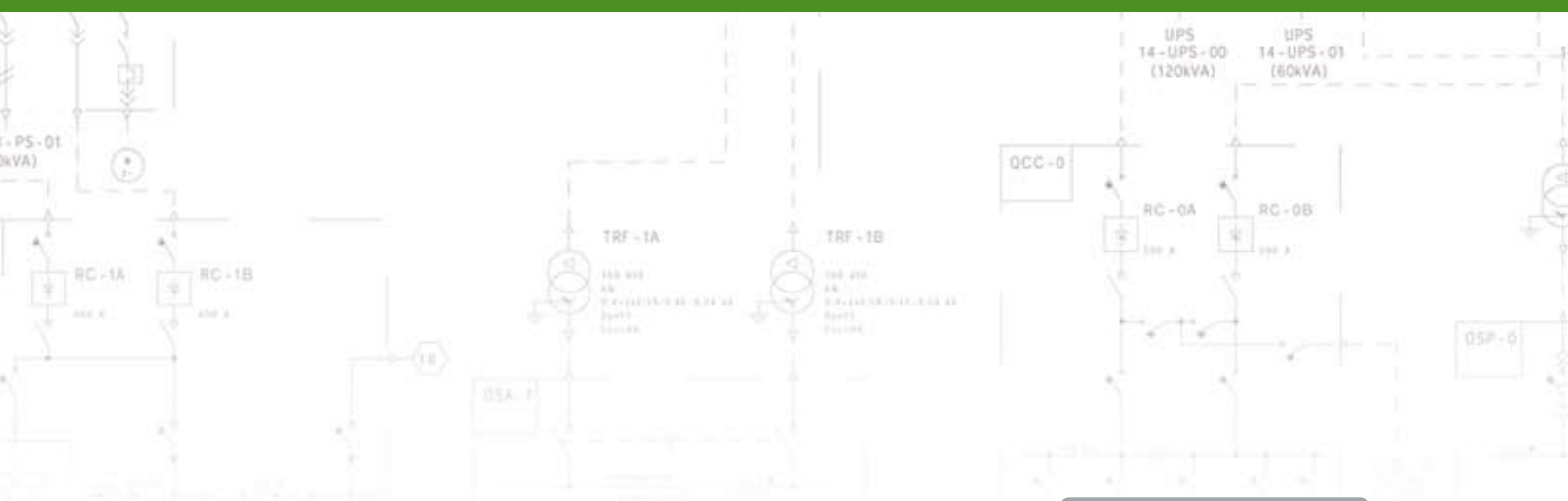
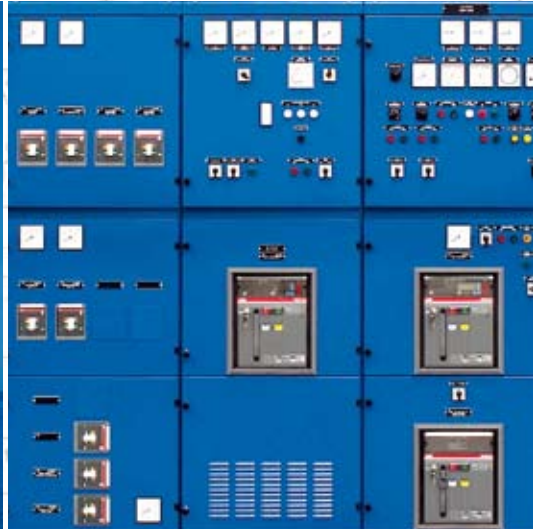
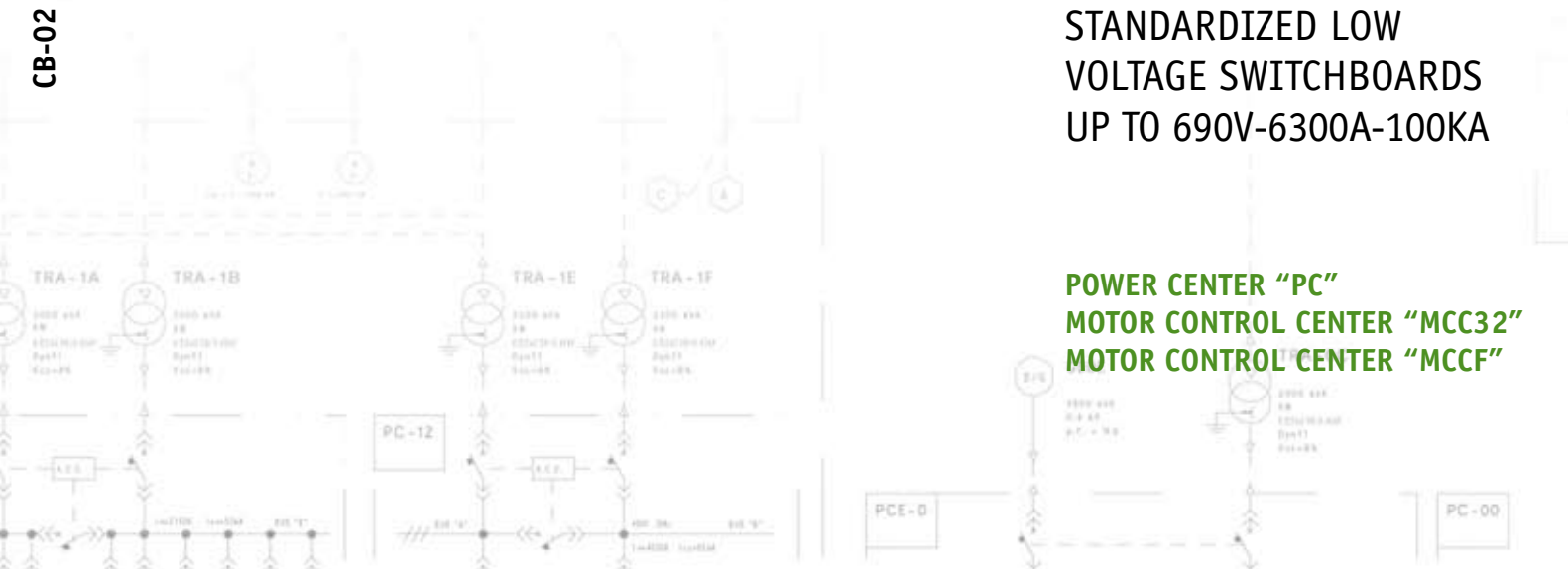


STANDARDIZED LOW VOLTAGE SWITCHBOARDS UP TO 690V-6300A-100KA

POWER CENTER "PC"
MOTOR CONTROL CENTER "MCC32"
MOTOR CONTROL CENTER "MCCF"





Premises 10.000mq
Offices 2.000mq
Warehouse 1.200mq
Open Area 15.000mq



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IMESA Low Voltage Switchboards consist of standardized modular units which can be easily coupled, even if they are of different type. IMESA manufactures the following types of LV switchboards:

- Power Center "PC"
- Motor Control Center with withdrawable units "MCC32"
- Motor Control Center with fixed units "MCCF"

The main characteristics of Low Voltage Switchboards are:

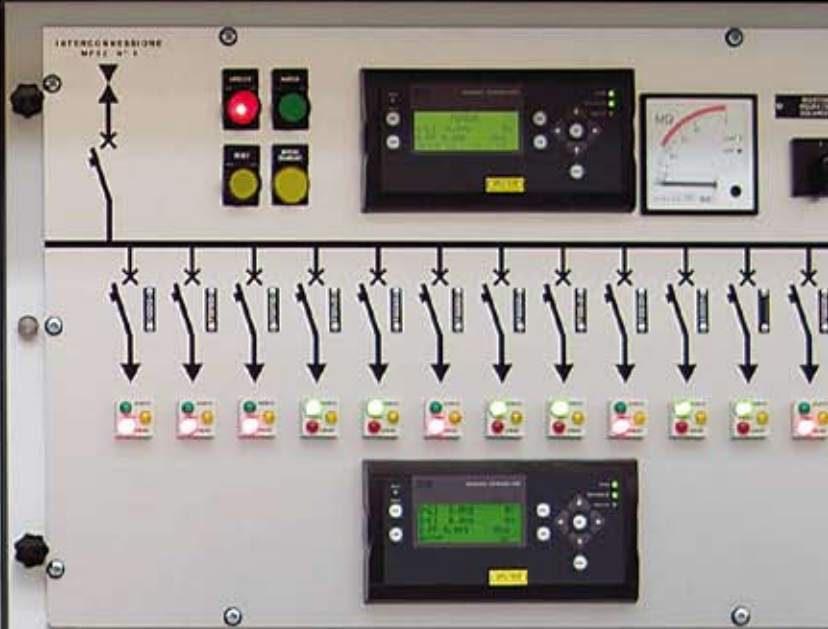
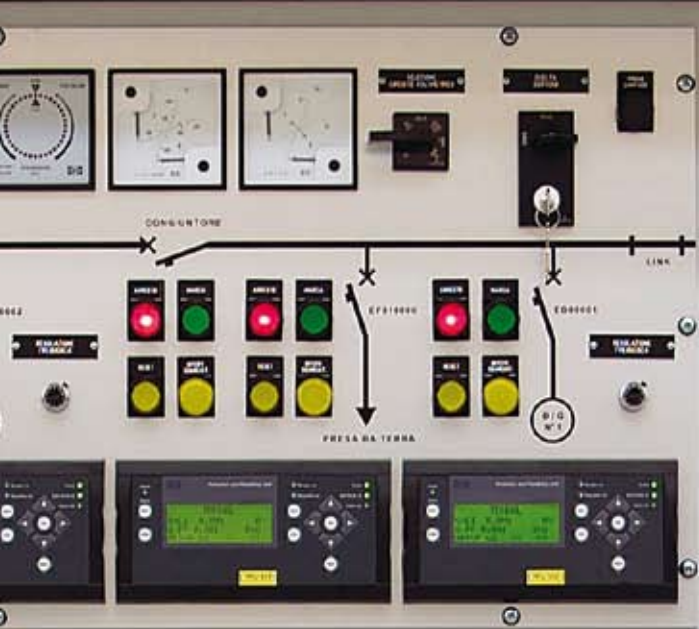
- Modular design
- Structural forms according to the regulations
- Internal arc proof version
- Very compact solutions
- Easy installation and maintenance
- Type tests and acceptance tests

Thanks to their characteristics, IMESA Low Voltage Switchboards can offer solutions for any kind of request, always ensuring service continuity, personnel security and the possibility to implement the switchboard in a supervision and control system.



LV Switchboards ensure versatility, they are suitable to be differently installed in main electrical plants such as:

- Industrial (cement, petrochemical, metallurgical and paper factories)
- Production and distribution of electric power (electric power plants, substations, cogeneration, alternative energy)
- Shipbuilding (passenger ships, military ships, merchant ships, platforms)
- Infrastructures (railways, undergrounds, airports)





DESCRIPTION

GENERAL DESCRIPTION

IMESA has manufactured Low Voltage Switchboards since 1972. It designs and continuously improves its products, adapting them to the highest requested standards of the market as well as to the evolution of regulations.

Such switchboards, after MV/LV transformers or generators, may be manufactured using simple busbars systems connected between them through joints or several busbars systems supplied by different energy resources.

IMESA Low Voltage Switchboards consist of modular units, separated by metal segregations which may compose the several structural forms provided for by international regulations. They may be in wall mounting version if the commissioning, maintenance and operation have to be carried out only from the front. IMESA can supply Low Voltage Switchboards in the following versions: Power Center ("PC") and Motor Control Center ("MCC32" and "MCCF"), including the certified internal arc proof version.



STANDARDS

IMESA Low Voltage Switchboards comply with the following international regulations:

- CEI IEC EN 60439-1



DESCRIPTION

OPERATING CONDITIONS

- Ambient temperature
 - Between -5°C and $+40^{\circ}\text{C}$
- Environment
 - Standard uncorrosive atmosphere, no dust, no flammable gas
- Humidity
 - Max. 50% at 40°C

SPECIAL CONDITIONS

IMESA Low Voltage Switchboards can operate in special conditions such as:

- High temperatures
- Presence of vibrations
- Naval use
- Earthquake zones use

STORAGE

In case of extended storage, in order to duly preserve the functional units, store them in their original packing in a dry place, safe from rain or sun, between -2°C and $+40^{\circ}\text{C}$.

DEGREE OF PROTECTION

The protection degrees of Low Voltage Switchboards refer to IEC 60439-1 regulations. Low Voltage Switchboards are normally manufactured with the following protection degrees:

- External protection degree: IP3X
 - Internal protection degree: IP2X
- IP54 for external protection degree, on request.



PAINTING

Painting is carried out with epoxy powder paint which is kiln polymerised at 180°C subject to washing, degreasing, phosphating, passivation and demineralised water treatments. Standard colour for metal structure and doors: RAL 7030. Painting minimum thickness is 70 micron.

SAFETY AGAINST THE RISK OF FIRE

The use of insulating materials with excellent self-extinguishing properties and the metal segregation partitions between the different cubicles of the compartment prevent fire from spreading.



PROTECTION AGAINST INTERNAL ARC

Even if an internal fault rarely occurs on IMESA Low Voltage Switchboards - designed, manufactured and tested according to CEI 60349-1 regulation - safety of the personnel and equipment near the switchboards cannot be ignored in case of serious events. In case of internal fault, an electrical switchboard having a rated voltage of 400V and a rated short-time withstand current of

20kA shows the following features:

- Emission of noise higher than 130db
- Pressure equal to 200kg towards a person who is 50cm far from the switchboard
- Temperature which can reach 7000°C (arc temperature)
- Throwing of incandescent metal parts which can cause serious burns.

Internal arc withstand tests, carried out at prestigious laboratories according to IEC 61641 regulation, confirm that the metal enclosure of IMESA LV switchboards is able to protect personnel working in proximity.





POWER CENTER "PC"

ELECTRICAL CHARACTERISTICS

Rated voltage	up to a 690V
Rated insulation voltage	up to 1000V
Impulse withstand voltage	12kV
Power frequency voltage test for 1 minute	
• power circuits (max)	3,5kV
• auxiliary circuits (max)	2,5kV
Rated frequency	50-60 Hz
Rated short-time withstand current (1s)	up to 100kA
Rated peak current	up to 220kA
Internal arc withstand current (1s)	up to 75kA
Busbars rated current	up to 6300A
Degree of protection	with opened doors IP20 with closed doors IP30 standard
Structural form	2, 3A, 3B, 4A, 4B
Ambient temperature	-5°C + 40°C
Humidity	max 50% at 40°C
Accessibility	front and rear accessibility or only with front accessibility





STRUCTURAL CHARACTERISTICS

Mechanical structure

The main structure of Power Center "PC"

Switchboards consists of:

- painted sheet plate bases and roofs
- pre-galvanised sheet plate pillars
- painted lateral panels and doors
- pre-galvanised sheet plate segregations

Earthing

Each unit consists of electrolytic copper earthing circuit which connects doors, segregations and dead metal parts of the circuit breakers.

Ventilation

The ventilation of the power equipment installed on "PC" switchboards is assured by an effective natural air circulation, through ventilation slots on the front, rear and top of each unit.

For applications with:

- high ambient temperature values
 - high protection degrees
- appropriate solutions can be offered in order

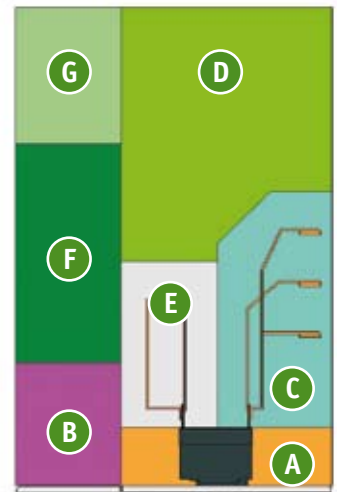
to guarantee the necessary ventilation of the internal equipment.

Switchboard structure

Each unit, designed for future extensions in both sides, consists of:

- **A** Circuit breaker compartment
- **B** Instrument compartment
- **C** Busbar compartment
- **D** Cable compartment
- **E** Cables connection compartment, only for 4B
- **F** Incoming/outgoing cable compartment shared with compartment "D" or riser/derivation/main busbar compartment
- **G** Incoming/outgoing cable compartment shared with compartment "D" or cable compartment for auxiliary connection

Plant view



Front





A - Circuit breaker compartment

The circuit breaker compartment, located in the front of the switchboard and accessible through a hinged door, can contain one or more circuit breakers of different types: air, moulded case or modular. The circuit breakers installed inside the cubicle can be in fixed, plug-in or withdrawable version.

B - Instrument compartment

The instrument compartment is located in the front side of the switchboard and it is accessible through a hinged door. It represents the auxiliary compartment which houses the instruments, the measure equipment, the protection relays and the control/protection devices.

C - Busbar compartment

The busbar compartment consists of:

- the main busbars, placed transversely in the middle, on the upper or central part of the switchboard
- the distribution busbars, placed longitudinally in the central part, which directly supply the circuit breakers installed on the panel





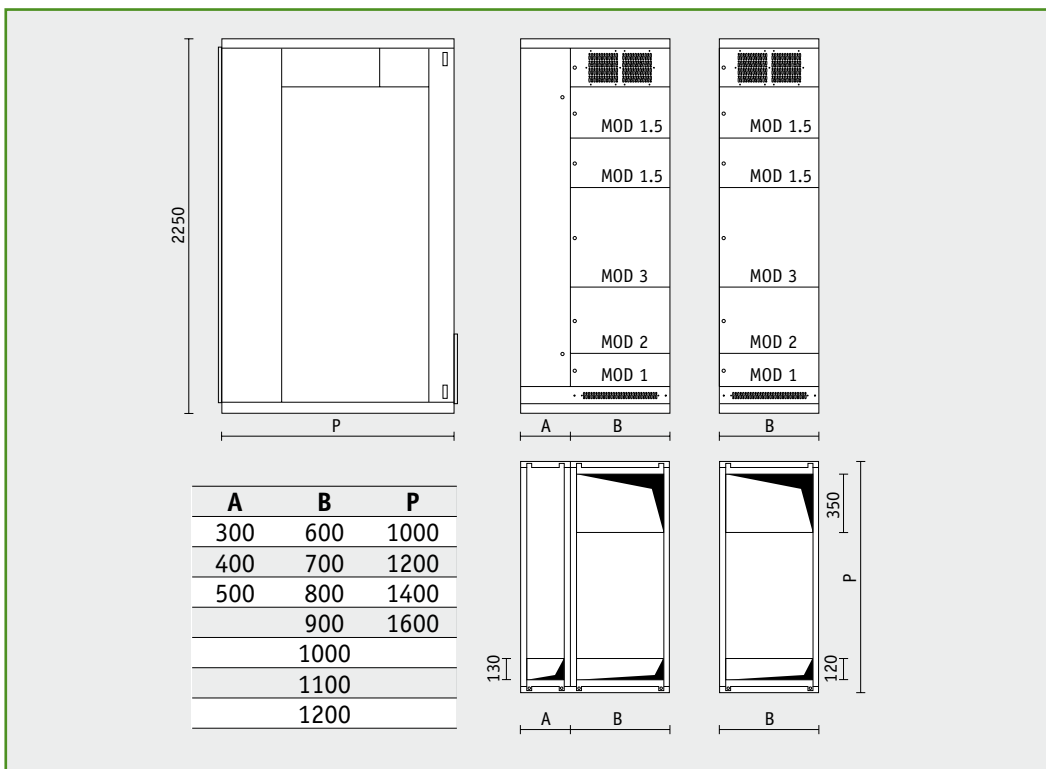
POWER CENTER "PC"

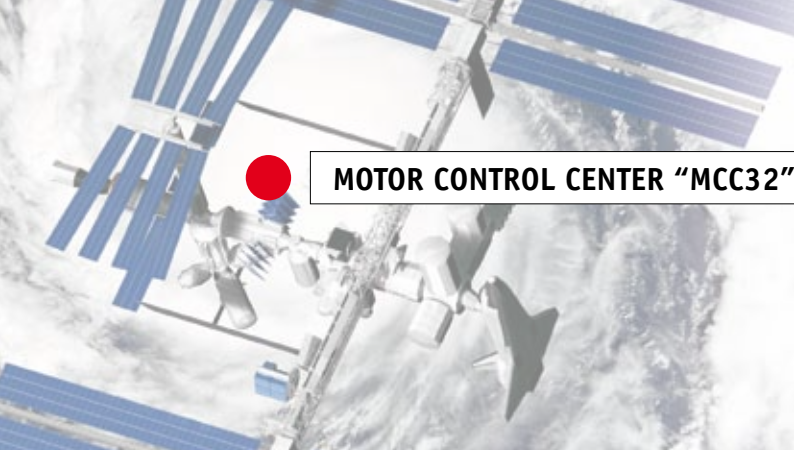
D - Cable compartment

The cable compartment on the back of each compartment houses outgoing or supply cables as well as current transformers and auxiliary terminal boards.

INTERNAL ARC PROOF VERSION

"PC" Switchboards can be also supplied in internal arc proof version.





MOTOR CONTROL CENTER "MCC32" WITH WITHDRAWABLE UNITS

ELECTRICAL CHARACTERISTICS

Rated voltage	up to 690 V
Rated insulation voltage	up to 1000V
Impulse withstand voltage	8kV
Power frequency voltage test for 1 minute	
• power circuits (max)	3,5kV
• auxiliary circuits (max)	2,5kV
Rated frequency	50-60 Hz
Rated short-time withstand current (1s)	up to 75kA
Rated peak current	up to 165kA
Internal arc withstand current	prevent the internal arc
Busbars rated current	up to 3200A
Degree of protection	with opened doors IP20 with closed doors IP30 standard
Structural form	3B, 4A, 4B
Ambient temperature	-5°C + 40°C
Humidity	max 50% at 40°C
Accessibility	front and rear accessibility or only with front accessibility*

**In the back to back version without rear accessibility, the busbars have a mechanical system for screws locking.*





STRUCTURAL CHARACTERISTICS

Mechanical structure

The main structure of Motor Control Center "MCC32" consists of:

- pre-galvanised sheet plate bases and roofs
- pre-galvanised sheet plate lateral panels, segregations and units metal frames
- painted sheet plate doors



Earthing

Each unit consists of electrolytic copper earthing circuit which connects doors, segregations and dead metal parts of the circuit breakers.

Ventilation

The ventilation of the power equipment installed on "MCC32" switchboards is assured by an effective natural air circulation, through ventilation slots on the front, rear and top of each unit.

Structure of the switchboard

Each unit, designed for future extensions in both sides, consists of :

- **A** Metal Framework
- **B** Withdrawable unit
- **C** Busbar compartment
- **D** Cable compartment



MOTOR CONTROL CENTER "MCC32" WITH WITHDRAWABLE UNITS

A - METAL FRAMEWORK

Motor Control Center "MCC32" can use two types of modular metal frames:

- Metal frame type "A" which houses up to 32 withdrawable units of size 1 (modular design 1/32), vertical type
- Metal frame type "B" which houses up to 8 withdrawable units of size 2 (modular design 1/8), horizontal type

Each compartment housing a single unit is completed with:

- power clamps directly connected to the distribution busbars
- auxiliary clamps with a high number of contacts (22 for size 1 units and up to 44 for size 2, 3 and 4 units)

B - WITHDRAWABLE UNIT

The vertical withdrawable units are manufactured in 4 different modular sizes which are suitable for both type "A" and "B" metal frames.



Units modular design	3/16	1/8	1/16	1/32
Units size	4	3	2	1

Each unit can be placed in the following positions:

- Connected: power circuit connected, auxiliary circuit connected
- Test: power circuit disconnected, auxiliary circuit connected
- Disconnected: power circuit disconnected, auxiliary circuit disconnected

Metal frame type "A"



Metal frame type "B"



The size 1 unit insertion and extraction can be done by acting on the opposite interlock, once the main circuit breaker is opened, while the size 2, 3 and 4 units can be moved by means of a lever supplied with the switchboard.



Connected

Disconnected

When the unit is inserted, the main circuit breaker or switch can be locked in open position.



MOTOR CONTROL CENTER "MCC32" WITH WITHDRAWABLE UNITS

C - BUSBAR COMPARTMENT

The busbar compartment on the back of the switchboard includes:

- the main busbars, disposed horizontally on the upper part of the panel
- the distribution busbars disposed vertically which may have 4 secondary busbars for each type "A" panel and 2 secondary busbars for each type "B" panel. Their rated current can be up to 800÷1000A.

Segregation between phases by means of insulating material plates which prevent the internal arc; in this case, according to the regulations, the switchboard is called "ARC FREE ZONE". Busbars compartment and units with metal segregation.

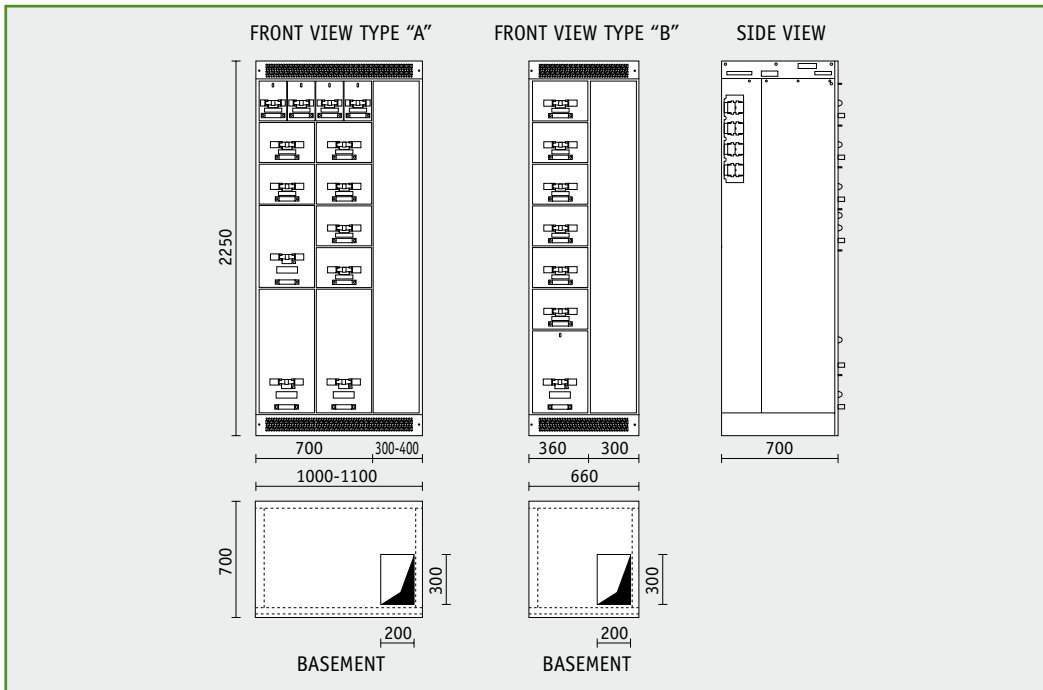


D - CABLE COMPARTMENT

The cable compartment, accessible from the front side through a hinged door, is placed on the right side of each panel. It houses supply and auxiliary cables connected with the relevant terminal boards which are disposed in two rows along the height of the panel.

INTERNAL ARC PROOF VERSION

An "MCC32" switchboard, supplied with insulating material segregations for each phase of the main and distribution busbars, is able to prevent an internal arc.





MOTOR CONTROL CENTER "MCCF" WITH FIXED UNITS

ELECTRICAL CHARACTERISTICS

Rated voltage	up to 690 V
Rated insulation voltage	up to 1000V
Impulse withstand voltage	8kV
Power frequency voltage test for 1 minute	
• power circuits (max)	3,5kV
• auxiliary circuits (max)	2,5kV
Rated frequency	50-60 Hz
Rated short-time withstand current (1s)	up to 50kA
Rated peak current	up to 165kA
Internal arc withstand current (0,3s)	up to 40kA
Busbars rated current	up to 1600A
Degree of protection	with opened doors IP20 with closed doors IP30 standard
Structural form	3B, 4A, 4B
Ambient temperature	-5°C + 40°C
Humidity	max 50% at 40°C
Accessibility	front and rear accessibility or only with front accessibility





MOTOR CONTROL CENTER "MCCF" WITH FIXED UNITS



STRUCTURAL CHARACTERISTICS

Mechanical structure

The main structure of Motor Control Center "MCCF" consists of:

- pre-galvanised sheet plate bases and roofs
- pre-galvanised sheet plate lateral panels segregations and units metal frames
- painted sheet plate doors

Earthing

Each unit consists of electrolytic copper earthing circuit which connects doors, segregations and dead metal parts of the circuit breakers.

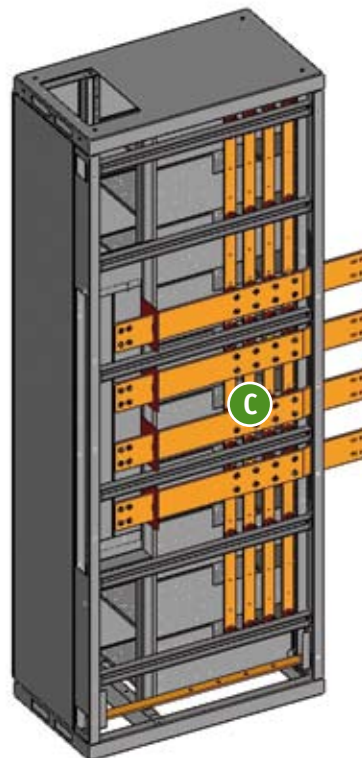
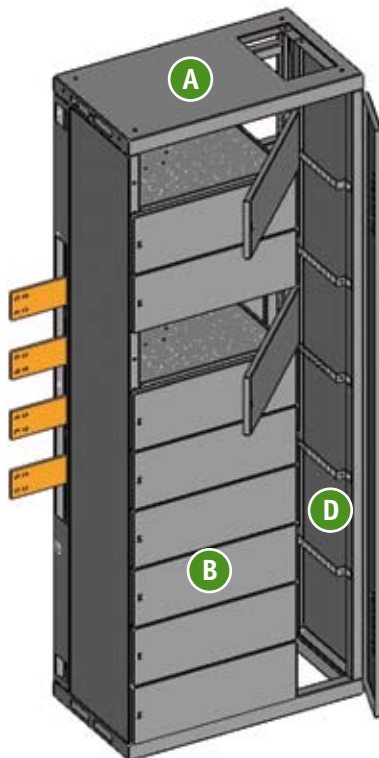
Ventilation

The ventilation of the power equipment installed on "MCCF" switchboards is assured by an effective natural air circulation, through ventilation slots on the front, rear and top of each unit.

Structure of the switchboard

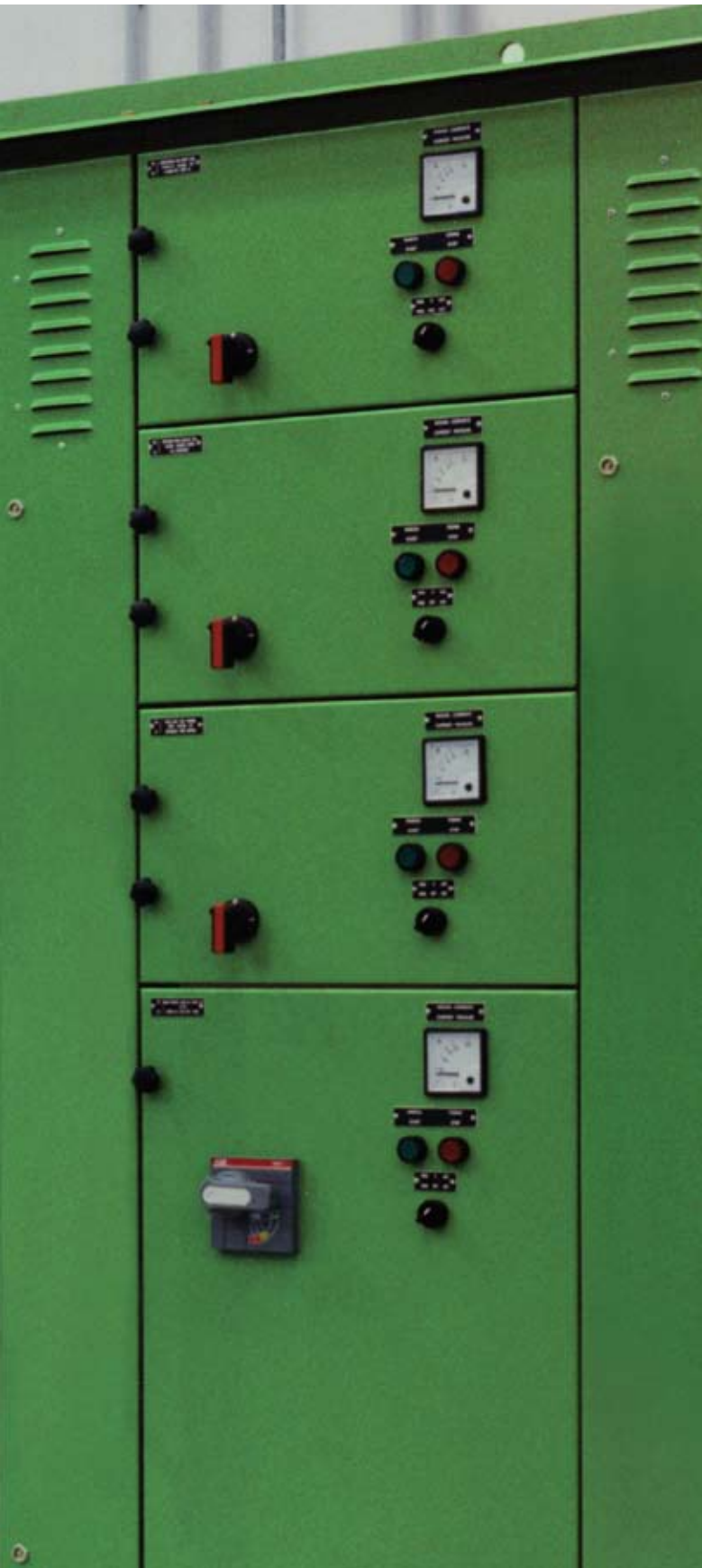
Each unit, designed for future extensions in both sides, consists of:

- **A** Metal Framework
- **B** Unit
- **C** Busbar compartment
- **D** Cable compartment





MOTOR CONTROL CENTER "MCCF" WITH FIXED UNITS



A - METAL FRAME

The metal frame is modular type, it may contain up to a max. of 20 units, 0,5 size (modular design 1/10).

B - UNIT

The unit can be made by using a modular design of 0,5, 1 and multiples of 1.

C - BUSBAR COMPARTMENT

The busbar compartment on the back of the switchboard includes:

- the main busbars, disposed horizontally on the central part of the panel
 - the distribution busbars, disposed vertically
- Busbars compartment and units (main and auxiliary) with segregation.

D - CABLE COMPARTMENT

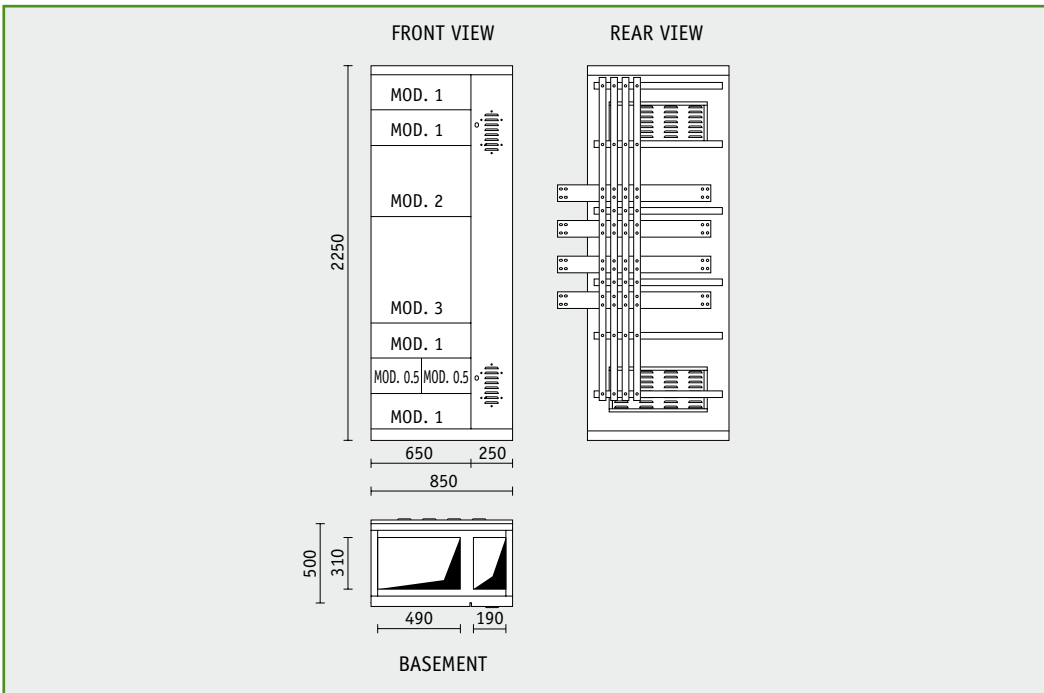
The cable compartment, accessible from the front side through a hinged door, is located on the right side of each panel. It houses supply and auxiliary cables connected with the relevant terminal boards.

INTERNAL ARC PROOF VERSION

"MCCF" Switchboards can be also supplied in internal arc proof version.



MOTOR CONTROL CENTER "MCCF" WITH FIXED UNITS





CERTIFICATIONS



Type tests at international accredited laboratories have been carried out for IMESA Low Voltage Switchboards. These tests have been performed in compliance with **CEI-EN 60439-1** regulation.

Type tests

- short time withstand current test
- temperature rise test up to 6300A
- atmospheric pulse voltage test
- power frequency voltage test
- degree of protection test

Special vibration and shock tests

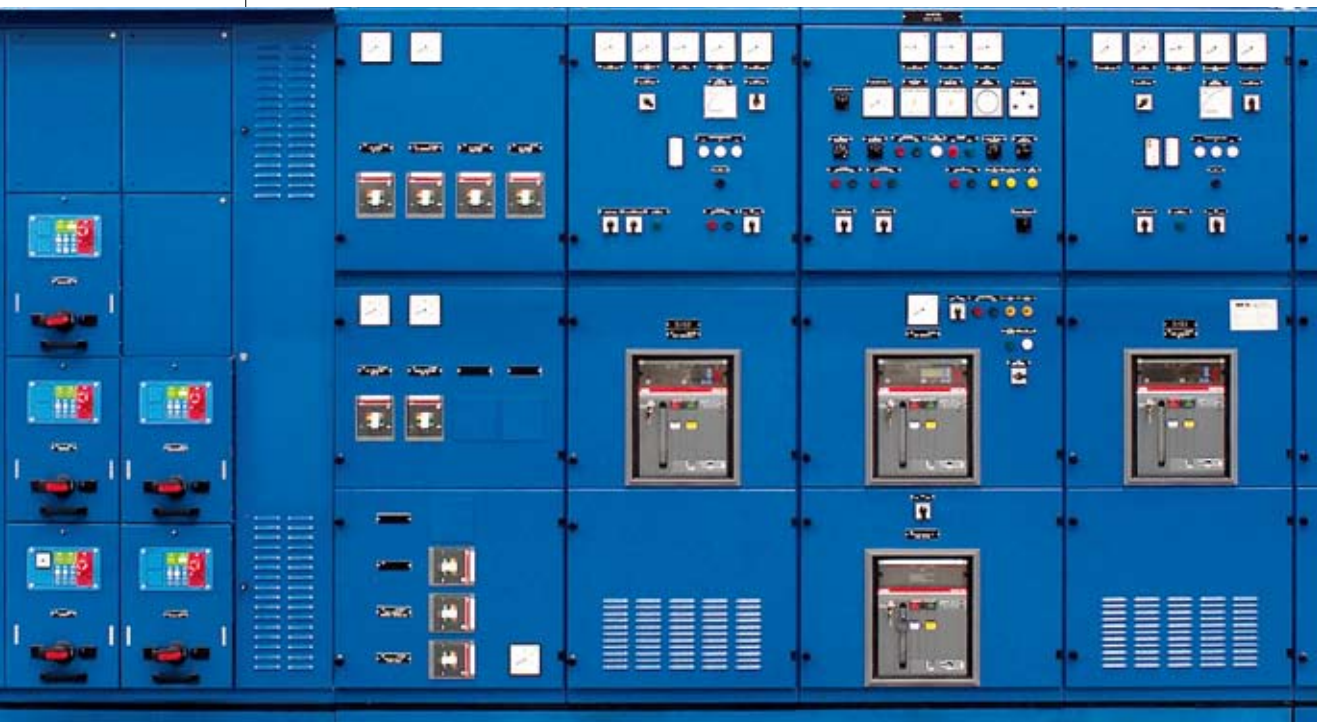
Test requested by Ship registers

IMESA Low Voltage Switchboards are tested by the most prestigious ship registers: ABS, BV, DNV, LR, MMI and Rina.

Routine tests

Before their delivery, IMESA Low Voltage Switchboards are subject to the routine tests listed below and the relevant certificate is provided to the customer:

- Visual inspection
- Verification of the sequence of mechanical operations
- Verification of the sequence of electrical operations
- Verification of the wirings
- Insulation test and measurement of the resistance of main and protection circuits
- Functioning test





Switchboards for shock and vibration environment

IMESA Low Voltage Switchboards can be installed in environments subject to vibrations or significant impacts.

Such special versions of switchboards are manufactured with particular constructive devices so that significant impacts or vibrations do not cause any damage to the electrical equipment inside the switchboards nor compromise its specific functions. Special versions of IMESA Low Voltage Switchboards are tested at official laboratories for the following tests:

Impact test - carried out according to IEC 60068-2-27/32 standard. For this test, the switchboard must be disposed in X, Y and Z axis and subject to mechanical stress.

Vibration test - carried out according to
• IEC 60068-2-6 standard.

- the monitoring of the switchboards and installations
- an easier ordinary and extraordinary maintenance
- the improvement of data filing with connections to management software systems

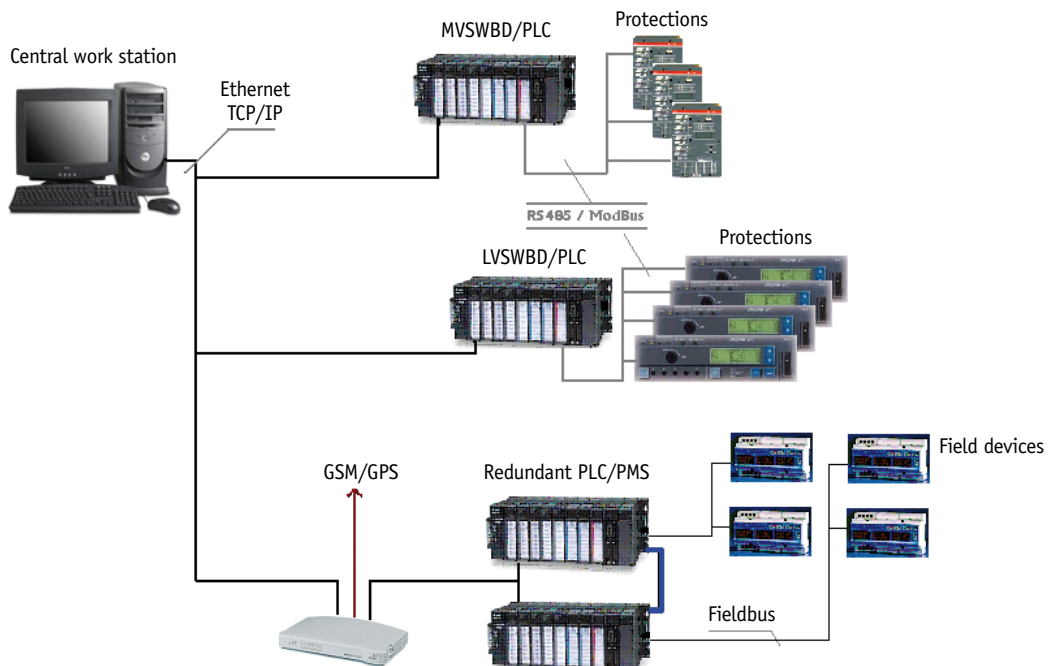
The systems configuration is designed according to customers specifications and special requests, for such aim the following devices may be used:

- electronic devices in the installation
- interface devices which permit concentration of data and possible exchanges with several communication protocols
- supervision devices designed on PC (SCADA) for civil, military and industrial plants, with the state of the art softwares available in the market or with operator panels

Intelligent switchboards

IMESA is able to supply its electrical switchboards completed with supervision and control systems. Such systems, whose software is entirely realised by IMESA, allow:

Together with the supervision and control systems, IMESA provides to its customers all the necessary assistance concerning system commissioning and personnel training, in addition to the after-sales assistance.





SPECIAL VERSIONS

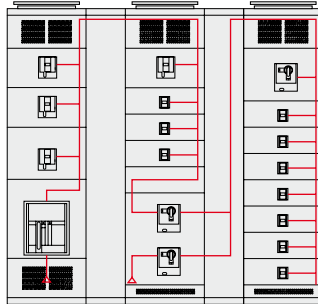
Fixed or mobile switchboards for outdoor use
IMESA is able to supply substations for outdoors, including the mobile or slide version, which contain medium and low voltage electrical switchboards, power transformers and technological installations of any kind.



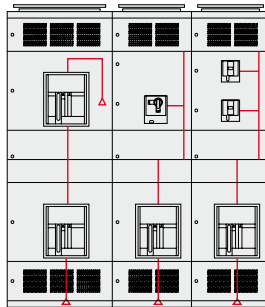


EXAMPLES OF LOW VOLTAGE SWITCHBOARDS COMPOSITION

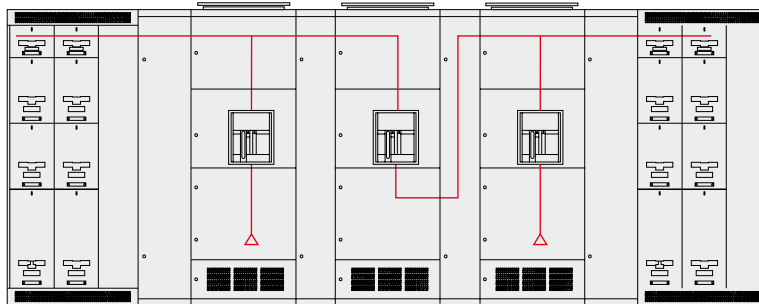
Typical configuration
of Power Center "PC"



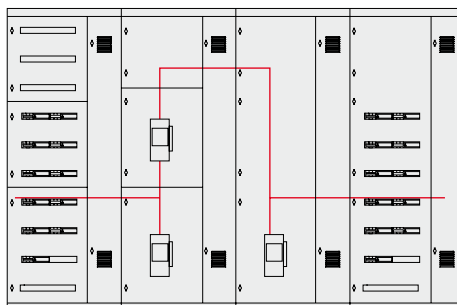
Typical configuration
of Power Center "PC"



Typical configuration
of Power/Motor
Control Center
"PC/MCC32"



Typical configuration
of Power/Motor
Control Center
"PC/MCCF"





SEGREGATION STRUCTURAL ARRANGEMENTS

IMESA LV Switchboards can be manufactured in accordance with one or more typical shapes of segregation. The maximum segregation allows the access inside the switchboard guaranteeing the personnel security, with the benefit of service continuity of the installation. According to **CEI EN 60439-1** standard, the segregation type identifies the structural form. A summary to identify the structural form is given here below.

<p>FORM 1 No segregation.</p>			
<p>FORM 2A Segregation of busbars and circuit breaker compartments. Terminals are not separated from busbars.</p>			<p>A Circuit breaker compartment B Busbar, outgoing terminals and cable compartment C Outgoing terminals and cable compartment D Cable compartment E Outgoing terminals compartment F Segregated outgoing terminals compartment G Segregated busbar compartment</p>
<p>FORM 2B Segregation of busbars and circuit breaker compartments. Terminals are separated from busbars.</p>			
<p>FORM 3A Segregation of busbars and circuit breaker compartments. Each circuit breaker compartment is segregated from the others. Segregation of terminals and circuit breaker compartments. Each circuit breaker compartment is not segregated from the others. External cable terminals and busbar compartments without segregation.</p>			
<p>FORM 3B Segregation of busbars and circuit breaker compartments. Each circuit breaker compartment is segregated from the others. Segregation of terminals and circuit breaker compartments. Each circuit breaker compartment is not segregated from the others. External cable terminals and busbar compartments with segregation.</p>			
<p>FORM 4A Segregation of busbars and circuit breaker compartments. Each circuit breaker compartment is segregated from the others. Segregation between terminals and circuit breaker and busbars compartments. External cable terminals are housed in the circuit breaker compartment.</p>			
<p>FORM 4B Segregation of busbars and circuit breaker compartments. Each circuit breaker compartment is segregated from the others. Segregation between terminals and circuit breaker and busbars compartments. External cable terminals are housed in separate single compartments, protected by an enclosure.</p>			



HOW TO REACH US:

By car: turn off the A14 motorway at the "Ancona Nord" tollgate, continue on the S.S.76 trunk road in the direction of Jesi and turn off at "Jesi Est" following the signboards indicating ZIPA-Jesi. Our facility is about 1 km from the trunk road turn off.

By train: Jesi Railway Station: just 2 km far from our facility.

By air: Ancona-Falconara Airport: just 12 km drive far from our facility.



In order to take into consideration the evolution of the Rules and the materials, the features and dimensions indicated in this catalogue can be considered binding only after confirmation by IMESA SpA.

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