

MANUAL FOR INSTALLATION,
USE AND MAINTENANCE
FOR M.V. BOARDS SERIES

UNICAM-R

unicamr



MESSINA
ENERGIA s.r.l.
unipersonale

The present document contains the instructions necessary for the installation, the placing in service, the exercise and the maintenance of medium voltage cubicles of the UNICAM/R series.

[It is important read this manual before the installation of the cubicles.](#)

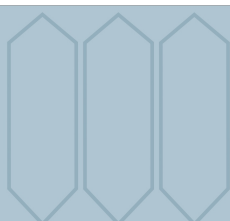
The respect of the information contained in this publication guarantees the operators' safety and the good working of the equipment.

MESSINA Energia S.r.l. declines every responsibility for inconveniences connected to the missed observance of these instructions or to the execution of not foreseen operations in this manual.

MESSINA Energia S.r.l. declines every responsibility for any type of tampering made towards the carpentries and equipment contained in them.

It's not recommended, therefore, a different use of the cubicles from the one shown in all types of schemes inside our documents (see catalogue and manual of use and maintenance).

Ask directly in case of further clarifications MESSINA Energia S.r.l. Barletta (BT)
ITALY



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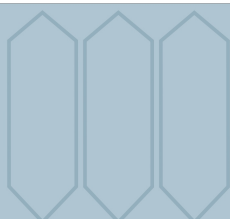
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General description

Elctrics characteristics

Rules and prescriptions

The equipment is corresponding to the Rules:

- Italian: CEI 17-6
- International: IEC 298
- D.P.R. 547 27.04.1955
- current work accidents

Principal electric characteristics

- Rated voltage	kV	12	17,5	24
- Test voltage to f.i. 50 Hz 1 min.	kV	28	38	50
- Rated current busbars	A	400 - 630 - 800- 1250		
- Simm. Short circuit current busbars for 1 sec.	kA efc.	12,5 - 16 - 20		
- Dynamics limit current (crest value) for the busbars	kA cr.	31,5 - 40 -50		
- Outside protection degree	IP 3X			
- Internal protection degree	IP 2X			

The mechanical working and the above-mentioned electric characteristics are warranted for normal service conditions and for inside (CEI 17-21):

- Environment temperature : -5÷40°C Max
- Altitude : 1000m Max
- Humidity : 95% Max
- Environment : Free from contaminations like dust, smoke, salts, gas, corrosive or flammable steams.

Packing and transport- Handling

Shipment

Depending on the means of transport and destination, the shipment can be made by different packages.

For shipments to the national territory (by lorry), pack is made, in almost totality of the cases, for single boxes and only rare cases for groups of two.

Pack consists in a footboard in wood on which the box is fixed, and in an envelope in polyethylene which covers the itself one and protects him from dust and bad weather.

Every pack is numbered with the same number of confirmation taken back on the document of transport.

The accessories and the documents to outfit like electric bolts of coupling, bars of coupling, levers of manoeuvre, fuses, electric and installation schemes, etc. are positioned inside the box.

The circuit breaker is inserted inside the cubicle type "SI".

In case of supply of more cubicles wich compose a switchboard, will be provided n°2 levers of manoeuvre reported to the switchboard and electric and installation schemes referred to the whole board

For shipments to foreign countries or by railways/ships how much saying is worth above to exception of pack that is executed according to the instructions of the carrier.

Material reception

Upon receipt of the material:

- make sure that no handling has taken place during transport
- check that all the materials have arrived, referring to the order confirmation from us issued and accepted
- check that the packaging and its contents do not show signs of damage. Otherwise inform promptly the nearest office of MESSINA Energia S.r.l. and, if deemed appropriate, stick out at the same time claim to the company that carried out the transport..

Weights and dimensions

See the technical sheets of the cubicle.

Note: The weights must be approximate and refer to the compartments complete with equipment.

Handling in general



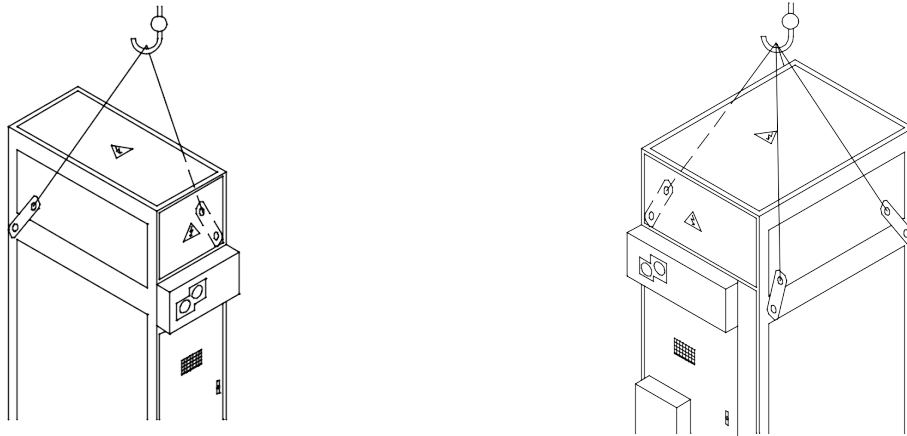
Do not make the boards wave



Do not move the board by acting on the command cells

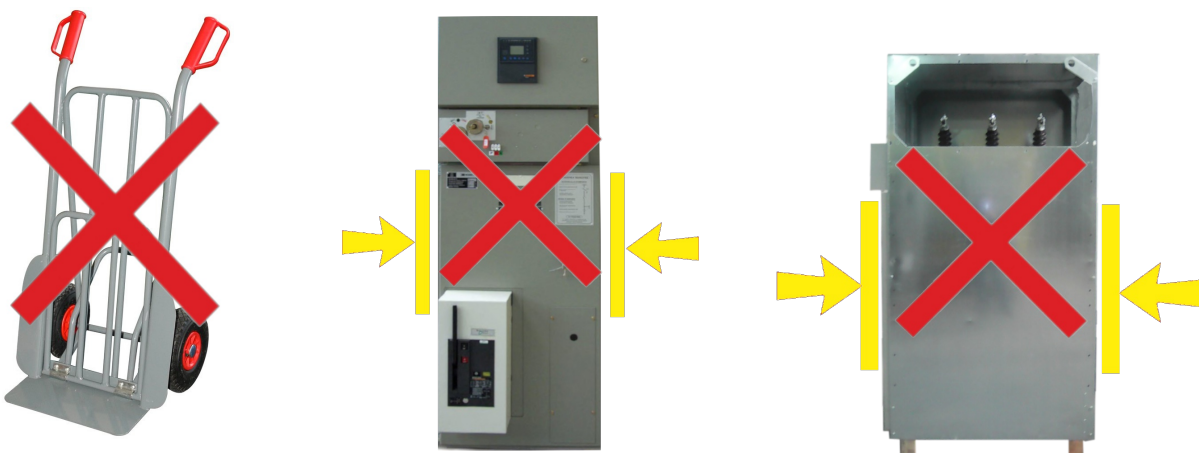
Handling with crane or overhead crane

Each unit must be lifted individually, using a mobile crane or overhead crane of adequate capacity, using the appropriate lifting eyebolts supplied with each unit. During lifting, avoid dangerous maneuvers and / or oscillations.



Handling with forklift

To avoid sharp swings, balance the compartment on the basis of the means of transport support.

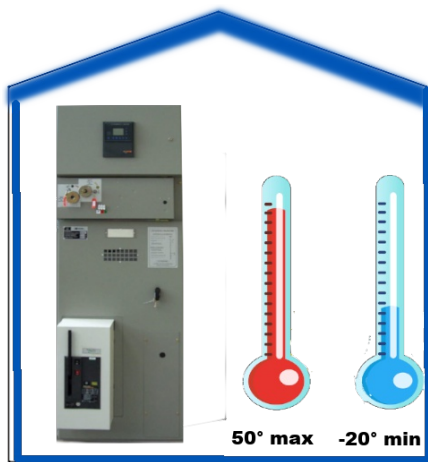


Storage

In the case of long-term storage, keep in a covered, dry and ventilated area.

Restore the original packaging if it has been opened.

If work is in progress near or in the room itself, cover the units with a sheet that protects them effectively against powders, debris, paints, etc.



Installation

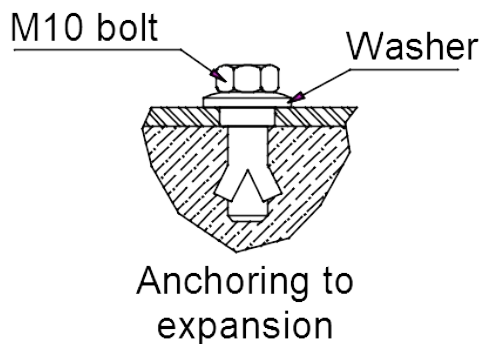
Environmental characteristics

The premises in which they will be installed compartments must be constructed so as to ensure the normal environmental conditions previously defined.

Preparazione del piano di appoggio

Stated beforehand that the plan of support of the switchboard must be positioned in respect to the perimetral walls as described in the Installation board chapter, it must be perfectly levelled, in longitudinal and transverse sense, with maximum levelness tolerance of 2/1000 on all the surface of support of the board.

In the support plan must be provided the passage's drillings of the M.V. and some l.v. cables. The dimensions of the holes and the positioning are noticeable from the technical cards of the cubicles. The position of the four holes is noticeable from the technical cards furthermore to be practised on the plan to fix the boxes by of anchoring to expansion as taken back in the particular "A".



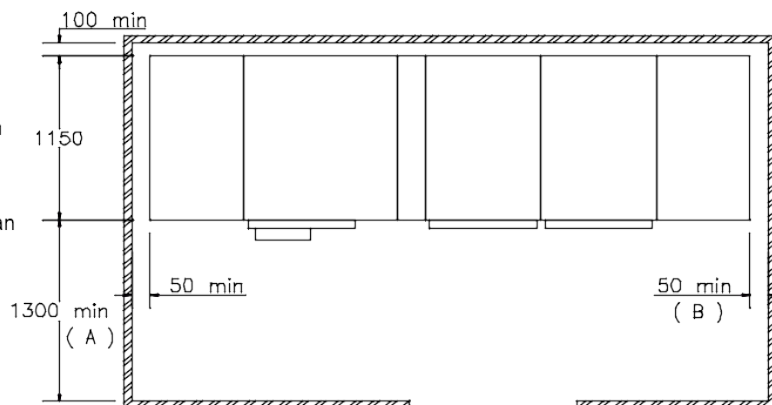
Board installation

- Clean the support surface arranged for the installation of the board.
- Verify, keeping present dimensions of the board and the typology of the cubicles, that the minimum distances taken back in the drawing below are respected.
- Prepare the cubicles for the installation.
- Fix, combine the cubicles and verify the board assembly.
- Mount the principal bars.
- Earth circuit assembly.
- M.V. cable terminal connection.
- Connection cables l.v. (auxiliaries)
- Choice and fuses installation..

-Height clean of the bay in which the board will be installed:
Height board more 500 mm

(A)-Such quote can reduce it at 1000 mm for boards without SI-E/R cubicle.

(B)-Such quote must be min. 300 mm when the adjacent box to the wall is an AC/R box with earthing knife switch.



Preparation of the compartments for the installation

- Remove the polyethylene packaging.
- Remove the wooden platform.
- Check the status of the equipment; the compartments are shipped with:
 - Line switches and disconnectors in open position
 - Earth switch in closed position(with this configuration it is possible to access the compartments protected by doors with interlocks opening the same acting on the handle)
- Remove the sheet metal panel from the roof.
- Remove the busbar compartment front panel (when provided).
- Remove the lower cable compartment panel only for the inverted compartments (SL-B/R – SVT-B/R – SS-B/R – SI-B/R)

Fixing and coupling of the compartments and checking the assembly of the panel

- Proceed with fixing the compartments to the floor using the holes provided in the base panel and by expansion anchors.
In this phase the anchors do not have to be tightened and you have to check the correct leveling of the compartments (otherwise work with shims).
- Proceed with the temporary coupling of the compartments using the appropriate holes prepared on the side walls and the bolts supplied.
(In this phase it is necessary to assemble any internal segregation panels to make details segregations: a typical case is that in which there is a conjunctor with a relative ascent of bars and as a consequence the two busbar systems must be segregated).
- Once the installation has been completed, after checking that the arrangement obtained is the one indicated on the drawing of together with the panel, proceed to lock the various floor compartments and make sure that between them during this operation there will be no deformation of the structures.
- Once the assembly has been completed, fit the appropriate side closing panels on the end sections busbar compartment.
When the end compartments are RC / R-AC / R or SI-E / R in addition to the above panel must be also mounted the side closing panel of the cable compartment.

Assembly of main busbars

Verify the state of the surfaces of contact of the bars if they turn out oxidized (typical case that verifies when the cubicles stay for a long period at deposit) revive the themselves ones with very fine-grained sandpaper and clean with a rag soaked in alcohol.

Mount the bars in copper provided to outfit so as to join the attack points arranged in the various cubicles. The access to the cubicles for such operation is agreed by the high one and the frontal part of the cubicles.

N.B. *The roof of the box only has a pad function therefore it is not pedestrian; avoid in the most absolute way rising, walking or leaning weights against the roof.*

The bars to be used can be of three different lengths among the center of the holes (Type A $L_i=550\text{mm}$, Type B $L_i=700\text{mm}$, Type C $L_i=900\text{mm}$) the A type must be used to combine two cubicles of which one 550 mm wide and positioned on the left frontally looking at the board. The B type one 700 mm wide and positioned on the left must be used to combine two cubicles of which frontally looking at the board.

-> Assembly of main busbars

The C type one 900 mm wide and positioned on the left must be used to combine two cubicles of which frontally looking at the board. For arrangement of bars from 400A to 800A are used M12 bolts mounted as in the drawings afterwards taken back.



The couple of clamping is of 60 Nm

Assembly of the ground circuit

The assembly of the ground circuit has the purpose of realizing the continuity of the earth bar along the whole board.

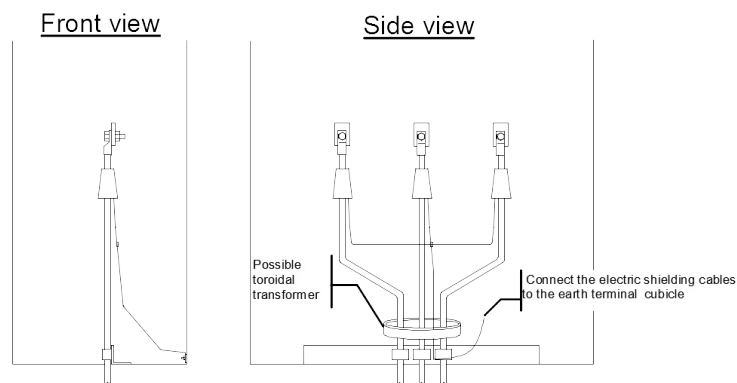
This continuity is achieved by coupling with bridge connections and bolts supplied with the earth bars provided in the compartments.

To this earth bar, located in the rear inside of the compartment, the external ground system must be connected to the panel with a conductor of equivalent section.

In the terminal compartments, after the installation of the earth circuit, close the holes of passage of the earth conductor with the appropriate plates if they have not been used.

M.V. cable connection

Before connecting the M.V. cables make sure that the earthing switch is in the closed position. The cables that can be connected must be of the unipolar type with extruded insulation, with a maximum section of 240mm² and equipped with internal terminals of the type taped with rubber sleeve or heat-shrinking sheath (to make the terminals follow the instructions of the manufacturer). After having made the terminals and after having made them pass through a possible toroid, connect them to the attachment points provided in the compartments starting from the rear phase (only approached bolt). Fasten the cable to the special fixing bracket with clamps, collars or clamps available on request, taking care that the weight of the cable is supported by the cable shelf and not by the connection of the terminal. Tighten the bolts left side by side: the bolt provided for the connection of the terminals has dimensions M12, therefore it is recommended to tighten it with a torque of 60Nm. Connect the cable shields and any toroids to the ground circuit of the compartment as shown below. Mount the bottom plate, available on request, when you want to avoid access from the tunnel inside the compartment to people or animals such as cats, rats, etc ...



Auxiliary l.v circuit cable connection

The auxiliary circuits of all the devices mounted in the compartments: circuit breakers, Load-break switch, space heater, internal lighting, current and voltage transformers, are connected to a terminal board whose location is shown in the data sheets of the individual compartments.

A low voltage box is mounted at the top on the front of the compartments when there are particularly complex auxiliary circuits, in this case part of the said terminal block is housed in the box: generally this is the part intended for the interpanel connections between the compartments composing the panel.

To the terminal board, also accessible with compartments in tension, must be attested all the cables coming from the field whose section must be appropriately sized paying particular attention to the amperometric and voltmetric circuits. The auxiliary cable entry is provided by holes drilled on the floor.

Important:

- *The cables must be connected to the terminal board making reference to the wiring diagrams supplied with the compartment and / or panel.*

Choice assembly and disassembly M.V. fuses

The fuses to be used must be of the type constructed according to the Standards CEI 32-3, IEC 282-1 and DIN 43625.

The fuses are characterized by a nominal voltage, rated current, tripping curve. The choice of fuses must be made by consulting the catalog of the manufacturer according to the loads to be protected.

Assembly and disassembly is performed by inserting / extracting the lower contact of the fuse into the lower fuse holder and then inserting / extracting the other contact into the fuse holder.

To guarantee the release of the Load-break switch, fuses must be used with a firing pin which must be capable of exerting a force of 55N at an initial stroke of 5mm and of 23N at a stroke of 23mm.

Important:

- *Take care when assembling the fuses with a firing pin that is fitted with the firing pin facing the special pad that activates the opening system of the Load-break switch when the fuse intervenes.*

Instructions of putting in services

Checks before putting in services

Visual checks

- **dimensions:** check both the total dimensions of the panel and the individual compartments and their sequence as indicated in the assembly drawing;
- **bars:** check that the main bars are correctly mounted and tightened with a torque of 60Nm;
- **earthing:** check the connection of the panel busbar to the system ground network;
- **insulators:** check the external integrity of the insulators (clean all insulating parts thoroughly with dry rags);
- **foreign bodies:** make sure, checking every single unit, that there are no foreign bodies, such as tools, insects or excessive accumulation of dust inside the various compartments;
- **appliance plates:** verification of the correspondence of the plate data of all the appliances with what is indicated on the drawings of the panel;
- **terminations:** check that the terminals are correctly installed and secured with a tightening torque of 60Nm;
- **fuses:** check that the fuses are correctly positioned (striker facing the release bracket) and are of the type suitable for the chosen use.

Attention:

Before making the next tests assure that there is no voltage presence on the cables and the bars.

Mechanical tests

- **interlock keys and mechanics:** verification of the functionality of all the interlock keys and mechanics;
- **manual commands circuit breakers of manoeuvre disconnection switches:** execution for every circuit breaker of a series of commands of opening and closing acting on the commands;
- **manual commands circuit breakers:** the command of the circuit breaker can be made only with the circuit breaker inserted in the cubicle. Since the circuit breaker is equipped with an interlock key with the line disconnection switch, for command the circuit breaker closing the line disconnection switch is necessary extract the key, insert it in the interlock key of the circuit breaker, unlock it and therefore execute a series of commands of opening and closing acting on the mechanical commands after loading by hand the closing springs;
- **normal commands disconnection vacuum switches:** execution of a few manoeuvres of opening and closing of the disconnection switches acting on the commands;

Functional tests

- verify the correct calibration of the possible installed relè;
- execution of manoeuvres of opening and closing of the devices in room and in remote;
- control of the circuits of alarm, of signaling and electric block;
- simulation of the intervention of the protections with intervention of the circuit breakers;
- verification of the correct position of the auxiliary contacts of the devices in all the positions;
- verify that the secondary circuits of the TA and of TV (if presents) are respectively in series (cto cto) or in shunt (open) especially in the case there are measure or protection links outside the board;

Insulation check

- measure the isolation resistance between the phases, and between these ones and the mass of the primary circuit with circuit breakers in enclosure position. Admissible minimum value: $R=V+10$ (square nominal V =tensione expressed in kV) $M\Omega$.

Placing in voltage of the arrival cables

- Restore the interlocks possibly removed during the tests (the removal of the interlocks is not permitted except the direct supervision and responsibility of responsible for cabin).
- Remount possible removed panels.
- Close the door of the cubicle which has arrival function.
- Open the possible earthing knife switch.
- Put the cables in voltage with the possible open line disconnecting switch (upstream feeding from the cabin).

Check voltage presence (if present)

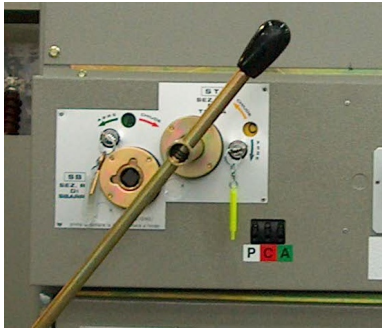
When tensioning the cables, the voltage indicator lamps must light up.

Cubicle with SF6 circuit breaker

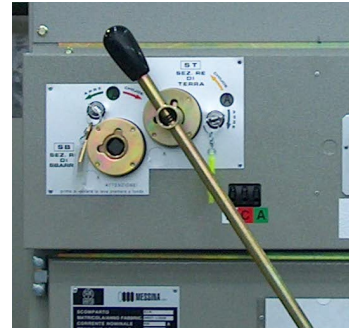
Operating instructions

Putting in services

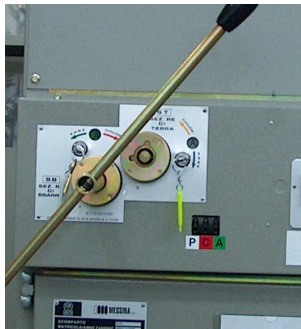
- Close the cubicle's door
- Open the earthing switch (Photo 1-2)
- Close the switch disconnector (Photo 3-4)
- Rotate and extract the key from the key lock of the switch disconnector (Photo 5)
- Insert and turn the circuit breaker key into the appropriate key lock (Photo 6)
- Load circuit breaker's springs and make the closure



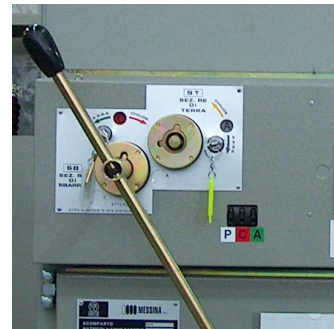
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Cubicle with SF6 circuit breaker

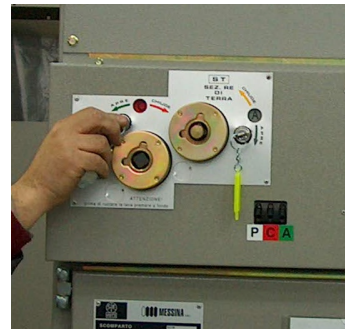
Operating instructions

Putting out of service

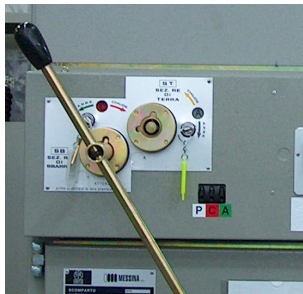
- Open the circuit breaker pushing on the button “O” and extract the key (Photo 1)
- Insert and turn the key into the keylock of the switch disconnector (Photo 2)
- Open the switch disconnector (Photo 3-4)
- Close the earthing switch (Photo 5-6)
- Open the cubicle’s door



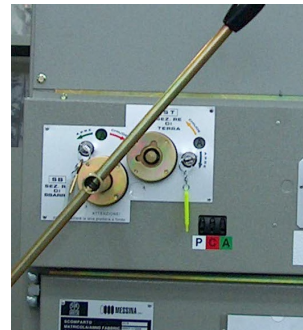
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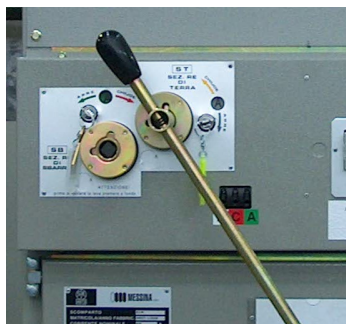
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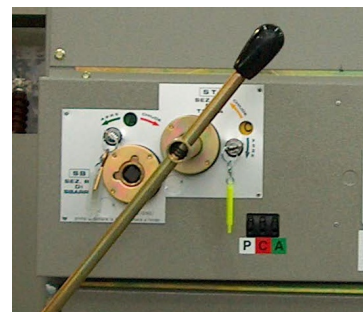
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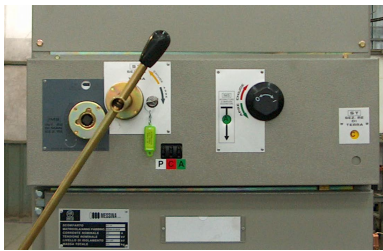
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Cubicle with Load-Break switch(IMS) and fuses

Operating instructions

Putting in services

- Close the cubicle's door
- Open the earthing switch (Photo 1-2)
- Load the Load-break switch's springs (Photo 3-4)
- Close the Load-break switch rotating the appropriate knob placed on the carter (Photo 5)



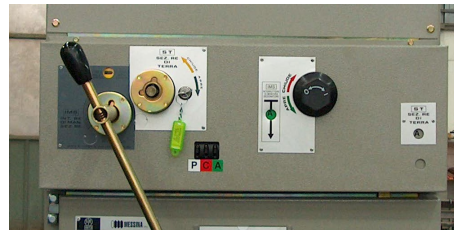
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Cubicle with Load-Break switch(IMS) and fuses

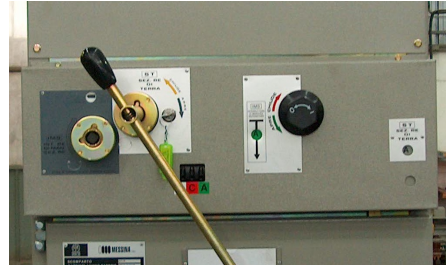
Operating instructions

Putting out of service

- Open the Load-break switch rotating the appropriate knob placed on the carter (Photo 1)
- Close the Load-break switch (Photo 2-3)
- Open the cubicle's door



1



2



3

Troubleshooting

Table of anomalies and remedies

CUBICLE	ANOMALIES	REMEDIES
All the cubicles	The voltage indicator does not light up	Verify that the cables/bars of arrival are in voltage Verify the state of the lamps For the SVT/R, SVT-B/R boxes verify the good state of the M.T fuses.
SL/R SS/R SVT/R SL-B/R SVT-B/R SI/R SI-E/R SI-B/R	The door does not open or cannot be sluice	Verify that the earthing knife switch is closed.
	Impossibility to introduce the manoeuvre lever in the seats of command of the earthing knife switch.	Verify that the door is closed correctly.
	Impossibility to introduce the manoeuvre lever in the command seats	Verify that the introduction of the lever is not prevented by an interlock key.
	It is possible to introduce the manoeuvre lever in the command seat but manoeuvring the earthing knife switch is impossible	Verify that the Load-Break Switch or the rotative disconnecting switch is open
	It is possible to introduce the manoeuvre lever in the command seat but manoeuvring the Load-Break Switch or the rotative disconnecting switch is impossible	Verify that the earthing knife switch is open.
SI-E/R	Closing the door is not possible with closed earthing knife switch	Verifying that the mobile part of the connector of the circuit breaker is correctly inserted in the fixed part.

Contact our Technical office for other anomalies:

Tel. 0039 0883-331446

Fax 0039 0883-522343

Important:

notice the serial number of the cubicles before contacting us for signaling some possible anomalies.

Maintenance

General and maintenance program

Important:

any maintenance intervention must:

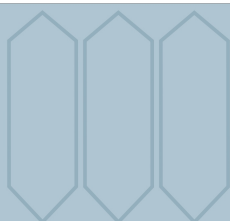
- Be made by staff specialized and opportunely taught
- Be made with the board out of voltage and the grounding interested part.
- Be made respecting all the prescriptions and security directives.
- Be made adopting opportune precautions what padlocks mounted the manoeuvres you interest of the equipment and positioning opportune posters you monitor.

The frequency and the types of maintenance interventions depend on the severity of service of the cubicle/board or from the frequency of the manoeuvres and the environmental conditions.

It's recommended for a condition of normal service to make the following maintenance operations every year:

- Remove dust and dirt from the insulating parts with clean and dry rags.
- Inspect on sight the insulators and possibles TA and TV.
- Remove dust from possible ventilation splits with a dry brush.
- Verify the clamping of the bolts.
- Verify the correct working of the leverages and if necessary fatten the parts in movement.
- Make a few manoeuvres on the electric equipments.
- Verify the functionality of interlock.
- Verify the working of possible anticondensate resistors and internal lighting.
- Verify the working of possible members of the auxiliary circuits: signaling lamps, relè, etc..

After the maintenance, remove the possible posters monitor and padlocks mounted on the manoeuvres, remount the possible removed panels and make all the necessary operations for the putting on servic.







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AGENZIA DI ZONA

