



MEDIUM VOLTAGE SWITCH- BOARD MINIFLUOR series



Use and Maintenance
Translation of original instructions

Code MP1800001EN

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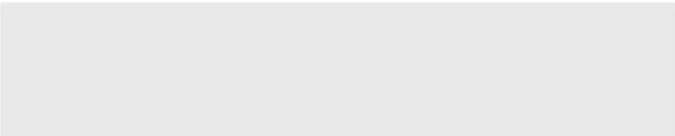
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Scope of the manual

- The information was written by the manufacturer in its original language (ITALIAN) in accordance with the principle of professional writing and in compliance with the applicable standards.
- The information is reserved ONLY for those who carry out commissioning and maintenance work on the switchgear.
- The personnel assigned to carry out interventions must have acquired and recognised expertise in the relevant field.
- Information on handling, transport and installation can be found in the accompanying manual.
- Functional diagrams and all the necessary technical documentation are also enclosed.
- Refer to the user's manual, particularly when first using the equipment and make sure that you fully understand its contents.
- It is important to take some time to read the "Instructions for Use" in order to minimise risks and avoid unpleasant accidents.
- To facilitate reading and comprehension, the principles of communication most appropriate to the characteristics of the intended audience have been adopted.
- Information may be translated into other languages to meet legislative and/or commercial requirements.

Translations of information must be made directly, without alterations, from the texts of the ORIGINAL INSTRUCTIONS.

Each translation must be marked as "TRANSLATION OF THE ORIGINAL INSTRUCTIONS".

- Carefully read the "Instructions for Use" in the manual and those applied directly onto the switchgear.
- Pay attention to the SAFETY WARNINGS, do not adopt IMPROPER USE and assess the RESIDUAL RISKS that may exist.

- There is no substitute for caution. Safety is also in the hands of those who interact with the electrical equipment over its expected lifetime.
- **Sometimes, accidents may be due to "careless" behaviour on the part of the personnel in charge.**
- **It is always too late to remember what should have been done when it has already happened.**
- Keep the information and the attached documents in a known place so that they are always available when they need to be referenced.
- The manufacturer reserves the right to make changes to the information without prior notification, provided that such changes do not alter the level of safety. Any feedback from the intended audience can be an important contribution to the improvement of after-sales services that the manufacturer intends to offer to its customers.
- To highlight important parts of text or specifications, the following symbols are illustrated and described.

Danger – Attention



The symbol indicates situations of serious danger which, if ignored, can seriously jeopardise the health and safety of persons.



Caution - Warning

The symbol indicates that appropriate behaviours must be adopted to avoid jeopardising the health and safety of persons and to avoid causing property damage.



Important

The symbol indicates technical and operational information of particular importance that should not be disregarded.

Note: The symbol is used to reinforce the concept of the reference information.

Switchgear identification

The nameplate shown is attached directly to each switchgear cubicle.

- In addition to the identification references of the manufacturer, all indications indispensable for operational safety are given.

Manufacturer's stamp

Switchboard type

Reference standards

Rated voltage

Rated thermal current

Degree of protection

Loss of service continuity category

Auxiliary circuits

Arc test current

Internal arc category

Rated short-time current

Serial number

Year of manufacture

User manual references

Rated withstand voltage (operating frequency)

Short circuit rated duration

Accessibility type

Arc test current duration

Rated withstand current (lightning impulse)

Rated peak current

Rated frequency

Glossary of terms

The glossary contains some terms used, with their definition, to facilitate understanding of the meaning.

- **Helper:** a person chosen, trained and appropriately coordinated to minimise risks associated with human-machine interaction.
- **cubicle:** functional unit consisting of several compartments to compose the switchgear, customised to the buyer's requirements. **Compartment:** part of a cubicle, enclosed in a metal casing.
- **PPE:** Personal Protective Equipment.
- **Routine maintenance:** all work necessary to keep the equipment at maximum efficiency. The works are planned by the manufacturer, who will set out the necessary competences and work methods.
- **Extraordinary maintenance:** work due to events not planned by the manufacturer, which must be carried out by the expert maintenance technician.
- **Shut-down:** operating state that involves disabling a cubicle on which works are necessary. To disable a cubicle and ensure safety, the operator must follow the “Shut-down” procedure step by step.
- **Energizing:** operating state in which a cubicle is enabled. To enable a cubicle and ensure safety, the operator must follow the “energizing” procedure step by step. **Switchgear:** combination of several cubicles customised to the purchaser's requirements. **Residual risks:** all risks that remain despite the fact that all safety solutions have been adopted and integrated in the design phase.

- **Expert technician (PES):** a person trained and authorised to carry out work where precise technical competence and recognised skills are required.
- **Misuse:** reasonably foreseeable use, different from that indicated in the user manual, which can derive from human behaviour.

Request for technical support

- Please contact the manufacturer's Technical Service Department if you have any questions.
Phone: 073 164921
- E-mail: info@imesaspa.com
- For each technical support request, please indicate the data on the nameplate, the approximate hours of operation and the type of defect found.

Attached documents

The listed documentation is issued to the customer together with the manual.

- Specific information (operating sequence) regarding the switchgear shut-down procedure

Note: The information is useful to carry out the intervention correctly and safely.

- Actual switchgear layout with the cubicle configuration
- Wiring diagrams
- Warranty conditions
- Technical manuals of the installed commercial components or sub-assemblies

General safety conditions

- The switchgear has been designed and built with all precautions to minimise risks over its intended life.
 - Read the SAFETY WARNINGS in the "Instructions for Use" before interacting with the switchgear.
 - Abide by the indications on RESIDUAL RISKS that may exist and do not adopt IMPROPER USES.
 - When interacting with the switchgear, wear the PPE as specified in the "Instructions for Use" and the PPE required by labour laws.
 - Carry out the operations EXCLUSIVELY according to the methods indicated by the manufacturer in the "Instructions for Use".
 - Interact with the switchgear ONLY if you are trained and authorised for the type of work to be done.
 - Avoid activities that could distract one's attention (using the phone, eating etc.).
- Note:** DO NOT interact with the switchgear if you have ingested substances or medication that may alter your reflexes during work.
- The personnel assigned to carry out interventions must have acquired and recognised expertise in the relevant field.
 - Keep the information and safety labels legible and observe the instructions.
 - Information signs can be of different shapes and colours, to indicate dangers, obligations, prohibitions and instructions.
 - Replace and relocate signs that can no longer be read at the same point of origin.

Safety recommendations for use and operation

- Use is restricted to ONE operator only, who must be trained, have appropriate skills for the work to be performed and be in a suitable condition.
- The continuous presence of the operator is not required for the use and operation of the switchgear.
- Refer to the user's manual, particularly when first using the equipment and make sure that you fully understand its contents.
 - Identify the position and function of the controls and simulate some manoeuvres to familiarise yourself with them.
- Interact with the switchgear ONLY in the manner indicated by the manufacturer.
- Shut down a defective cubicle immediately and re-enable it only after normal operating conditions have been restored.
- The operator must be informed about the CORRECT USE of the switchgear and the RESIDUAL RISKS.
 - Check that all safety devices are fully installed and efficient.
 - Tampering with and circumventing safety devices can pose risks (even serious risks) to operators.
 - Interact with the switchgear ONLY with the original safety devices installed by the manufacturer.
 - ALWAYS keep perimeter areas clean and in a suitable condition to minimise risks.
 - Prepare an emergency plan to respond promptly after critical environmental events (earthquakes, floods etc.).
 - The emergency plan must consider the damage and the procedures for restoring the correct operation of the switchgear. This precaution is especially necessary for switchgears installed in sensitive environments (hospitals, airports, police stations etc.).

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Safety conditions for misuse

- DO NOT allow the switchgear to be used by untrained, undocumented and unauthorised operators.
- DO NOT interact with the switchgear in any way other than as intended by the manufacturer.
- DO NOT interact with the switchgear without wearing the PPE instructed by the manufacturer and the applicable workplace laws.
- DO NOT interact with the switchgear if you have ingested substances or medication that may alter reflexes during work.
- DO NOT continue to interact with the switchgear if abnormalities are detected.
- DO NOT continue to use the switchgear if the scheduled maintenance has not been regularly performed.
- DO NOT tamper with, remove or bypass the safety devices installed.
 - DO NOT modify the construction and functional characteristics of the switchgear in any way.
 - DO NOT carry out any work other than as indicated in the user's manual without an express authorisation from the manufacturer.
 - NEVER perform any work on the cubicles without having carried out the "Shut-down" procedure.
 - DO NOT clean the switchgear with water, steam or aggressive products so as not to damage it irreversibly.
 - DO NOT replace components with non-original spare parts or with different design and construction characteristics.
 - DO NOT dispose of materials and/or waste generated during work in the environment, but in accordance with the relevant laws.

Safety conditions on residual risks

Residual risks: all risks that remain despite the fact that all safety solutions have been adopted and integrated in the design phase.

- The manufacturer has paid particular attention to RESIDUAL RISKS that may arise during energizing and shut-down.
- Special care was taken during the design phase not to compromise the safety and health of operators.

- Energizing and shut-down CANNOT take place if the procedures are performed incorrectly.
- The procedures are described in detail in the user and maintenance manual.

Safety conditions for adjustment and maintenance

- Maintain the switchgear in a fully functional condition and carry out maintenance as and how often as specified.
- **Good maintenance will maintain performance over time, a longer service life and a constant level of safety requirements.**
- The trained and authorised maintenance personnel must have specific technical competence in the field.
- Mark areas for intervention and prevent access to devices which, if activated, could compromise safety.
- Wear the PPE indicated in the “Instructions for Use” and those required by labour laws.
- Abide by the indications on RESIDUAL RISKS that may exist and do not adopt IMPROPER USES.
- Activate all envisaged safety measures and check whether there is any residual energy before carrying out works.
- Carry out the work according to the procedures and the methods indicated by the manufacturer in the “Instructions for Use”.
The mode is necessary to be able to operate safely.

- Carry out all work ONLY with suitable tools, in good condition, so as to avoid damaging components.
- The disconnecting switch is a sealed system that contains SF6 gas and must not be opened or drilled.



Caution - Warning

In the event of a gas leak (or suspected gas leak), contact the manufacturer's technical support department.

- Replace SAFETY DEVICES only with original spare parts in order not to alter the intended level of safety.
- The use of similar but non-original spare parts may lead to improper repairs, altered performance and property damage.
- At the end of the work, check that there are no tools or other materials left in hazardous areas.
- Contact the manufacturer's Technical Support Department if work is necessary, but not described in the “Instructions for Use”
- Some interventions may require the use of devices and/or support equipment to be used properly.
- At the end of each intervention, record the performed operations in the “cab register”.

Safety conditions for the electrical equipment

The switchgear was built in accordance with the relevant standards and it functions correctly if the listed conditions are met.

- Ambient temperature and relative humidity within the minimum and maximum permissible limits.
- Absence of electromagnetic interference and radiation (X-rays, lasers etc.) in the environment.
- Absence of areas with concentrations of potentially explosive gases and dusts and/or a risk of fire.
- Installation area near maritime areas or other areas where there is a risk of corrosion. Corroded electrical components will be irreversibly damaged.

- Transport and storage temperature between the minimum and maximum permissible limits.
- Altitude not exceeding the maximum permissible limits.
Do not install under conditions other than those permitted.

Important

All listed condition values are listed in the technical data table.

- If one or more of the listed conditions cannot be fulfilled, agree on additional solutions in the contractual stage.

Safety conditions for environmental impact

Every organisation has the responsibility of applying procedures to identify, assess and monitor the impact of its activities (products, services etc.) on the environment.

- The procedures to be followed to identify significant impacts on the environment must take into account the listed factors.
 - Insulated fluid drains
 - Waste management
 - Environmental contamination

Caution - Warning



Sulphur hexafluoride (SF₆ gas) must be recycled and NOT released into the atmosphere.

- In order to minimise environmental impact, consider the listed indications.
 - Dispose of the packaging in compliance with the regulations in force in the country of installation.

- Keep noise at minimum levels in order to reduce noise pollution.
- Select materials according to their composition and dispose of them separately in accordance with the relevant laws.
- Components of electrical and electronic equipment may contain hazardous substances and are marked with an appropriate label.
- Dispose of waste electrical and electronic equipment properly, at authorised collection centres, to avoid harmful and damaging effects.
- Avoid releasing polluting materials and products (electrical components, electronics etc.) into the environment.
- Abusive disposal of hazardous waste is punishable by penalties regulated by the laws in force in the territory where the offence is committed.

General information about the switchgear

The illustration shows, by way of example, the different types of cubicles that could make up the switchgear.

- According to the purchaser's wishes, the switchboards are customised by assembling the bays during installation.

Note: To find out the dimensions and actual composition of the cubicles, please refer to the assembly layout.

- The electrical characteristics of the switchgear are stated on the attached nameplate (see "switchgear identification").
- The cubicles are connected to each other with copper rods supported by insulators.
- Technical information on each individual cubicle can be found in the corresponding file.



Description of the switchgear

Switchboards in the MINIFLUOR series are equipment for electric power distribution in transformer substations.

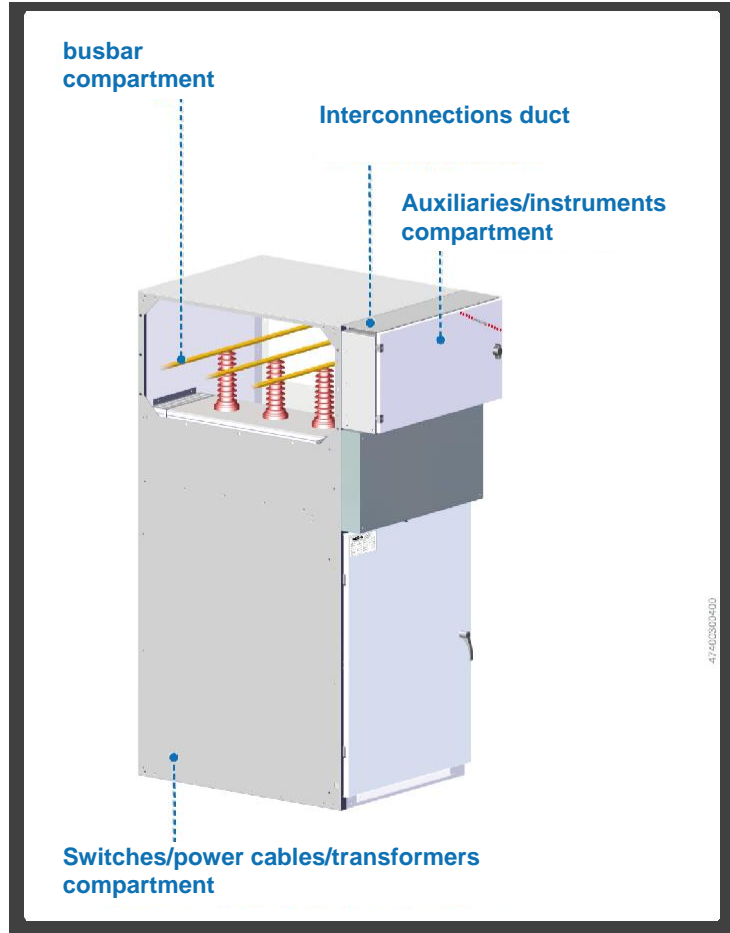
- The switchgears are used in secondary medium-voltage electrical distribution.
- These switchgears are used to mechanism power transformers and protect power lines.
- The applications are numerous: photovoltaic installations, railways, industry, ports, airports, hospitals etc.

Note: The continuous presence of the operator is not required for the use and operation of the switchgear.

- When designing the switchgear, the manufacturer considered all types of consumers to be served.
- The manufacturer has paid special attention to switchgears installed in sites considered sensitive (hospitals, airports, police stations etc.). The manufacturer, together with the purchaser, have set up the procedures to be adopted in the event of critical environmental events (earthquakes, floods etc.).

- The switchboard and its bays are designed and built according to current laws and standards.
- All switchboard components are built with selected materials and innovative technologies to ensure safety.
- The adopted technologies provide a high level of safety against external effects that could harm people.
- The dimensions of the switchboard are contained to be installed on the floor or wall.
- The illustration shows, by way of example, the different compartments that could form a bay.

Note: See the information for each individual cubicle for more details.



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Electrical technical data

Table: Technical data

Description	Abbreviation	Units of Measurement	Value			
Rated voltage	Ur	kV	12	17.5	24	36
Rated insulation level at the operating frequency						
- Between the phase connections and between the earthing connections	Ud	kV	28	38	50	70
- Between opened connections	Ud	kV	32	45	60	80
Rated isolating lightning impulse withstand voltage						
- Between the phase connections and between the earthing connections	Up	kV	75	95	125	170
- Between opened connections	Up	kV	85	110	145	195
Rated frequency	-	Hz	50 / 60			
Rated thermal current of main bars	In	UNTO	400- 630 - 800 - 1250			400 - 630

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Description	Abbreviation	Units of Measurement	Value		
Rated permissible short-time current (1 second)	I _{cw}	kA	12.5- 16 - 20 - 25	12.5 - 16 - 20	12.5 - 16
Rated permissible short-time current (3 seconds)	I _{cw}	kA	12.5 - 16		-
Rated peak current	I _p	kA	31.5- 40 - 50 - 63		31.5 - 40
Internal arc withstand for 1 second (IAC AFLR on request)	-	kA	16		12.5
External protection	IP	-	3X		
Internal protection degree	IP	-	2X		

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Technical data of fuses

The table outlines the amperage of the fuses that can be installed in the various cubicles.

– In case of replacement, only use fuses with the same characteristics as those listed in the table.

Table: Rated fuse current (Ampere)

		Operating voltage (kV)								
		3	5	6	10	12	15	17.5	20	24
Rated transformer power (kVA)	25	10	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	40	16	10	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	50	25	16	10	10	6.3	6.3	6.3	6.3	6.3
	63	25	16	10	10	10	10	6.3	6.3	6.3
	80	40	25	16	16	10	10	6.3	6.3	6.3
	100	40	25	16	16	16	16	10	10	6.3
	125	63	40	25	25	16	16	16	16	10
	160	63	40	25	25	25	25	16	16	16
	200	100	63	25	25	25	25	25	16	16
	250	100	63	40	40	40	25	25	25	16
	315	100	100	40	40	40	40	25	25	25
	400	100	100	63	63	40	40	40	40	25
	500	160	100	63	63	63	40	40	40	40
	630	-	100	100	100	63	63	63	40	40
	800	-	160	100	100	100	63	63	63	40
1000	-	-	160	160	100	100	63	63	63	

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Reference standards

The switchgear was built to ensure adequate safety conditions and it was designed in accordance with the listed standards.

- CEI EN 62271-1
High-voltage switchgear and controlgear
Part 1: Common specifications
- CEI EN 62271-102
High-voltage switchgear and controlgear - Part
102: Alternating current disconnectors and
earthing switches.

- CEI EN 62271-103
High-voltage switchgear and controlgear - Part
103: Switches for rated voltages above 1 kV up to
and including 52 kV
- CEI EN 62271-200
High-voltage switchgear and controlgear - Part
200: AC metal-enclosed switchgear and
controlgear for rated voltages above 1 kV and up
to and including 52 kV

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Safety and information signs

The illustrations show the safety and information signs with their meanings alongside.

- **Risk of electric shock or electrocution:** a hazard sign indicating not to enter areas with live parts.
- **Access prohibited:** a sign indicating that unauthorised persons are prohibited from passing through.
- **Lifting signal:** it indicates lifting points. with a hook device.



Handling, transport and installation instructions

- The information was written by the manufacturer in its original language (ITALIAN) in accordance with the principle of professional writing and in compliance with the applicable standards.
- The information is restricted to qualified operators in charge of handling and transporting the switchgear.
- The manual also contains information for qualified operators installing the switchgear.
- The personnel assigned to carry out interventions must have acquired and recognised experience in the relevant field.
- Functional diagrams and all necessary technical documentation are also enclosed.
- To facilitate reading and comprehension, the principles of communication most appropriate to the characteristics of the intended audience have been adopted.
- Keep the information and the attached documents

in a known place so that they are always available when they need to be referenced.

- To highlight important parts of text or specifications, the following symbols are illustrated and described.

Danger - Attention

The symbol indicates situations of serious danger which, if ignored, can seriously jeopardise the health and safety of people.

Caution - Warning

The symbol indicates that appropriate behaviours must be adopted to avoid jeopardising the health and safety of persons and to avoid causing property damage.

Important

The symbol indicates technical and operational information of particular importance that should not be disregarded.

Note: The symbol is used to reinforce the concept of the reference information.

Safety conditions for handling and transport

- The manufacturer has paid particular attention to the packaging in order to minimise the risks involved in shipping, handling and transport.
- To facilitate transport, the shipment can be carried out with some components disassembled and carefully protected and packed.
- The manufacturer must agree in advance with the purchaser on the type and load-bearing capacity of the equipment to make arrangements for handling the packages.
- Carry out handling (loading and unloading) in accordance with the information present directly on the packaging and in the user manual.
- The personnel authorised to carry out loading, transport and unloading must be proficient in the use of lifting equipment and must possess recognised experience in the specific field.
- One or more helpers may be needed for some phases, who must be trained and informed in advance about the tasks they will be assigned.
- Loading and transport must be carried out

with means of appropriate load-bearing capacity by anchoring in the arranged points indicated on the packages.

- DO NOT attempt to bypass in any way the handling methods and the lifting points.
- Properly anchor the shipped parcels to the means of transport for safety during transfer and to guarantee the integrity of the contents.
- Check that the gauge does not exceed the maximum permitted dimensions and, if necessary, provide appropriate markings.
- DO NOT carry out handling with an insufficient field of view and in the presence of obstacles on the way to the installation area.
- Slowly lift the packages to the minimum height indicated and move them with great care to avoid dangerous swaying.
- DO NOT allow people to pass or stand in the operating range during the lifting and handling of loads.

- Unload the packages and store them in an environment protected from the weather. This should be adopted when the switchgear is not immediately installed.
- Store packages close to the installation area if the switchgear is installed immediately.
- During transport, temperatures and vibrations must remain within the permissible limits in order not to damage components.
- For limits that cannot be met, the purchaser and the manufacturer must agree on a suitable solution.
- **Failure to comply with the information given may result in material damage.**

Safety conditions for installation and testing

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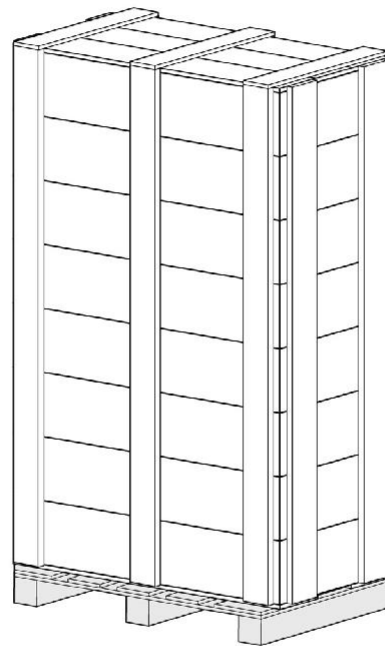
- Prepare the installation area in accordance with the installation layout.
- The installation area must be prepared to allow the work to be carried out as intended and safely.
- The installation area manager and the installation manager must implement a “safety plan” in compliance with current workplace laws.
- The “safety plan” must take into account all surrounding work activities and necessary perimeter spaces.
- The “safety plan” must include a list of qualified and authorised installation personnel and their competences.
- Mark and demarcate the installation area properly to prevent access by unauthorised personnel.
- Make sure that the installation environment is protected from the weather, free from the risk of explosion and from corrosive substances.
- Check that the site has an adequate air exchange and that noise emissions are within the permissible values.
- The temperature of the installation environment must be within the specified minimum and maximum limits.
- Carry out the installation as indicated in the reference layout and connect the cables correctly as shown in the diagrams.
- Always take the relevant regulatory and legislative requirements into account during installation.
- Carry out work according to the logical sequence of assembly, without omitting any components.
- When installing, connect the cubicle to the previous one correctly, aligned and levelled (See **Installation**).
- **Correct connection, alignment and levelling are essential to avoid additional work and to ensure proper functioning.**
- Electrical connections must be carried out in a workmanlike manner for resistance or current leakage.
- At the end of the work, check that there are no tools or other materials left in hazardous areas.
- On completion of installation and connection, carry out the acceptance test and document all checks (See **Checks at the end of installation**).
- Testing is necessary in order to verify compliance with the agreed specifications and that commissioning can take place safely.

Packaging

The illustrations depict the most common types of packages used.



Packaging on pallet with nylon protection



Packaging with wooden crate

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- The packaging is made to measure, also depending on the type of transport adopted.
- To facilitate transport, the shipment can be carried out with some components disassembled and carefully protected and packed.
- Packaging for maritime transport is “over-sea” type in order to guarantee the packaged items are preserved.
- All information required for loading and unloading is provided on the packaging.
- Each shipment is accompanied by a document (“Packing list”), which contains the list and description of the packages.
- Bulk components are conveniently bundled in packages to avoid movement.

Loading

Authorised personnel must be proficient in the use of lifting equipment and must possess recognised experience in the specific field.

- The illustrations depict the most common modes of lifting.



- Read and observe the instructions on the packaging, packages and/or disassembled parts.
- DO NOT attempt to by-pass in any way the designated lifting, unloading and handling points of any disassembled package and/or part.
- The equipment must be compatible with the dimensions of the packages to be handled.
- Insert the lifting devices into the designated points on each package and check that they are correctly balanced.
- Slowly lift the packages to the minimum height indicated and move them with great care to avoid dangerous swaying.
- Carry out handling ONLY with an adequate field of view.
- Make use of a helper (placed at a safe distance) who is able to signal the necessary manoeuvres without ambiguity.

Important

DO NOT allow people to pass or stand in the operating range during the lifting and handling of loads.

- Keep packages upright with the pallet in place to facilitate unloading.
- Load the cubicles onto the transport vehicle in an orderly manner and in the sequence of installation.

Important

Disorderly loaded cubicles create confusion for all subsequent steps.

- Assess whether the means of transport causes excessive vibrations that could damage the components.
For excessive vibrations, take appropriate measures to dampen them.

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Transport

Authorised personnel must be proficient in the use of lifting equipment and must possess recognised experience in the specific field.

- Transport, also depending on the place of destination, may be carried out by different means.
- The diagram depicts the solutions most used.
- Carry out the transport with suitable means and of adequate load-bearing capacity.

- Anchor the cubicles to the transport vehicle to avoid sudden movements.
- Before transport, make sure that the gauge of the shipping packages does not exceed the maximum permitted dimensions.



Devices and accessories required for installation

- Dates will be agreed, in advance of the installation period, on which the lifting equipment and devices will be available for carrying out the work.
- The manufacturer and the purchaser must agree in advance on the support staff and equipment to be provided for installation.
- **Support staff:** Set out how many people and their competences.
- **Lifting devices:** Set out the type (forks or hooks) and the maximum load-bearing capacity.

- **Installation equipment:** set out the type of power tools and the size of the required hand tools.
- **Devices to access high areas:** set out the appropriate type to operate safely.

Important

The equipment and devices must comply with the relevant laws in force.

Unloading

Authorised personnel must be proficient in the use of lifting equipment and must possess recognised experience in the specific field.

- When you receive the packages, before unloading, find a suitable area in which to deposit or store them.
- Read and observe the instructions on the packaging, packages and/or disassembled parts.
 - DO NOT attempt to by-pass in any way the designated lifting, unloading and handling points of any disassembled package and/or dismantled parts.
- Make sure that the equipment and devices that have been agreed upon for intervention are available.
- Insert the lifting devices into the designated points on each package and check that they are correctly balanced.
- Slowly lift the packages to the minimum height indicated and move them with great care to avoid dangerous swaying.

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Storage

- Store the switchgear if installation is planned after the packages are received.
- The storage area must be enclosed, free from fire risks and accessible only to authorised personnel.
- The supporting surface of the storage area must be stable and have an adequate load-bearing capacity.

Unpacking

- Unpack only when starting assembly and installation works in the installation area.
- The packages must be unpacked in the most appropriate manner by the installation personnel.

- Carry out handling ONLY with an adequate field of view.
- Make use of a helper (placed at a safe distance) who is able to signal the necessary manoeuvres without ambiguity.

Important

DO NOT allow people to pass or stand in the operating range during the lifting and handling of loads.

- When you receive the packages, check that the material received matches to the accompanying document.
- Check that the packaging is perfectly intact and, in the case of overall packaging shipments, check that each parcel is intact.

Important

In the event of damage to packages or missing parts, contact the manufacturer to agree on procedures.

- The temperature and humidity of the storage area must be within the permissible minimum and maximum limits.
- It is advisable to store packages in the vicinity of the installation area in order to avoid excessive movement during installation.

Important

In the case of prolonged storage, check regularly that there are no changes in the storage conditions.

- Unpack each package in the most appropriate manner and check the integrity of the components.

Important

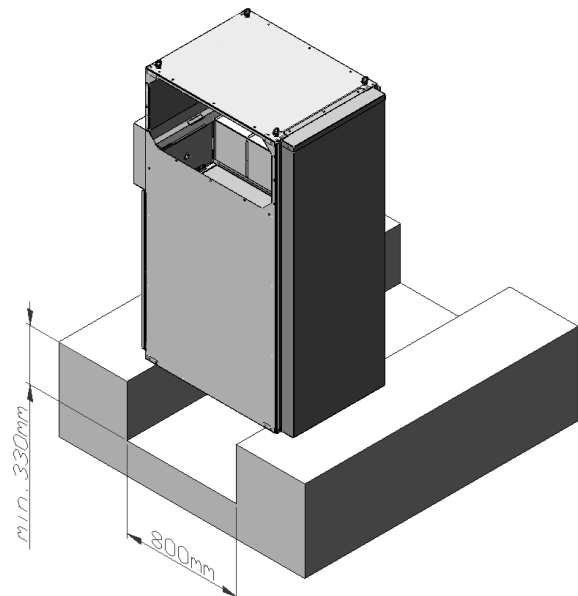
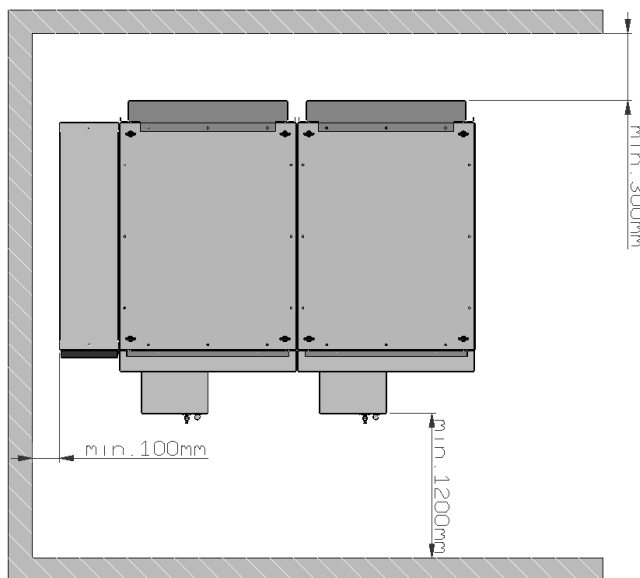
In the event of damage to packages or missing parts, contact the manufacturer to agree on procedures.

Handling, transport and installation

- Check that all fastening devices (brackets, special supports etc.), which are used to prevent sudden movement of the units, have been removed.
- Keep the devices installed and/or used for transport and handling in order to be able to re-use them in the event of relocation.
- Packaging material must be properly disposed of in accordance with the laws in force.
- When unpacking, leave the pallet assembled and only remove it when in the vicinity of the installation area.

Definition of the installation area

MINIFLUOR "INTERNAL ARC" INSTALLATION



There must be a minimum clearance of 600mm between the roof of the compartment and the ceiling of the room.

If the Minifluor is not "Internal Arc" version, the only mandatory clearance is minimum 1200mm between the front of the compartment and the wall of the room.

Please contact IMESA technical office in case of different installation from the above specifications.

Installation

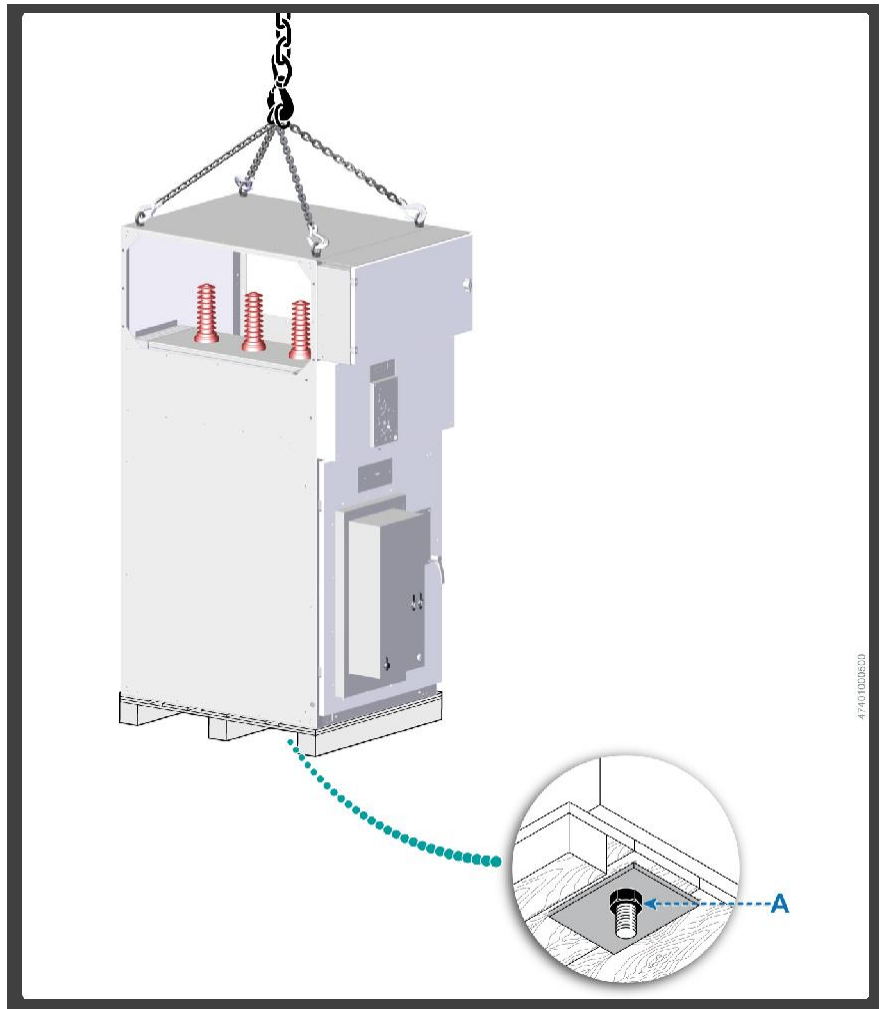
- The installation area manager and the installation manager must implement a “safety plan” in compliance with current workplace laws.
- The “safety plan” must take into account all surrounding work activities and necessary perimeter spaces.
- The “safety plan” must include the list of qualified people authorised for installation, with the relevant skills.
- Mark and demarcate the installation area properly to prevent access by unauthorised personnel.
- The installation area must have the listed characteristics:
 - Industrial-type flooring with a load-bearing capacity of: cubicle weight x 2.5
 - Pavement flatness equal to: ± 1 mm/m
- The illustrations depict the intervention points and the description indicates the procedures to be adopted.

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1. Wear the PPE indicated in the “Instructions for Use” and those required by labour laws.
2. Plot the coordinates to position the switchgear correctly.
3. Connect a hook lifting device to the eyebolts of the first cubicle to be installed.

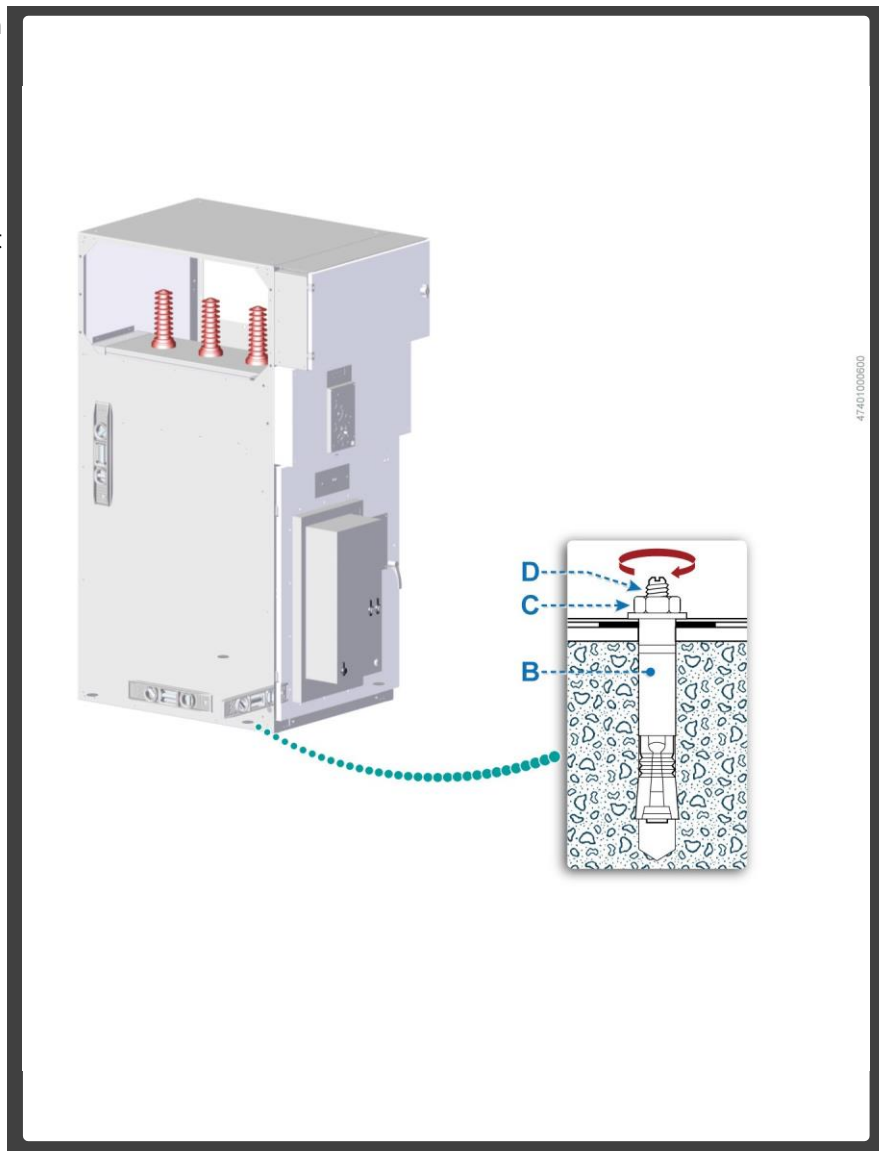
Note: The first cubicle to be installed is the one with the power supply cables.

4. Raise the cubicle to a sufficient height to be able to access the pallet fasteners.
5. Remove the fastening elements **A** of the pallet and pull it out.
6. Place the cubicle in the destination area.
7. Remove the lifting device.



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8. Drill the floor matching the holes in the cubicle.
9. Insert the dowels **B**.
10. Insert the nuts **C** and the Washers of each threaded rod **D**.
11. Tighten the nuts **C** a few turns, but not completely.
12. Check levelling (longitudinal and transversal) with the level positioned in the indicated points in the illustration.
13. Tighten nuts **C** completely in crosswise order or alternatively.
14. Connect a hook lifting device to the eyebolts of the next cubicle to be installed.
15. Position the cubicle next to the one previously installed.
16. Repeat the fastening and levelling operations as on the first cubicle.
17. Connect the two cubicles with the fasteners supplied.
18. Repeat the operations and assemble the subsequent cubicles one by one.



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□ MOUNTING OF THE BUSBAR

- All cubicles are connected with busbar.

19. Dismantle the upper fixed panels of each cubicle.

Note: For some cubicles, it is possible to access the intervention area from the auxiliary bin.



Important

To work at height, in not easily accessible or dangerous areas, provide adequate safety conditions.

20. Clean the contact surfaces of the busbar **E** with a wire brush or emery cloth.

Note: For silver-plated busbar clean the surfaces with a solvent-soaked cloth.

21. Mount the busbar **E** to the insulators **F** with the fasteners supplied.

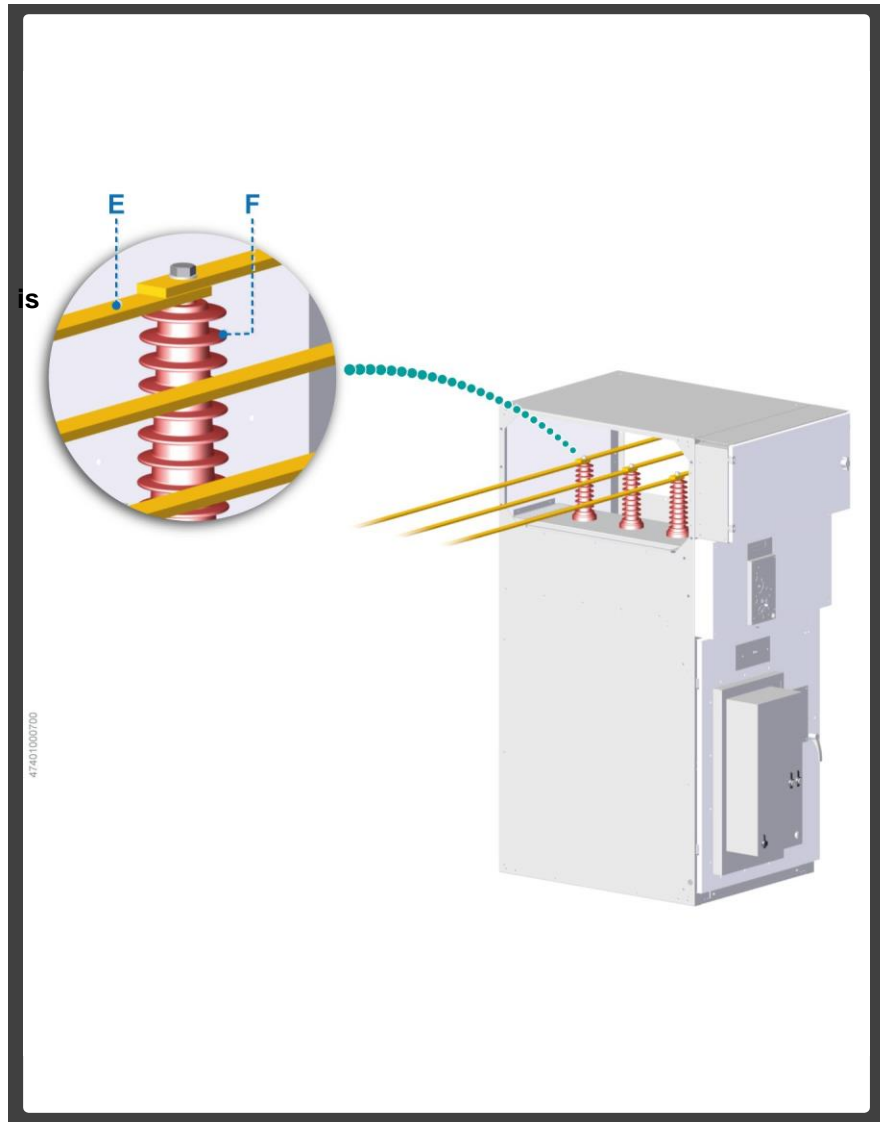
Note: Tighten all fasteners at the appropriate torque. (See *Tightening torques*).

22. Repeat the mounting operations for all cubicles.

23. At the end of the work, check that there are no tools or other materials left in hazardous areas.

24. Close and refit all protective panels used to access the intervention areas.

25. Remove the devices used to access the intervention area.



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□ MOUNTING OF THE EARTHING BARS

- All cubicles are connected with earthing bars.

26. Clean the contact surfaces of the earthing bars **G** with a wire brush or emery cloth.

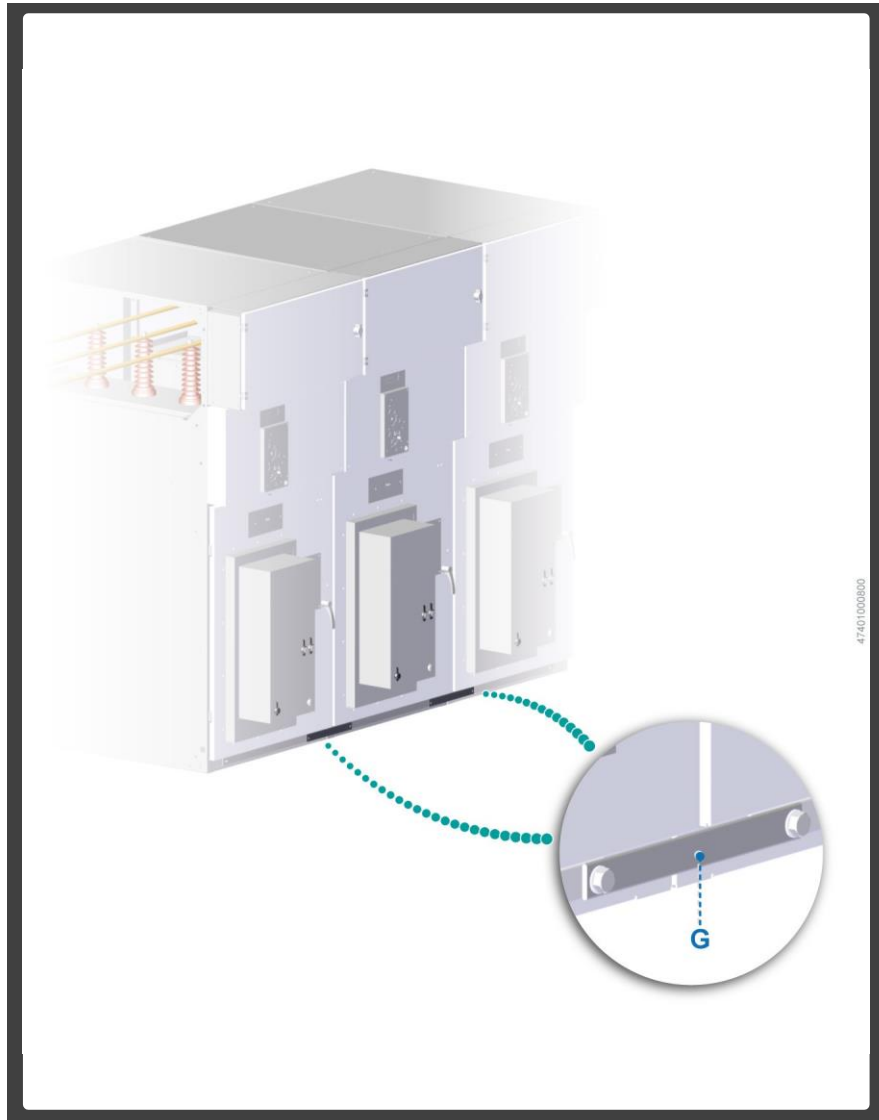
27. Connect the earthing bars **G** of two cubicles with the fasteners supplied.

Note: Tighten all fasteners at the appropriate torque. (See *Tightening torques* .).

28. Repeat the mounting operations for all cubicles.

□ ELECTRICAL CONNECTION

29. Make the connections to energy sources in a workmanlike manner, as indicated in the diagrams and in accordance with the relevant legal and regulatory requirements.



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Checks at the end of installation

- After installation is complete, carry out the checks indicated.

Important

The checks must be carried out by authorised personnel possessing recognised experience in the specific field.

Table: Checks at the end of installation

Part	Procedure to implement	Notes
Each cubicle	- Remove traces of moisture from insulating parts.	
	- Visually check that there is no damage inside and outside the cubicle.	
	- Visually check that the cubicle is complete with all its parts.	
	- Check the integrity and tightness of the screws	- For more details, see Tightening torques.
	- Check the correct operation of the mechanisms.	- For more details, see the instructions for use
	- At the end of the work, check that there are no tools or other materials left in hazardous areas.	
Busbar	- Check the integrity and tightness of the screws	- For more details, see Tightening torques.
Earthing bar	- Check the integrity and tightness of the screws	- For more details, see Tightening torques.
	- Check the efficiency of earthing	
Auxiliary circuits	- Check for proper operation	- Please refer to the circuit diagram for more details.
cubicle isolation	- Check that the insulation resistance of the power circuits is greater than 1000 MΩ	The insulation resistance must always be constant over time
	- Check that the insulation resistance of the auxiliary circuits is greater than 2 MΩ	Important Environmental conditions can affect the measured value

Tightening torques

Observe the tightening torques indicated in the table.

Important

For the assembly of the busbar, transformers etc., please refer to the suppliers' tables.

Table: Tightening torques for through-hole steel screws (resistance class 8.8)

Screw dimensions	Tightening torque (Nm)
M 5	5
M 6	9
M 8	22
M 10	45
M 12	75
M14	115
M 16	185

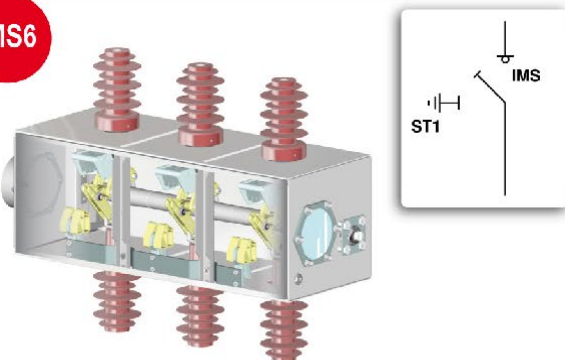
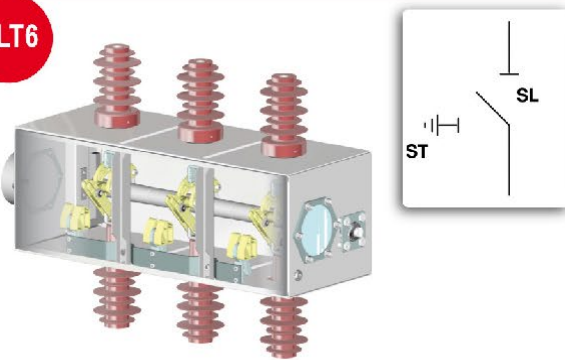
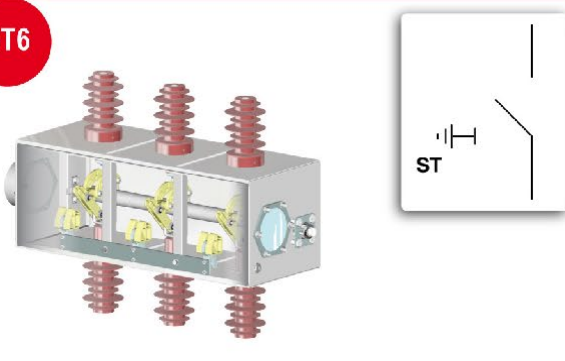
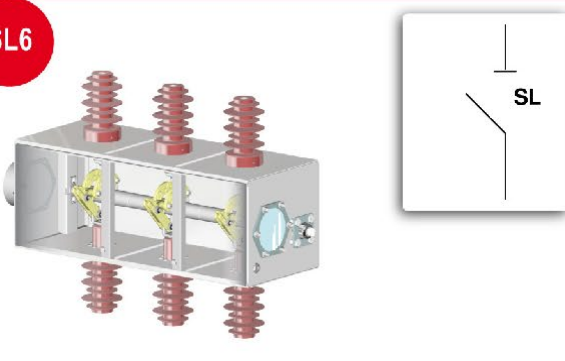
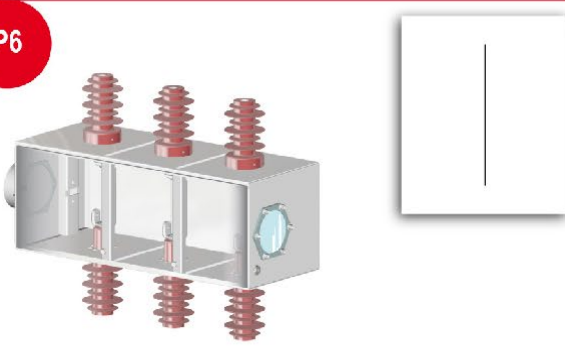
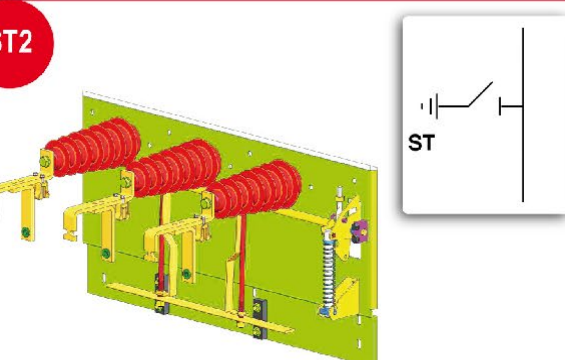
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Description of the electrical disconnecting switches

Each cubicle is provided with a disconnecting switch selected according to type and operation.

– The disconnecting switch is built in several versions.

– The illustration shows some types of electrical disconnecting switches.

<p style="text-align: center;">Current switch / earthing switch</p> <p>IMS6</p> 	<p style="text-align: center;">Line or earthing switch</p> <p>SLT6</p> 
<p style="text-align: center;">Earthing switch</p> <p>ST6</p> 	<p style="text-align: center;">Line switch</p> <p>SL6</p> 
<p style="text-align: center;">Three-pole monoblock</p> <p>P6</p> 	<p style="text-align: center;">Additional earthing switch</p> <p>ST2</p> 

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Current switch / earthing switch IMS6

The device, activated by a special command (see *Description of mechanisms*), serves to cut off the current.

– The illustration shows the main components and the list provides their description and function.

A) Structure: a sealed system to contain low pressure sulphur hexafluoride (SF6 gas). The gas is used to isolate the internal parts to avoid formation of electric arcs. The structure is classified as a “sealed pressure system” according to current standards.

Note: Gas filling or replacement must **ONLY** be carried out by technicians authorised by the manufacturer.

B) Inspection window (optional): for checking the position of the contacts and part inside structure **A**.

C) Contact movement shaft: to operate the contacts from the control panel.

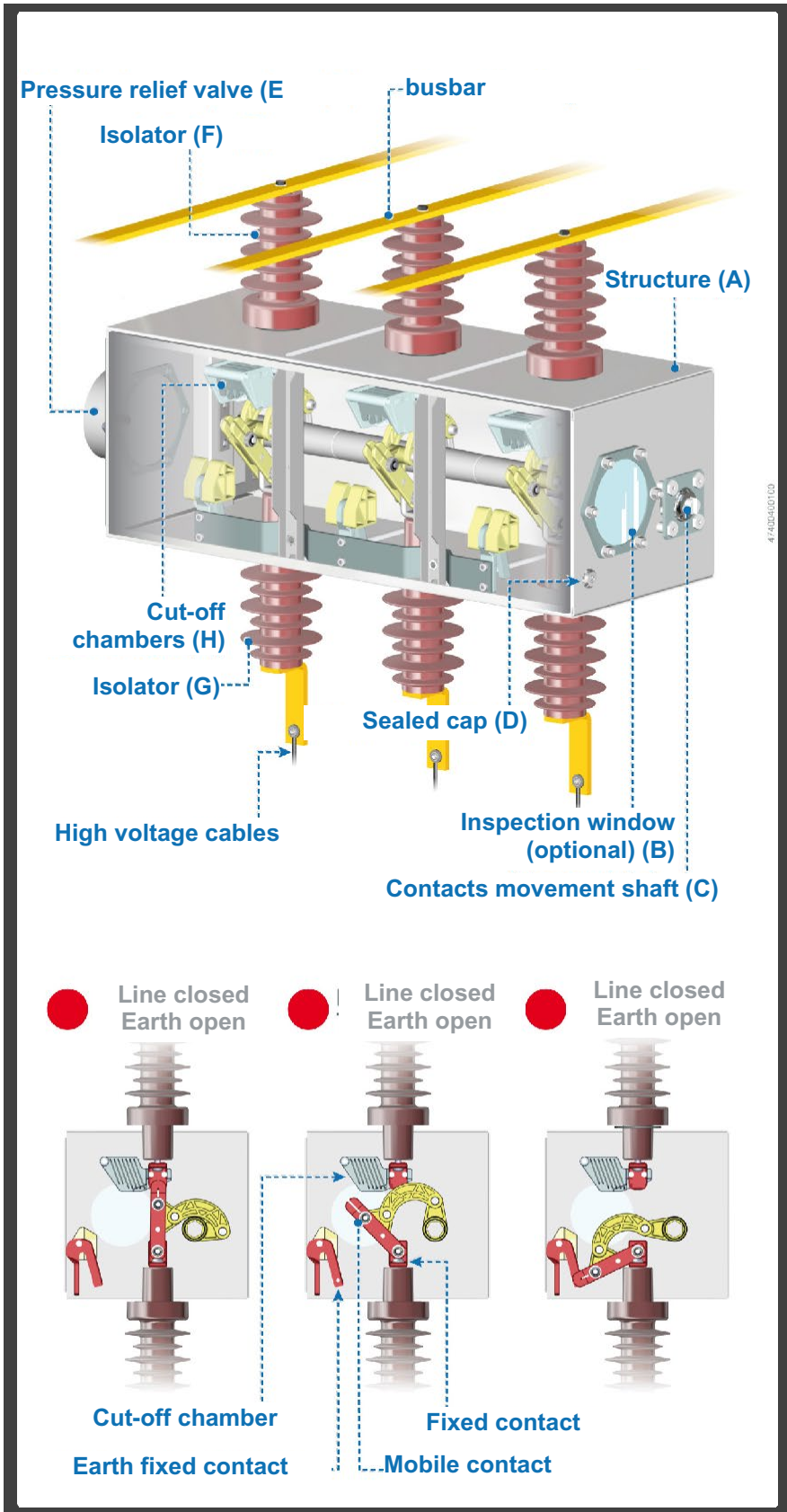
D) Sealed cap: to prevent gas leakage.

E) Pressure relief valve: a safety device to prevent the risk of explosion due to increased gas pressure.

F) Upper isolators: made of epoxy resin, to isolate structure **A** from the connecting bars.

G) Lower isolators: made of epoxy resin, to isolate structure **A** from the high voltage cables.

H) Cut-off chamber: to prevent electric arc when disconnecting the line.



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Line disconnecting switch or earthing switch SLT6

The device, activated by a special command (see *Description of mechanisms*), is used as a line disconnecting switch or earthing switch.

- The device can ONLY be operated if the current flow has been interrupted beforehand.

Note: A mechanical block inserted in the switchgear prevents activation of the device if the current passage is not interrupted.

- The illustration shows the main components and the list provides their description and function.

A) Structure: a sealed system to contain low pressure sulphur hexafluoride (SF₆ gas). The gas serves to insulate the internal parts in order to prevent arcing. The structure is classified as a “sealed pressure system” according to current standards.

Note: Gas filling or replacement must ONLY be carried out by technicians authorised by the manufacturer.

B) Inspection window (optional): for checking the position of the contacts and the inside of structure A.

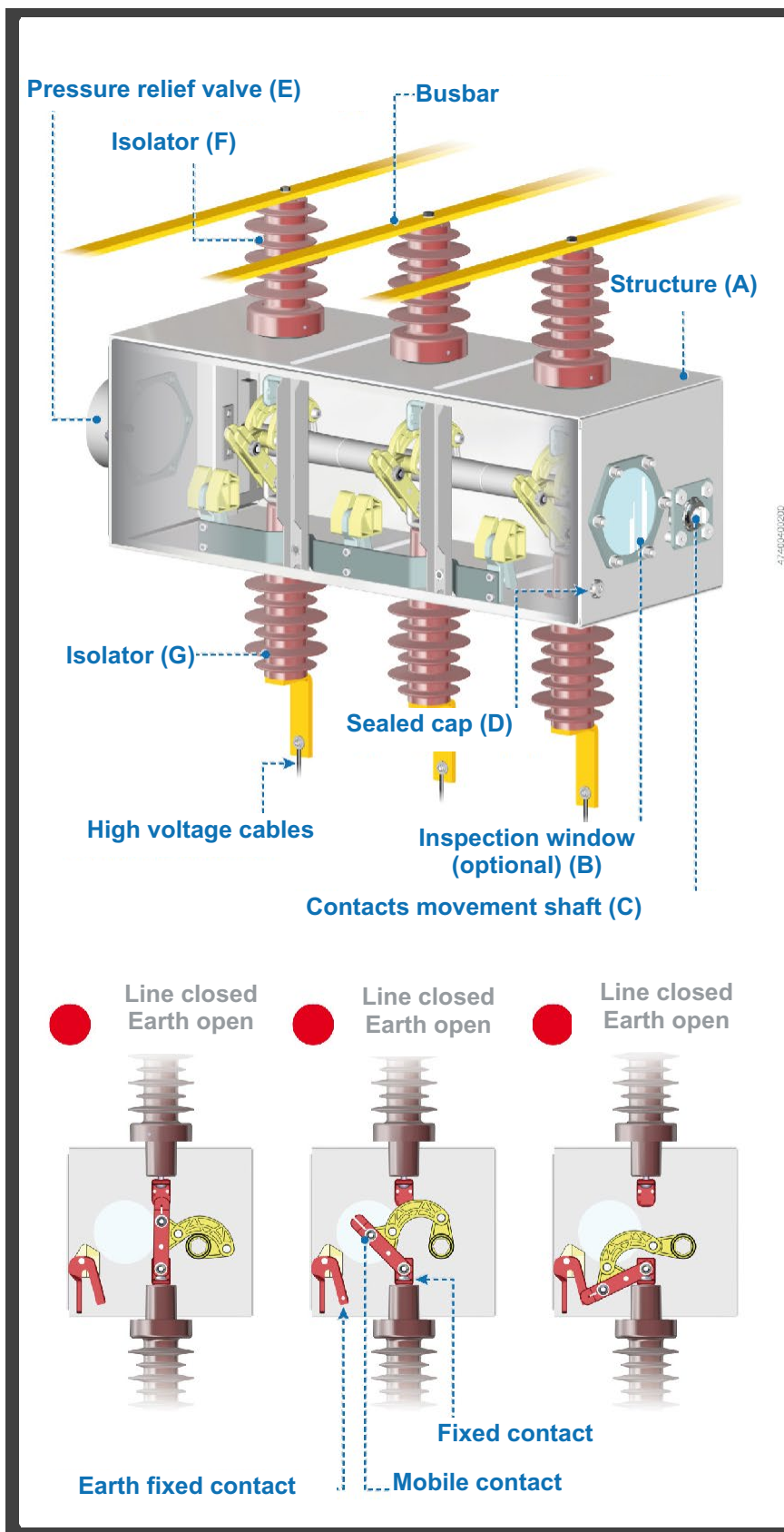
C) Contact movement shaft: to operate the contacts from the control panel.

D) Sealed cap: to prevent gas leakage.

E) Pressure relief valve: a safety device to prevent the risk of explosion due to increased gas pressure.

F) Upper isolators: made of epoxy resin, to isolate structure A from the connecting bars.

G) Lower isolators: made of epoxy resin, to isolate structure A from the high voltage cables.



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Earthing switch ST6

The device, activated by a special command (see *Description of mechanisms*), is used as an earthing switch.

- The device can ONLY be operated if the current flow has been interrupted beforehand.

Note: A mechanical block inserted in the switchgear prevents activation of the device if passage of the current is not interrupted.

- The illustration shows the main components and the list provides their description and function.

A) Structure: a sealed system to contain low pressure sulphur hexafluoride (SF₆ gas).

The gas serves to insulate the internal parts in order to prevent arcing.

The structure is classified as a “sealed pressure system” according to current standards.

Note: Gas filling or replacement must ONLY be carried out by technicians authorised by the manufacturer.

B) Inspection window (optional): for checking the position of the contacts and the inside of structure A.

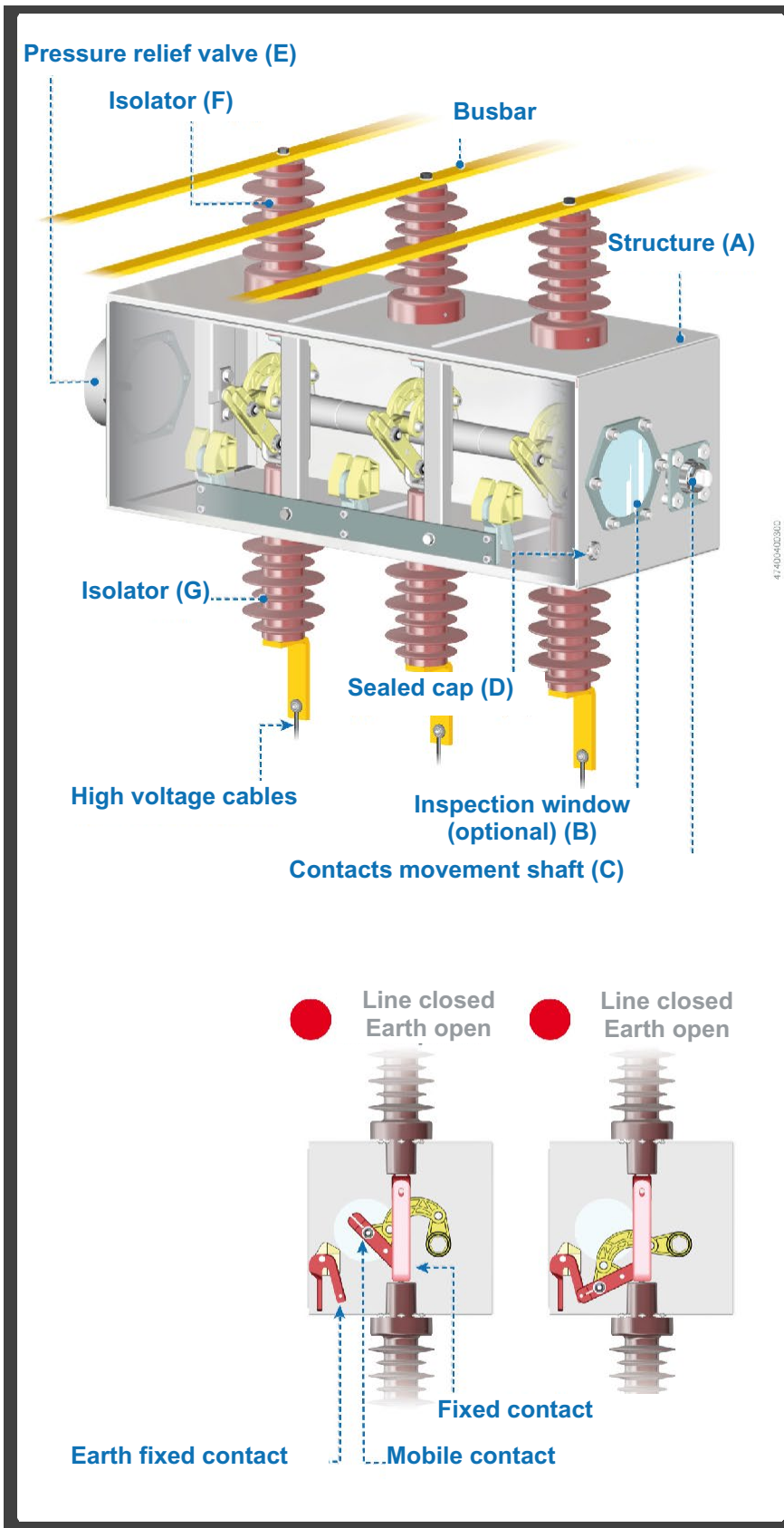
C) Contact movement shaft: to operate the contacts from the control panel.

D) Sealed cap: to prevent gas leakage.

E) Pressure relief valve: a safety device to prevent the risk of explosion due to increased gas pressure.

F) Upper isolators: made of epoxy resin, to isolate structure A from the connecting bars.

G) Lower isolators: made of epoxy resin, to isolate structure A from the high voltage cables.



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Line disconnecting switch SL6

The device, activated by a special command (see *Description of mechanisms*), is used as a line disconnecting switch.

– The device can ONLY be operated if the current flow has been interrupted beforehand.

Note: A mechanical block inserted in the switchgear prevents activation of the device if the current passage is not interrupted.

– The illustration shows the main components and the list provides their description and function.

A) Structure: a sealed system to contain low pressure sulphur hexafluoride (SF₆ gas). The gas serves to insulate the internal parts in order to prevent arcing. The structure is classified as a “sealed pressure system” according to current standards.

Note: Gas filling or replacement must ONLY be carried out by technicians authorised by the manufacturer.

B) Inspection window (optional): for checking the position of the contacts and the inside of structure A.

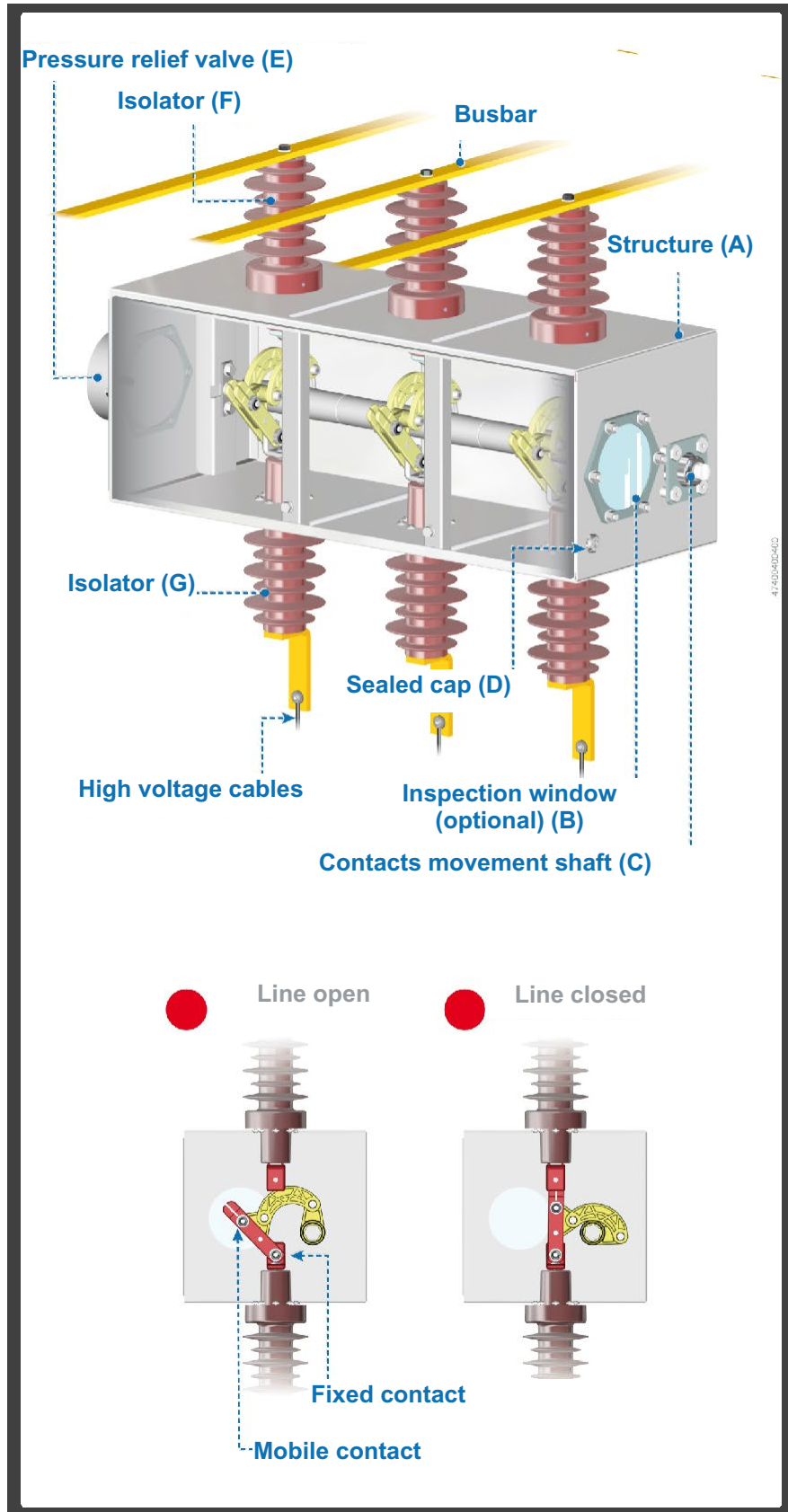
C) Contact movement shaft: to operate the contacts from the control panel.

D) Sealed cap: to prevent gas leakage.

E) Pressure relief valve: a safety device to prevent the risk of explosion due to increased gas pressure.

F) Upper isolators: made of epoxy resin, to isolate structure A from the connecting bars.

G) Lower isolators: made of epoxy resin, to isolate structure A from the high voltage cables.



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Three-pole monoblock P6

The device is not connected to the mechanisms and cannot carry out line or earthing disconnections.

The illustration shows the main components and the list provides their description and function.

A) Structure: a sealed system to contain low pressure sulphur hexafluoride (SF₆ gas). The gas is used to isolate the internal parts to avoid formation of electric arcs. The structure is classified as a "sealed pressure system" according to current standards.

Note: Gas filling or replacement must ONLY be carried out by technicians authorised by the manufacturer.

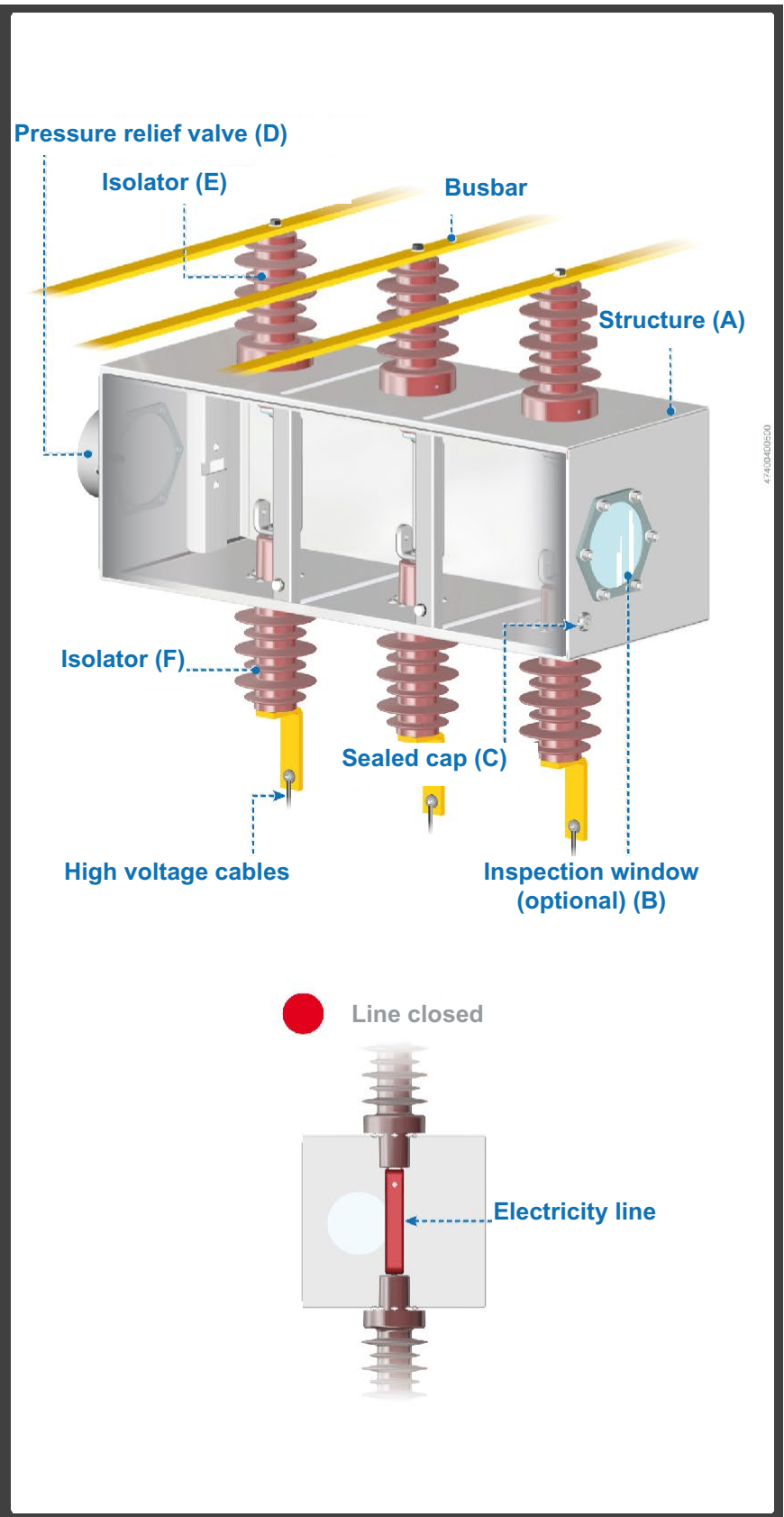
B) Inspection window (optional): for checking the position of the contacts and part inside structure A.

C) Sealed cap: to prevent gas leakage.

D) Pressure relief valve: a safety device to prevent the risk of explosion due to increased gas pressure.

E) Upper isolators: made of epoxy resin, to isolate structure A from the connecting bars.

F) Lower isolators: made of epoxy resin, to isolate structure A from the high voltage cables.



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Additional earthing switch ST2

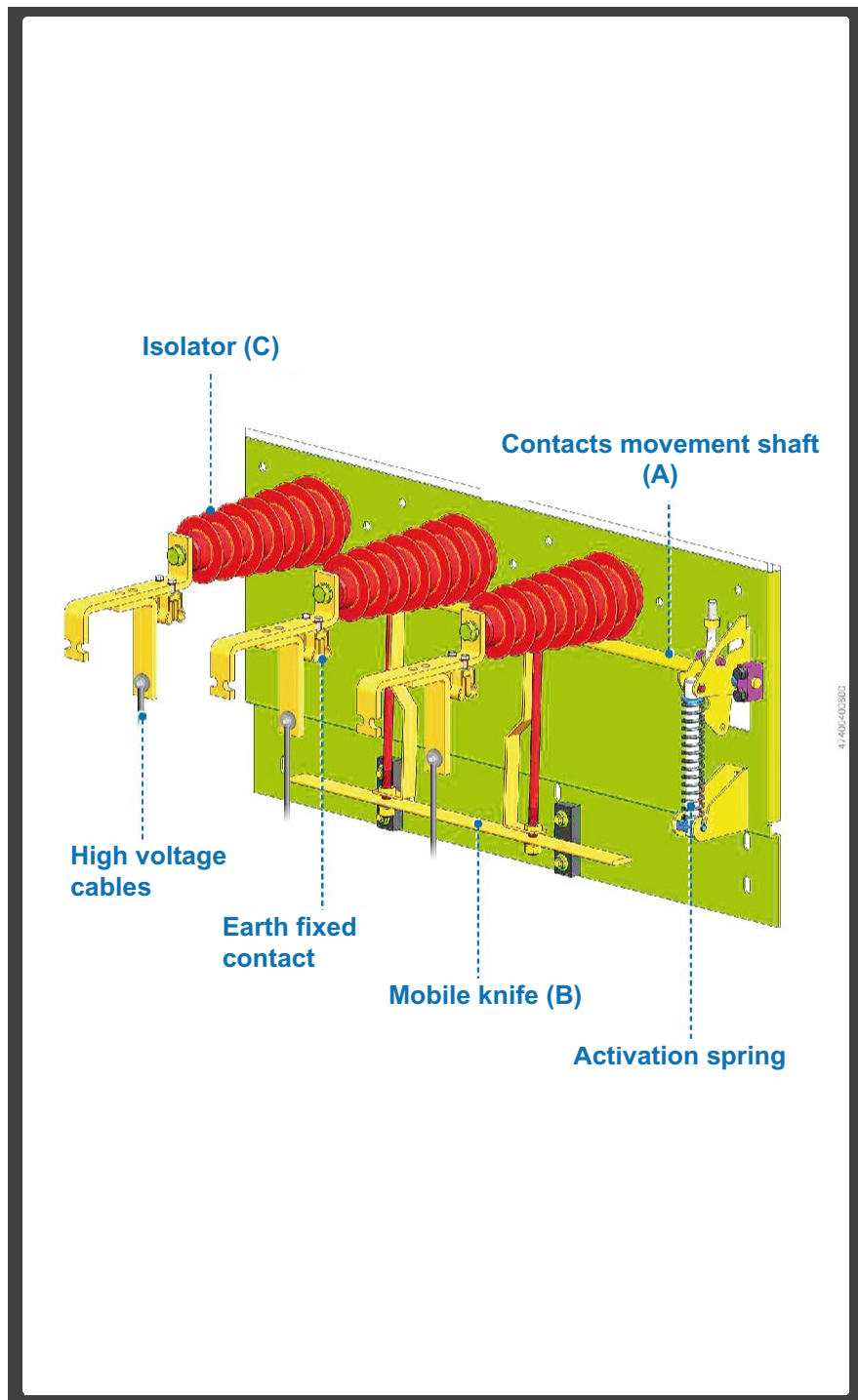
The device, activated by a special command (see *Description of mechanisms*), is used as an additional earthing switch.

- The device can ONLY be operated if there is no voltage on the main circuits.

Note: A mechanical block in the switchgear prevents the device from being operated if the current flow is not interrupted.

- The illustration shows the main components and the list provides their description and function.

- A) **Contact movement shaft:** to operate the mobile knife B.
- B) **Mobile knife:** to enable the electrical contact.
- C) **Insulators:** made of epoxy resin, to isolate the structure from the electrical parts.



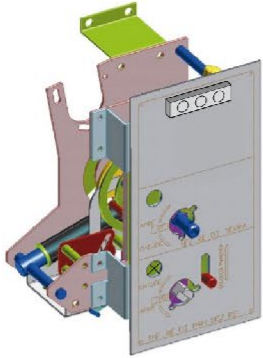
Description of mechanisms

Each cubicle is provided with a mechanism selected according to type and operation.

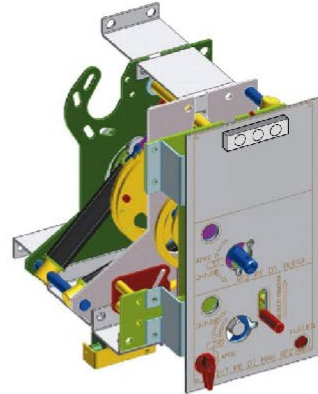
- The mechanism is built in several versions.
- The illustration shows some types of control devices.

Indipendet manoeuvre manual mechanism

C1

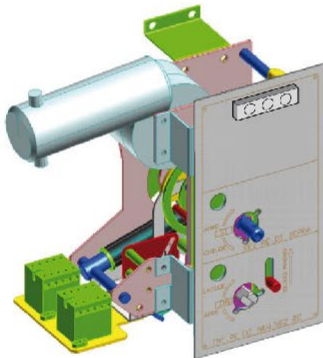


C2

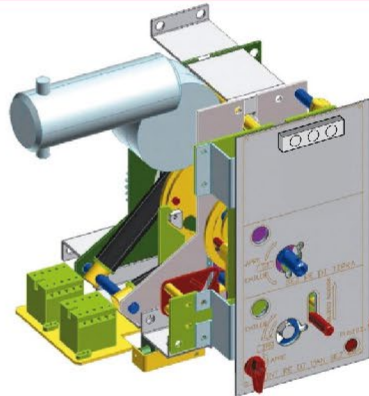


Indipendet manoeuvre motorised/manual mechanism

C1/M

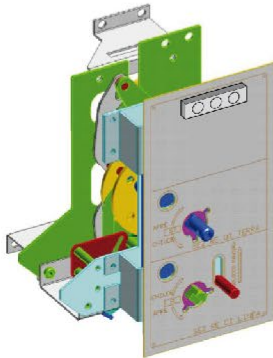


C2/M



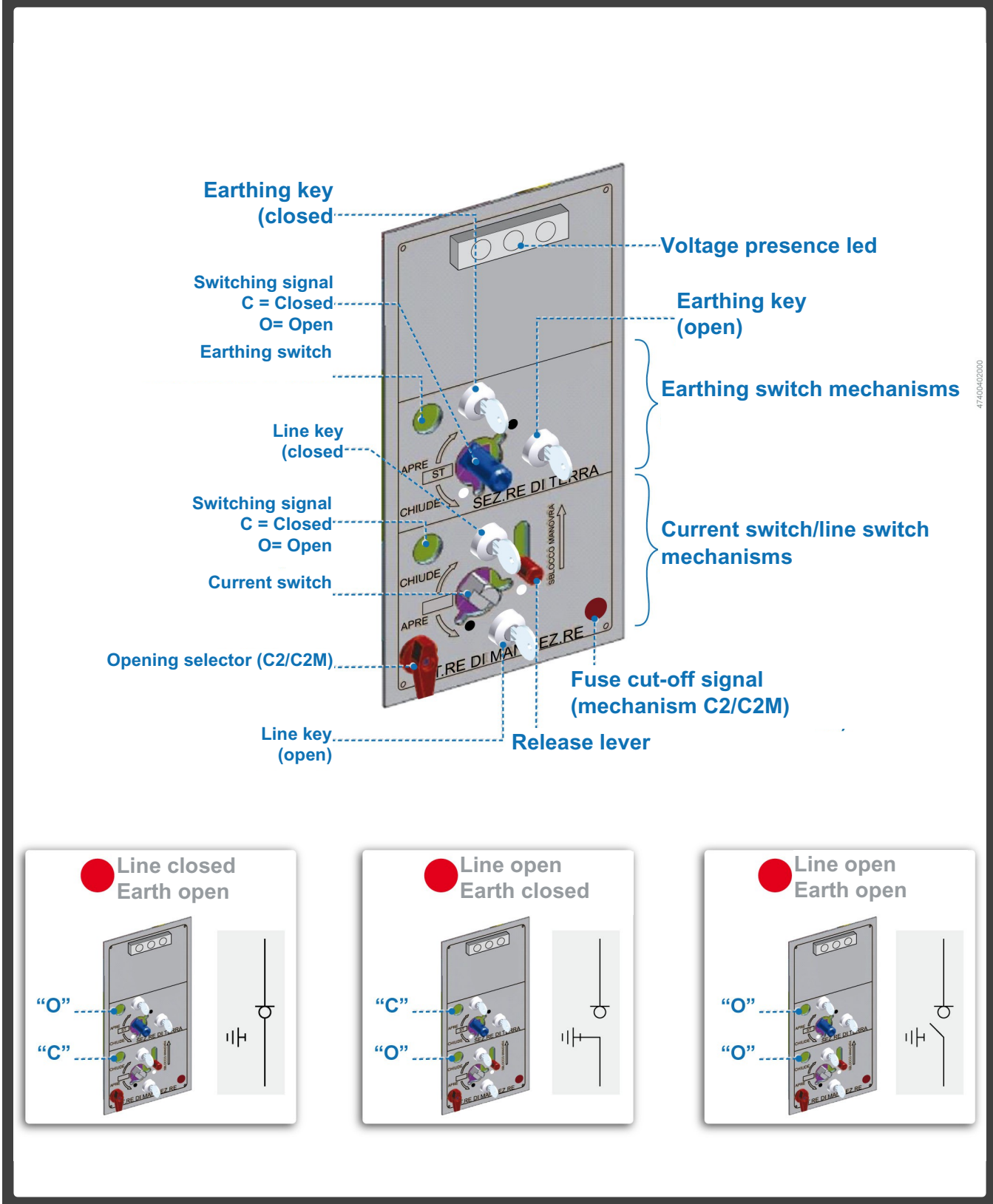
Dependet manoeuvre manual mechanism

M1/M2



Dashboard description

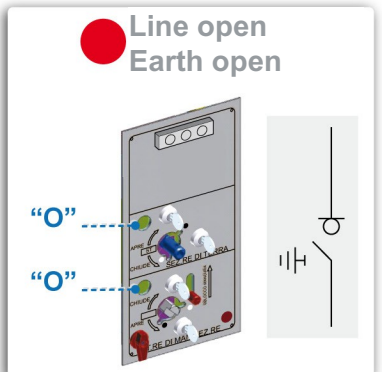
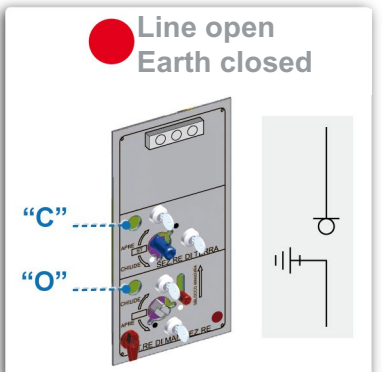
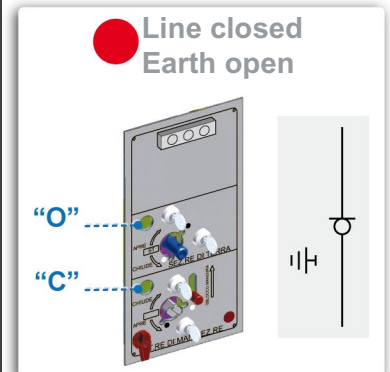
The device operates the cubicle for energizing and shutdown.
The illustration shows the main components.



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IMESA 07/2005-0



Recommendations for manoeuvre

ACCESS INSIDE THE CUBICLE

- Intervention should only be carried out by expert technicians with recognised skills for the intervention sector.
- To open the door, the current switch (IMS) must be opened and the earthing switch (ST) closed.

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- The dashboard is equipped with key interlocks to carry out all operations (See ***Dashboard description***).
- A label is attached to the cubicle, with the single wire diagram and the switching sequence to be carried out.
- Before opening the access door, check on the dashboard that the earthing switch (ST) is closed.

Note: For cubicles provided with an inspection window (optional), check that the earthing switch (ST) is closed.

- Access to cubicle compartments varies depending on the electrical connections made and must be carried out by the plant operator.

SWITCHING SEQUENCES

- The technician **MUST** only use the supplied operating lever to avoid damage to the device.
- To engage and disengage the operating lever, the release lever must be lifted.
- When engaging the operating lever, the lever pull out must coincide with the mark indicated on the dashboard.
- Once the lever has been operated, the manoeuvre must be carried out completely.
- Always pull out the lever at the end of the manoeuvre.
- Each manoeuvre must be carried out with a force of less than 200 Nm.
- With the manoeuvre locked, do not force the mechanical interlocks and check that the actuation sequence is correct.

Note: Mechanical interlocks, if a force interlock is provided, can withstand a maximum stress of 400 Nm without deforming.

- Energizing and shut-down procedures vary according to the type of mechanism installed.

Note: For detailed operating sequences, refer to the specific paragraphs of the individual mechanisms.

- The table shows the possible combinations of controls with disconnecting switches.

<i>mechanism</i>	<i>Disconnecting switch</i>	<i>Additional earthing switch</i>
C1 / C1M	IMS6	ST2
C2 / C2M	IMS6	ST2
M1	SLT6 / ST6	ST2
M2	SLT6 / ST6	ST2

Manual independent mechanism C1

– The illustration shows the intervention points and the description indicates the procedures to be adopted.

ENERGIZING

1. Close the door and lock it with handle **A**.

Note: The **B** LEDs must be off.

2. Insert the earthing key **K** and turn it.

3. Raise the release lever **D** and pull out operating lever **E** in the switch pin **F**.

Note: The pull out of the operating lever **E** must coincide with the black mark on the dashboard.

4. Turn lever **E** clockwise, as far as it will go, to open the earthing switch.

5. Check that the indicator **G** displays letter “O”.

6. Raise the release lever **D** and pull out operating lever **E**.

7. Insert the earthing key **H** and turn it.

8. Raise release lever **D** and insert operating lever **E** into switch pin **L**.

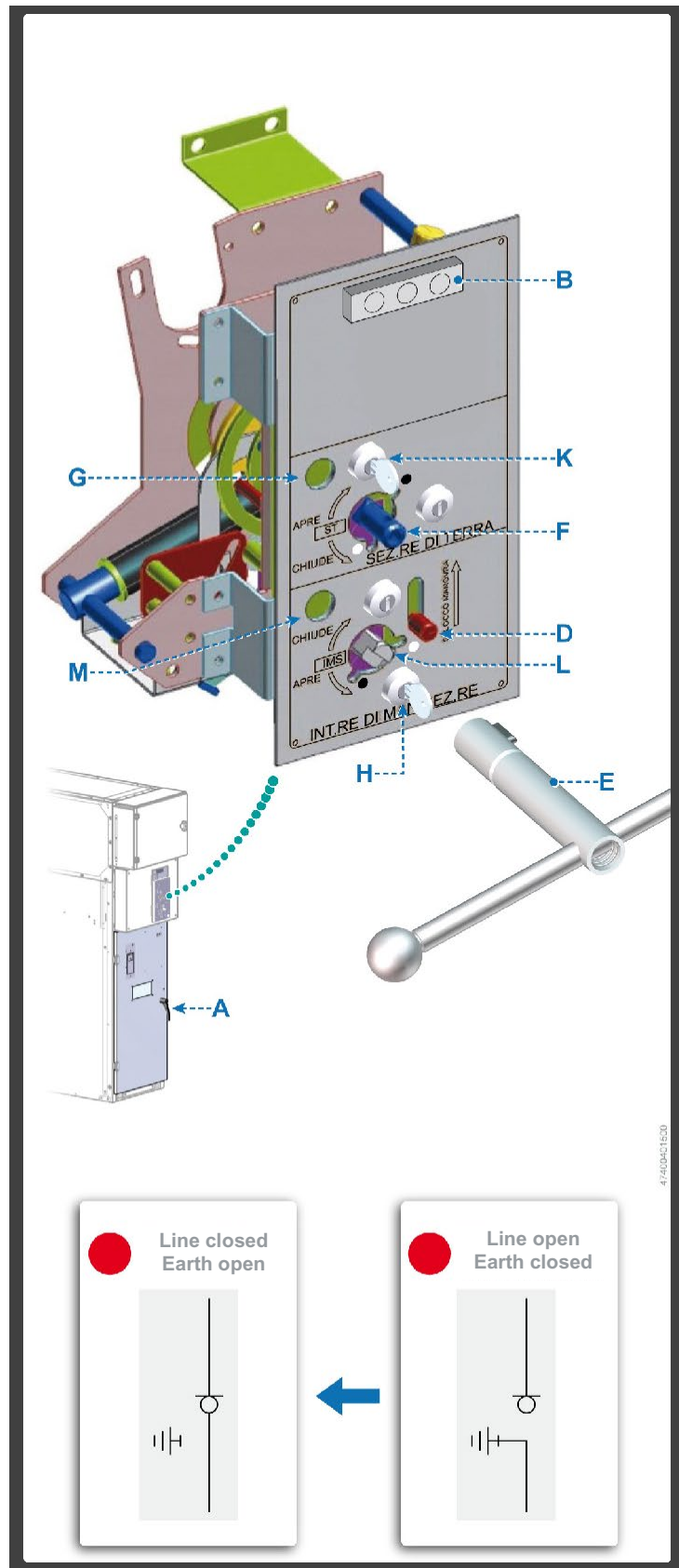
Note: The pull out of the operating lever **E** must coincide with the white mark on the dashboard.

9. Turn lever **E** clockwise, as far as it will go, to close the line disconnecting switch.

- The Leds **B** light up to indicate that the operation has been carried out correctly.

10. Check that the indicator **M** displays letter “C”.

11. Raise the release lever **D** and pull out operating lever **E**.



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SHUT-DOWN

1. Check that the LEDs **B** are on.
2. Insert the earthing key **N** and turn it.
3. Raise release lever **D** and insert operating lever **E** into switch pin **L**.

Note: The pull out of the operating lever **E** must coincide with the black mark on the dashboard.

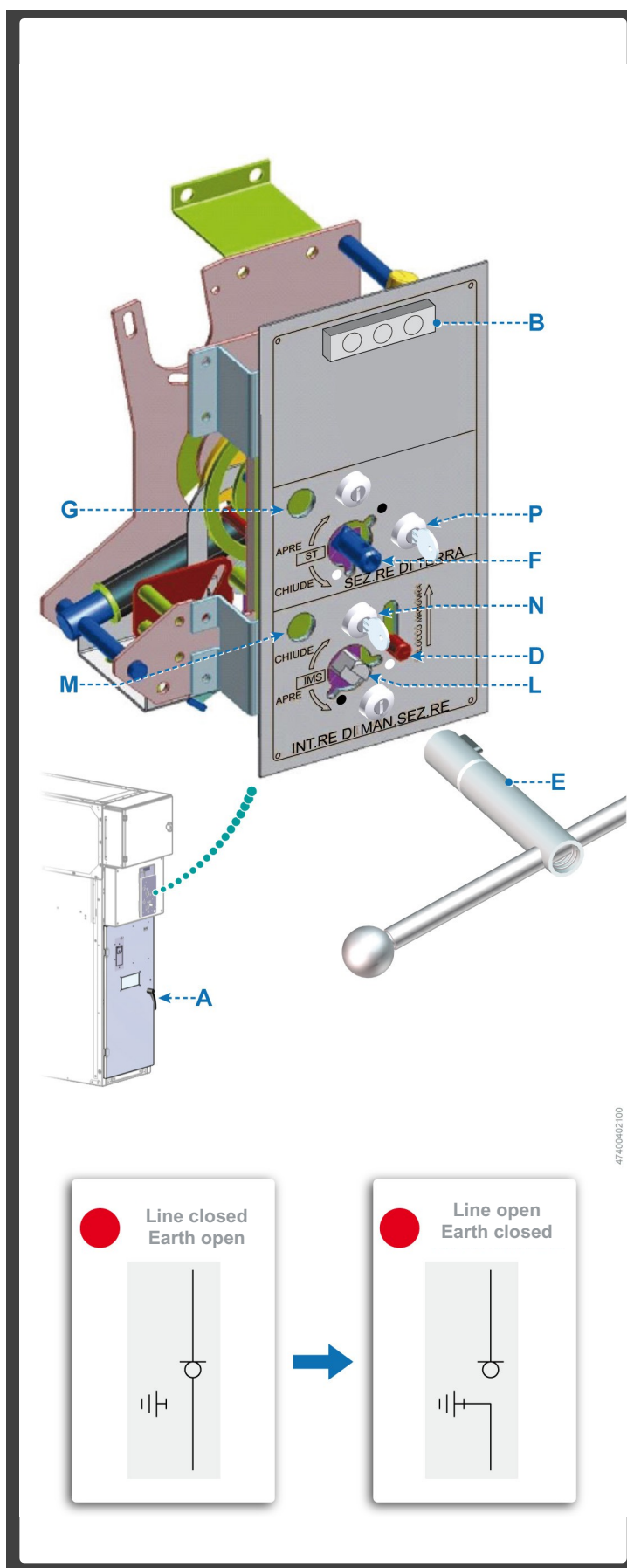
4. Turn lever **E** counter clockwise, as far as it will go, to open the line disconnecting switch.

Note: The **B** LEDs must be off.

5. Check that the indicator **M** displays letter “O”.
6. Raise the release lever **D** and pull out operating lever **E**.
7. Insert the earthing key **P** and turn it.
8. Raise release lever **D** and insert operating lever **E** into switch pin **F**.

Note: The pull out of the operating lever **E** must coincide with the white mark on the dashboard.

9. Turn lever **E** counter clockwise, as far as it will go, to close the earthing switch.
10. Check that the indicator **G** displays letter “C”.
11. Raise the release lever **D** and pull out operating lever **E**.
12. Unlock handle **A** and open the door.



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Manual independent mechanism C2

– The illustration shows the intervention points and the description indicates the procedures to be adopted.

ENERGIZING

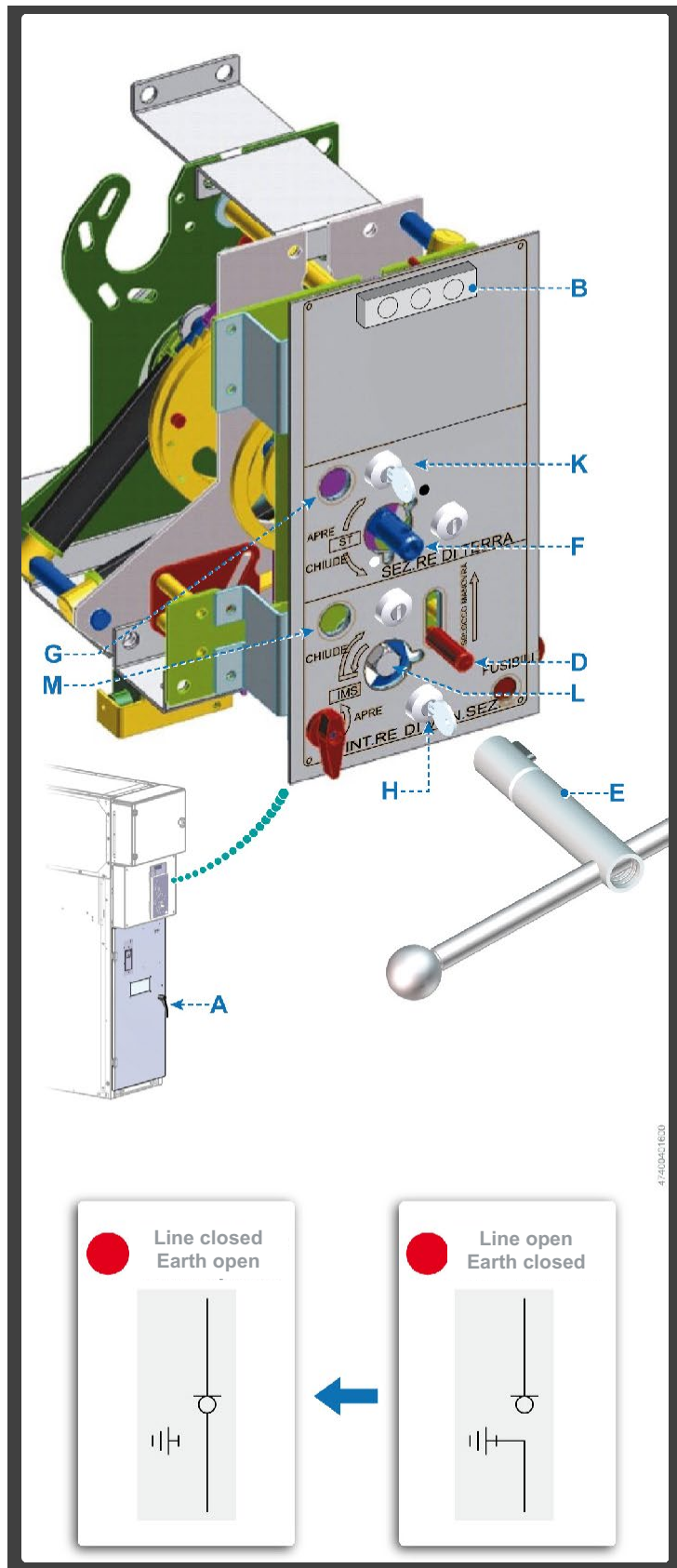
1. Close the door and lock it with handle **A**.

Note: The **B** LEDs must be off.

2. Insert the earthing key **K** and turn it.
3. Raise the release lever **D** and pull out operating lever **E** in the switch pin **F**.

Note: The pull out of the operating lever **E** must coincide with the black mark on the dashboard.

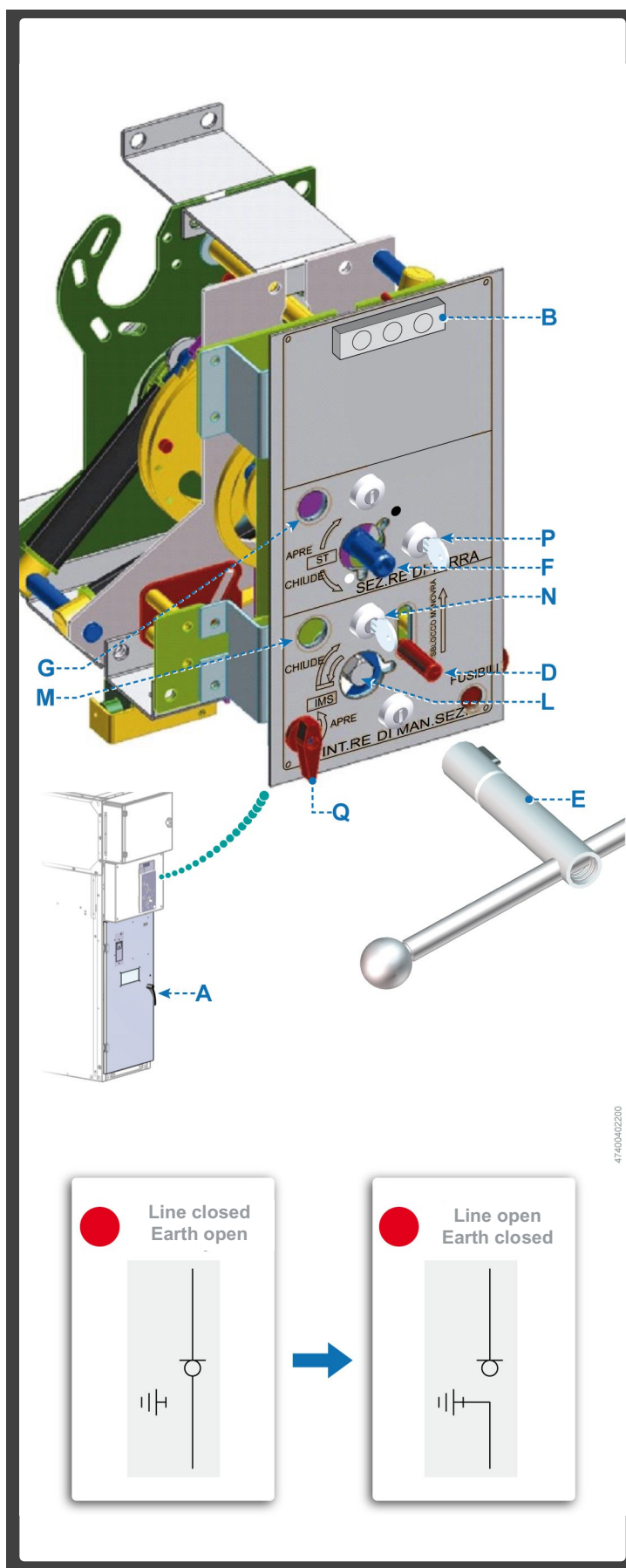
4. Turn lever **E** clockwise, as far as it will go, to open the earthing switch.
 5. Check that the indicator **G** displays letter “O”.
 6. Raise the release lever **D** and pull out operating lever **E**.
 7. Insert the earthing key **H** and turn it.
 8. Raise release lever **D** and insert operating lever **E** into switch pin **L**.
 9. Turn lever **E** counter clockwise, as far as it will go, load the springs.
 10. Turn lever **E** clockwise, as far as it will go, to close the line disconnecting switch.
- The Leds **B** light up to indicate that the operation has been carried out correctly.
11. Check that the indicator **M** displays letter “C”.
 12. Raise the release lever **D** and pull out operating lever **E**.



EN

SHUT-DOWN

1. Check that the LEDs **B** are on.
 2. Insert the earthing key **N** and turn it.
 3. Turn the **Q** selector anti-clockwise to disable switch **L**.
- Note:** The **B** LEDs must be off.
4. Check that the indicator **M** displays letter “O”.
 5. Insert the earthing key **P** and turn it.
 6. Raise release lever **D** and insert operating lever **E** into switch pin **F**.
- Note:** The pull out of the operating lever **E** must coincide with the white mark on the dashboard.
7. Turn lever **E** counter clockwise, as far as it will go, to close the earthing switch.
 8. Check that the indicator **G** displays letter “C”.
 9. Raise the release lever **D** and pull out operating lever **E**.
 10. Close the door and lock it with handle **A**.



EN

DM 174/004-0

Independent motorised mechanism C1/M

– The illustration shows the intervention points and the description indicates the procedures to be adopted.

ENERGIZING

1. Close the door and lock it with handle **A**.

Note: The **B** LEDs must be off.

2. Insert the earthing key **K** and turn it.

3. Raise the release lever **D** and pull out operating lever **E** in the switch pin **F**.

Note: The pull out of the operating lever **E** must coincide with the black mark on the dashboard.

4. Turn lever **E** clockwise, as far as it will go, to open the earthing switch.

5. Check that the indicator **G** displays letter “O”.

6. Raise the release lever **D** and pull out operating lever **E**.

Note: Act on the mechanism to automatically enable switch **L** or carry out the procedure in manual mode.

7. Insert the earthing key **H** and turn it.

8. Raise release lever **D** and insert operating lever **E** into switch pin **L**.

Note: The pull out of the operating lever **E** must coincide with the white mark on the dashboard.

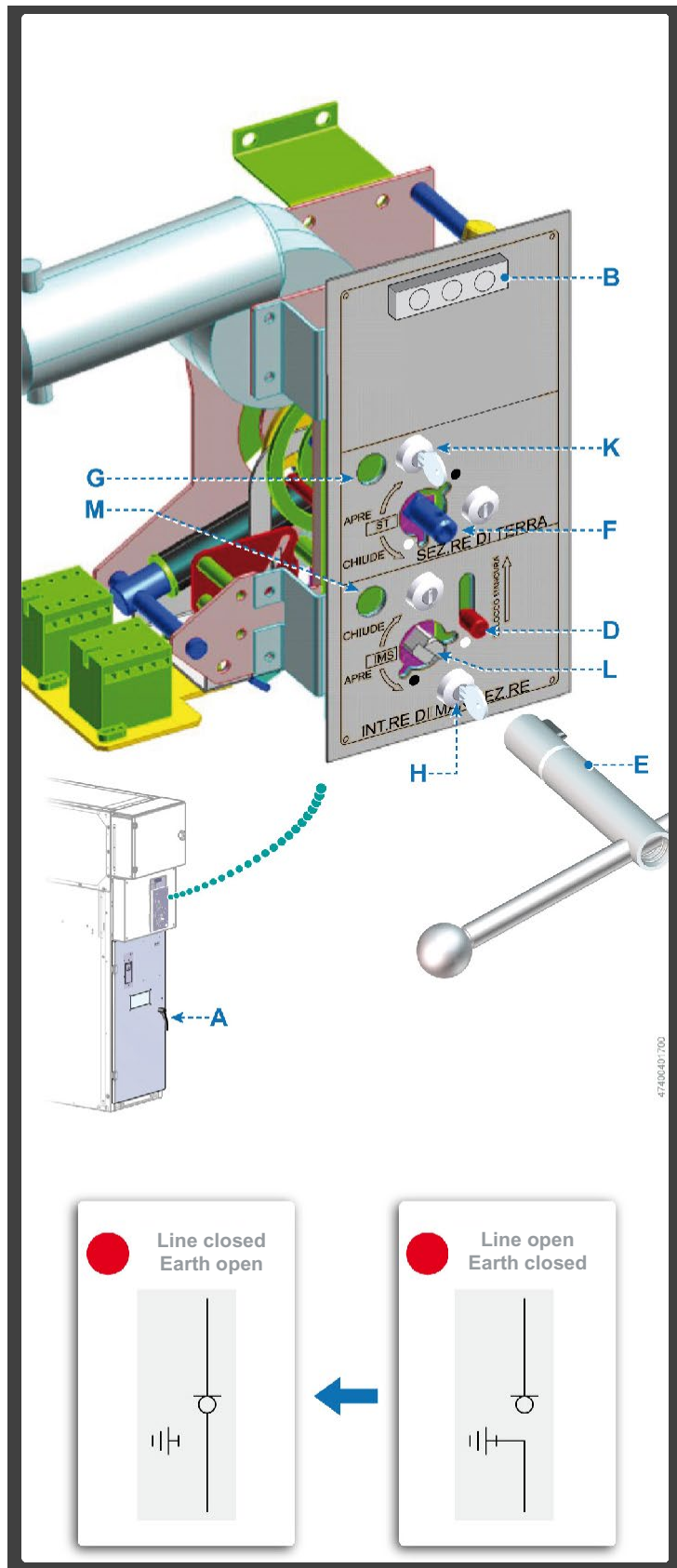
The operation disables the automatic mechanisms.

9. Turn lever **E** clockwise, as far as it will go, to close the line disconnecting switch.

- The Leds **B** light up to indicate that the operation has been carried out correctly.

10. Check that the indicator **M** displays letter “C”.

11. Raise the release lever **D** and pull out operating lever **E**.



EN

SHUT-DOWN

1. Check that the LEDs **B** are on.

Note: Act on the mechanism to automatically disable switch **L** or carry out the procedure in manual mode.

2. Insert the earthing key **N** and turn it.

3. Raise release lever **D** and insert operating lever **E** into switch pin **L**.

Note: The pull out of the operating lever **E** coincide with the black mark on the dashboard.

The operation disables the automatic mechanisms.

4. Turn lever **E** counter clockwise, as far as it will go, to open the line disconnecting switch.

Note: The **B** LEDs must be off.

5. Check that the indicator **M** displays letter “O”.

6. Raise the release lever **D** and pull out operating lever **E**.

7. Insert the earthing key **P** and turn it.

8. Raise release lever **D** and insert operating lever **E** into switch pin **F**.

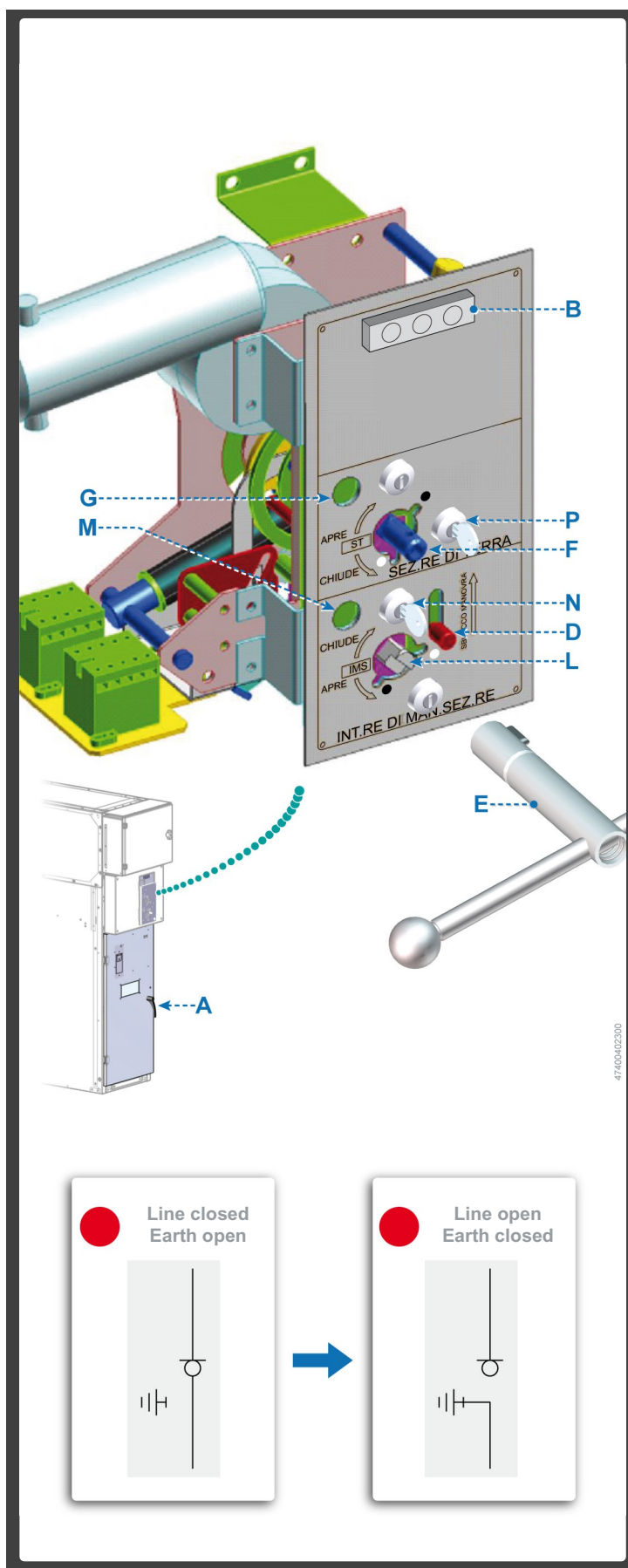
Note: The pull out of the operating lever **E** must coincide with the white mark on the dashboard.

9. Turn lever **E** counter clockwise, as far as it will go, to close the earthing switch.

10. Check that the indicator **G** displays letter “C”.

11. Raise the release lever **D** and pull out operating lever **E**.

12. Unlock handle **A** and open the door.



EN

BM 474004-0

Independent motorised mechanism C2/M

– The illustration shows the intervention points and the description indicates the procedures to be adopted.

ENERGIZING

1. Close the door and lock it with handle **A**.

Note: The **B** LEDs must be off.

2. Insert the earthing key **K** and turn it.
3. Raise the release lever **D** and pull out operating lever **E** in the switch pin **F**.

Note: The pull out of the operating lever **E** must coincide with the black mark on the dashboard.

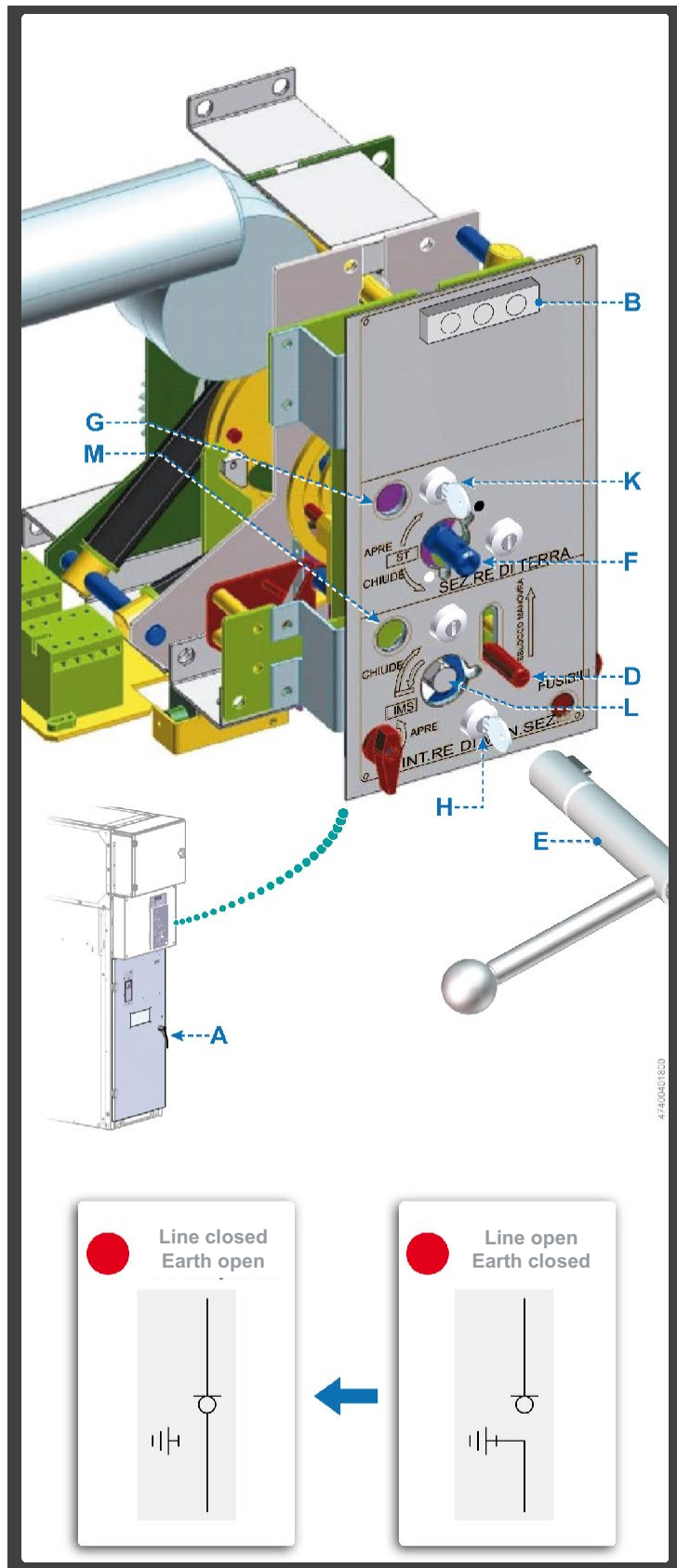
4. Turn lever **E** clockwise, as far as it will go, to open the earthing switch.
5. Check that the indicator **G** displays letter “O”.
6. Raise the release lever **D** and pull out operating lever **E**.

Note: Act on the mechanism to automatically enable switch **L** or carry out the procedure in manual mode.

7. Insert the earthing key **H** and turn it.
 8. Raise release lever **D** and insert operating lever **E** into switch pin **L**.
- The operation disables the automatic mechanisms.
9. Turn lever **E** counter clockwise, as far as it will go, load the springs.
 10. Turn lever **E** clockwise, as far as it will go, to close the line disconnecting switch.

- The Leds **B** light up to indicate that the operation has been carried out correctly.

11. Check that the indicator **M** displays letter “C”.
12. Raise the release lever **D** and pull out operating lever **E**.



EN

SHUT-DOWN

1. Check that the LEDs **B** are on.

Note: Act on the mechanism to automatically disable switch **L** or carry out the procedure in manual mode.

2. Insert the earthing key **N** and turn it.

3. Turn the **Q** selector anti-clockwise to disable switch **L**.

Note: The **B** LEDs must be off.

4. Check that the indicator **M** displays letter “O”.

5. Insert the earthing key **P** and turn it.

6. Raise release lever **D** and insert operating lever **E** into switch pin **F**.

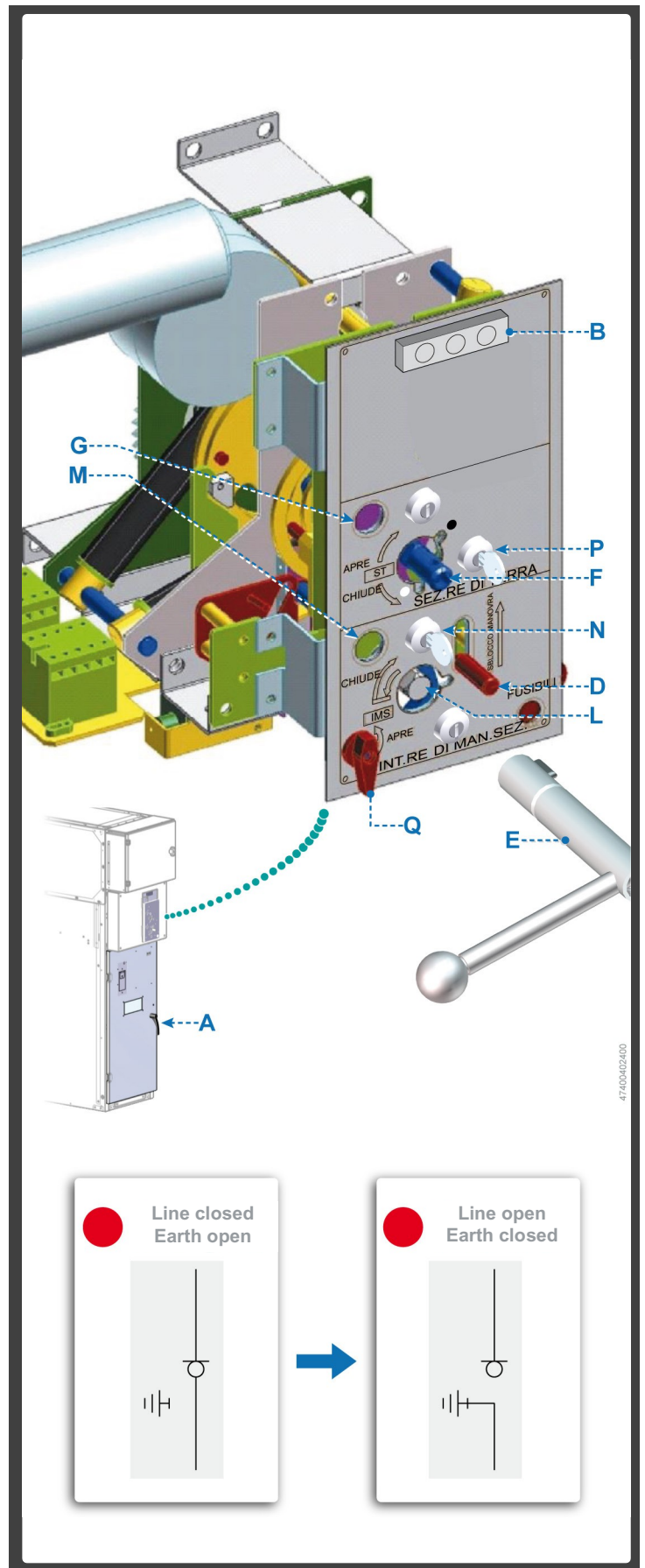
Note: The pull out of the operating lever **E** must coincide with the white mark on the dashboard.

7. Turn lever **E** counter clockwise, as far as it will go, to close the earthing switch.

8. Check that the indicator **G** displays letter “C”.

9. Raise the release lever **D** and pull out operating lever **E**.

10. Close the door and lock it with handle **A**.



EN

IDM 47430340

Manual dependent mechanism M1 / M2

– The illustration shows the intervention points and the description indicates the procedures to be adopted.

ENERGIZING

1. Close the door and lock it with handle **A**.

Note: The **B** LEDs must be off.

2. Insert the earthing key **K** and turn it.

3. Raise the release lever **D** and pull out operating lever **E** in the switch pin **F**.

Note: The pull out of the operating lever **E** must coincide with the black mark on the dashboard.

4. Turn lever **E** clockwise, as far as it will go, to open the earthing switch.

5. Check that the indicator **G** displays letter “O”.

6. Raise the release lever **D** and pull out operating lever **E**.

7. Insert the earthing key **H** and turn it.

8. Raise release lever **D** and insert operating lever **E** into switch pin **L**.

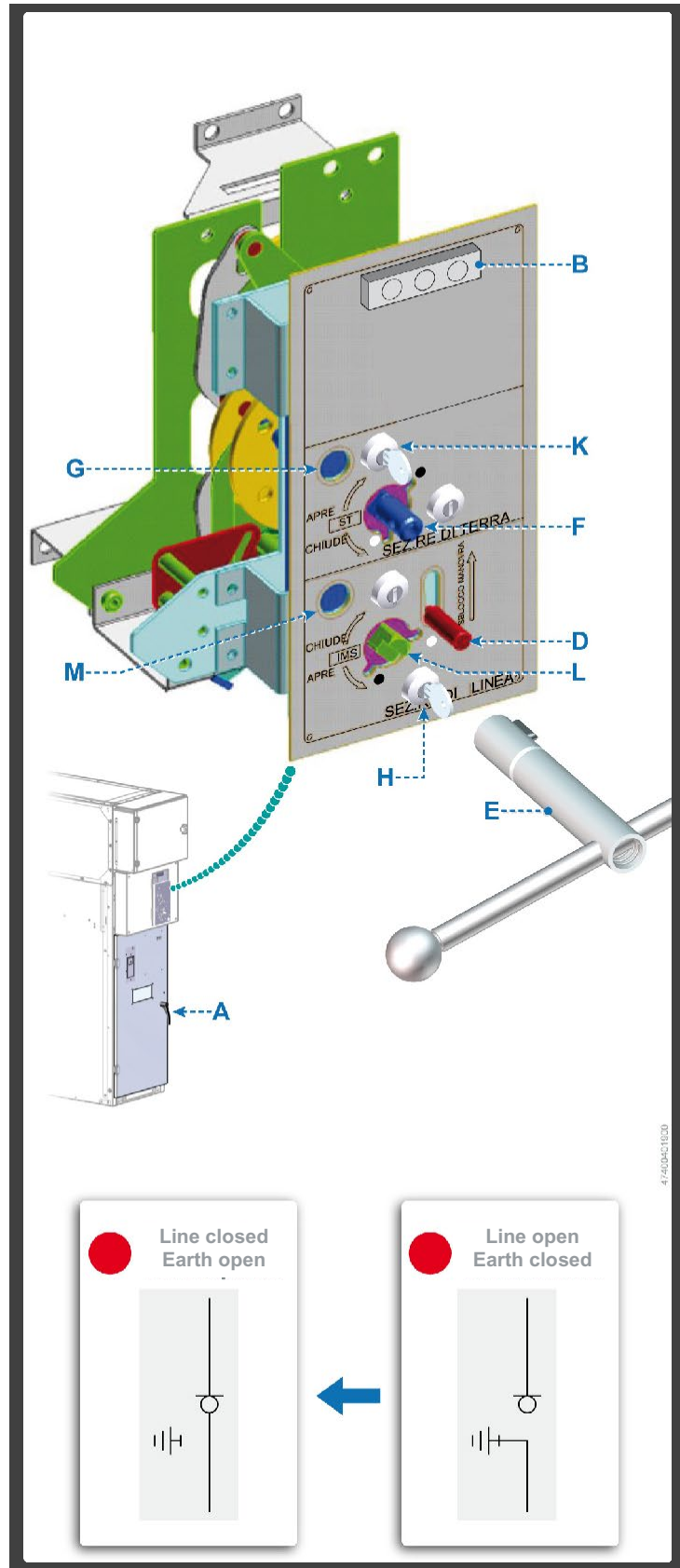
Note: The pull out of the operating lever **E** must coincide with the white mark on the dashboard.

9. Turn lever **E** clockwise, as far as it will go, to close the line disconnecting switch.

- The Leds **B** light up to indicate that the operation has been carried out correctly.

10. Check that the indicator **M** displays letter “C”.

11. Raise the release lever **D** and pull out operating lever **E**.



EN

SHUT-DOWN

1. Check that the LEDs **B** are on.
2. Insert the earthing key **N** and turn it.
3. Raise release lever **D** and insert operating lever **E** into switch pin **L**.

Note: The pull out of the operating lever **E** must coincide with the black mark on the dashboard.

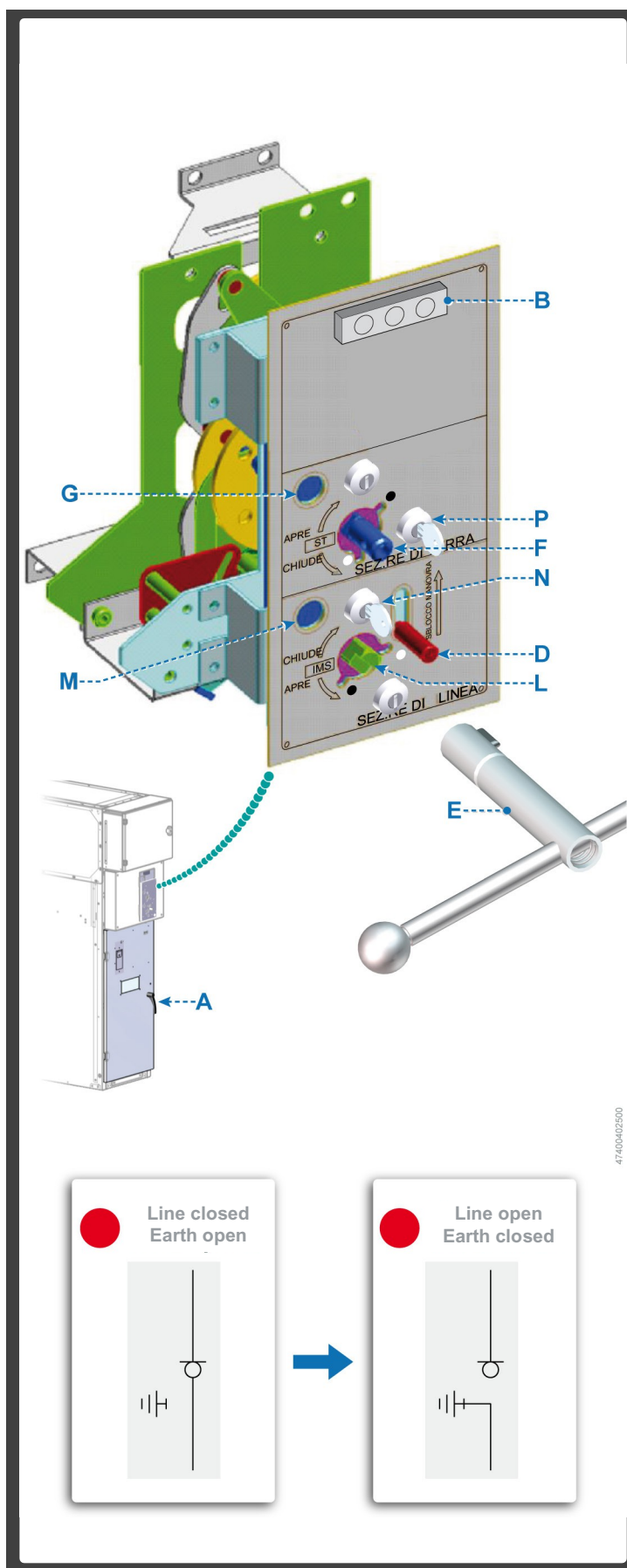
4. Turn lever **E** counter clockwise, as far as it will go, to open the line disconnecting switch.

Note: The **B** LEDs must be off.

5. Check that the indicator **M** displays letter "O".
6. Raise the release lever **D** and pull out operating lever **E**.
7. Insert the earthing key **P** and turn it.
8. Raise release lever **D** and insert operating lever **E** into switch pin **L**.

Note: The pull out of the operating lever **E** must coincide with the white mark on the dashboard.

9. Turn lever **E** counter clockwise, as far as it will go, to close the earthing switch.
10. Check that the indicator **G** displays letter "C".
11. Raise the release lever **D** and pull out operating lever **E**.
12. Unlock handle **A** and open the door.



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BM 474004-0

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Inspection schedule

The schedule indicates preventive checks, to be carried out periodically, to check for safe operation.

- Works must be carried out by the manufacturer's authorised technicians.
- In agreement with the manufacturer, works may be carried out by the purchaser's personnel, provided they are trained and authorised (PES).
- The inspections are linked to the combination of various factors to which the switchgear is subjected.
- Factors to be considered are: frequency of switching operations, value of cut-off current, power factor, installation environment etc.

- Check that the earthing connection mechanism of each cubicle is switched on before starting the work.

- Check that the door of each cubicle is unlocked (For the procedures, see **Description of mechanisms**).



Important

All work carried out must be recorded in the attached "Inspection Sheet".

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Table: Inspection schedule

Each 3 years		
Part	Operation to be performed	Procedure to implement
Command panel	Check: operation	- Enable and disable the mechanisms 2 times to check for correct operation. - The two operations must be carried out completely without stopping in intermediate positions
	Clean from any residue	- For more details on maintenance operations, see Cleaning the switchgear .
	Clean the mechanical manoeuvre and remove rust	- Lubricate rusted parts with a brush - Use grease type Castrol Tribol Gr 4020/220-2PD
Insulating parts	Clean from dust and traces of electrical discharge and oxidation	- Use a vacuum cleaner and a clean dry (non-abrasive) cloth

Each 5 years		
Part	Operation to be performed	Procedure to implement
Auxiliary circuits	Check wiring and connections	- Replace faulty wiring and connections
	Check the tightening of connecting screws	- Tighten the screws.
Safety interlocks	Check: operation	- Perform enabling and disabling operations.
Isolation resistors	Check the value	- If in doubt, do not intervene directly, but contact the manufacturer's Technical Support Department.

Important

In case of doubt, do not intervene directly, but contact the manufacturer's Technical Support Department.

Maintenance recommendations

- The trained and authorised maintenance personnel must have specific technical competence in the field.
- Mark areas for intervention and prevent access to devices which, if activated, could compromise safety.
- Wear the PPE indicated in the “Instructions for Use” and those required by labour laws.
- Activate all envisaged safety measures and check whether there is any residual energy before carrying out works.
- Carry out the work according to the procedures and the methods indicated by the manufacturer in the “Instructions for Use”.
The mode is necessary to be able to operate safely.
- Carry out all work ONLY with suitable tools, in good condition, so as to avoid damaging components.
- The disconnecting switch is a sealed system that contains SF6 gas and must not be opened or drilled.



Caution - Warning

In the event of a gas leak (or suspected gas leak), contact the manufacturer's technical support department.

- At the end of the work, check that there are no tools or other materials left in hazardous areas.
- DO NOT dispose of materials and/or waste generated during work in the environment, but in accordance with the relevant laws.
- Contact the manufacturer's Technical Support Department if work is necessary, but not described in the “Instructions for Use”
- **In order to avoid risks to personal safety and property damage, in addition to the recommendations, please follow the information in the SAFETY WARNINGS section.**

Scheduled maintenance intervals

Maintain the cubicles in the switchgear in a condition of maximum efficiency.

- Carry out scheduled maintenance in accordance with the frequency and the manner specified by the manufacturer.

- Good maintenance will maintain performance over time, a longer service life and a constant level of safety requirements.

Note: At the end of each intervention, record the performed operations in the “cab register”.

Table: Maintenance intervals

3 months after commissioning		
Part	Operation to be performed	Procedure to implement
switchgear	Check for abnormal overheating	- Use appropriate inspection tools to carry out the works correctly.
	Check the tightening of connecting screws	- Tighten the screws.

Each year		
Part	Operation to be performed	Procedure to implement
switchgear	Clean from any residue	- For more details on maintenance operations, see Cleaning the switchgear.
	Clean air filters (if any)	
	Checking painted surfaces	
Cooling fan	Clean from any residue	- Using a vacuum cleaner

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IDM 174 0049

Each year		
Part	Operation to be performed	Procedure to implement
Command panel	Clean the mechanical manoeuvre and remove rust	<ul style="list-style-type: none"> - Lubricate rusted parts with a brush - Use grease type Castrol Tribol Gr 4020/220-2PD
Insulating parts	Clean from dust and traces of electrical discharge and oxidation	<ul style="list-style-type: none"> - Use a vacuum cleaner and a clean dry (non-abrasive) cloth
External electrical connections (power and auxiliary circuits)	Clean from dust and traces of electrical discharge and oxidation	<ul style="list-style-type: none"> - Use a cloth soaked in solvent and remove oxidation with emery cloth
	Check the tightening of connecting screws	<ul style="list-style-type: none"> - Tighten the screws.

Each 2 years		
Part	Operation to be performed	Procedure to implement
Protection covers	Check the functionality of hinges and locks	<ul style="list-style-type: none"> - Check the condition of the hinges and the closing effectiveness of locks - Clean and lubricate hinges
Circuit breakers	Clean and lubricate the connections	<ul style="list-style-type: none"> - Use a clean dry (non-abrasive) cloth. - Lubricate contacts with specific grease

Each 3 years		
Part	Operation to be performed	Procedure to implement
Command panel	Check: operation	<ul style="list-style-type: none"> - Enable and disable the mechanisms 2 times to check for correct operation. - The two operations must be carried out completely without stopping in intermediate positions

Each 5 years		
Part	Operation to be performed	Procedure to implement
Circuit breakers and earthing connections	Clean from dust and traces of electrical discharge and oxidation	<ul style="list-style-type: none"> - Remove oxidation with emery cloth
	Check the tightening of connecting screws	<ul style="list-style-type: none"> - Tighten the screws.
Auxiliary circuits	Check wiring and connections	<ul style="list-style-type: none"> - Replace faulty wiring and connections
	Check the tightening of connecting screws	<ul style="list-style-type: none"> - Tighten the screws.
Cooling fan	Replacement	<ul style="list-style-type: none"> - Replace the cooling fan

Tightening torques

Check all fasteners of the various components with a torque spanner.

- Observe the tightening torques indicated in the table.



Important

For the assembly of the busbar, transformers etc., please refer to the suppliers' tables.

Table 1: Tightening torques for through-hole steel screws (resistance class 8.8)

Screw dimensions	Tightening torque (Nm)
M 5	5
M 6	9
M 8	22
M 10	45
M 12	75
M14	115
M 16	185

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Cleaning the switchgear

It must **ONLY** be carried out by trained and authorised expert technicians.

- Carry out the shutdown procedure for each cubicle (For the procedures, see *Description of control devices*).
- Check that the door of each cubicle is unlocked.

Danger - Attention

The inspections are essential to be able to operate safely.

- Wear the provided personal protection equipment (PPE).
- Remove dirt and debris with the use of a suitable vacuum cleaner.
- Clean the air filters with a suitable suction system.

- Clean the inspection window with a clean, dry (non-abrasive) lint-free cloth.
- Clean all metal surfaces with a suitable vacuum cleaner and a clean dry cloth. DO NOT clean the switchgear with water, steam or aggressive products so as not to damage it irreversibly.
- Touch up damaged painted parts
- ALWAYS keep the perimeter areas clean and free of obstacles to minimise the risks during man-machine interaction.



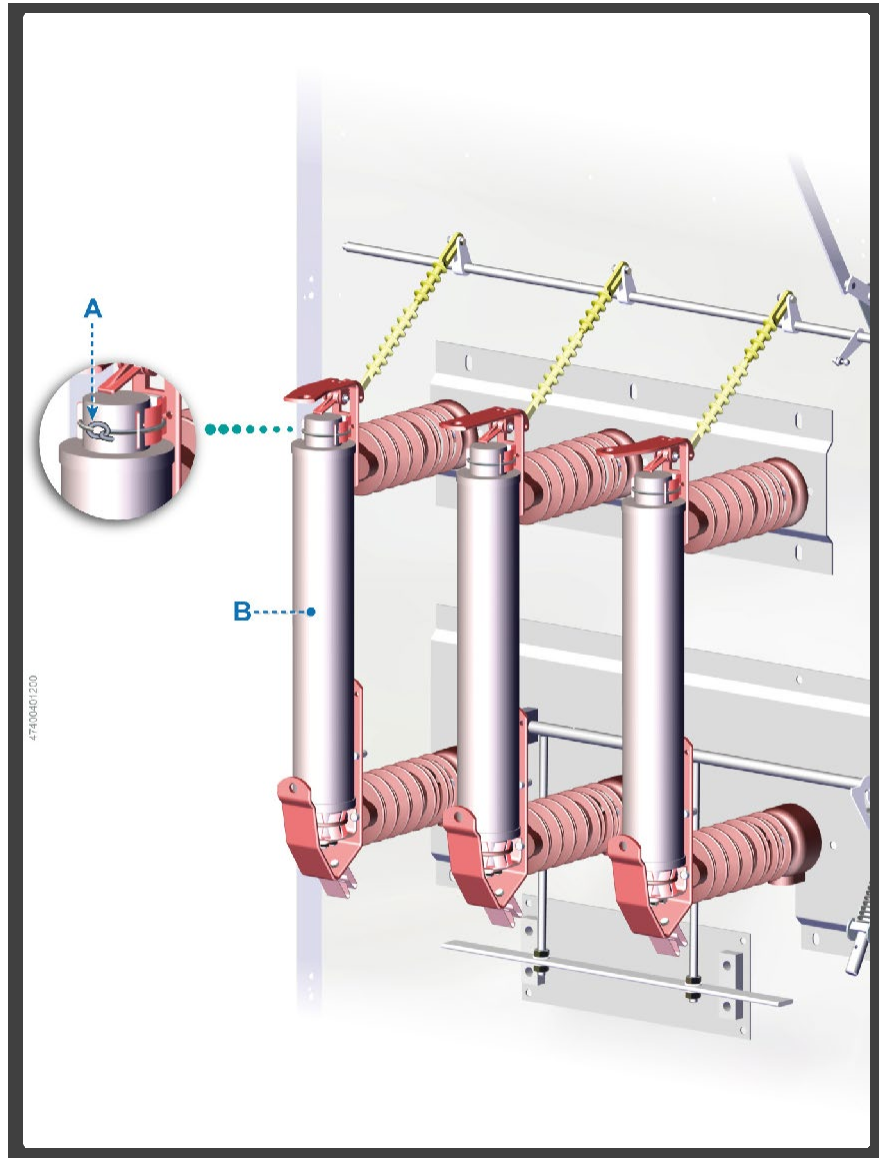
Important

The cubicles must be started up **ONLY** after they have all been cleaned.

Replacement of fuses

– The illustration shows the intervention points and the description indicates the procedures to be adopted.

1. Carry out the shutdown procedure (See *Description of mechanisms*).
2. Remove safety catch **A**.
3. Replace blown fuse **B** with one with the same characteristics.
4. Insert safety catch **A**.
5. Carry out the energizing procedure (See *Description of mechanisms*).



Malfunctions

The table lists the faults that may occur during normal operation with an indication of possible remedies.

Table: Malfunctions

Problem	Cause	Solution
Excessive heating of the cubicle	Cooling air ducts clogged	Clean the air intake ducts.
	Electrical connections (branches, power circuits etc.) not correctly tightened	Clean and tighten connections
	Electrical overload	Remove the cause of the overload.
	High ambient temperature	Reduce ambient temperature
Condensate inside the cubicle	Cooling air ducts clogged	Clean the air intake ducts.
	High ambient humidity	Fit anti-condensation heaters Contact the manufacturer's Technical Support Department.
Abnormal operation of the cubicle	Malfunctioning of functional components	Contact the manufacturer's Technical Support Department.

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Decommissioning and scrapping

□ Decommissioning

- Dismantling should be entrusted to authorised centres with qualified personnel and adequate equipment to operate safely.
- DO NOT carry out decommissioning without the support of authorised centres with qualified personnel to ensure safety and correctness.
- Contact the manufacturer for details of authorised disposal centres.
- Store all components in an enclosed area not accessible to outsiders.

□ Scrapping

- Scrapping should be entrusted to authorised centres with qualified personnel and adequate equipment to operate safely.
- DO NOT carry out scrapping without the support of authorised centres with qualified personnel to ensure safety and correctness.

- Contact the manufacturer for details of authorised scrapping centres.
- The person in charge with scrapping must identify any residual energy and implement a “safety plan” to eliminate any risk.
- Identify the presence of residual risks and take all necessary measures to operate under safe conditions.
- Dispose of materials, polluting liquids and residues generated during operations in accordance with the relevant laws.



Caution - Warning

Sulphur hexafluoride (SF₆ gas) must be recycled and NOT released into the atmosphere.

- Dispose of waste electrical and electronic equipment properly, at authorised collection centres, to avoid harmful and damaging effects.

IDM 074-004-0

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Description of the main parts of cubicle type "A / AX"

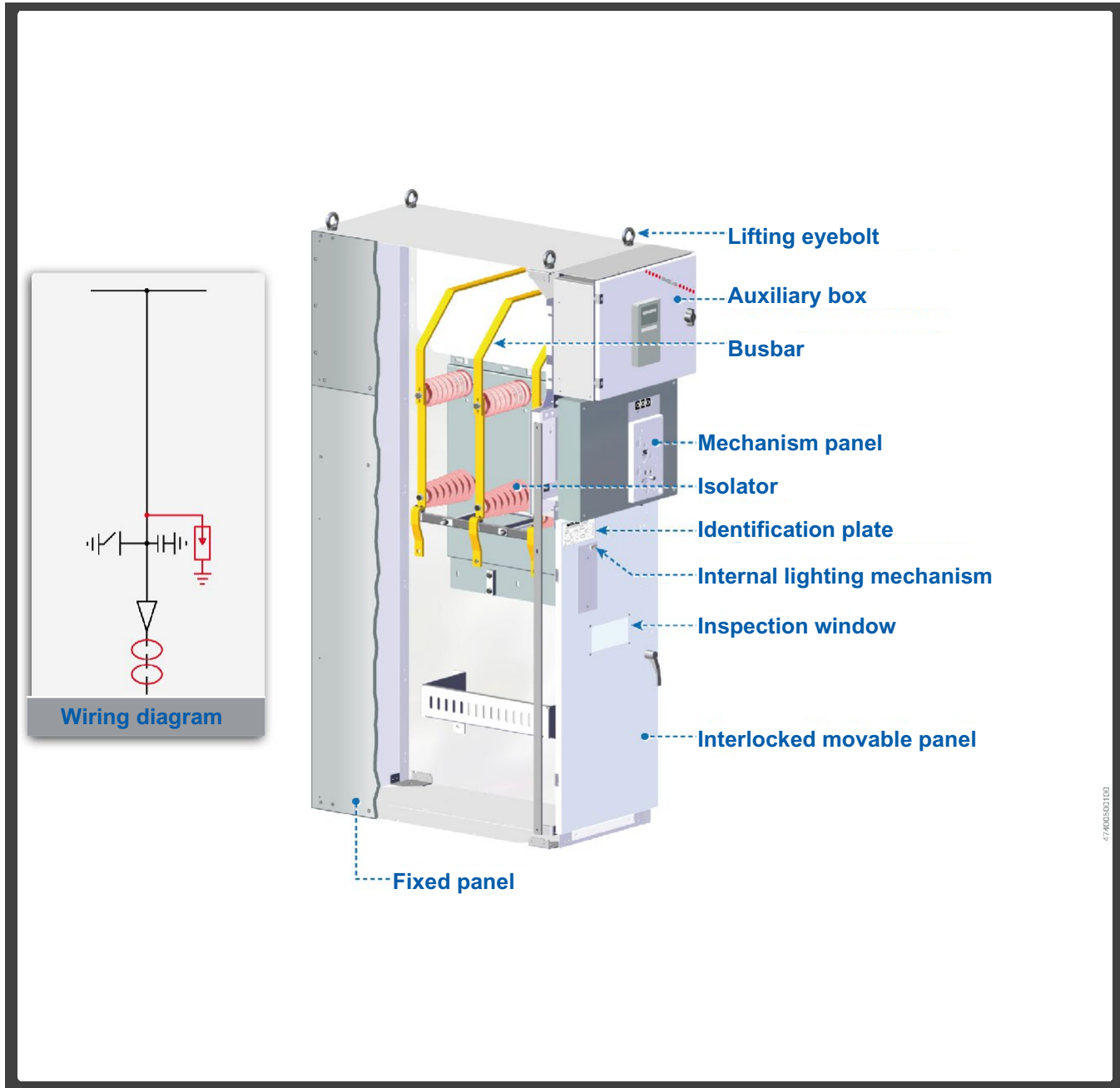
The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.

- panel opening is only possible having executed the shut-down procedure.

- On closing the panel, the interlock re-enables at the end of the energizing procedure.

- The cubicle is characterised by reduced maintenance and by an inspection window.

- The illustration shows the main parts.

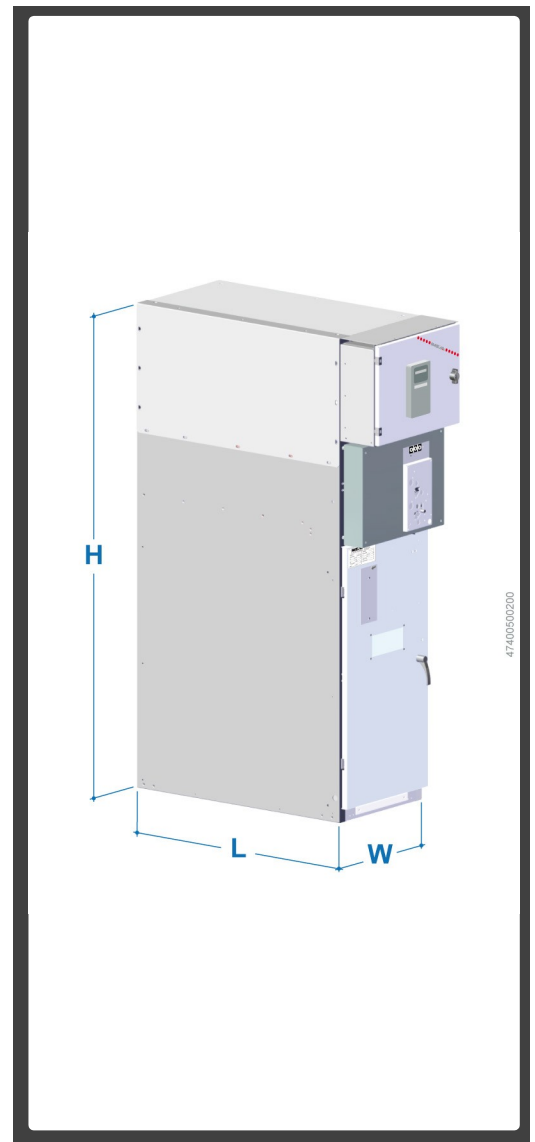


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Technical data of cubicle type “A / AX”

Table: Technical data

Description	Units of measurement	Value	
		UNTO	AX
Electrical power supply			
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-
Dimensions and weights			
Length L			
- Standard version	mm	960	960
- Version with “Internal arc” IAC ⁽¹⁾	mm	1050	1050
Width W	mm	500	375
Height H	mm	1850	1850
Weight			
- Standard version	kg	170	157
- Version with “Internal arc” IAC ⁽¹⁾	kg	200	193
Environmental conditions			
Maximum operating altitude (a.s.l.)	m	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-
Maximum noise level	dB	-	-



⁽²⁾ The “Internal Arc” version is indicated in the “**IAC**” field of the identification plate.

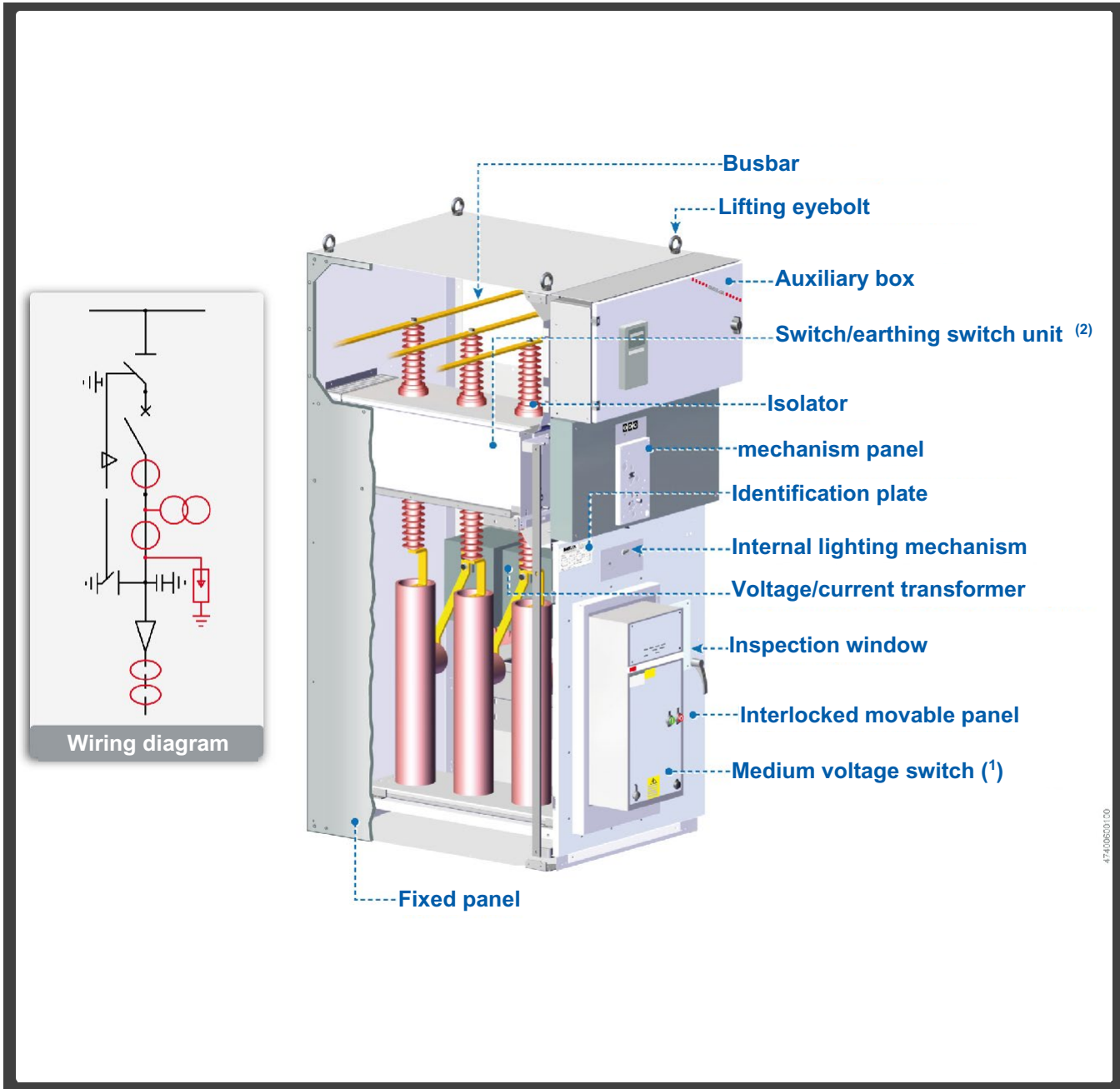
Description of the main parts of cubicle type “APB / APBX”

The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.

- panel opening is only possible having executed the shut-down procedure.

– On closing the panel, the interlock re-enables at the end of the energizing procedure.

- The cubicle is characterised by reduced maintenance and by an inspection window.
- The illustration shows the main parts.



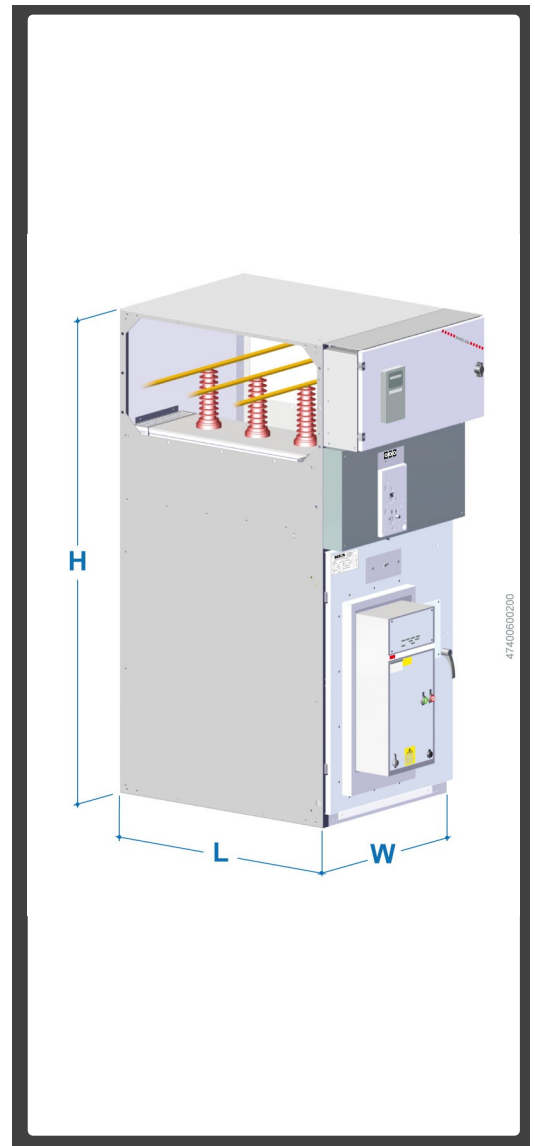
(¹) For the use methods, consult the manufacturer's manual.

(²) Sealed system to contain low pressure sulphur hexafluoride (SF₆ gas).

Technical data of cubicle type “APB / APBX”

Table: Technical data

Description	Units of measurement	Value	
		APB	APBX
Electrical power supply			
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-
Dimensions and weights			
Length L			
- Standard version	mm	960	960
- Version with “Internal arc” IAC ⁽³⁾	mm	1050	1050
Width W	mm	750	600
Height H	mm	1850	1850
Weight			
- Standard version	kg	341	315
- Version with “Internal arc” IAC ⁽³⁾ ⁽⁴⁾	kg	396	355
Environmental conditions			
Maximum operating altitude (a.s.l.)	m	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-
Maximum noise level	dB	-	-



⁽³⁾ The “Internal Arc” version is indicated in the “IAC” field of the identification plate.

⁽⁴⁾ Approximate value that excludes the CT / VT and auxiliary systems.

Description of the main parts of cubicle type “APBR / APBRST”

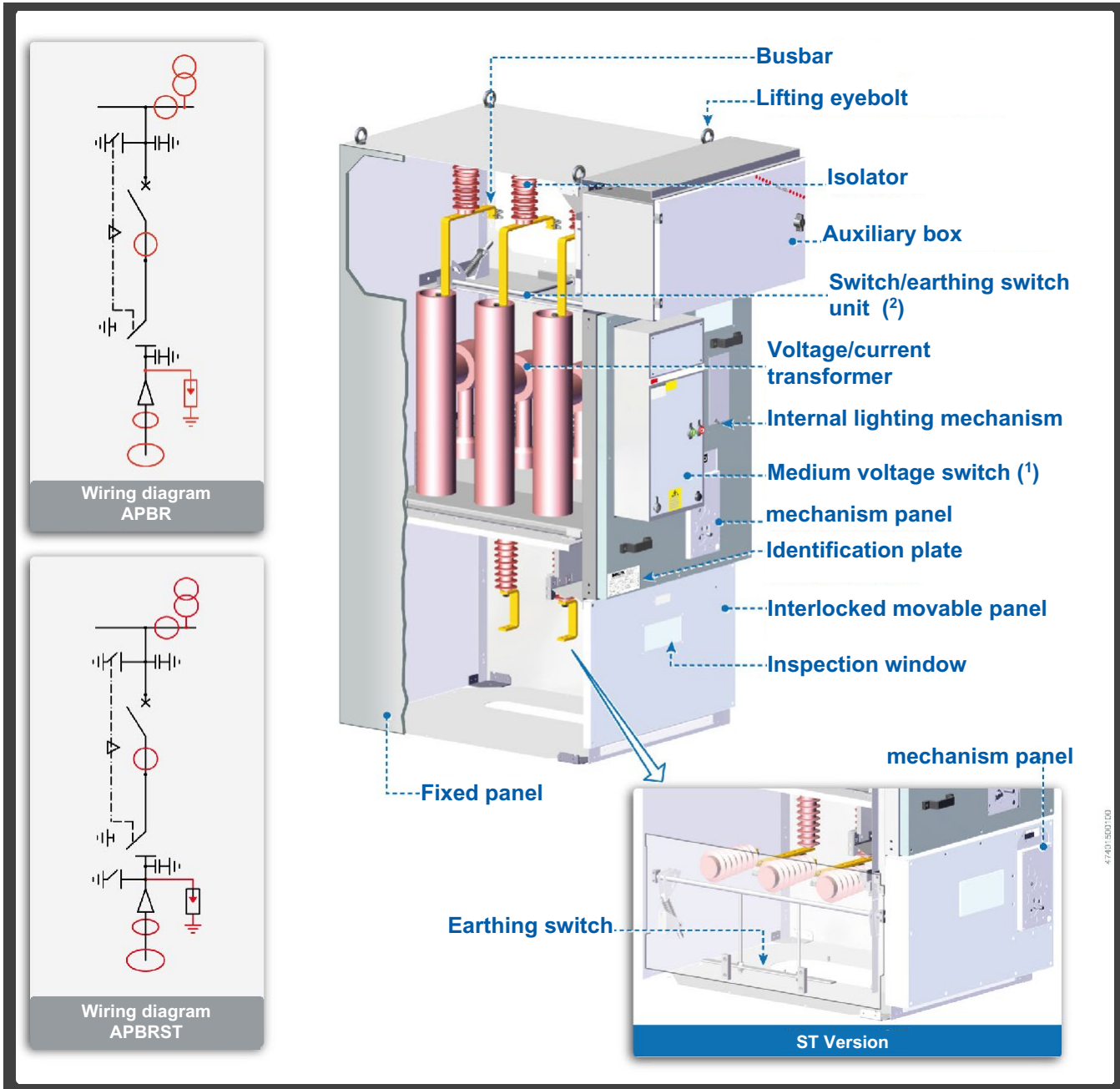
The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.

- panel opening is only possible having executed the shut-down procedure.

- On closing the panel, the interlock re-enables at the end of the energizing procedure.

- The cubicle is characterised by reduced maintenance and by an inspection window.

- The illustration shows the main parts.



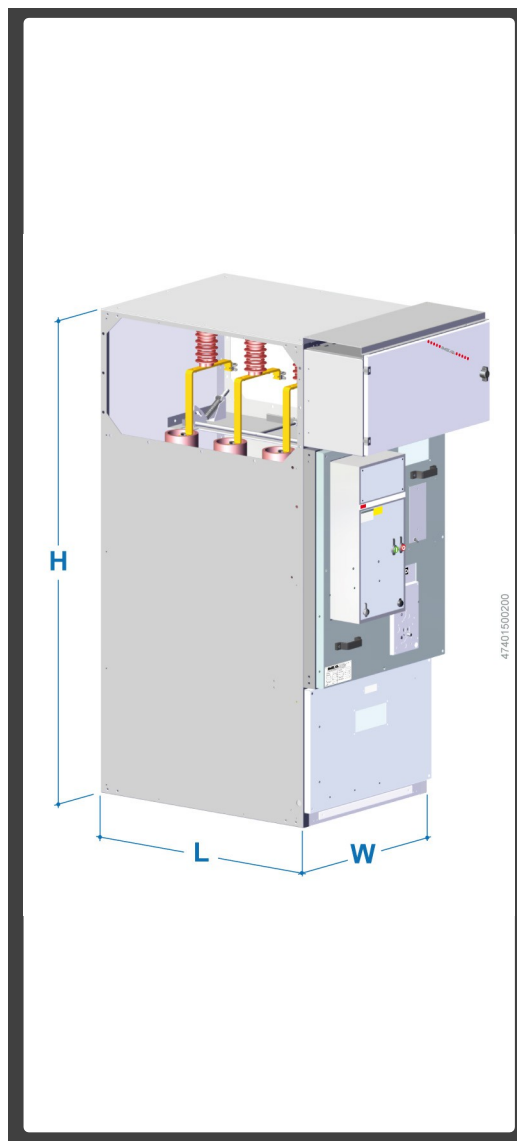
⁽¹⁾ For the use methods, consult the manufacturer's manual.

⁽²⁾ Sealed system to contain low pressure sulphur hexafluoride (SF6 gas).

Technical data of cubicle type “APBR / APBRST”

Table: Technical data

Description	Units of measurement	Value	
		APBR	APBRST
Electrical power supply			
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-
Dimensions and weights			
Length L			
- Standard version	mm	960	960
- Version with “Internal arc” IAC ⁽³⁾	mm	1050	1050
Width W	mm	750	750
Height H	mm	1850	1850
Weight			
- Standard version	kg	350	370
- Version with “Internal arc” IAC ⁽³⁾ ⁽⁴⁾	kg	405	425
Environmental conditions			
Maximum operating altitude (a.s.l.)	m	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-
Maximum noise level	dB	-	-



⁽³⁾ The “Internal Arc” version is indicated in the “**IAC**” field of the identification plate.

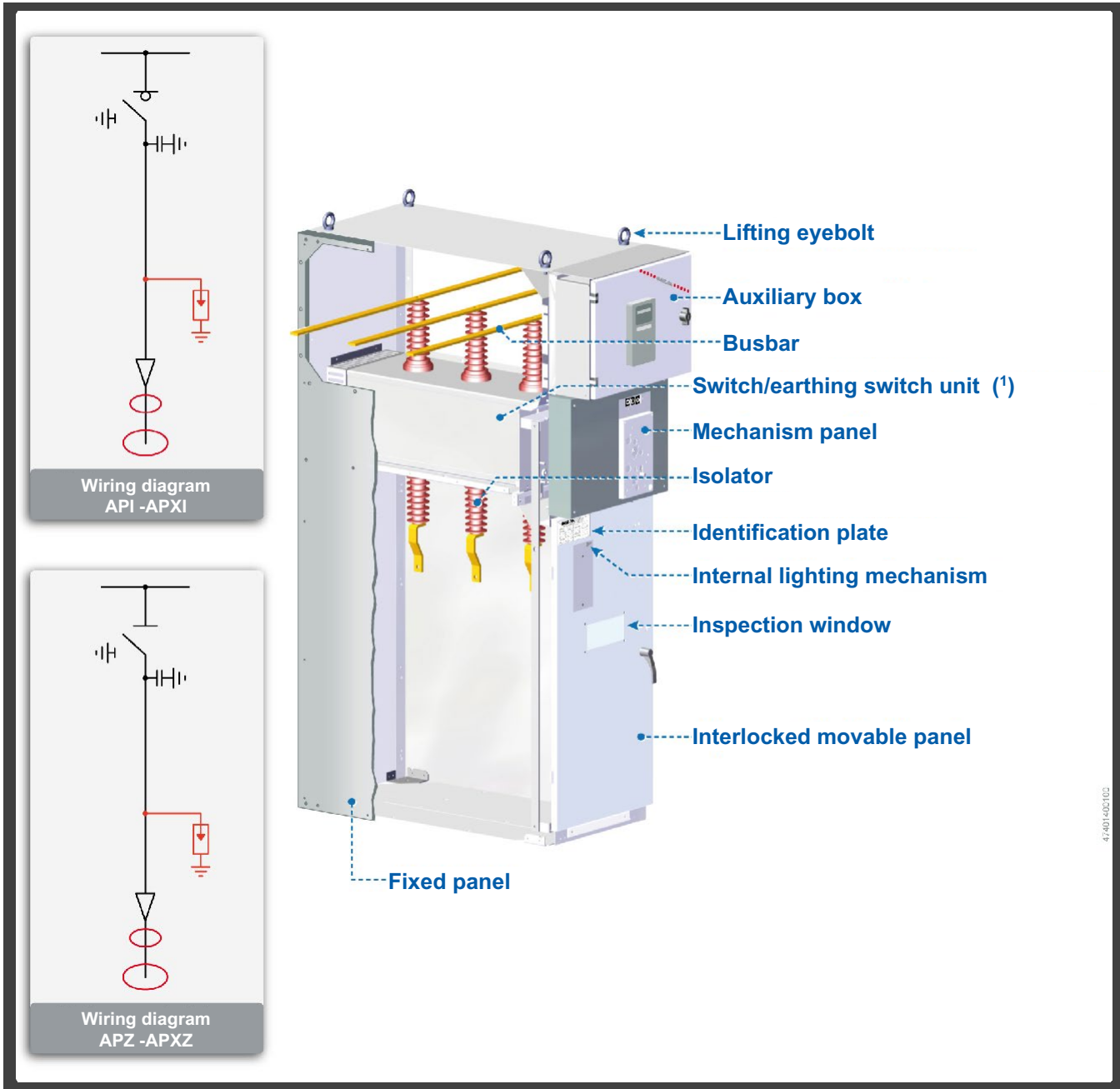
⁽⁴⁾ Approximate value that excludes the CT / VT and auxiliary systems.

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IDM 47401550

Description of the main parts of cubicle type “API / APZ / APXI / APXZ”

- The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.
- panel opening is only possible having executed the shut-down procedure.
 - On closing the panel, the interlock re-enables at the end of the energizing procedure.
 - The cubicle is characterised by reduced maintenance and by an inspection window.
 - The illustration shows the main parts.



(1) Sealed system to contain low pressure sulphur hexafluoride (SF6 gas).

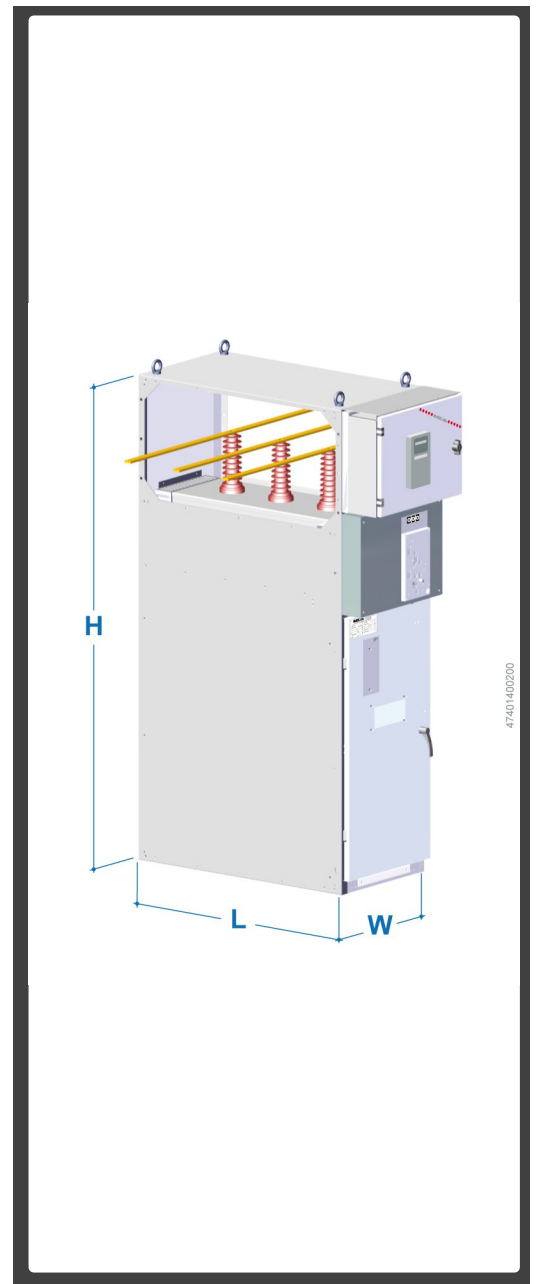
Technical data of cubicle type “API / APZ / APXI / APXZ”

Table: Technical data

Description	Units of measurement	Value			
		API	APZ	APXI	APXZ
Electrical power supply					
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-	-	-
Dimensions and weights					
Length L					
- Standard version	mm	960	960	960	960
- Version with “Internal arc” IAC ⁽²⁾	mm	1050	1050	1050	1050
Width W	mm	500	500	375	375
Height H	mm	1850	1850	1850	1850
Weight					
- Standard version	kg	175	175	170	170
- Version with “Internal arc” IAC ⁽²⁾ ⁽³⁾	kg	211	211	200	200
Environmental conditions					
Maximum operating altitude (a.s.l.)	m	<1000	<1000	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-	-	-
Maximum noise level	dB	-	-	-	-

⁽²⁾ The “Internal Arc” version is indicated in the field of the identification plate .
“IAC”

⁽³⁾ Approximate value that excludes the CT / VT and auxiliary systems.

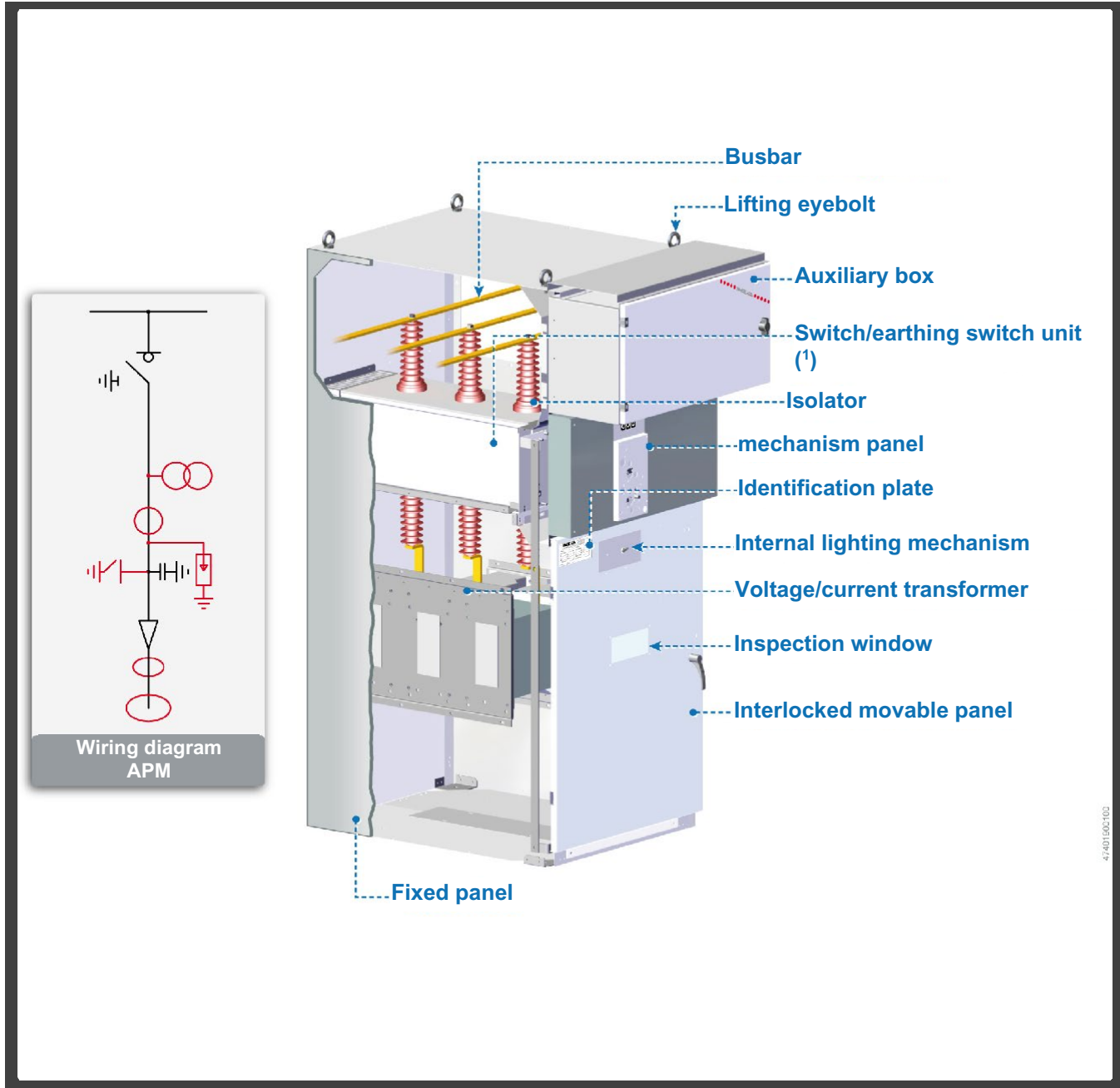


Description of the main parts of cubicle type “APM”

The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.

- panel opening is only possible having executed the shut-down procedure.

- On closing the panel, the interlock re-enables at the end of the energizing procedure.
- The cubicle is characterised by reduced maintenance and by an inspection window.
- The illustration shows the main parts.

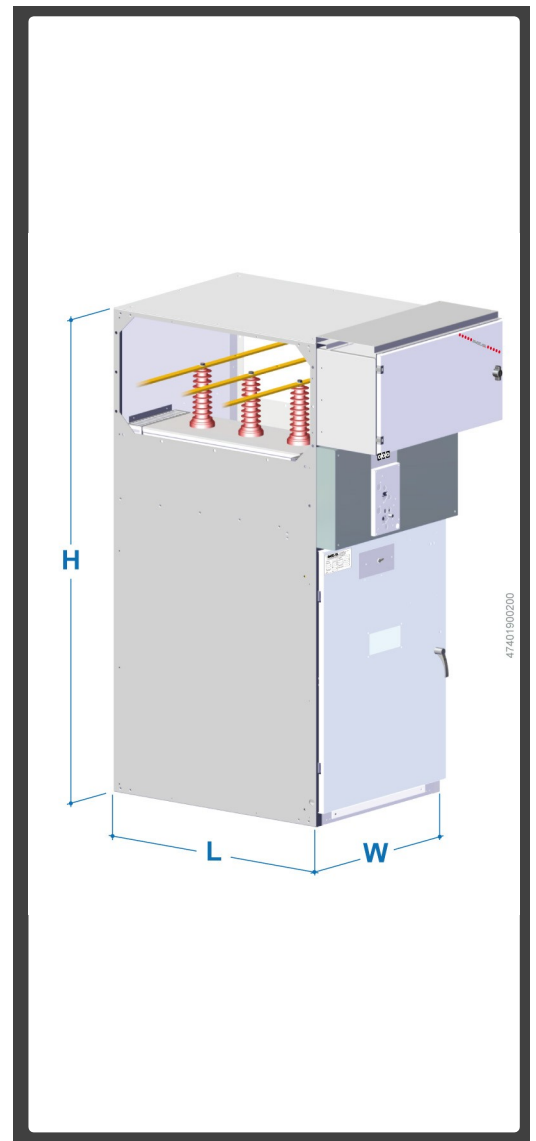


(1) Sealed system to contain low pressure sulphur hexafluoride (SF6 gas).

Technical data of cubicle type “APM”

Table: Technical data

Description	Units of measurement	Value
		APM
Electric power supply		
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-
Dimensions and weights		
Length L		
- Standard version	mm	960
- Version with “Internal arc” IAC ⁽²⁾	mm	1050
Width W	mm	750
Height H	mm	1850
Weight		
- Standard version	kg	260
- Version with “Internal arc” IAC ⁽²⁾ ⁽³⁾	kg	315
Environmental conditions		
Maximum operating altitude (a.s.l.)	m	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95
Operating temperature	°C	-5 ÷ 40
Ambient lighting	LUX	-
Maximum noise level	dB	-

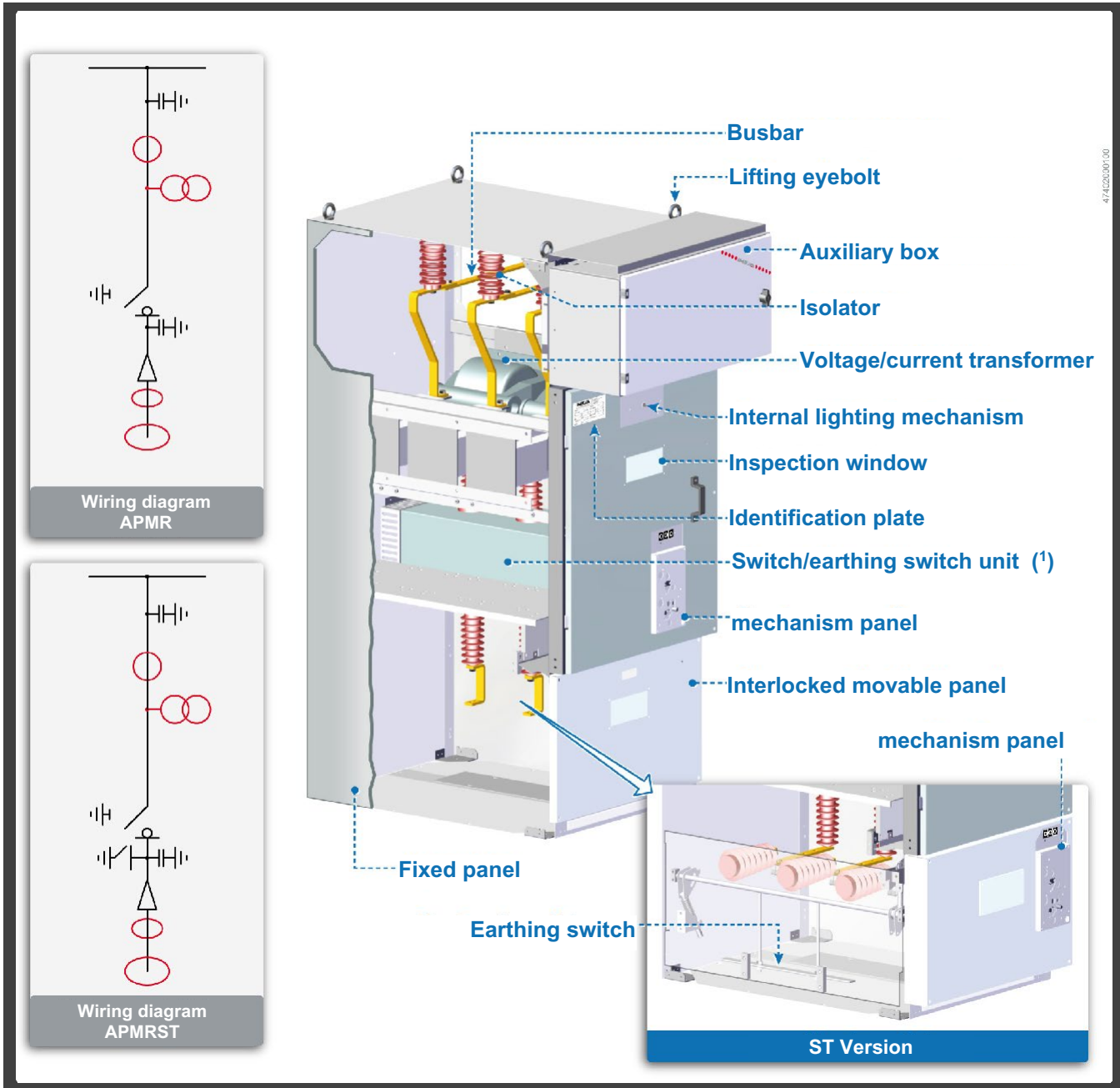


⁽²⁾ The “Internal Arc” version is indicated in the “**IAC**” field of the identification plate.

⁽³⁾ Approximate value that excludes the CT / VT and auxiliary systems.

Description of the main parts of cubicle type “APMR / APMRST”

- The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.
- panel opening is only possible having executed the shut-down procedure.
 - On closing the panel, the interlock re-enables at the end of the energizing procedure.
 - The cubicle is characterised by reduced maintenance and by an inspection window.
 - The illustration shows the main parts.

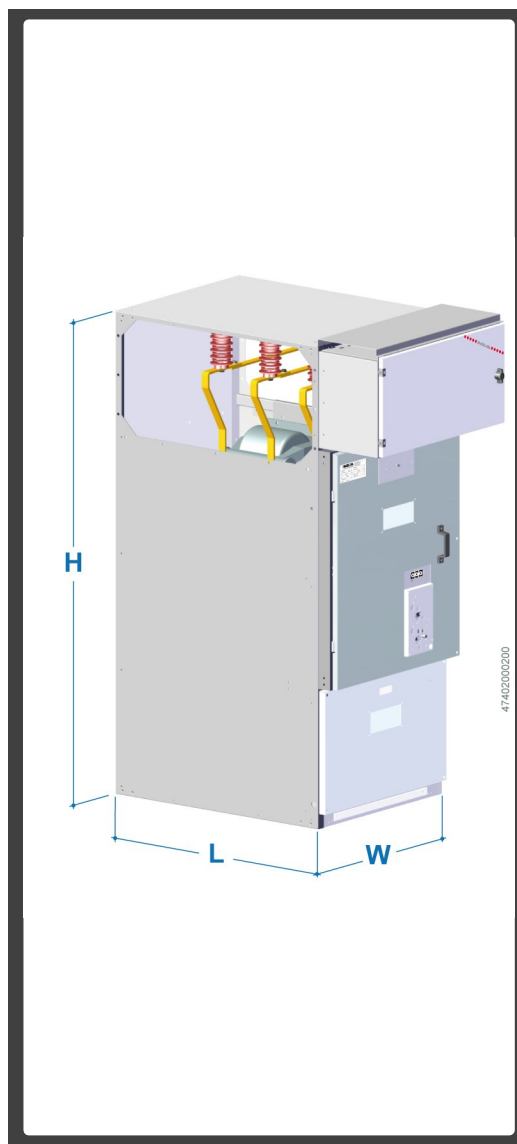


(1) Sealed system to contain low pressure sulphur hexafluoride (SF6 gas).

Technical data of cubicle type “APMR / APMRST”

Table: Technical data

Description	Units of measurement	Value	
		APMR	APMRST
Electric power supply			
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-
Dimensions and weights			
Length L			
- Standard version	mm	960	960
- Version with “Internal arc” IAC ⁽²⁾	mm	1050	1050
Width W	mm	750	750
Height H	mm	1850	1850
Weight			
- Standard version	kg	250	270
- Version with “Internal arc” IAC ⁽²⁾ ⁽³⁾	kg	305	325
Environmental conditions			
Maximum operating altitude (a.s.l.)	m	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-
Maximum noise level	dB	-	-



⁽²⁾ The “Internal Arc” version is indicated in the “**IAC**” field of the identification plate.

⁽³⁾ Approximate value that excludes the CT / VT and auxiliary systems.

Description of the main parts of cubicle type “AR / ARX”

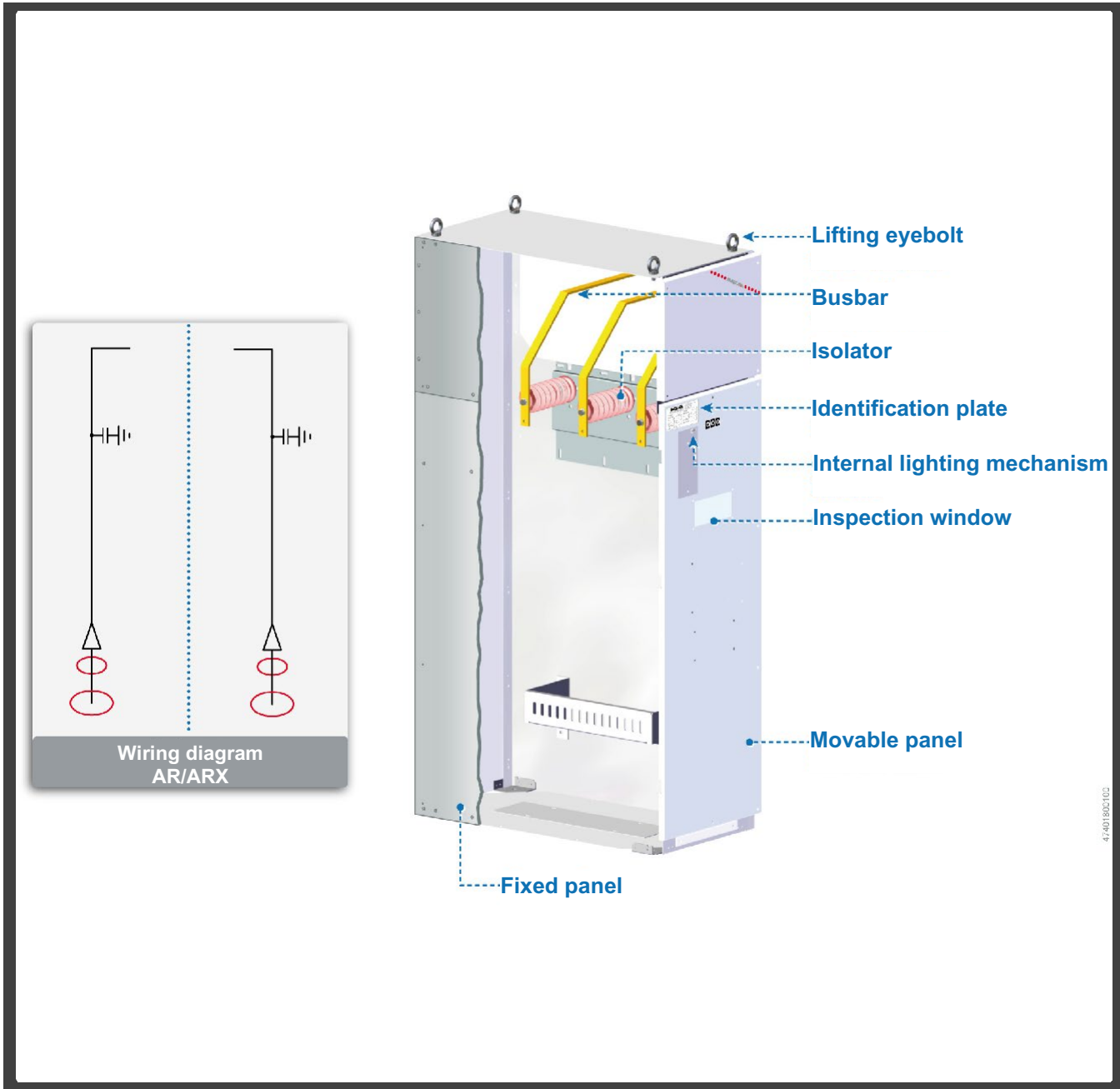
The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.

– panel opening is only possible having executed the shut-down procedure.

– On closing the panel, the interlock re-enables at the end of the energizing procedure.

– The cubicle is characterised by reduced maintenance and by an inspection window.

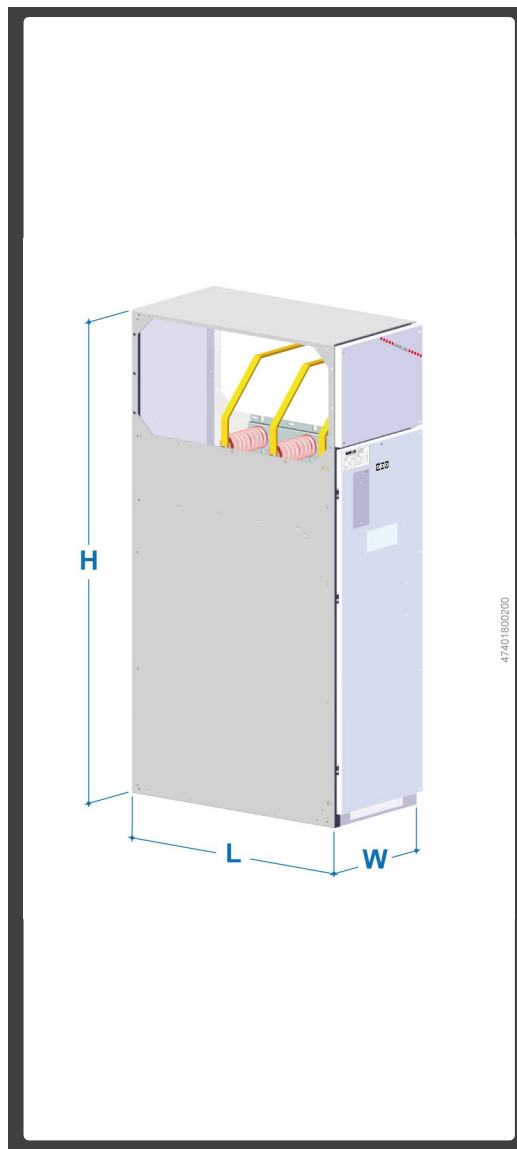
– The illustration shows the main parts.



Technical data of cubicle type “AR / ARX”

Table: Technical data

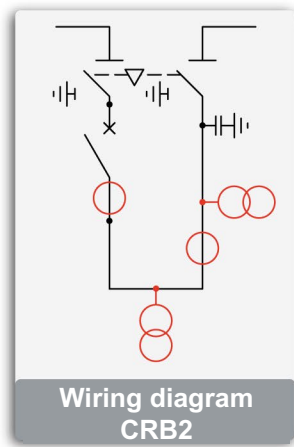
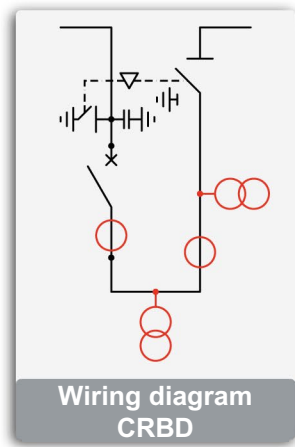
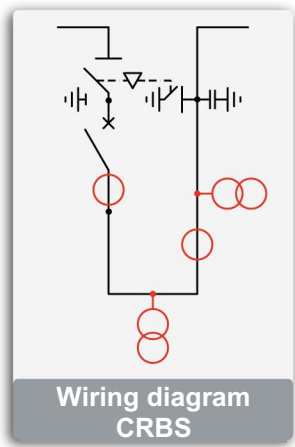
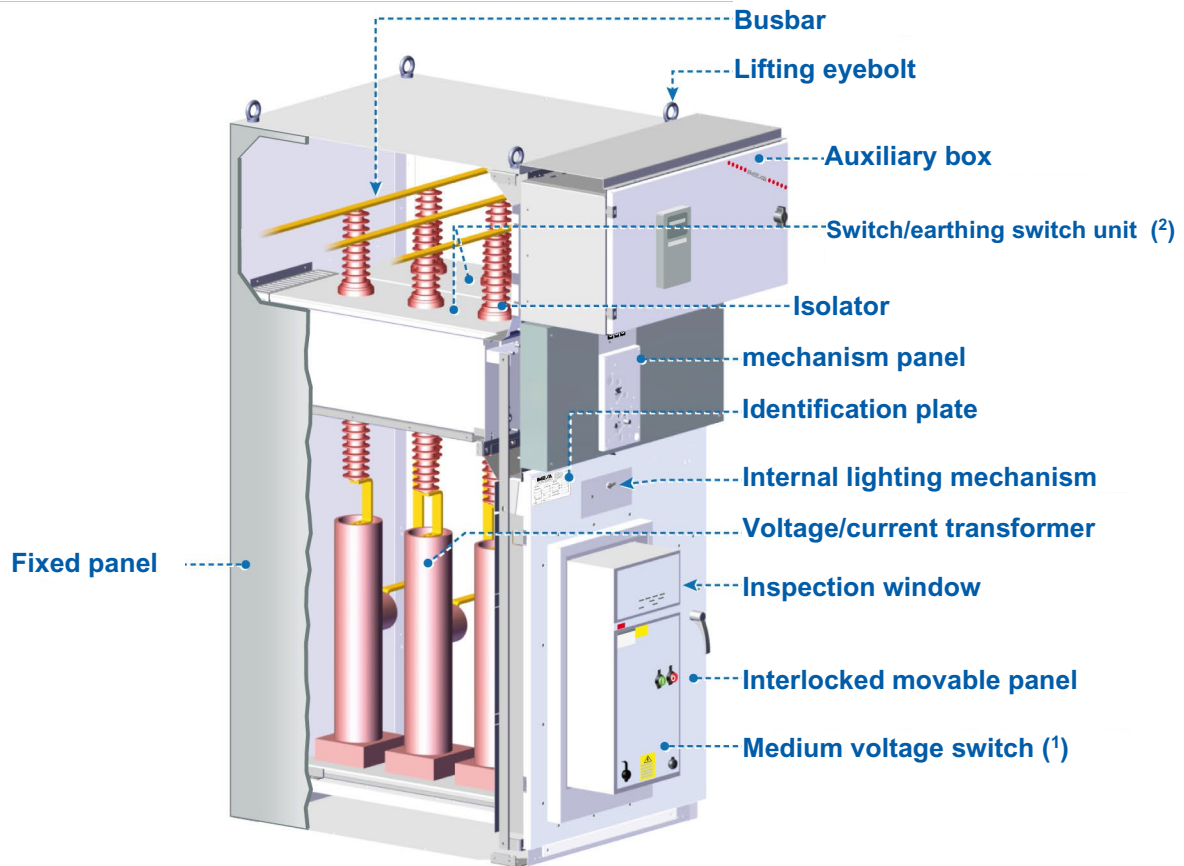
Description	Units of measurement	Value	
		AR	ARX
Electric power supply			
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-
Dimensions and weights			
Length L			
- Standard version	mm	960	960
- Version with “Internal arc” IAC ⁽¹⁾	mm	1050	1050
Width W	mm	500	375
Height H	mm	1850	1850
Weight			
- Standard version	kg	130	102
- Version with “Internal arc” IAC ⁽¹⁾	kg	166	132
Environmental conditions			
Maximum operating altitude (a.s.l.)	m	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-
Maximum noise level	dB	-	-



⁽²⁾ The “Internal Arc” version is indicated in the “**IAC**” field of the identification plate.

Description of the main parts of cubicle type “CRBS / CRBD/ CRB2”

- The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.
- panel opening is only possible having executed the shut-down procedure.
 - On closing the panel, the interlock re-enables at the end of the energizing procedure.
 - The cubicle is characterised by reduced maintenance and by an inspection window.
 - The illustration shows the main parts.



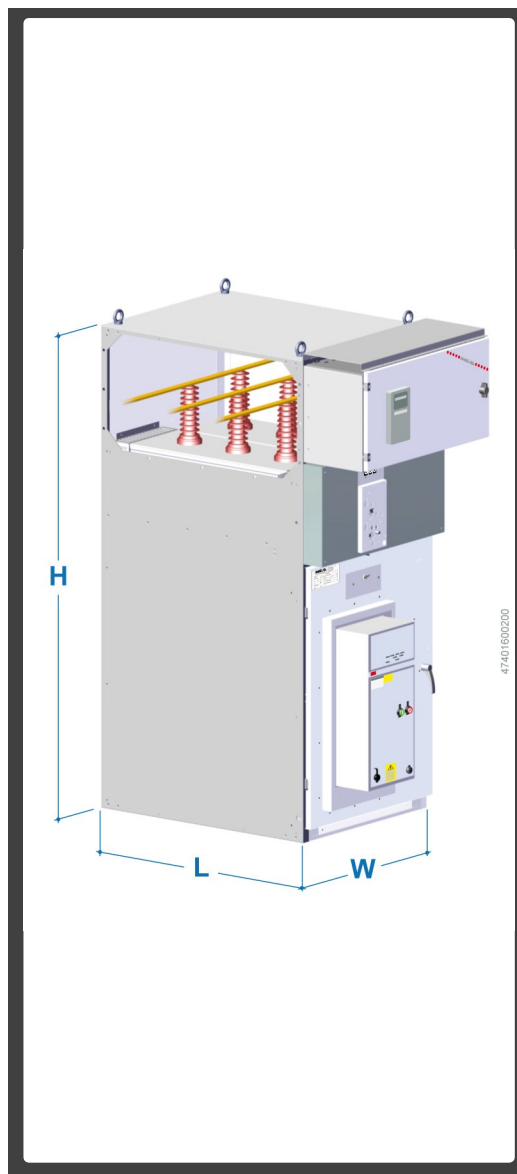
(1) For the use methods, consult the manufacturer’s manual.

(2) Sealed system to contain low pressure sulphur hexafluoride (SF6 gas).

Technical data of cubicle type “CRBS / CRBD/ CRB2”

Table: Technical data

Description	Units of measurement	Value		
		CRBS	CRBD	CRB2
Electrical power supply				
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-	-
Dimensions and weights				
Length L				
- Standard version	mm	960	960	960
- Version with “Internal arc” IAC ⁽³⁾	mm	1050	1050	1050
Width W	mm	750	750	750
Height H	mm	1850	1850	1850
Weight				
- Standard version	kg	385	385	400
- Version with “Internal arc” IAC ⁽³⁾ ⁽⁴⁾	kg	440	440	455
Environmental conditions				
Maximum operating altitude (a.s.l.)	m	<1000	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-	-
Maximum noise level	dB	-	-	-



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⁽³⁾ The “Internal Arc” version is indicated in the “**IAC**” field of the identification plate.

⁽⁴⁾ Approximate value that excludes the CT / VT and auxiliary systems.

Description of the main parts of cubicle type “CRIS / CRID / CRZS / CRZD”

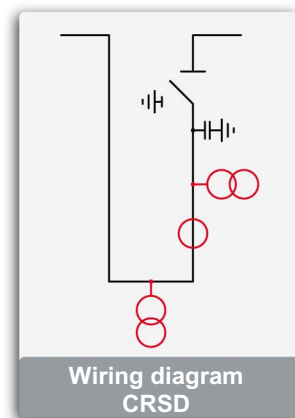
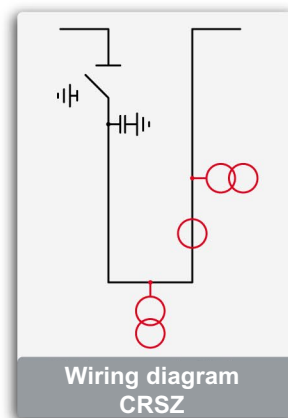
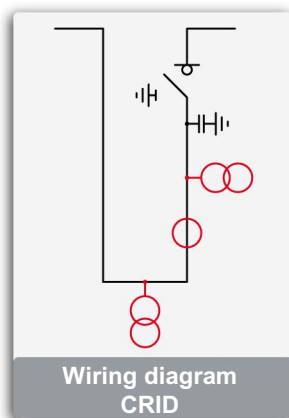
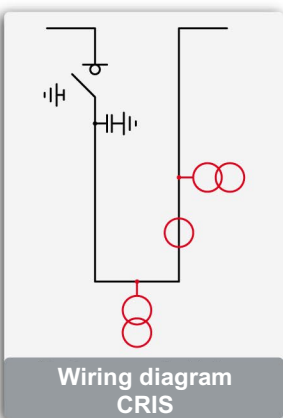
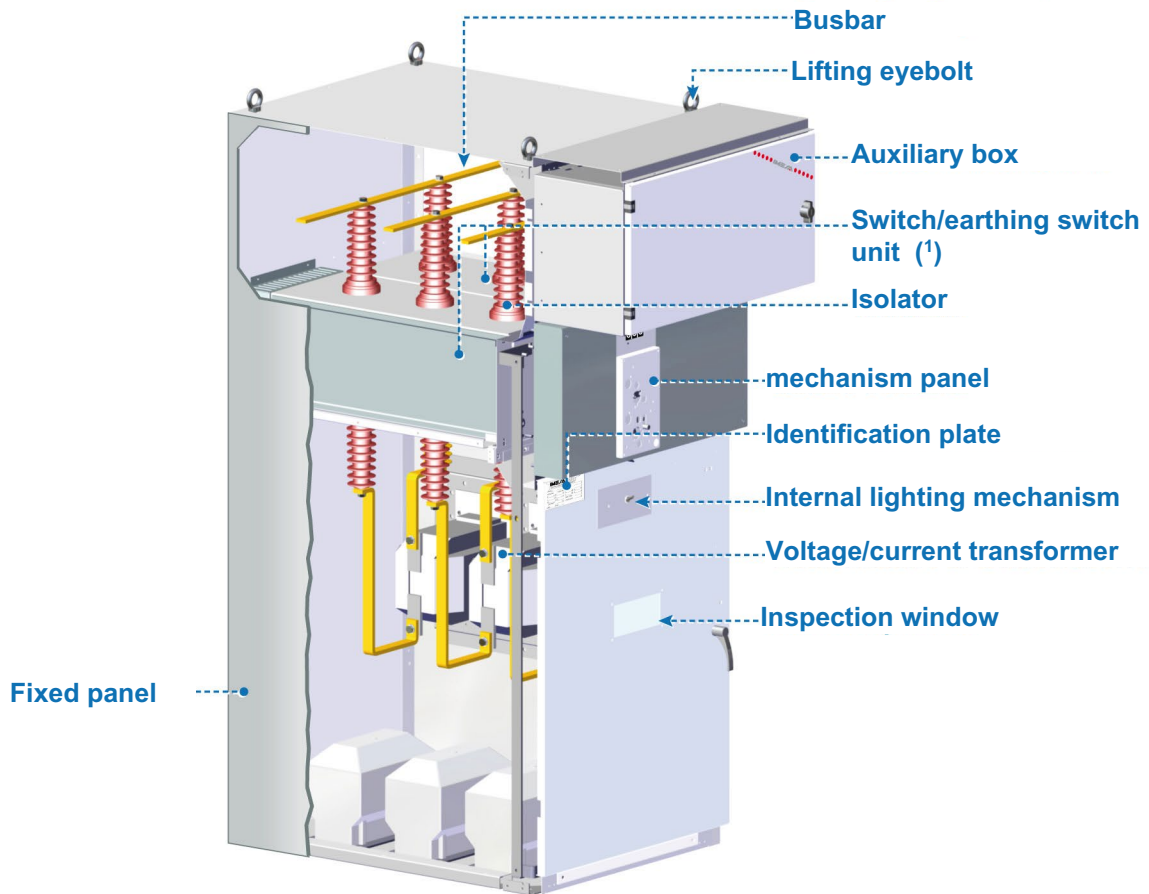
The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.

– panel opening is only possible having executed the shut-down procedure.

– On closing the panel, the interlock re-enables at the end of the energizing procedure.

– The cubicle is characterised by reduced maintenance and by an inspection window.

– The illustration shows the main parts.

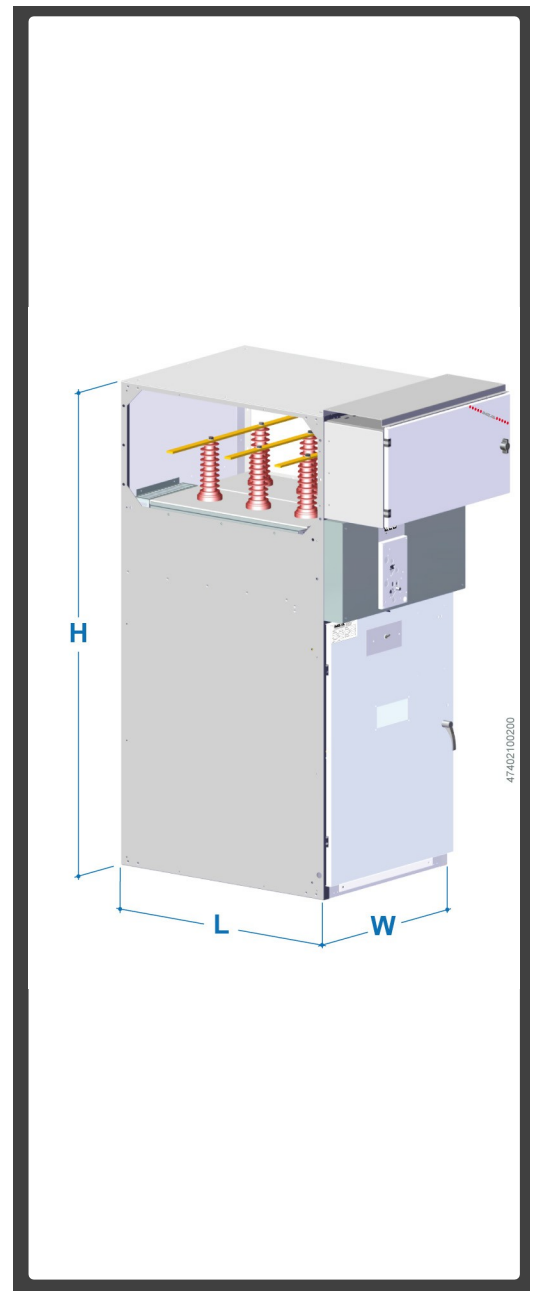


(1) Sealed system to contain low pressure sulphur hexafluoride (SF6 gas).

Technical data of cubicle type “CRIS / CRID / CRZS / CRZD”

Table: Technical data

Description	Units of measurement	Value			
		CRIS	CRID	CRZS	CRZD
Electric power supply					
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-	-	-
Dimensions and weights					
Length L					
- Standard version	mm	960	960	960	960
- Version with “Internal arc” IAC ⁽²⁾	mm	1050	1050	1050	1050
Width W	mm	750	750	750	750
Height H	mm	1850	1850	1850	1850
Weight					
- Standard version	kg	305	305	280	280
- Version with “Internal arc” IAC ⁽²⁾ ⁽³⁾	kg	360	360	340	340
Environmental conditions					
Maximum operating altitude (a.s.l.)	m	<1000	<1000	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-	-	-
Maximum noise level	dB	-	-	-	-



⁽²⁾ The “Internal Arc” version is indicated in the “IAC” field of the identification plate.

⁽³⁾ Approximate value that excludes the CT / VT and auxiliary systems.

Description of the main parts of cubicle type “MI / MZ/ MLI”

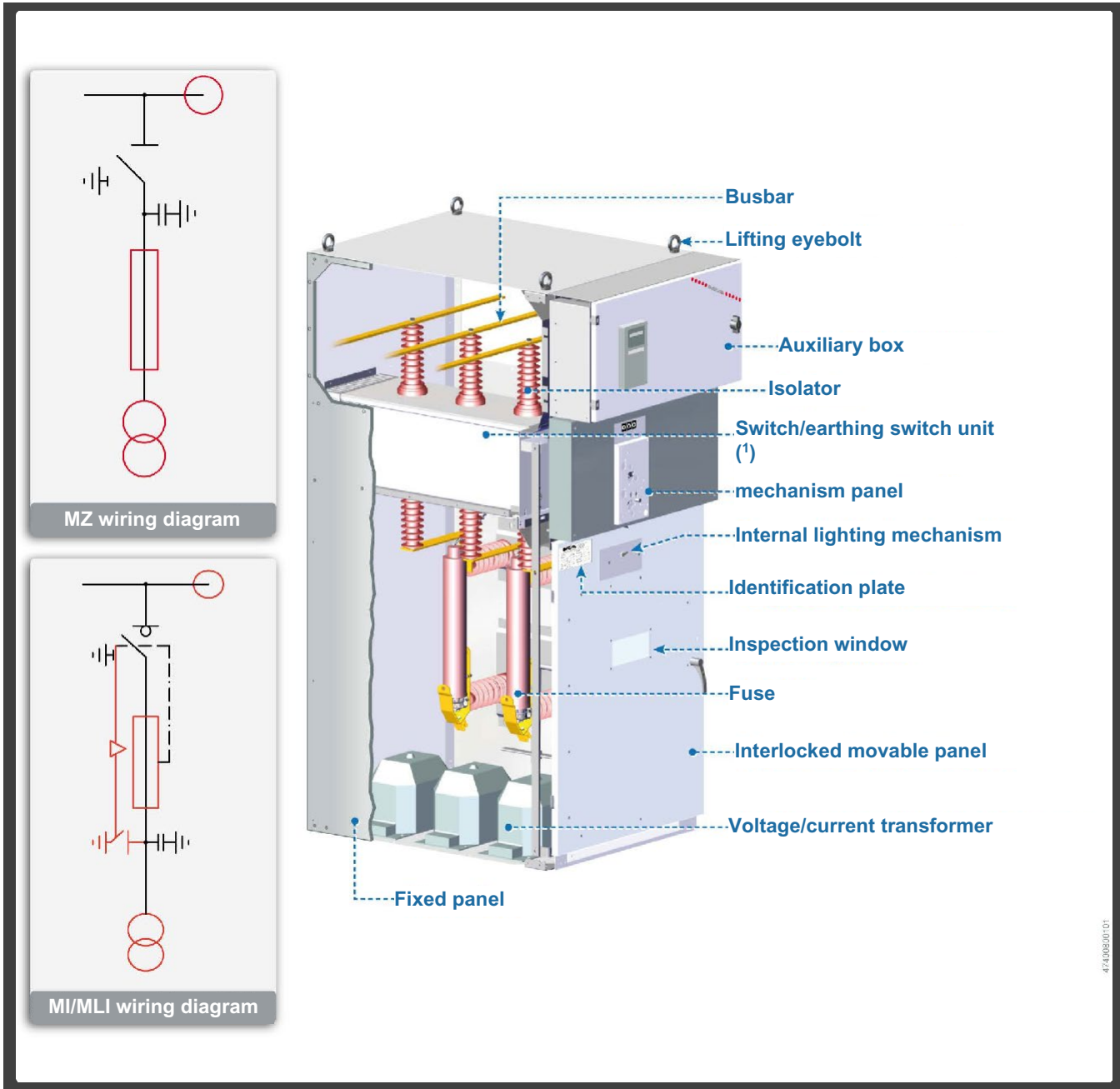
The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.

– panel opening is only possible having executed the shut-down procedure.

– On closing the panel, the interlock re-enables at the end of the energizing procedure.

– The cubicle is characterised by reduced maintenance and by an inspection window.

– The illustration shows the main parts.

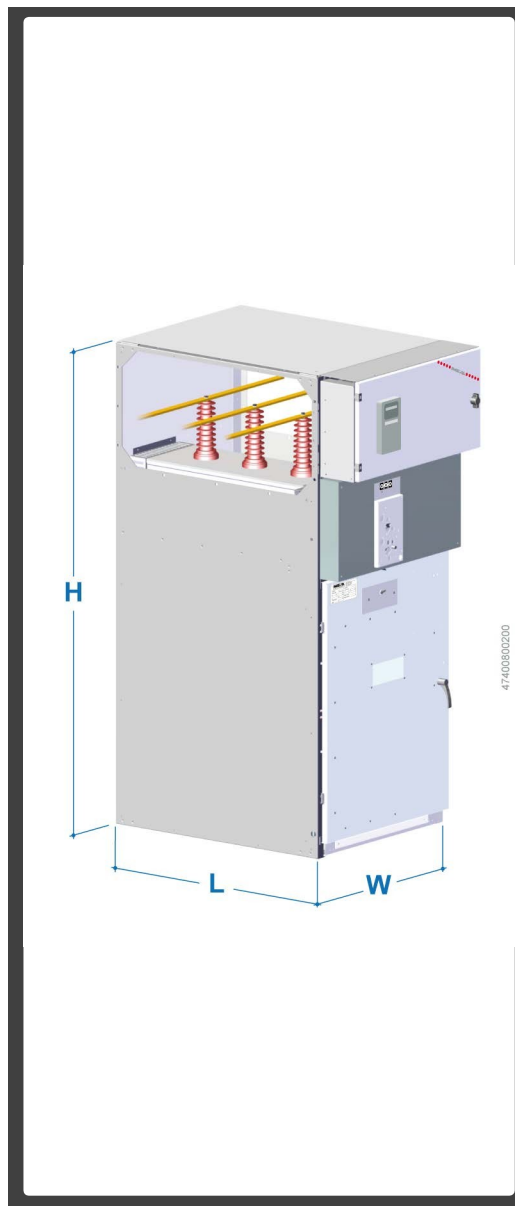


(1) Sealed system to contain low pressure sulphur hexafluoride (SF6 gas).

Technical data of cubicle type “MI / MZ/ MLI”

Table: Technical data

Description	Units of measurement	Value		
		MI	MZ	MLI
Electrical power supply				
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-	-
Dimensions and weights				
Length L				
- Standard version	mm	960	960	960
- Version with “Internal arc” IAC ⁽²⁾	mm	-	-	-
Width W	mm	600	600	750
Height H	mm	1850	1850	1850
Weight				
- Standard version	kg	210	200	290
- Version with “Internal arc” IAC ⁽²⁾ ⁽³⁾	kg	251	240	345
Environmental conditions				
Maximum operating altitude (a.s.l.)	m	<1000	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-	-
Maximum noise level	dB	-	-	-



⁽²⁾ The “Internal Arc” version is indicated in the “**IAC**” field of the identification plate.

⁽³⁾ Approximate value that excludes the CT / VT and auxiliary systems.

Description of the main parts of cubicle type "PT / PTX"

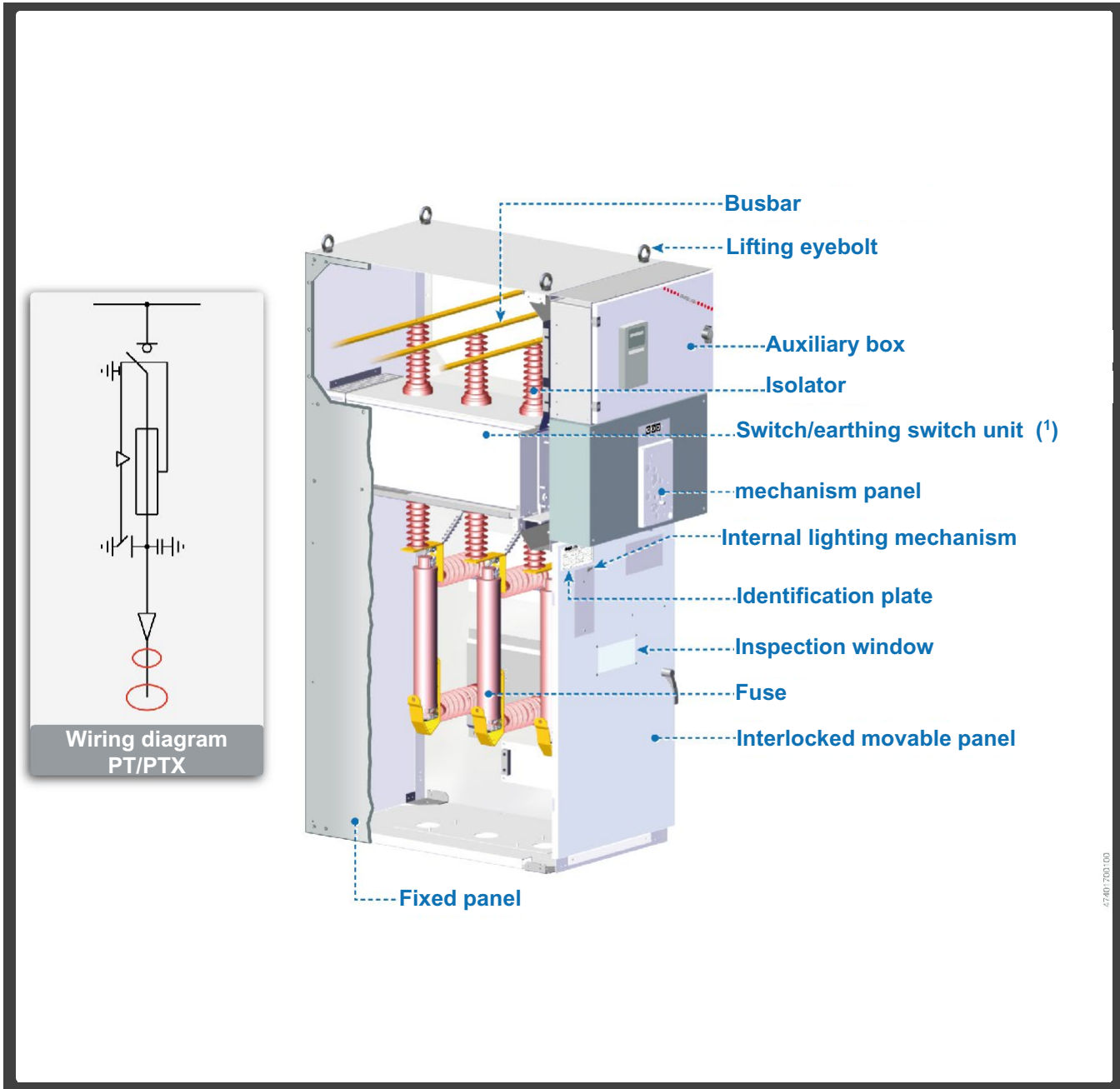
The cubicle is equipped with a movable interlocked panel to prevent access to the live zones.

- panel opening is only possible having executed the shut-down procedure.

- On closing the panel, the interlock re-enables at the end of the energizing procedure.

- The cubicle is characterised by reduced maintenance and by an inspection window.

- The illustration shows the main parts.

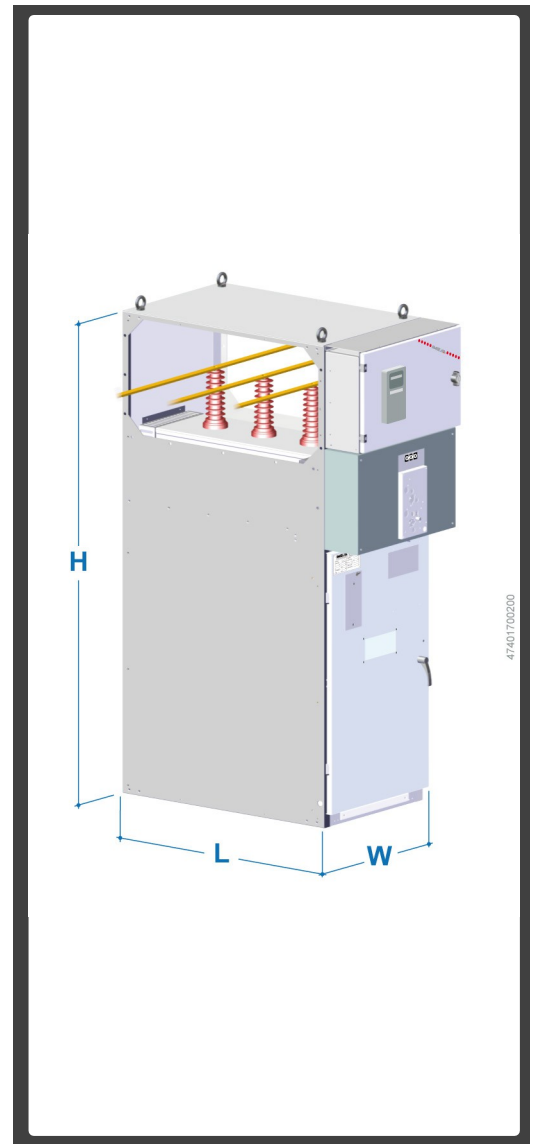


(*) Sealed system to contain low pressure sulphur hexafluoride (SF6 gas).

Technical data of cubicle type “PT / PTX”

Table: Technical data

Description	Units of measurement	Value	
		PT	PTX
Electric power supply			
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-
Dimensions and weights			
Length L			
- Standard version	mm	960	960
- Version with “Internal arc” IAC ⁽²⁾	mm	1050	1050
Width W	mm	600	375
Height H	mm	1850	1850
Weight			
- Standard version	kg	215	175
- Version with “Internal arc” IAC ⁽²⁾ ⁽³⁾	kg	256	205
Environmental conditions			
Maximum operating altitude (a.s.l.)	m	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-
Maximum noise level	dB	-	-



⁽²⁾ The “Internal Arc” version is indicated in the “**IAC**” field of the identification plate.

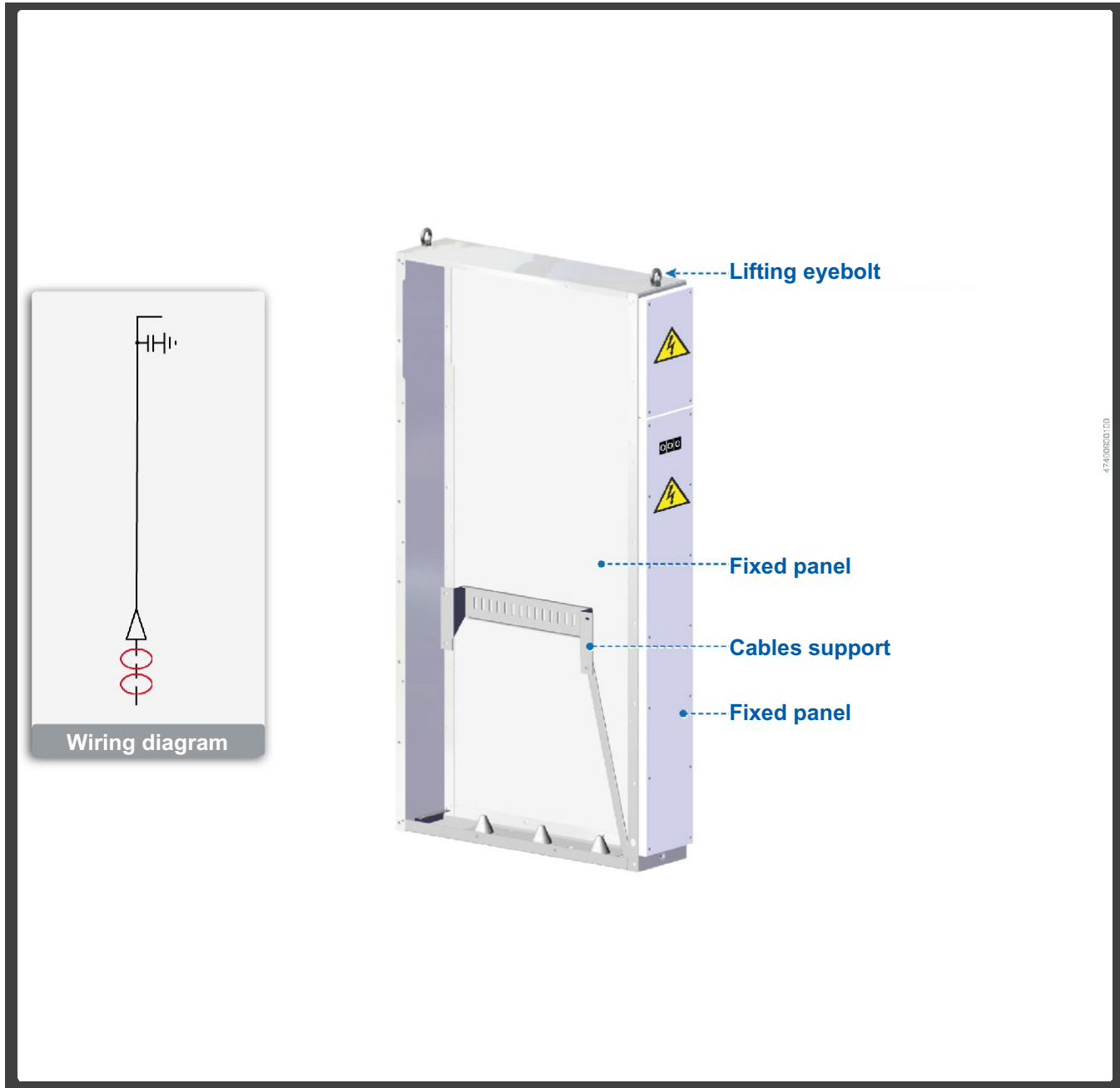
⁽³⁾ Approximate value that excludes the CT / VT and auxiliary systems.

Information on cubicle type “RW / CC”

Description of the main parts of cubicle type “RW / CC”

The cubicle is used to close the ends of the switchgear.

– The illustration shows the main parts.



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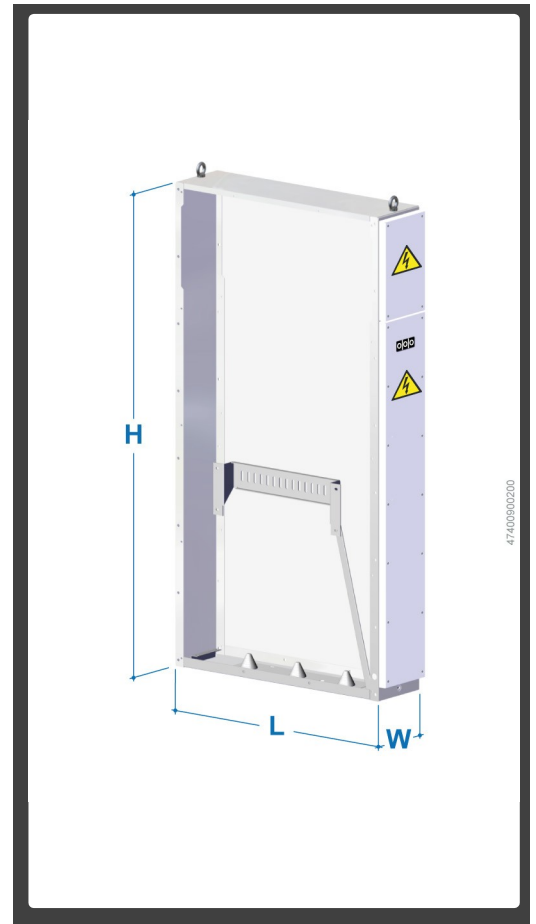
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Technical data of cubicle type “RW / CC”

Table: Technical data

Description	Units of measurement	Value	
		RW	CC
Electrical power supply			
The technical data of the electrical power supply are outlined on the identification plate applied to the cubicle.	-	-	-
Dimensions and weights			
Length L	mm	960	960
Width W	mm	250	150
Height H	mm	1850	1850
Weight	kg	57	50
Environmental conditions			
Maximum operating altitude (a.s.l.)	m	<1000	<1000
Relative humidity (measured at a temperature between 20°C and 40°C)	%	95	95
Operating temperature	°C	-5 ÷ 40	-5 ÷ 40
Ambient lighting	LUX	-	-
Maximum noise level	dB	-	-



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