Instruction Manual

PM6

SF6 insulated load break switch 24 kV

Manual hook stick operation

Medium Voltage Distribution

WNW02142P01_EN

10/20 Ind: A0

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Life Is On Schneider Electric

Legal Information

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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Remarks on this manual

As our products are subject to continuous further development, we reserve the right to make changes regarding the standards, illustrations and technical data.
All dimensions specified in this manual are in millimeters.

Purpose and target group

This Technical Manual describes operation and maintenance of gas-insulated medium- voltage switchgear units of the PM6 series. It is exclusively for manufacturer's staff use, or by persons trained for the PM6 series.
Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.
This Technical Manual is an integral part of the product and must be stored so that it is readily accessible at all times for and can be used by persons who are to work on the switchgear. If the switchgear is relocated to another site, this Technical Manual must be passed on to the new operators along with the unit.
This Technical Manual cannot describe every imaginable individual case or every customer-specific version of the product. For information which is not included in this manual, please contact the manufacturer.

Reference documents

The following additional documents should be consulted:

- The purchase contract with the stipulations regarding the specific equipment for cells, legal information and the corresponding electrical diagrams / specific documentation for the equipment.
- The operation manuals of the devices installed in the equipment.
- The assembly instructions from the manufacturer of the cable connection systems to be connected to the equipment, when applicable.
- The assembly drawings supplied with the equipment, when applicable.
- Product Environmental Profile (PEP).
- Instructions for the end of the product’s service life.
- Associated RTU manual (T300 P or others)

CAUTION!

Whenever high voltage equipment is operating, certain components may carry an electrical charge, others may be in motion, and some parts can reach high temperatures. As a consequence, using such equipment may involve electrical, mechanical and thermal risks.

Manufacturers forming part of AFBEL—the Spanish Association of High and Medium Voltage Equipment Manufacturers—in order to provide an acceptable level of protection to people and property, and taking into consideration the applicable recommendations with respect towards the environment, develop and manufacture their products in accordance with the integrated safety principle, based on the following criteria:

Eliminating hazards whenever possible.

When this is not technically or economically feasible, incorporating adequate protections in the equipment itself.

Informing users of the remaining risks to facilitate the design of operating procedures that prevent said risks, the training of operating

personnel who carry out said procedures, and the use of the pertinent personal protection equipment.

Using, in accordance with the state of the art and the applicable technical and economic restrictions, recyclable materials and establishing treatment procedures for the equipment and its components so that, once its service life has ended, they can be conveniently handled at in order to respect, as far as possible, the environmental criteria established by the competent bodies.

Warranty

The manufacturer guarantees this product against any defect in materials and malfunction during the contractual period. If a defect is found, the manufacturer may choose to repair or replace the equipment. The warranty does not cover indirect effects of the malfunction or defect and its repair, such as loss of profits and downtime. Improper handling of the equipment as well as repair by the user will be considered as a breech of warranty and will give rise to its definitive cancellation.

Safety information

The following special messages may appear throughout this manual or on the equipment to warn you of potential hazards, or to draw your attention to information that clarifies or simplifies a procedure.

This is the safety alert symbol. It is used to warn of hazards that can cause personal injury. Observe all safety indications following this symbol to avoid possible injury or death.

This symbol added to a "Warning" or "Danger" safety label indicates an electrical hazard that may cause personal injury if instructions are not followed.

DANGER

DANGER indicates a hazardous situation that, if not avoided, **will cause** death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION

CAUTION indicates a hazardous situation that, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to adress practices not related to physical injury.

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledges related to the construction and operation of electrical equipment and its installation and has received safety training to recognize and avoid the hazards involved.

1. Safety provisions

Before performing work on the panel, it is essential that you comply with the following instructions:

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Before removing covers and before performing assembly or maintenance work, make sure you isolate the system from the high voltage and the supply voltage , and that you ground it.
- **Comply with the five safety rules:**
  - Isolate from the power supply
  - Make sure that the unintentional restart (reclosing) is prevented
  - Verify zero voltage
  - Earth and short-circuitof all possible voltage sources
  - Cover or cordon off adjacent live components.

Failure to follow these instructions will result in death or serious injury.

WARNING

RISK OF INJURY DUE TO MOVING MECHANICAL PARTS

Prior to carrying out assembly and maintenance work:

- Isolate the system from the supply supply
- Do not remove the mechanism during maintenance work.

Failure to follow these instructions will result in death or serious injury.

WARNING

RISK OF SEVERE DAMAGE FROM INSULATING GAS LEAKAGE

- Do not drill into or open the pressurized container

Failure to follow these instructions can result in death or serious injury.

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WARNING

RISK OF FALLING DURING MAINTENANCE TASKS

The topsides of the switchgear panels cannot be walked upon:

- Pay attention to cracks or holes in the floor of the switchgear room
- When working on the topside of the switchgear panels temporarily attach a mounting frame that can be walked upon. Secure the workplace when working on switchgear panels.

Failure to follow these instructions can result in death or serious injury.

CAUTION

RISK OF INJURY DUE TO SHARP-EDGED SHEETMETAL AND METAL PARTS
During installation and maintenance work:

- Always wear the approved protective clothing in accordance with the valid accident prevention and work regulations
- Always cover sharp edges.

Failure to follow these instructions can result in injury.

For the equipment described in this manual and/or in its immediate vicinity, paragraph 12.3 of the IEC 62271-1:2017 standard will be followed, and only properly trained and/or supervised personnel will be considered (according to EN 50110-1, EN 50110 -2, IEC 61936-1 / EN 50522). Keep the national regulations applicable in the country where the equipment is to be installed.

Personnel must be fully familiar with the instructions and warnings contained in the manual and also with those of a general order which are applicable in accordance with the legislation in force (Occupational Hazards Prevention Law and, as it may be appropriate, the General Health and Safety Ordinance).

All the aforementioned has to be seriously taken into account as the correct operation of this unit depends not only on its design but also on circumstances beyond the control and responsibility of the manufacturer, as may be:

- Appropriate transport and handling on the way from the manufacturing plant to the installation site.
- Any intermediate storage made under conditions which do not alter and/or damage the characteristics of the unit or any of its basic parts.
- Installation carried out according to the instructions given in this manual and the rules of sound practice.
- Service conditions compatible with the rated characteristics of the equipment.
- Handling and service operations strictly according to the instructions given in the manual, showing a clear understanding of the operating and safety principles involved.
- Appropriate maintenance for the real service conditions.
- End of life treatment carried out according to the instruction manual and in accordance with the legislation in force at the time.

For this reason, the manufacturer will not be responsible of any direct or indirect damage resulting from

any breach of the warranty or of the aforementioned instructions, under any jurisdiction including personal injuries or good damages, non-profits, periods of inactivity time, cost of repair or replacement of materials.

Recycling your equipment at end-of-life

This equipment contains SF6, a powerful greenhouse gas that is harmful to the environment. Prior to disposal of equipment at end of life, the SF6 gas must be recovered in order for it to be recycled, reclaimed or destroyed.

DO NOT carry out any dismantling operations unless authorized.
DO NOT handle SF6 unless certified.
DO NOT release SF6 gas to the atmosphere.

Penalties may apply according to local regulations and rules (Regulation EU No 517/2014 for all European countries).

Schneider Electric offers a complete service to dismantle and recycle Medium Voltage equipment and SF6 gas at the end-of-life. This service is compliant with IEC 62271-4:2013 and conforms to local regulations. Please contact Schneider Electric for details.

SF6 is a powerful greenhouse gas having a Global Warming Potential of 22800 compared to CO2 (in accordance with the 4th IPCC assessment report and annex I of EU regulation on fluorinated gases 517/2014)

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2. Characteristics and applications

2.1. Service conditions

PM6 24 kV pole-mounted load break switches are insulated in SF6, within a metallic enclosure for OUTDOOR installations and in accordance with the applicable national and international standards.

PM6 24 kV pole-mounted load break switches have been designed and manufactured in accordance with the latest technology and meet the most demanding requirements as far as service reliability and availability are concerned. The reliability and service life of this equipment depend on its correct application, as specified in the instructions, and proper maintenance. Hence the importance of observing the instructions contained in this manual.

The PM6 switch is designed to be used in accordance with its nominal characteristics and normal service conditions (class --30 ° C, outdoor) according to IEC 62271-1:2017.

- Maximum temperature : 40 ºC and its average value, measured over a period of 24 h does not exceed 35 °C.
- The ambient air temperature does not drop below -30 °C;
- The altitude does not exceed 1 000 m.

Any other use could affect the performance qualities of the unit. Therefore, before starting with its handling and installation, it is essential to read and understand this manual. Also, installation and service should be carried out by appropriately trained personnel.

The manufacturer will accept no liability for any consequence which may be derived from the non-compliance with the instructions of this manual or any operation which is not described in this manual.

Should any operation of this kind be carried out, it is advisable to inform us first.

Comply the described operations with the current safety regulations applicable to the location and be carried out under the responsibility of a qualified person appointed by the client.

As a result of product development, certain characteristics of the unit may not exactly correspond to the information given in this document. If in doubt, please do not hesitate to contact us using the contact details at the end of this manual.

2.2. Description

The PM6-24, used in 24 kV public distribution networks, is an overhead switch-disconnector , with breaking and insulation using SF6, designed for outdoor mounting on different types of standard poles.

A switch-disconnector is a device used to open and close MV lines with the possibility of breaking current (up to 630 A), making short circuit current (up to 16 kA.) and is a disconnector in open position .

It can be installed in overhead, rural and semi-urban distribution networks up to 24 kV.

Although it is specially designed for remote operation functions (motorised version), there is also a variant for manual operation only.

It basically consists of:

	Manual	Motorised
-Three-phase SF6 insulated switch	x	x
-Electric mechanism.		x
-Manual mechanism.	x	
-Manual command	x	x
-Command box, which includes a power supply, electric command system and interfaces needed for remote control		x

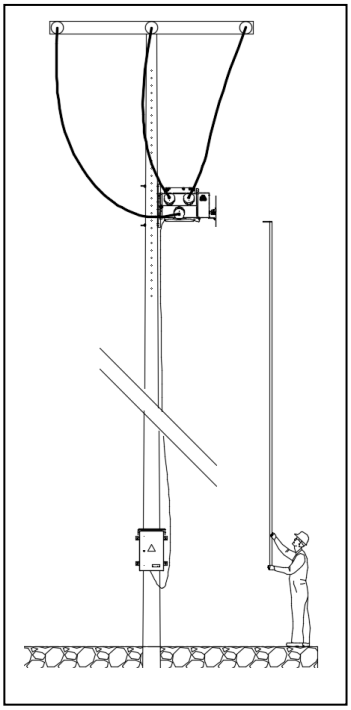
The unit is manufactured for mounting on a MV line pole.

It can be operated:

- Remotely: via remote control in the command box. (motorized version).
- Locally with the electric command activated from the command box (motorized version) and with a manual hook stick command (manual and motorized version).

The main device consists of the switch-disconnector unit, plus a manual or electric mechanism, mounted on a frame, with a manual hook stick operation and the command box (motorized option).
Its operating limitations are established by the application standards and a listed in section 2.1

Options:



Base option:

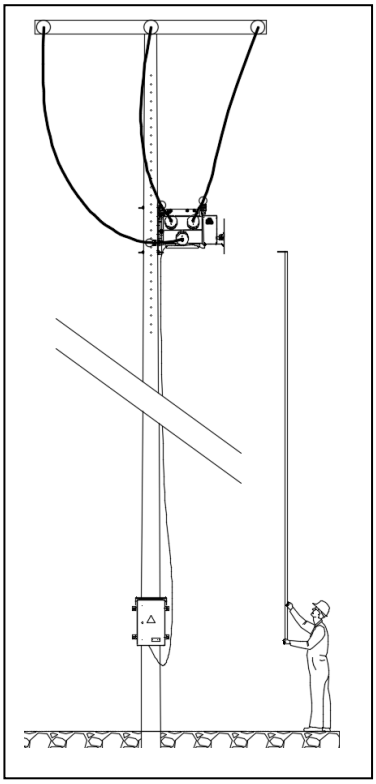
Direct connection to the MV line.

・Switch unit and command mounted to the frame.

・Manual command.

・Command box. (motorised only)

Fig. 2.2(1)



Option 1:

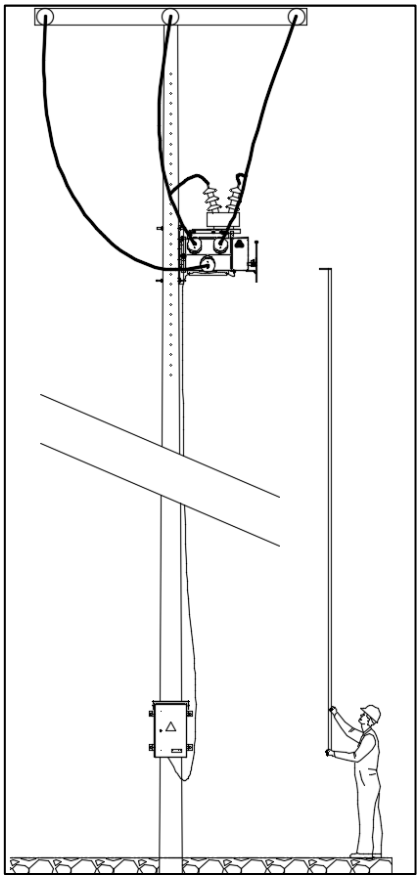
Connection to MV line via surge arresters.

Switch unit and command mounted on a frame equipped with surge arresters.

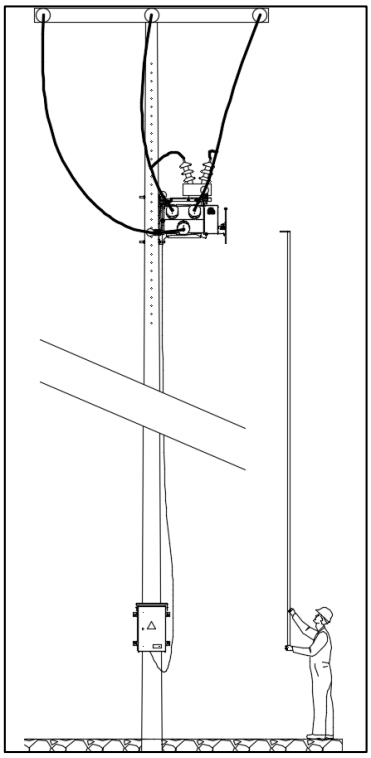
Manual command.

Command box. (motorised only)

Fig. 2.2(2)

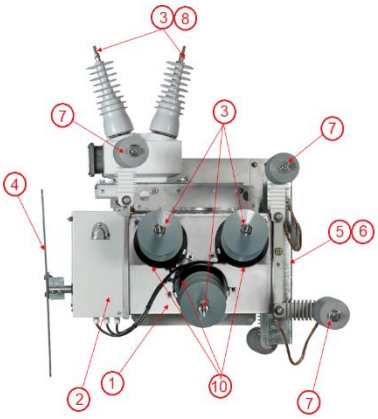


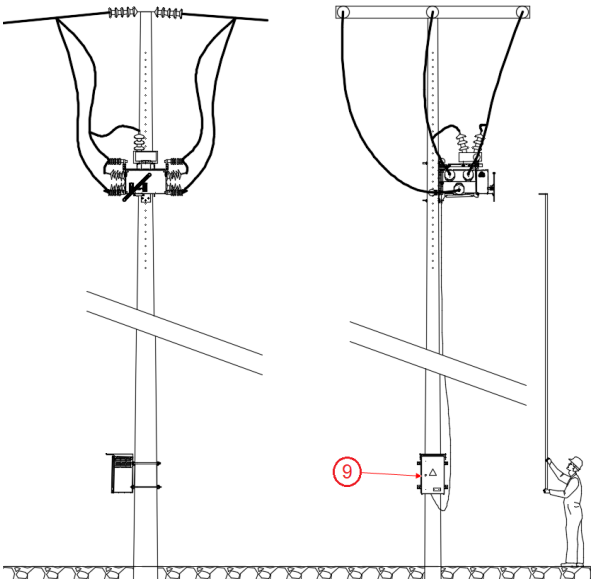
<u>Option 2 (motorised only)</u>
Direct connection to the MV line, power-supply to the command box via voltage transformer
Voltage transformer installed on the frame.
Manual command
Command box.
Fig. 2.2(3)



<u>Option 1+2 (motorised only</u>):
Connect to the MV line via surge arresters, , power-supply to the command box via voltage transformer.
· Switch unit and command mounted on the frame equipped with surge arresters and a voltage transformer.
· Manual command.
· Command box.
Fig. 2.2(4)

Option 3 (motorised only):
Fault detection, this function is done by current transformers mounted to one side of the switch output.
Automatic opening at zero voltage of the reclosing cycle of the main circuit breaker or recloser.
The automatism is set to turn the system on after one, two, three or four failures.
This option is only possible when associated with options 2 and 3.
Fig. 2.2(5)





Components:

1 PM6 switch-disconnector.
2 Electric or manual mechanism.
3 MV line connections.
4 Manual command hook stick.
5 Support frame .
6 Support to pole.
7 Surge arresters.
8 Voltage transformer.
9 Command box.
10 Current transformers.

Fig. 2.2.(1)

2.3. Applied standards

IEC 62271-1 **(2017)**	Common specifications for alternating current switchgear and controlgear.
IEC 62271-200 **(2011)**	AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
IEC 62271-102 **(2003-2018)**	Alternating current disconnectors and earthing switches
IEC 62271-103 **(2011)**	Switches for rated voltages above 1 kV and including 52 kV.

2.4. Technical characteristics

Rated voltage	kV	24
Nominal current	A	630
Rated short-duration power-frequency withstand voltage	kV	50
Rated lightning impulse withstand voltage	kV	125
Rated peak withstand current	kA	40
Rated short time withstand current	kA	16
Switch class (According to IEC 62271-103)		E3 M2
Service conditions		-30ºC, +40ºC
Insulation gas		SF_6
Rated filling presure, relative		0.032 MPa
IP Code . mechanism		IP - 54

3. Handling, transport and storage

3.1. Dimensions and weights

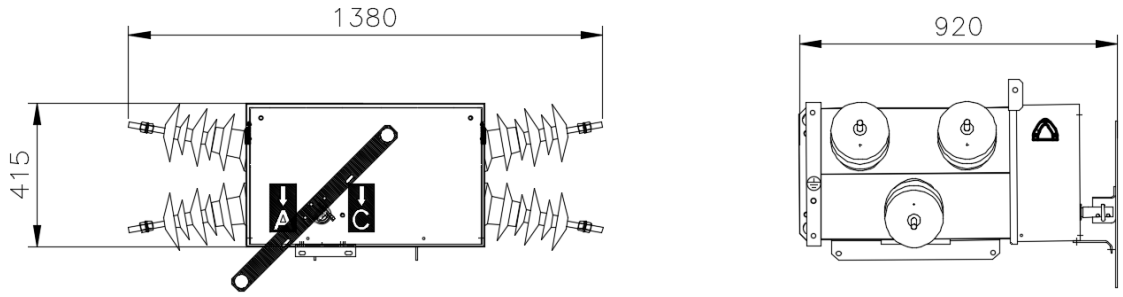


Fig. 3.1(1)

PM6	
COMPONENT	**APPROX. WEIGHT (Kg)**
SWITCH + CT	100
VT SUPPORT FRAME	5
SUPPORT TO POLE	15
VOLTAGE TRANSFORMER	50
COMMAND BOX	45

3.2. Supply, packing and transport

The product is shipped at the customer's expense, except when expressly stated otherwise. Consequently, the company shall not be held liable for problems related to supply.

⚠ WARNING

HAZARD OF TOP HEAVY LOAD

- If lifting the equipment by forklift, stabilize the shipping section with a safety strap.

Failure to follow these instructions can result in death or serious injury.

⚠ CAUTION

HAZARD OF UNBALANCED LOAD OR EQUIPMENT DISTORTION

- Do not remove the pallet until the shipping sections have reached the installation location.
- Always use the pallet to prevent equipment distortion.

Failure to follow these instructions can result in injury or equipment damage.

Delivery form:

The handling instructions on the packaging must be followed.
There must be suitable transport and handling from the factory outlet to the installation site. Consult the manufacturer for any queries.
The load switch-disconnector is either packaged in a crate or covered in plastic wrap.

The equipment is supplied in 1 packages

Package 1:

-Switch-disconnector , VT and CTs.
-Support to Pole .
-Command box.
-LV Connection cable. (PM6 command , current transformer , voltage transformer cables)
-surge arresters.

Lifting and transport equipment:

The handling instructions given on the packaging must be observed.
Forklifts and/or cranes may be used for its transport and handling. (figure 2)
Avoid:
- Bumps and sudden movements, which may affect the components.
- Leaving the packages improperly positioned or on unstable surfaces.
- Sliding them or moving them up inclined planes or stairs.

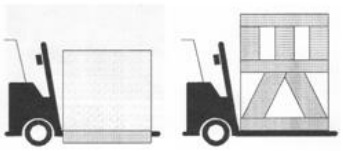


Figure 3.2(1)

3.3. Reception

Inspection:

Once the equipment arrives at its destination, verify that the packaging corresponds to the requested order according to the associated documentation.

It is recommended to perform a sight check of the devices, to verify if any damage has occurred during transport.

The completion of the report and notification to MESA during the warranty period, from the date of receipt, is essential to demand any responsibility.

	■ **Reception**	Acceptable	Rejected
1	• Verify that the package itself and contents are not damaged. If the package is in poor condition and the contents are suspected to have been damaged, consider rejecting it or make a thorough review of the entire contents.	☐	☐
2	• Check the materials list according to the packing list	☐	☐
3	• Notes		

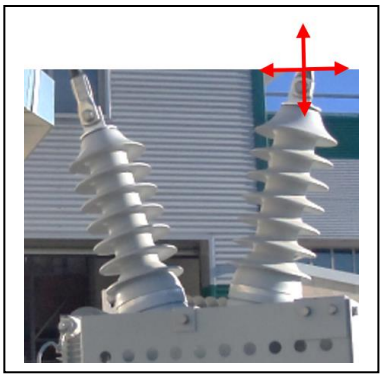
3.4. Handling and unpacking

Unpacking.

Great care must be taken when unpacking the equipment to prevent breakage or damage to the conductive parts of the switch-disconnector or the Voltage Transformer.
Once the package has been opened, as indicated, release the low-tension cabling in such way that it remains tight, so as not to displace the device's center of gravity.

	■ **Prior verifications**	Acceptable	Rejected
1	Check the package contains all the materials indicated on the packing list. • If material is missing, evaluate whether assembly can continue or to reject the package.	☐	☐

3	Validate the PM6 and voltage transformer nameplates, checking it corresponds to those of the MV network.	☐	☐
4	Make a visual check of the condition of the materials contained in the unit: • If the unit is damaged, evaluate the importance and reject the package with the suspicion that it may affect operation.	☐	☐
5	Make a visual check of the silicone bushings of the switch-disconnector and the VT. (fig. 3.4 (1) and (2)) • Check for any breakage, imperfections or stains on the silicone. Evaluate their importance to decide whether to reject them or not	☐	☐
6	Make a sight check that the VT, Switch or CT command box interconnection cables and connectors do not show any damage. • If damage is noted in the cables or connectors, evaluate rejecting them.	☐	☐



. Fig. 3.4(1)

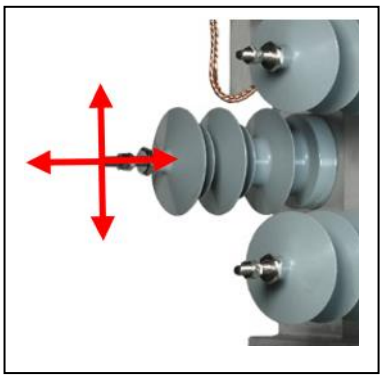


Fig. 3.4(2)

3.5. Storage

- The switch is to be stored in its original packaging.

- Protect against aggressive atmospheres such as chemical agents: cement dust, acid fumes, smoke, saline environments, etc.
- Store in a dry and ventilated place.

- In general, all parts must be stored in a rational and organised way.

- After extended storage and before putting them into operation, clean them as indicated in section 7 on maintenance of this document.
With a temperature between –30ºC and 40ºC.

The devices must not be kept in sealed packaging, such as maritime freight containers, for a period exceeding six months.

- Check the condition of the battery and the set of cables.

CAUTION
- The battery should never be stored for more than 3 months without being recharged.
- In order to maintain the battery properties, the command box itself must be used to recharge the batteries, never a car battery charger.

4. Installation

4.1. General Conditions

This section contains instructions for installing PM6-24 switches. Prior to installing, dismantling or working on or inside the equipment, please read and have a good understanding of these instructions.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

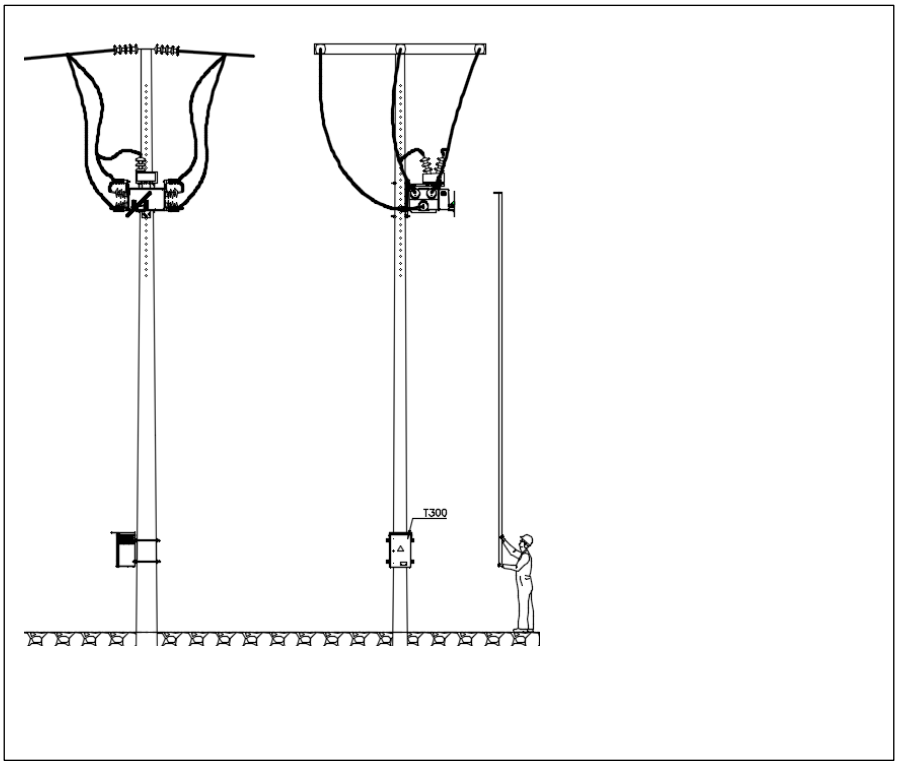
- Apply appropriate personal protection equipment (PPE) and follow safe electrical work practices.
- This equipment must only be installed and serviced by qualified, trained, and certified electrical personnel.
- Only qualified electrical personnel familiar with medium voltage circuits should perform the instructions in this bulletin. Personnel must understand the hazards involved in working with or near medium voltage equipment,
- Turn off all power supplying this equipment before working on or inside it.
- Always use a properly sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on the power to this equipment.

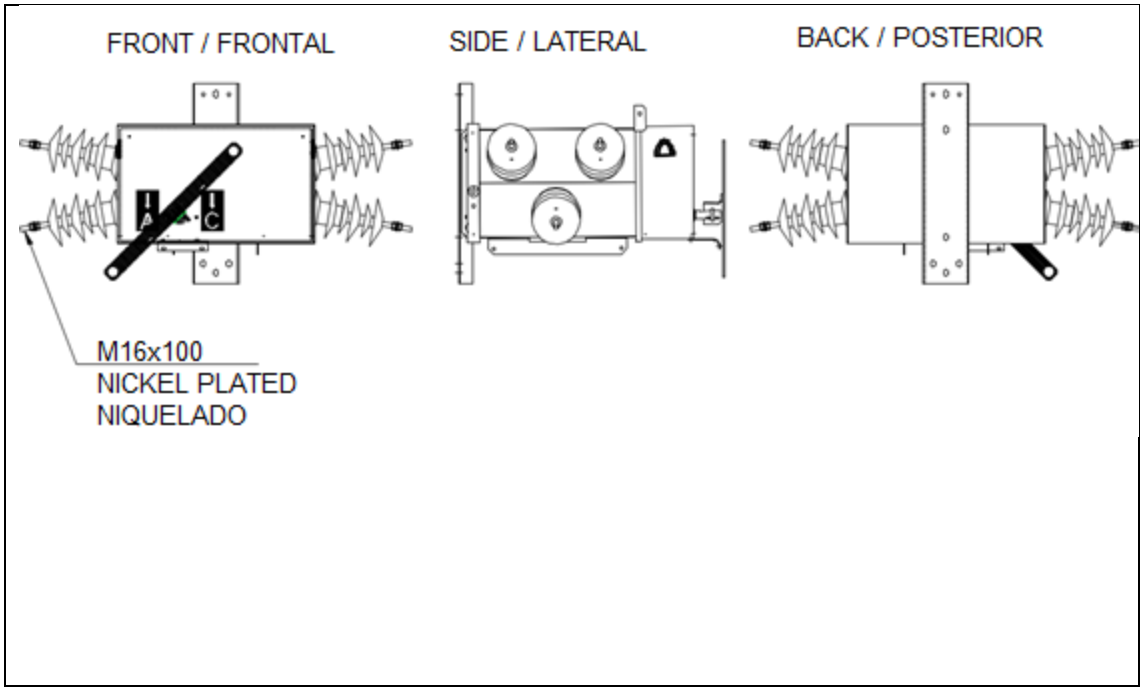
Failure to follow these instructions will result in death or serious injury.

Before starting the assembly process, check that all the switchgear and material recorded in the transport documentation is in good condition, and the required tools are available.

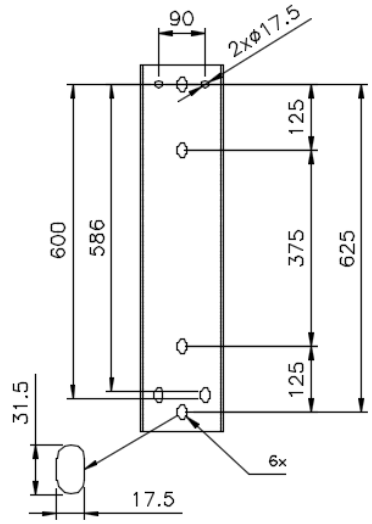
Follow the steps in this section to make control-wiring connections.
1. Consult the customer wiring diagrams for re-connection of control wiring at the shipping splits, when applicable. Each wire has been identified and previously connected during assembly when tested at the factory.
2. Make all outgoing control connections according to the wiring diagrams. After wiring is complete, carefully

4.2. Assembly

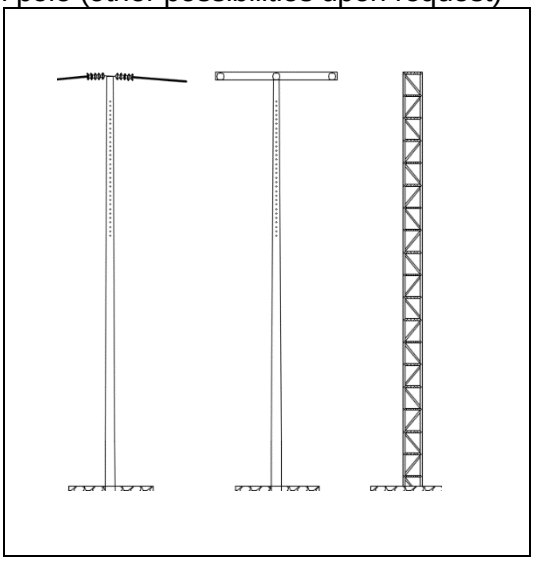

T300


FRONT / FRONTAL
SIDE / LATERAL
BACK / POSTERIOR
M16x100
NICKEL PLATED
NIQUELADO

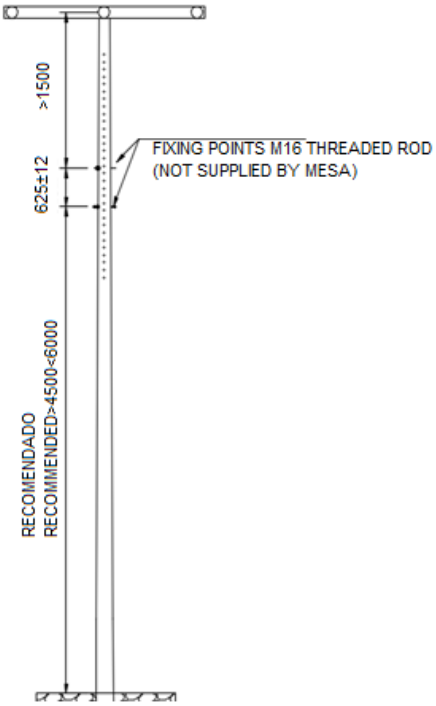
DIMENSIONS FOR ANCHORING THE SWITCH

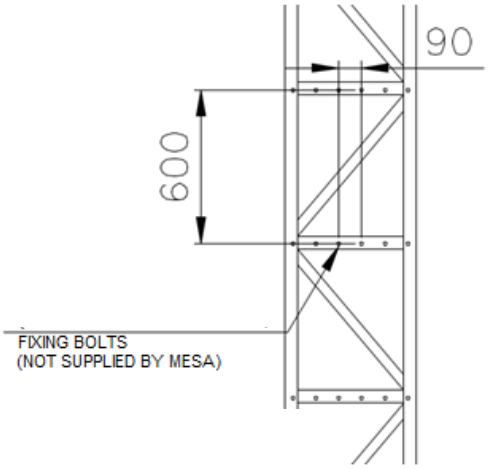


Suitable for installation:
Concrete or lattice steel pole (other possibilities upon request)



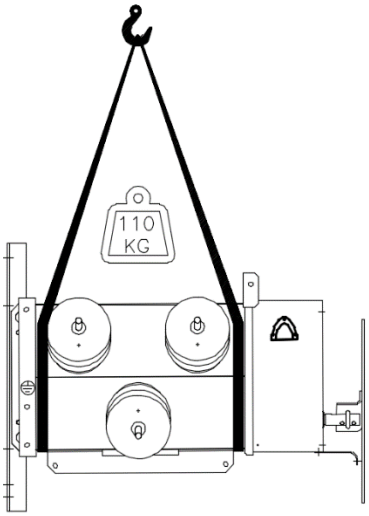
FIXING SCREWS MINIMUM QUALITY 8.8 OR STAINLESS STEEL, (NOT SUPPLIED BY MESA)



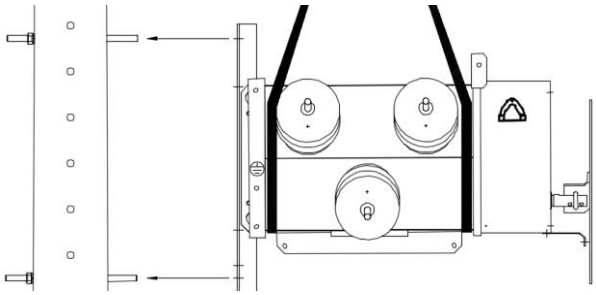


LIFTING

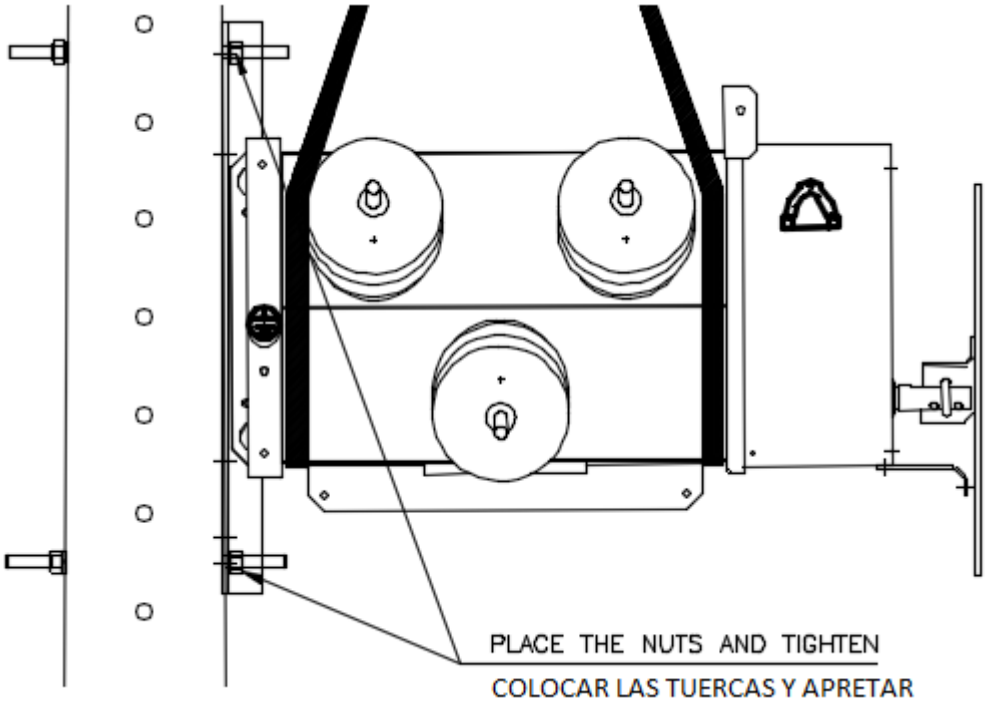
Three-meters slings needed not supplied by mesa



LIFT THE SWITCH TO THE ANCHOR BOLTS AND SCREW

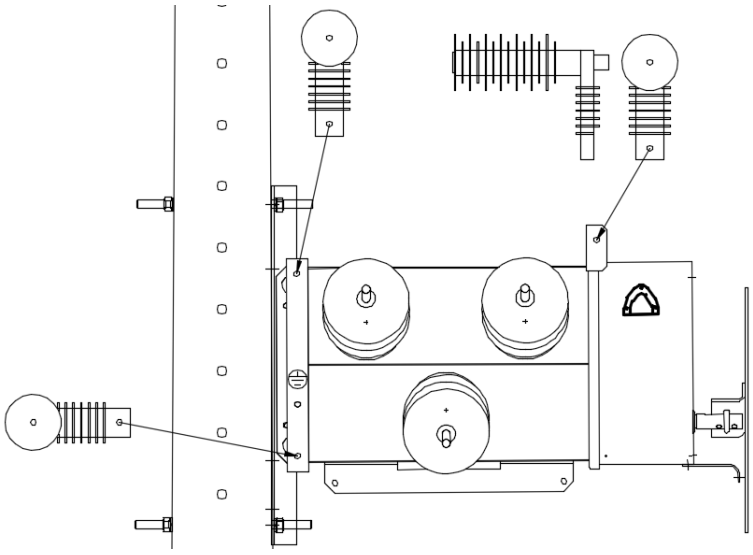


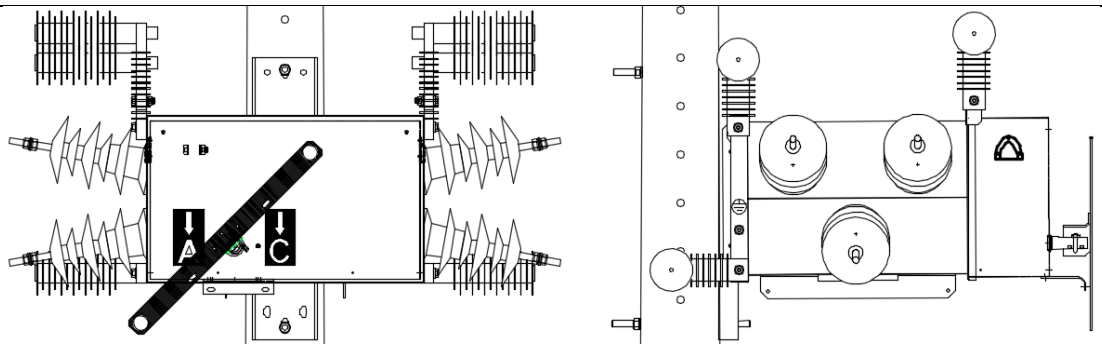
TIGHTENING TORQUE 18Kpm



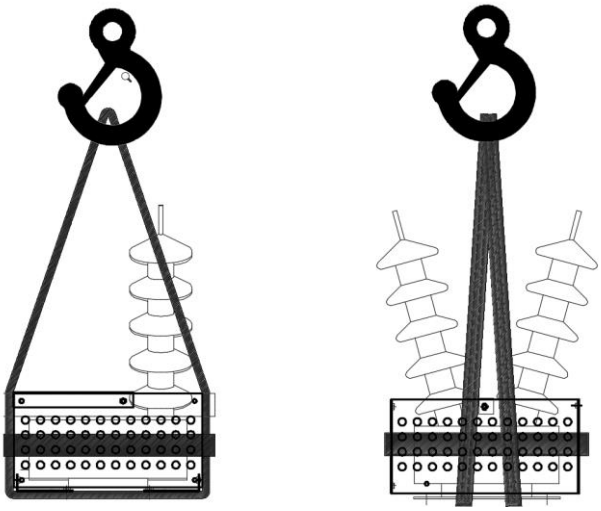
ACCESORIES

6 SURGE ARRESTERS, 6 STAINLESS STEEL SCREWS M12x50, WASHERS AND NUTS (SUPPLIED BY MESA)

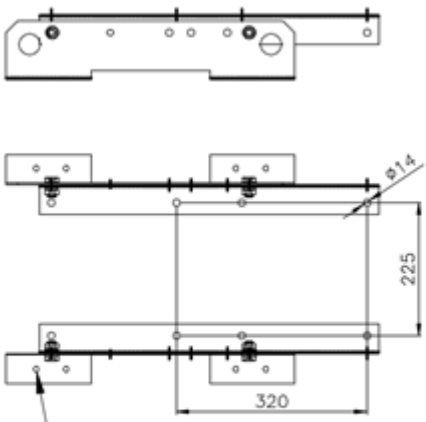




VOLTAGE TRANSFORMER MOUNTED ON SUPPORT TO FIX ON THE SWITCH. BOLTS, NUTS AND WASHERS (SUPPLIED BY MESA)
LIFTING USING 3 BELTS (NOT SUPPLIED BY MESA)

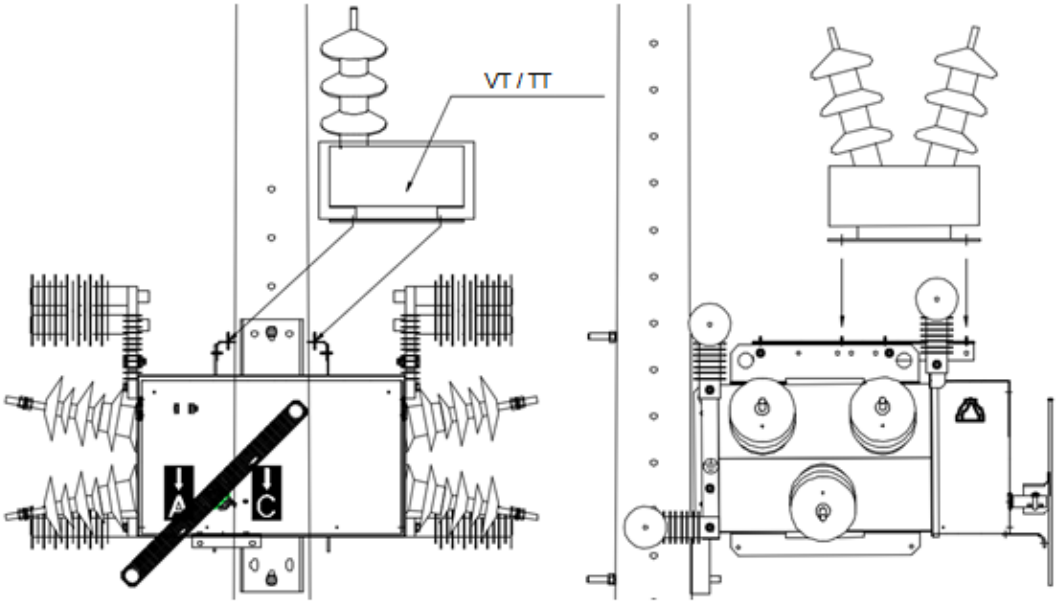


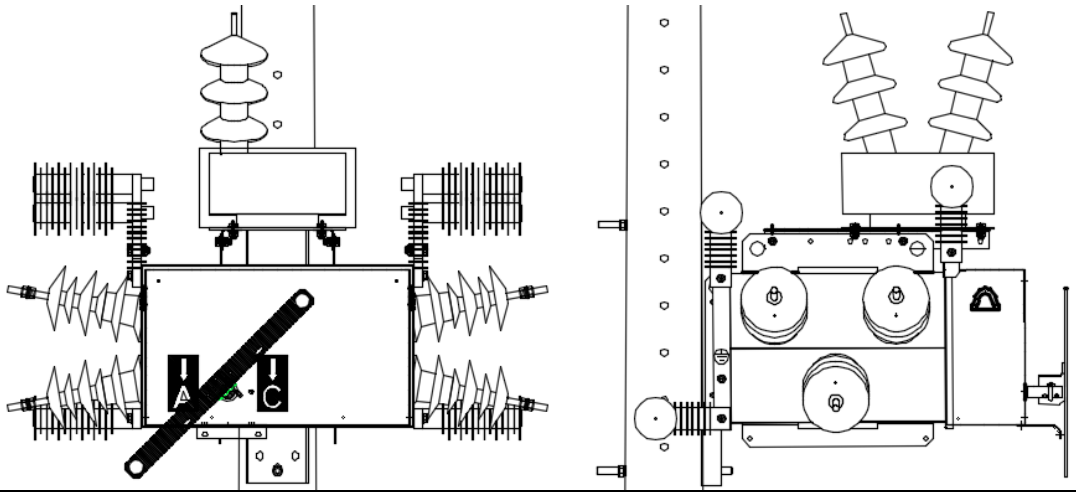
Support with standard anchors for different ratio voltage transformers supplied by mesa



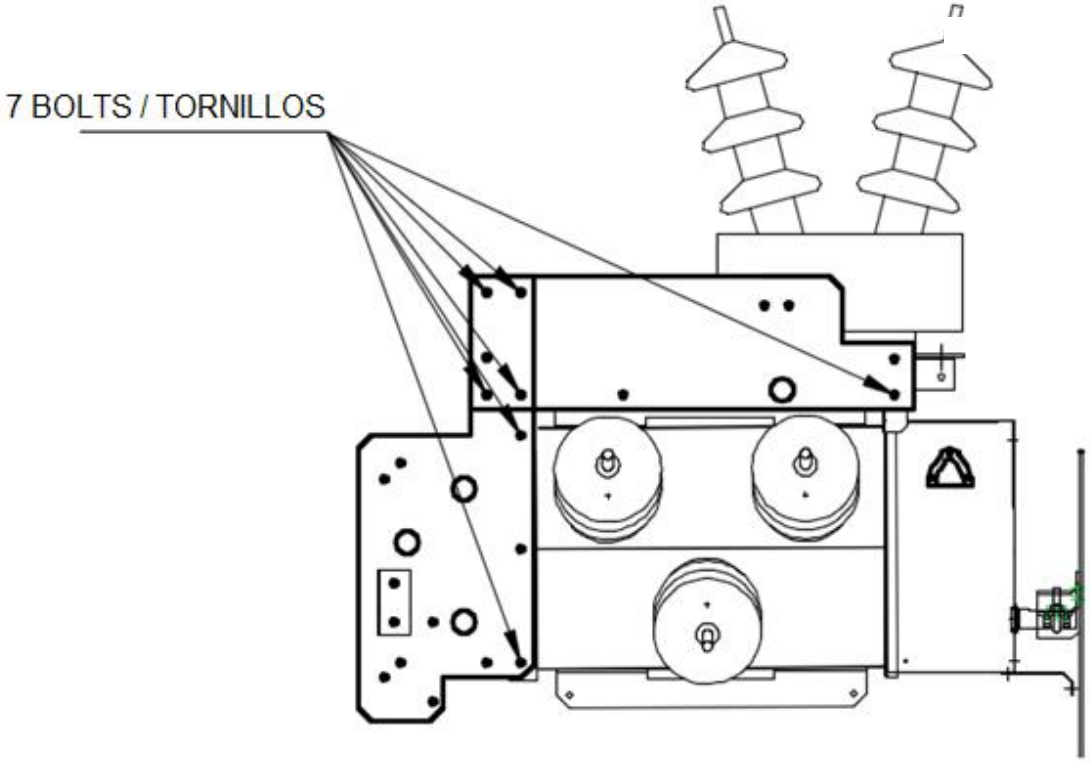
DRILLS TO HOLD THE SUPPORT TO THE TANK

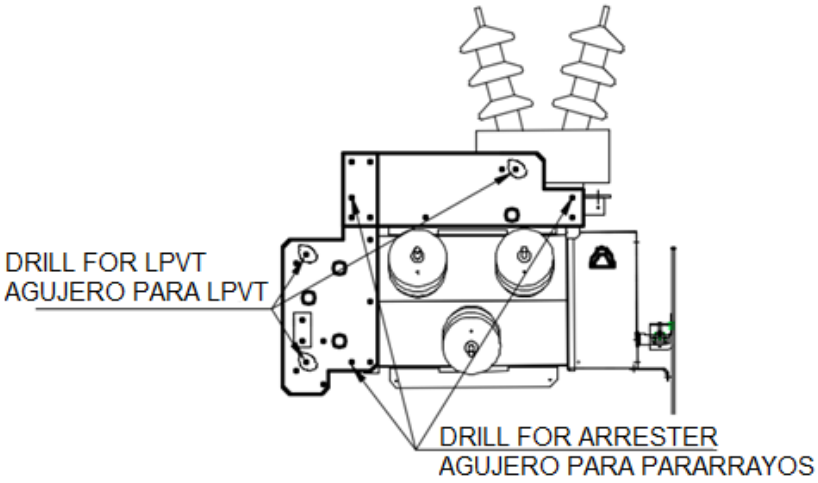
TALADROS PARA SOSTENER EL SOPORTE AL DEPÓSITO



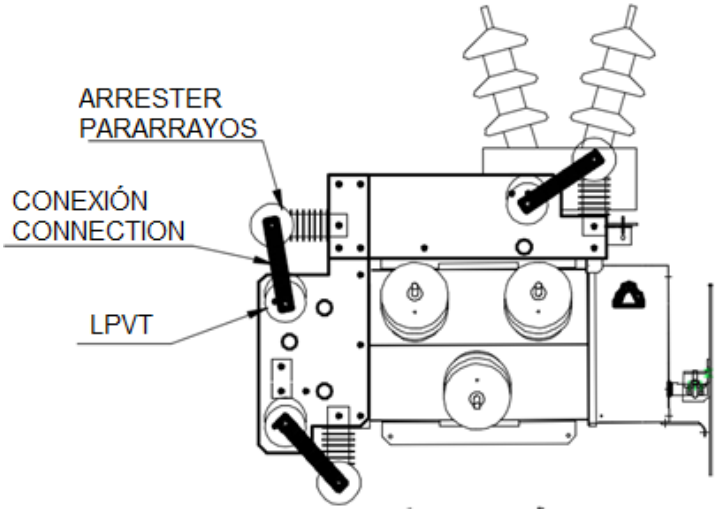


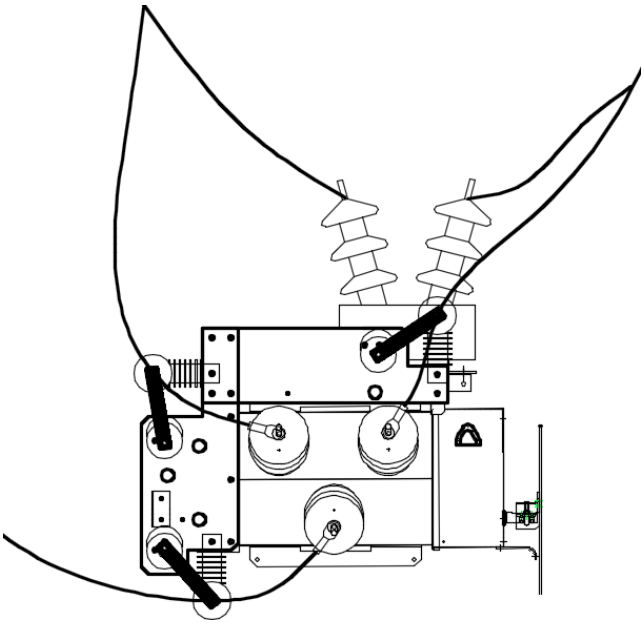
Option lpvt: - fix the supports to the switch, bolts supplied by mesa



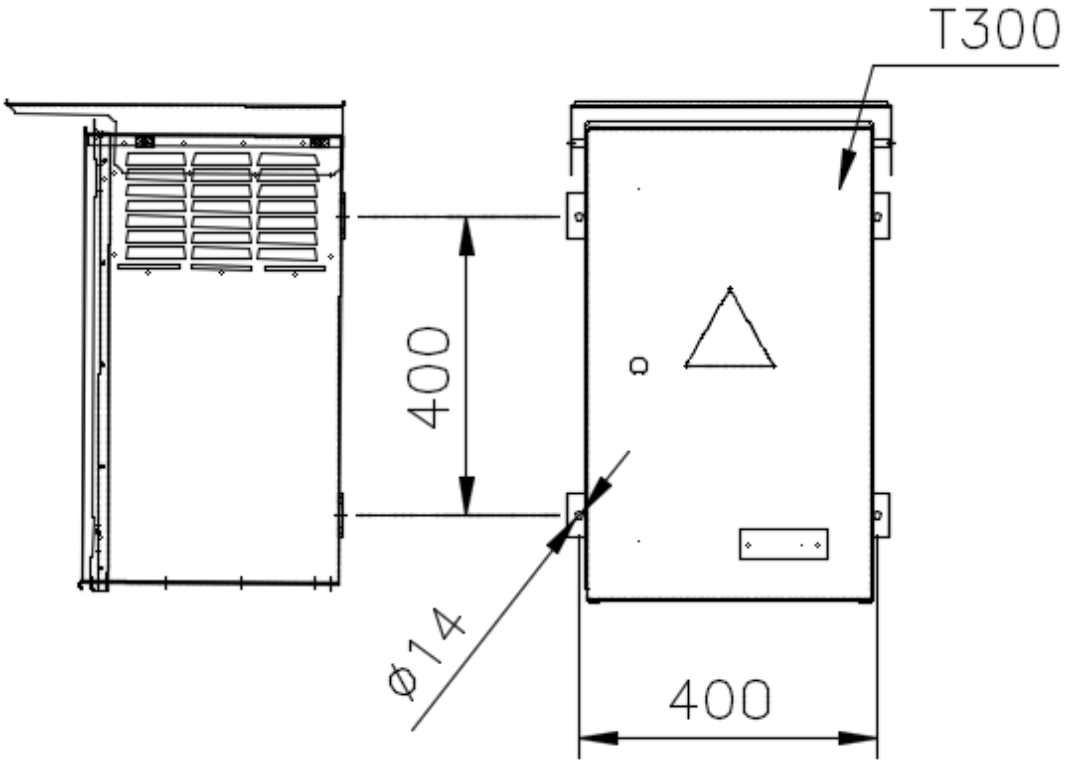


PLACE LPVT, SURGE ARRESTERS AND MV CONNECTIONS ACCORDING TO THIS DRAWING



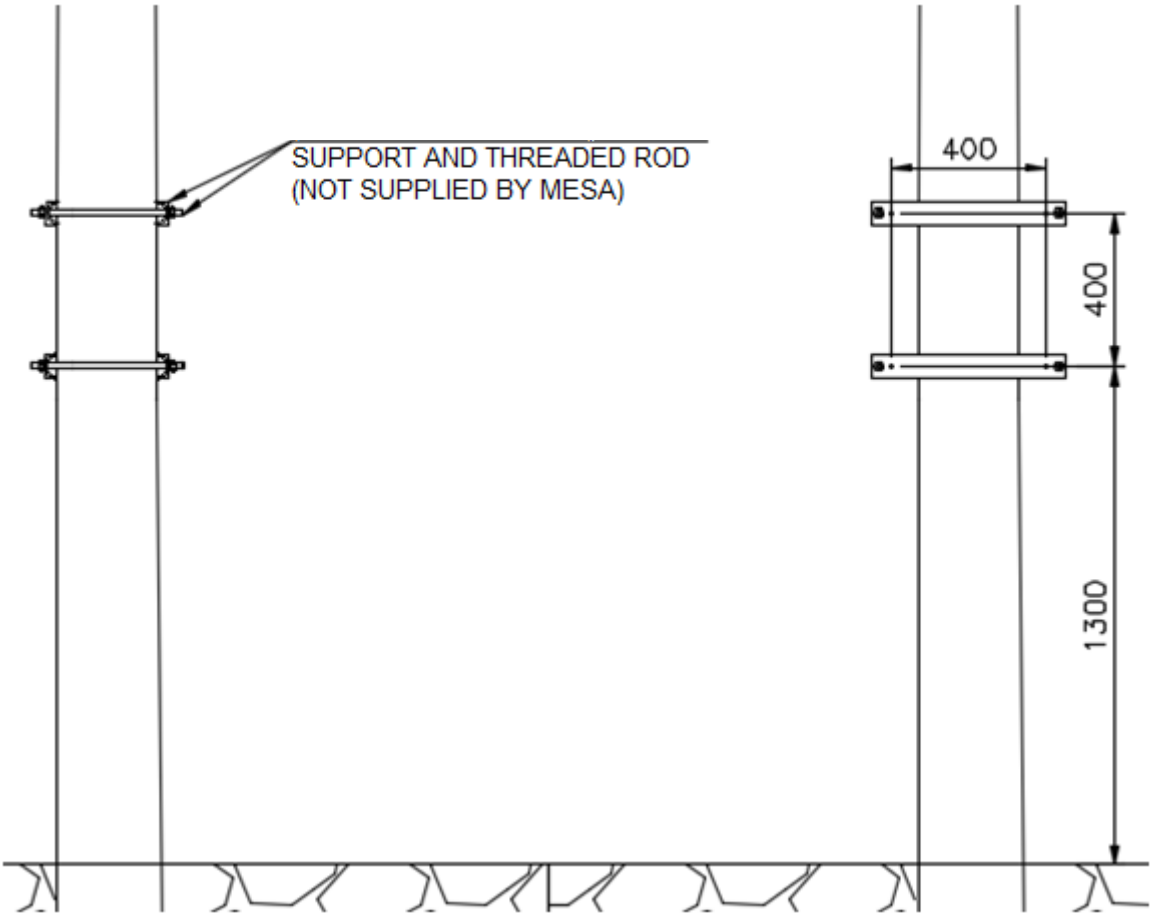


T300 Electric command

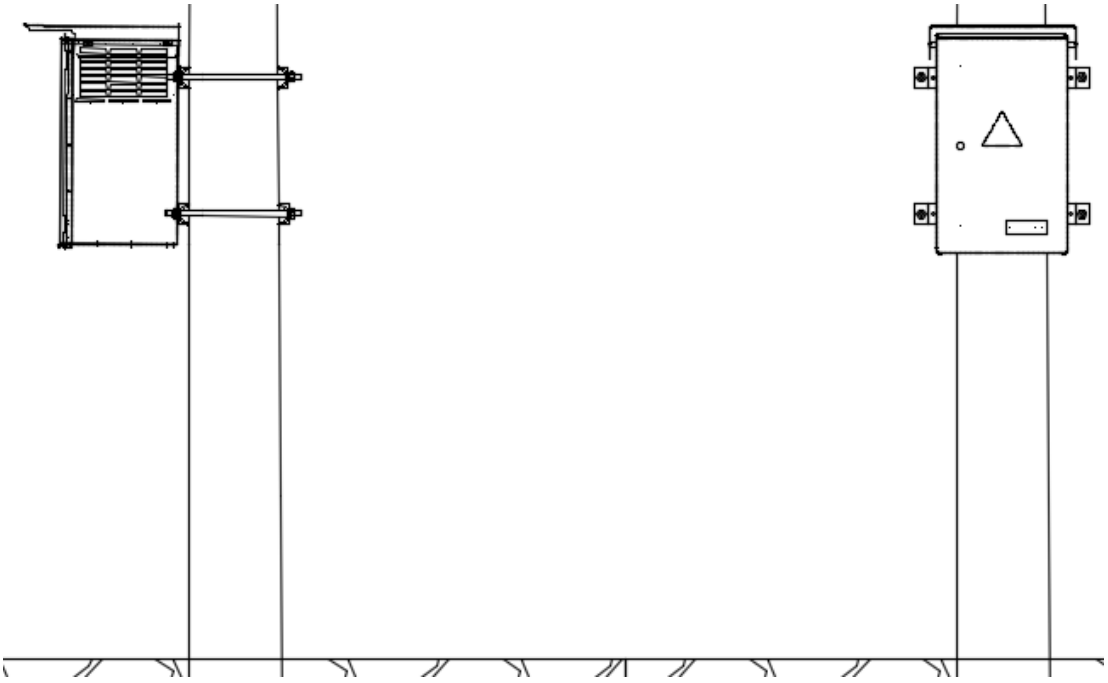


See T300P manual

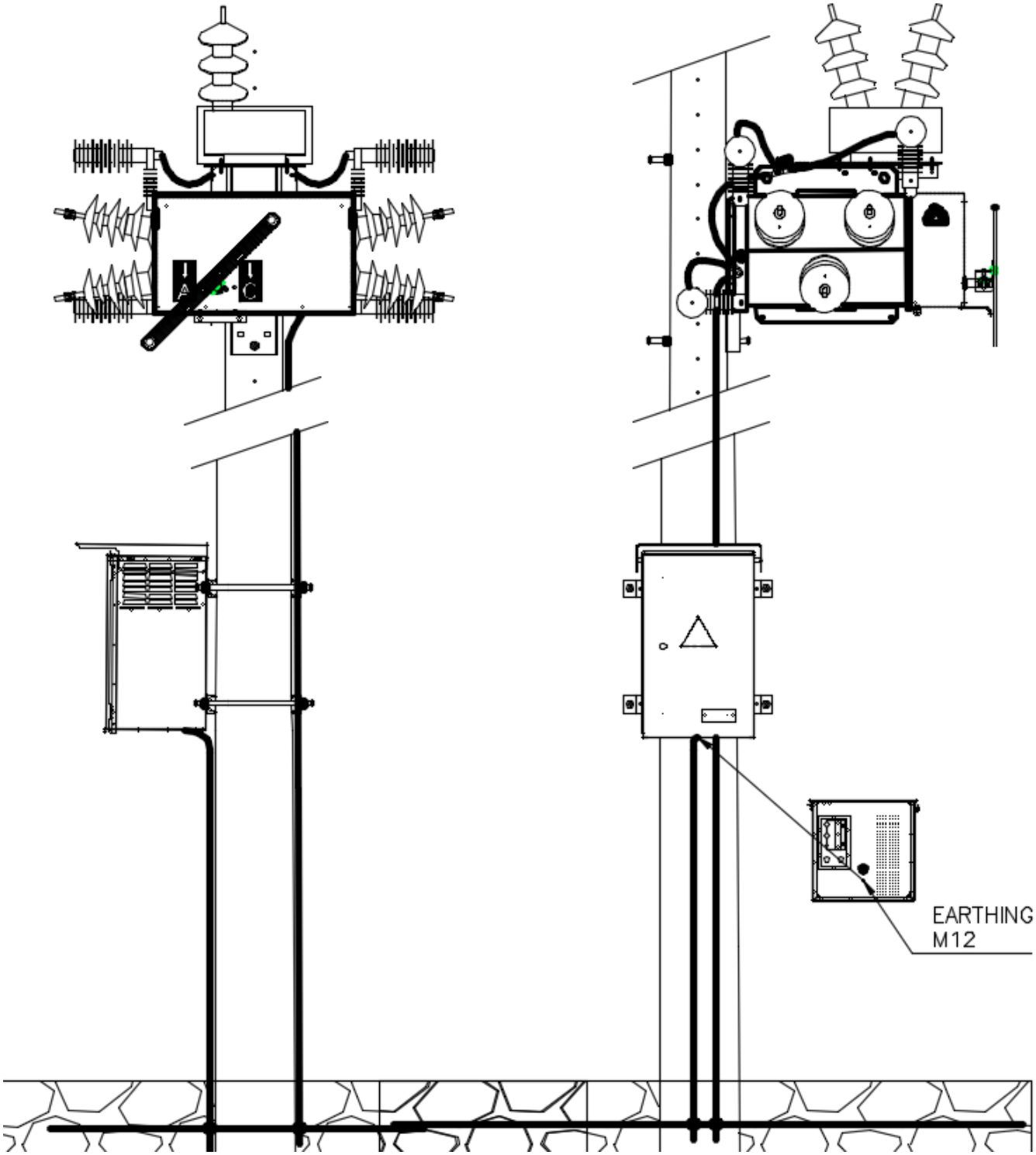
PREPARE SUPPORT FOR T300P



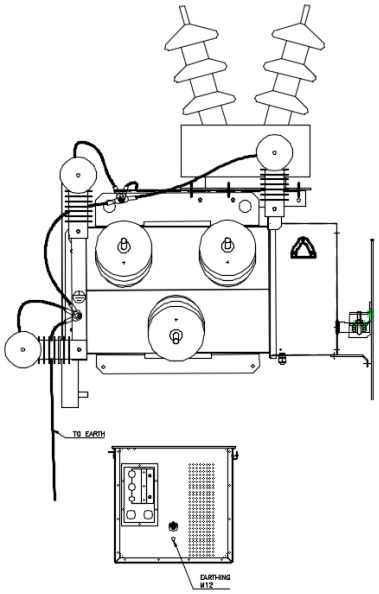
PLACE THE CONTROL BOX ON ITS SUPPORT



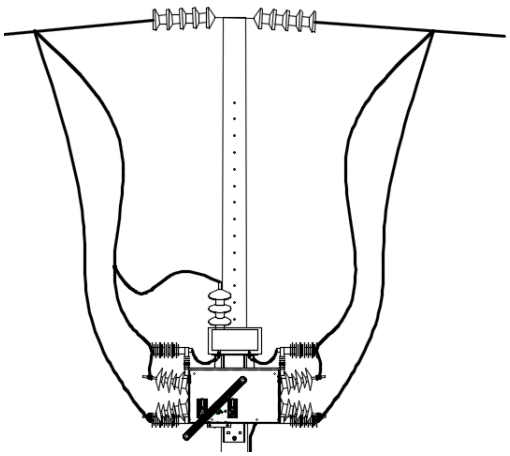
Earthing connections:
Connect all surge arresters to the general earthing point, and from earthing point to ground.

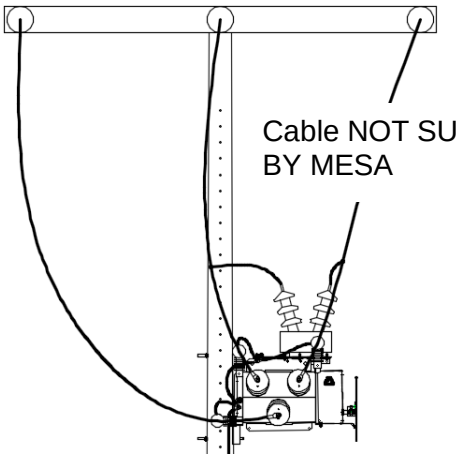


CONNECT TO GROUND THE COMMAND BOX.

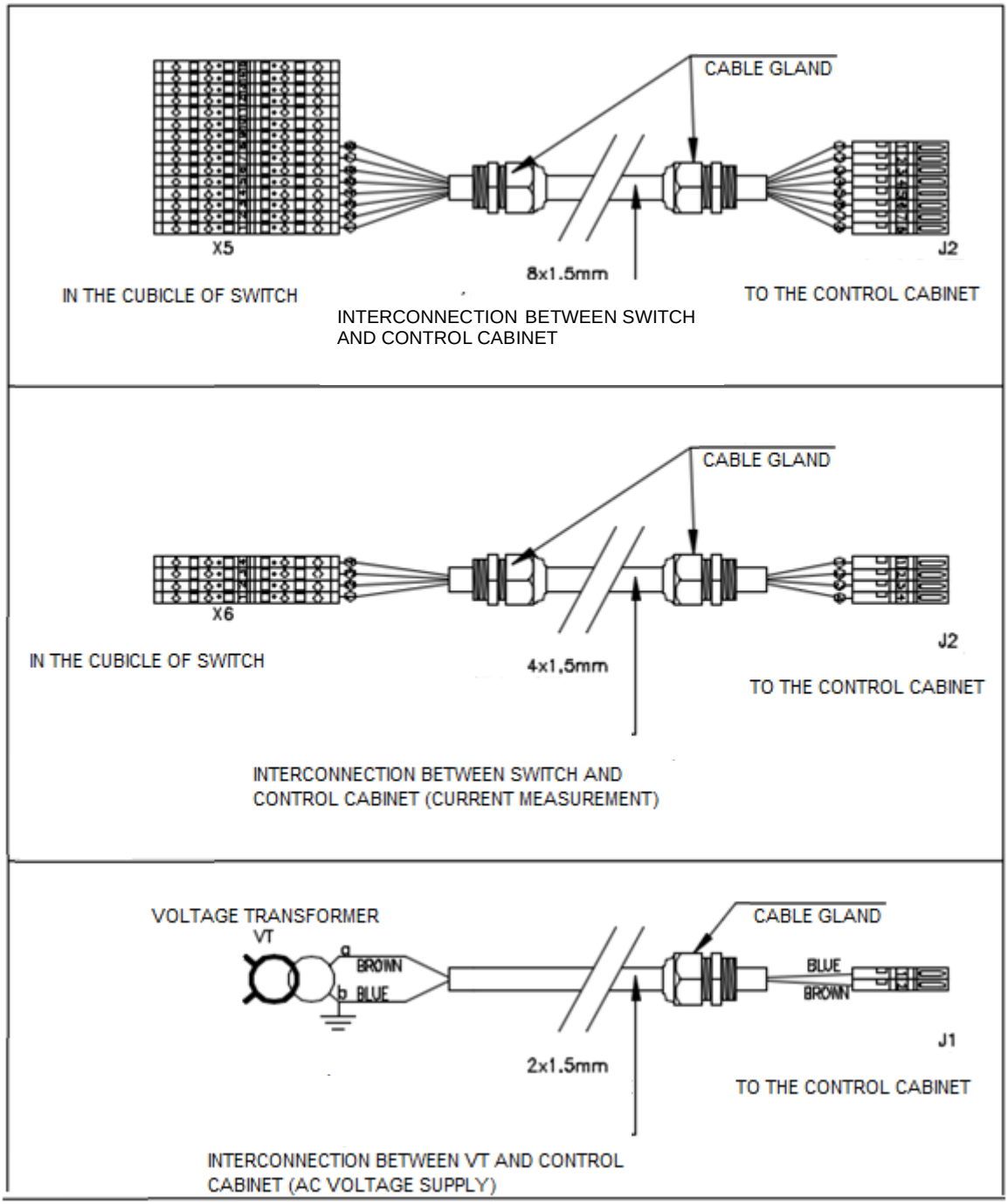


CONNECTIONS



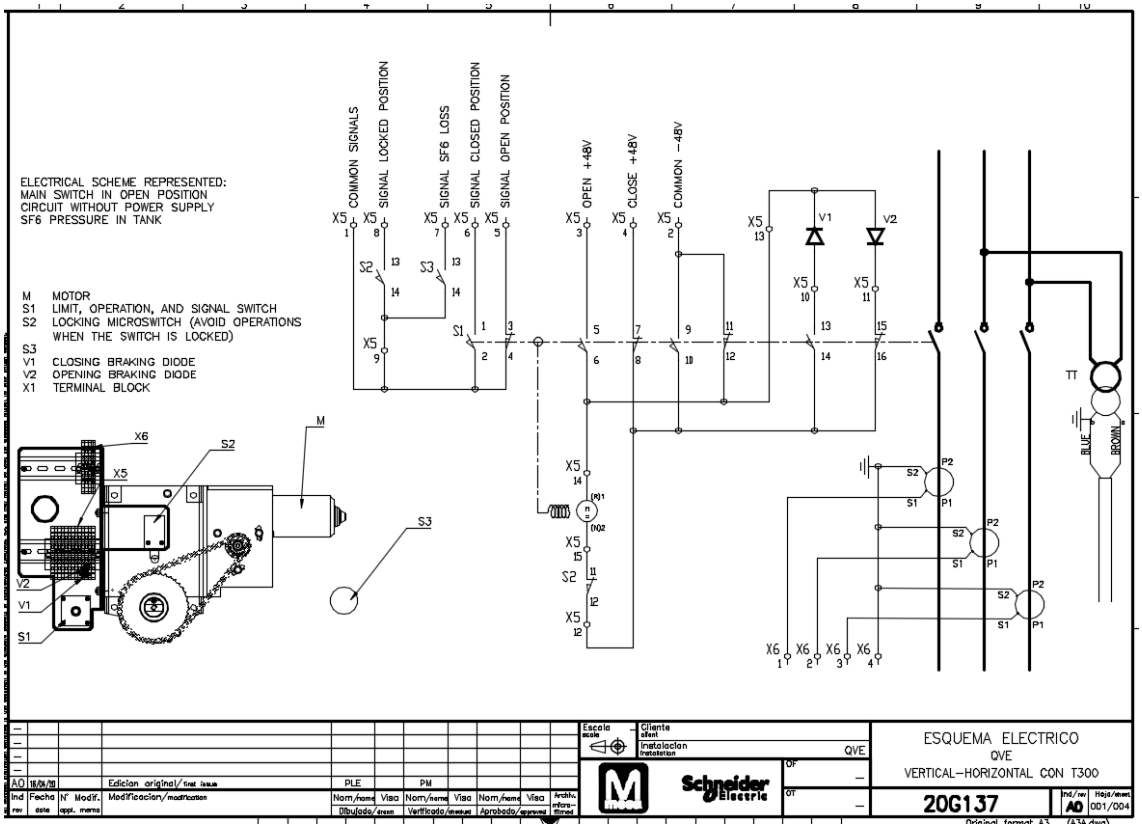


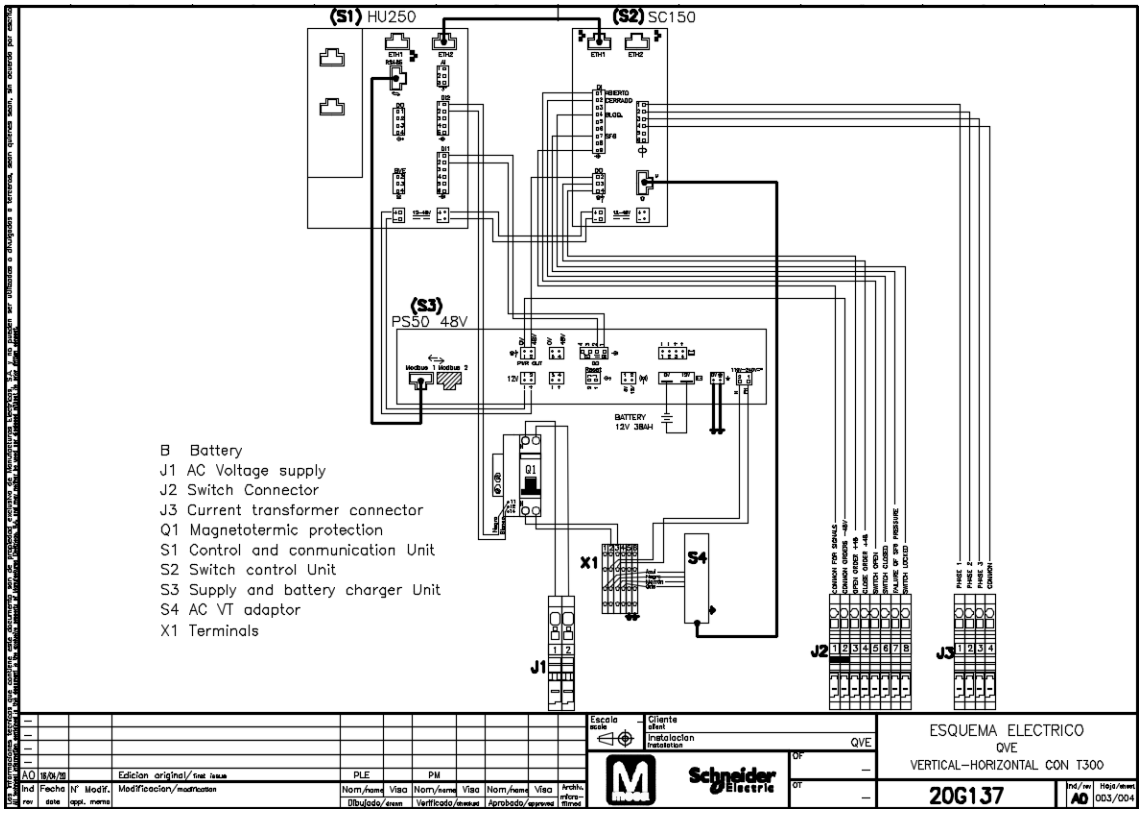
INTERCONNECTION BETWEEN SWITCH AND COMMAND BOX

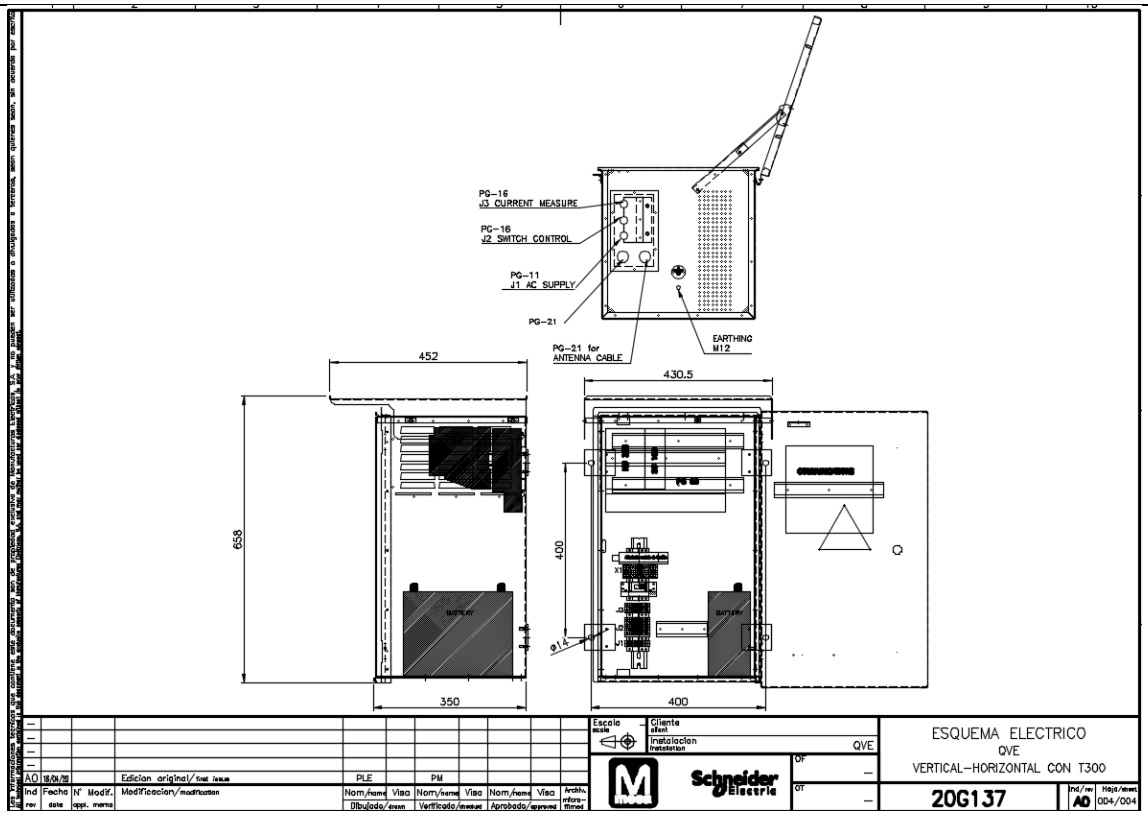


SEND CLOSING AND OPENING ELECTRICAL COMMANDS FROM THE COMMAND BOX. CHECK POSITION SIGNALS

ELECTRIC DIAGRAM / ESQUEMA ELÉCTRICO

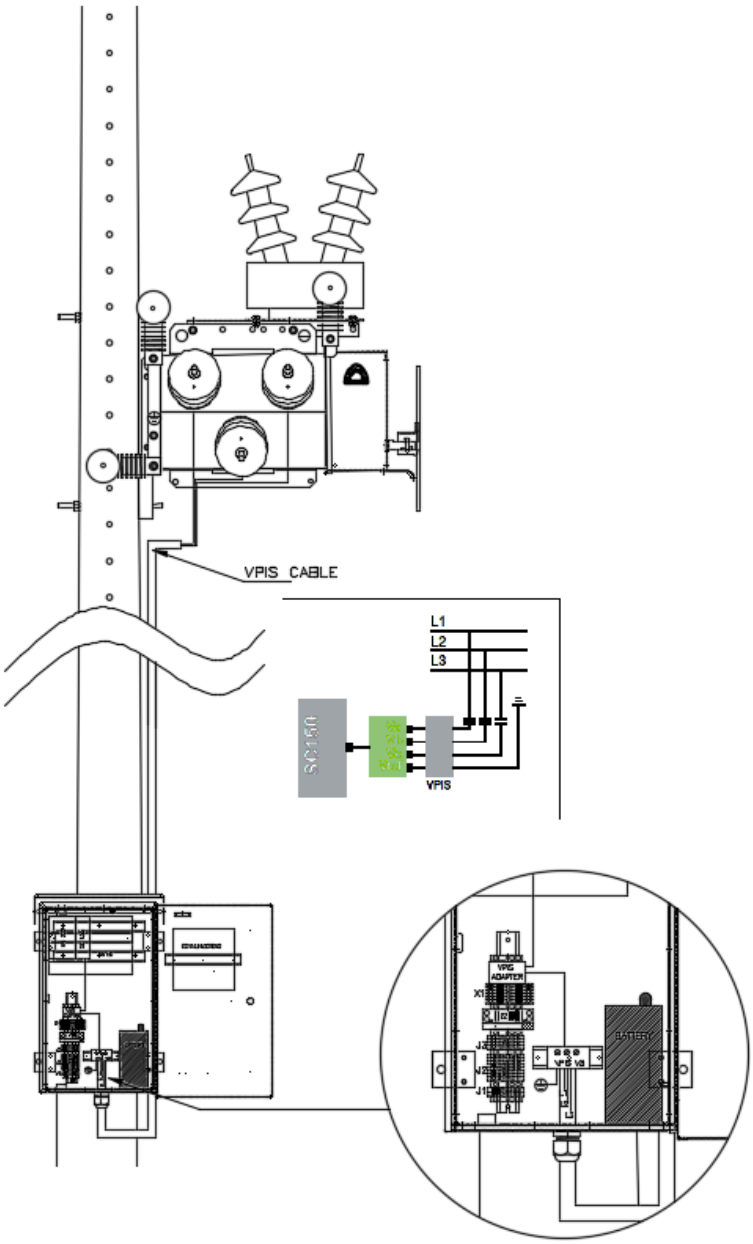




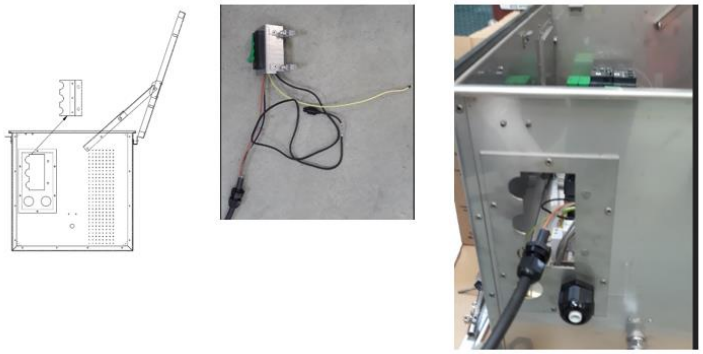

PG-16
J3 CURRENT MEASURE
PG-16
J2 SWITCH CONTROL
PG-11
J1 AC SUPPLY
PG-21
PG-21 for
ANTENNA CABLE
EARTHING
M12
452
430.5
658
400
350
400
ESQUEMA ELECTRICO
QVE
VERTICAL-HORIZONTAL CON T300
20G137
Schneider Electric

Opción CVT

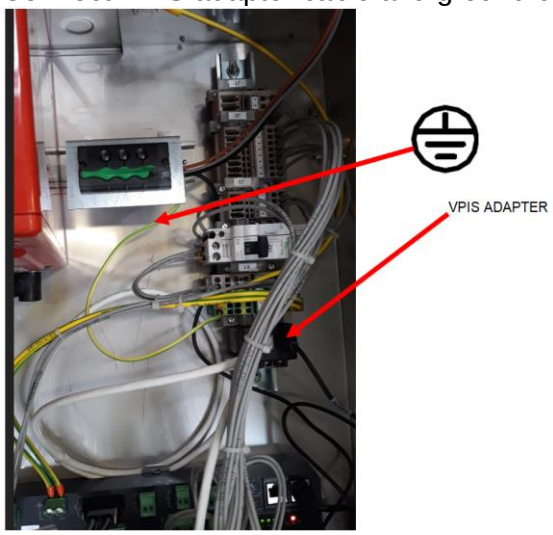
INTERCONEXIÓN ENTRE CVT - ARMARIO DE CONTROL (T-300 P)



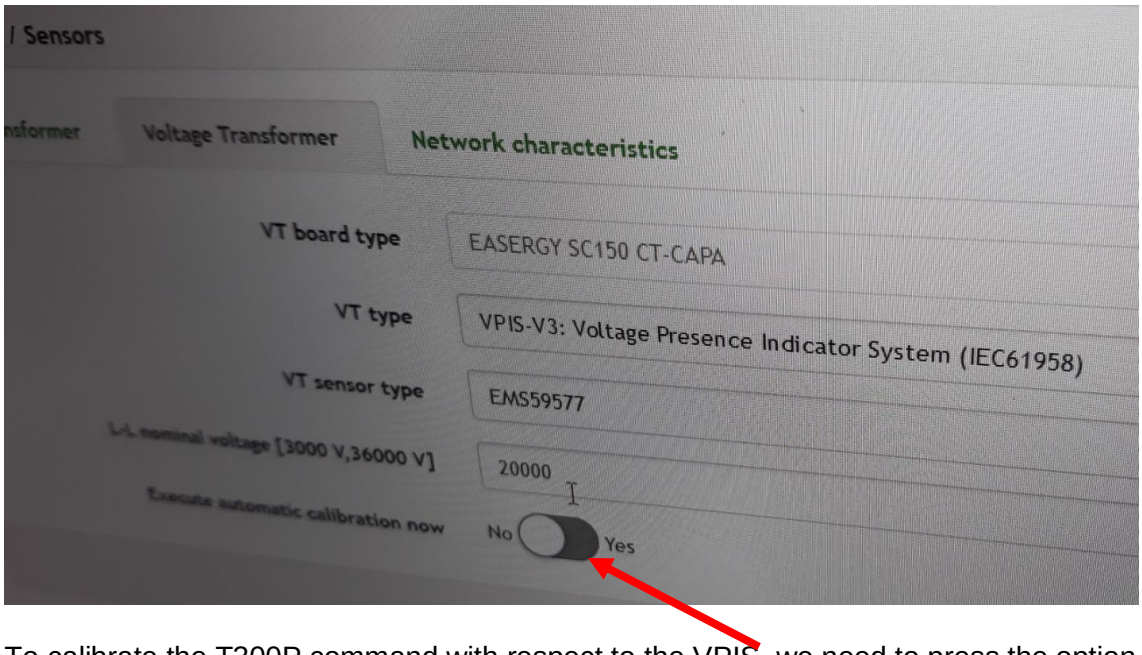
Introduce capacitive cable inside the command box.



Connect VPIS adapter cable and ground cable.



Setting the voltage sensor parameters:



To calibrate the T300P command with respect to the VPIS, we need to press the option “execute automatic calibration now” on the T300P website when the nominal voltage is the indicated in the parameters.

4.3. Live line working

-When carrying out **live-line work**, it is necessary for the voltage transformer terminals to simultaneously receive voltage to prevent inducted voltage from damaging the transformer. A procedure is suggested below for live-line assembly on a typical option of the PM6. Consult for other options.

-**Make a provisional by-pass on the line where the switch is to be installed**.

-switch-disconnector in open position.

-Connect to the line on the side of the switch that has no transformer. (Fig. 4.2.3 (1)). To ensure the voltage transformer receives voltage simultaneously in the two primary terminals of the transformer when the line is energized.

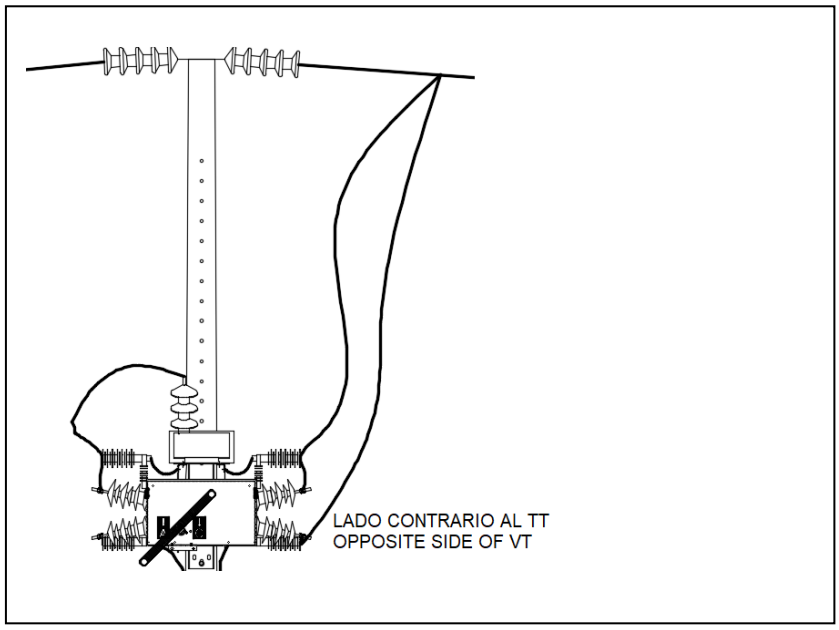


Fig. 4.2.3 (1)

Once the three phases are connected, manually close the switch and wait 15 minutes.

- With the switch closed, connect the 3 phases of the other side of the switch to the line. (Fig. 4.2.3 (2)).

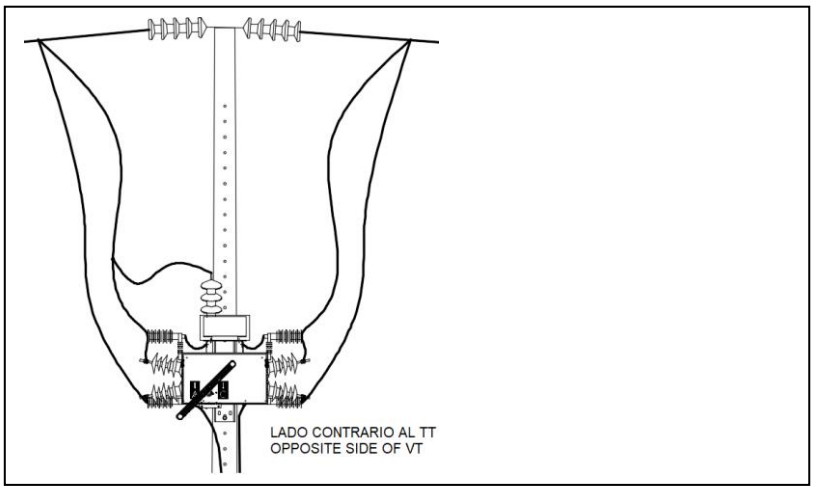


Fig. 4.2.3 (2)

5. Operating Manual.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

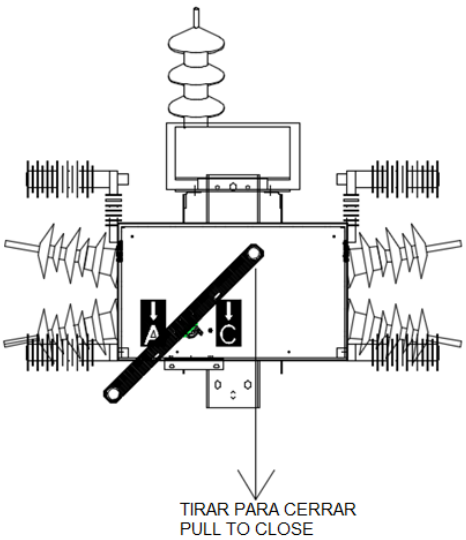
- Apply appropriate personal protection equipment (PPE) and follow safe electrical work practices.
- This equipment must only be installed and serviced by qualified, trained, and certified electrical personnel.
- Only qualified electrical personnel familiar with medium voltage circuits should perform the instructions in this bulletin. Personnel must understand the hazards involved in working with or near medium voltage equipment,
- Turn off all power supplying this equipment before working on or inside it.
- Always use a properly sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on the power to this equipment.

Failure to follow these instructions will result in death or serious injury.

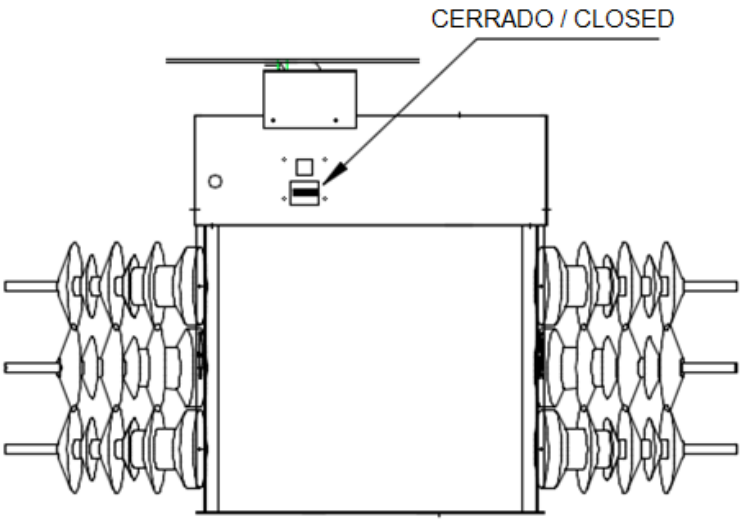
The opening and closing operations are done remotely or with the operating levers supplied for this purpose.

5.1. Manual operations

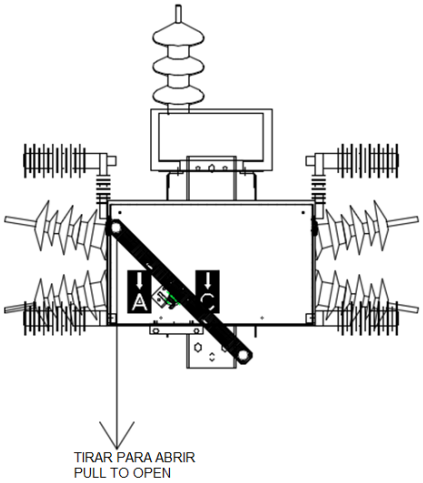
Manual closing operation



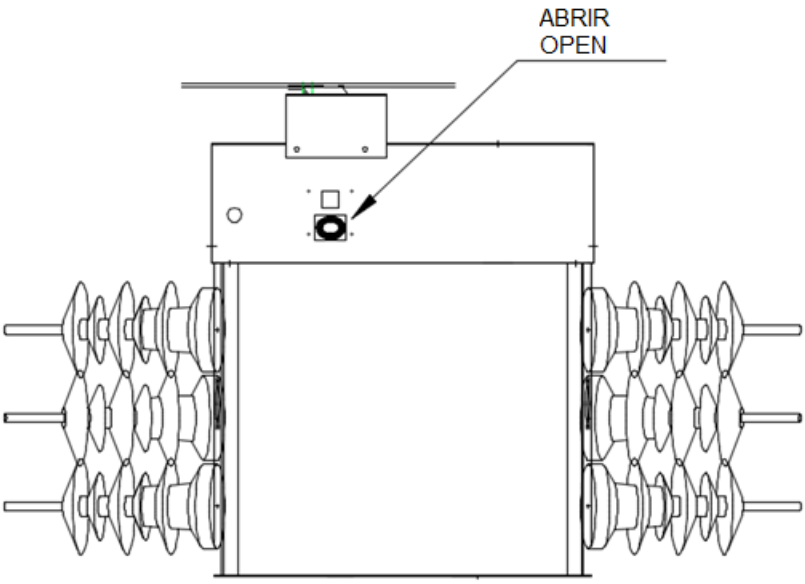
Check closed position signal



Manual opening operation



CHECK OPEN POSITION SIGNAL

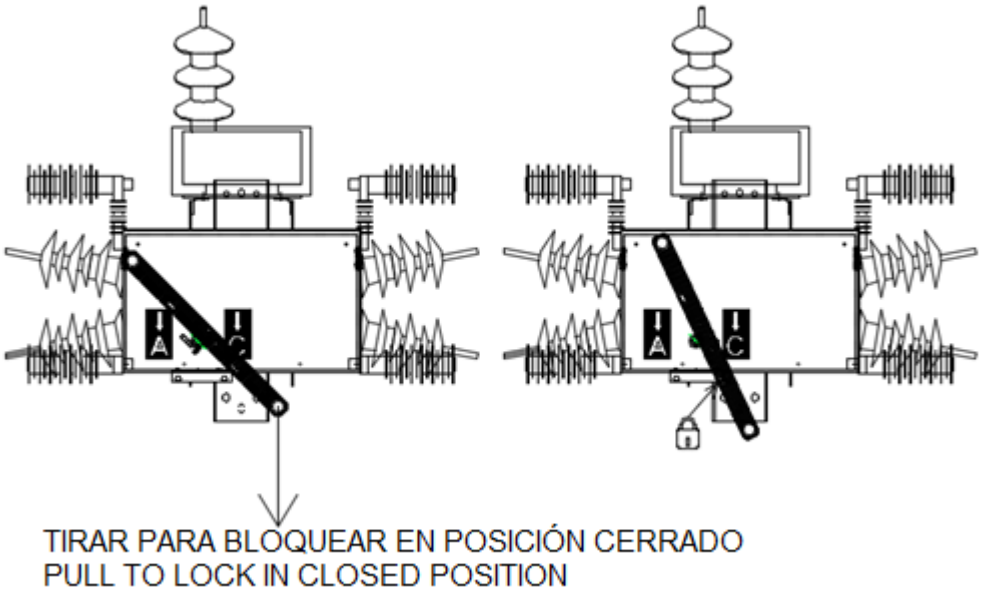


5.2. Locking.

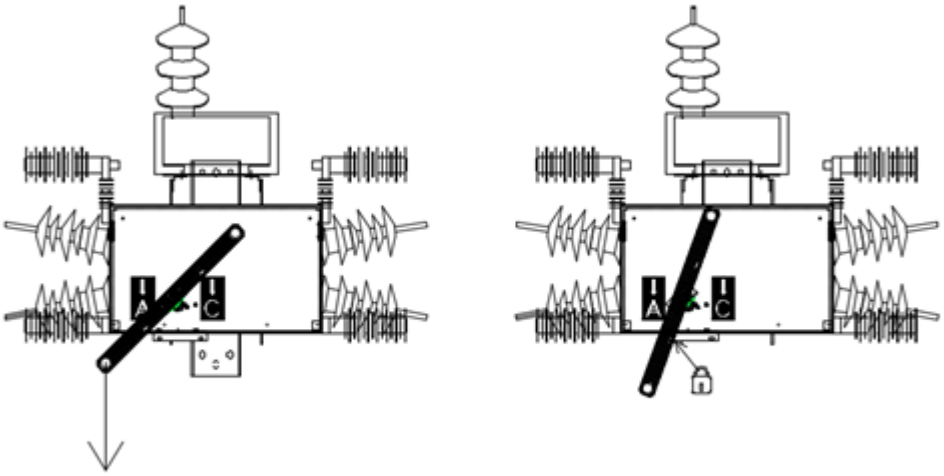
The transmission can be locked using 1 padlock in 2 possible positions:

- open
- closed

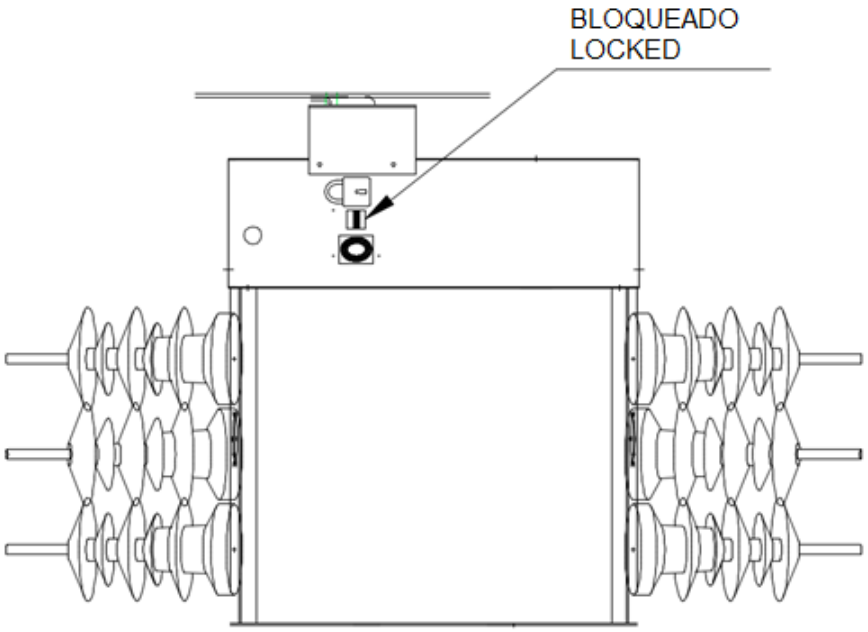
LOCKING SYSTEMM IN CLOSED POSITION



LOCKING SYSTEM IN OPEN POSITION



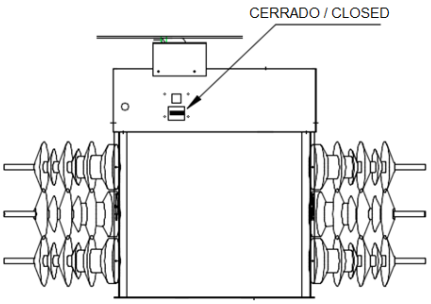
LOCKED SIGNAL



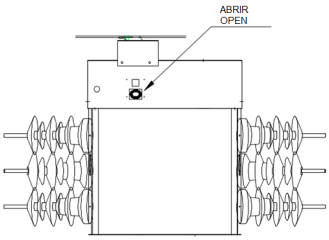
5.3. Electrical operations

- To check in locked position according to 5.2 , is not posible electrical operation, neither open or close.
- Go to un-locked position :turn the hook stick lever in the correct direction according to 5.2.
- Send Local or remote-control electric operations. Check switch position change and local and remote indicators properly signal its position.

Closed position



- Open position.



DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protection equipment (PPE) and follow safe electrical work practices.
- This equipment must only be installed and serviced by qualified, trained, and certified electrical personnel.
- Only qualified electrical personnel familiar with medium voltage circuits should perform the instructions in this bulletin. Personnel must understand the hazards involved in working with or near medium voltage equipment,
- Turn off all power supplying this equipment before working on or inside it.
- Always use a properly sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on the power to this equipment.

Failure to follow these instructions will result in death or serious injury.

6. Maintenance.

The PM6 switch-disconnector consists of a stainless-steel envelopping that contains SF6 insulation and breaking components, making their inner components maintenance free throughout the equipment's service life.
The electric or manual mechanism found inside a separate cubicle adjoining the interrupter device of the switch-disconnector does not require maintenance.
Personnel in charge of the installation must be in possession of the service instructions prior to taking responsibility for the facility.
Any maintenance task performed must respect the safety mechanisms described in the applicable sections of this manual.
Similarly, maintenance operators must have the previously mentioned skill level.
In a malfunction is detected, contact your nearest Schneider Electric representative.

NOTICE
HAZARD OF SWITCHGEAR DAMAGE • Preventive maintenance operations must be carried out regularly on medium voltage equipment. • These switchgears have been designed for low maintenance service. Nevertheless, a regular inspection is advised, checking the gas pressure and condition of the external elements and to carry out the usual cleaning task. (See maintenance program). **Failure to follow these instructions can result in equipment damage.**

As for scheduled maintenance tasks, it is recommended to follow the utility company's action protocol for this type of equipment:

MV connections	Check the condition of the contacts of the primary terminals, that they are not rounded or have traces of oil, and the torque in both the switch and the transformer is correct. Clean these surfaces. Use thermovision or similar device to check there are no hot spots. Check the condition of the conductors, Earth connections and circuit. The line and the earth cables are connected, respecting the minimum distances required by the voltage level.
Cables from the switch down to	Check the condition of the secondary terminals and they are properly tightened. Check the condition of the switch drop cables: control, cables

command box	from the current transformers and voltage transformers. Verify that there are no loose drop cables, checking they are well-fastened to the pole.
Support to pole	Check the tightening torque of the bolts, the anchoring to the structure, transmissions, command, command box.
Stainless steel enclosure	General cleaning of the stainless-steel switch envelopping, using a non-abrasive cloth with a domestic cleaning product for stainless steel, in order to eliminate all foreign bodies, dust, humidity, oils, etc. that may have deposited on the equipment.
Load break switch	Carry out manual opening and closing manoeuvres, verifying that the switch movement is correct. Check that the signaling of the switch in open (o) (indicator in open position) changes to (I) (indicator in closed position) while the switch is closed.
Command box. See command box manual (T300p...)	IMPORTANT: **For maintenance tasks or replacing components, disconnect the Q1 circuit-breaker.** -Check the condition of the command box closing seals. -General cleaning of the stainless steel housing using a non-abrasive cloth with a domestic cleaning product for stainless steel, in order to eliminate all foreign bodies, dust, humidity, oils, etc. that may have deposited on the command box. -Perform local opening and closing operations, checking: that the switch moves properly, activating the buttons of the command box. The switch in open (o) (indicator in open position) changes to (I) (indicator in closed position) while the switch is closed. Electric closing command, check: The closure of the switch can actually be heard (motor + switch trigger) and the motor performs the operation. Proper signaling on the switch indicator “I”. Proper signaling on the command box (LED CLOSED) Electric opening command, check: The opening of the switch can actually be heard (motor + switch trigger) and the motor performs the operation. Proper signaling on the switch indicator “O”. Proper signaling on the command box (LED opening)

	Once these operations are completed, return the equipment to service.
SF6 pressure	Correct indication of the manometer if it has one (it shows green). If it does not have manometer, check it on the corresponding LED in the command box.

Before putting the equipment into service, check the applicable points of section 8.2 of this manual.

7. Spare parts and warranty

. **Spare parts.**

If any type of spare part is required, please provide as much information as possible:

- rating plate,
- site location,
- type of mounting,
- other supplementary indications.

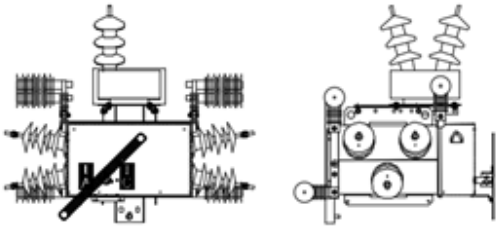
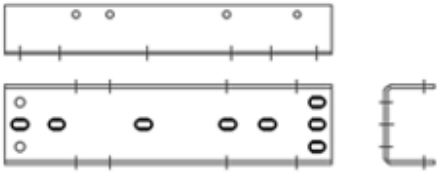
Warranty

The materials are under warranty for a period of 12 months from their commissioning or 18 months from our delivery or making the material available to you, whichever is considered to be fulfilled first.

The warranty is limited to the delivery, free of charge, in the same situation as the corresponding order and in the shortest possible time, of the parts or components that replace the defective ones.

8. Appendix

8.1. Devices and equipment

PM6 Switch-disconnector unit mounted on support frame Acc. to options previously described	
Command box	
Support to pole	
Drop cables to command box	

8.2. Check-List

PM6 VERIFICATION AND INSTALLATION CHECK-LIST
Equipment identification:
Load break switch serial no.:
T-300P serial no.:
Voltage transformer serial no.:

	■ Reception	
1	Check that the equipment is contained in its original packaging.	☐
2	Check the state of the packaging.	☐
3	Open the box to check the contents.	☐
4	Check the general state of the switch and for any dents in the housing.	☐
5	Check there are no dents on the electric mechanism housings.	☐
6	Check the high voltage silicone connections	☐
7	Check the voltage transformer connections.	☐
8	Check the condition of the battery	☐
9	Check the set of cables (apparent creases, correct connection and good general conditions)	☐
10	Check the switch rating matches the Medium Voltage Grid rating where it is to be installed.	☐

	■ Installation	
11	Prior to installation, follow the steps given in the equipment reception section	☐
12	Check the relief valve is in good conditions (no denting)	☐
13	The cables that drop from the switch, the current and voltage transformers must be fastened to the post using flanges and be separated from the High Voltage terminal.	☐
14	No dents on the bushing	☐
15	The silicone connections are well connected and do not flex, which could indicate a broken bushing.	☐
16	The connection terminals of the voltage transformer are in good condition: no fissures	☐
17	The connection terminals of the current transformer have no traces of oil.	☐
18	Check that the cables dropping from the switch are not earthed or cut (using a multimeter)	☐
19	Check the SF6 pressure. With manometer, check if the needle stays in the green zone With a pressure switch, check if the presence of SF6 is signaled properly in the controller	☐

	■ **Adjustment, final checks and commissioning**	
20	Check that the drop cables are properly connected, with the aid of the corresponding electrical diagram.	☐
21	The earth is installed (connection of all the components to the earthing line included in its specification)	☐
22	Check that the assembly respects all the indications given in the installation section.	☐
23	The high voltage connections should not be under mechanical tension, which could cause a continuous bending stress on the high voltage terminals of the switch	☐
24	Carry out manual opening and closing manoeuvres, verifying that the switch movement is correct. The delivered switch in open (o) (indicator in open position) changes to (I) (indicator in closed position) while the switch is closed.	☐
25	Manual opening of the switch:	☐
26	The switch signaling correctly shows the O symbol.	☐
27	The “open” LED lights up in the command box	☐
28	With the command in the open-locked position, the locking LED lights up in the command box	☐
29	Manual closing of the switch:	☐
30	The switch signaling correctly shows the I symbol.	☐
31	The “closed” LED lights up in the command box	☐
32	With the command in the closed-locked position, the locking LED lights up in the command box	☐
33	Check the tightening torque of all the bolts, the anchoring to the structure, , etc.	☐
34	**The secondary connections of the voltage transformer are connected to the command enclosure protections using connectors.** **If the installation does not contain a command enclosure, make sure the connections are not short-circuited.**	☐
35	Check that the operating lever is not placed in the locking position when using remote control service.	☐
36	General cleaning of the stainless steel envelopping using a non-abrasive cloth with a domestic cleaning product for stainless steel, in order to eliminate all foreign bodies, dust, humidity, oils, etc. that may have deposited on the equipment during assembly in order to recover the original condition of the stainless steel.	☐
37	Locking the manual command with a padlock.	☐
38	Check that all electric operations is disabled with the command box in the locked position.	☐
39	Check that the automatism function is enable / disable according to the operating criteria.	☐
40	Check the settings in the command box using PC in the automatism option.	☐
41	The line and the earthing cables are connected, respecting the minimum distances required by the voltage level.	☐
42	The auxiliary circuits are properly connected:	☐
43	Voltage transformer secondary connected to the command box.	☐
44	Battery connected.	☐
45	Once the equipment is live:	☐
46	Check the input voltage in the command box using a voltmeter.	☐
47	If the voltage is correct, shut on the circuit breaker and check the remaining connections	☐

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