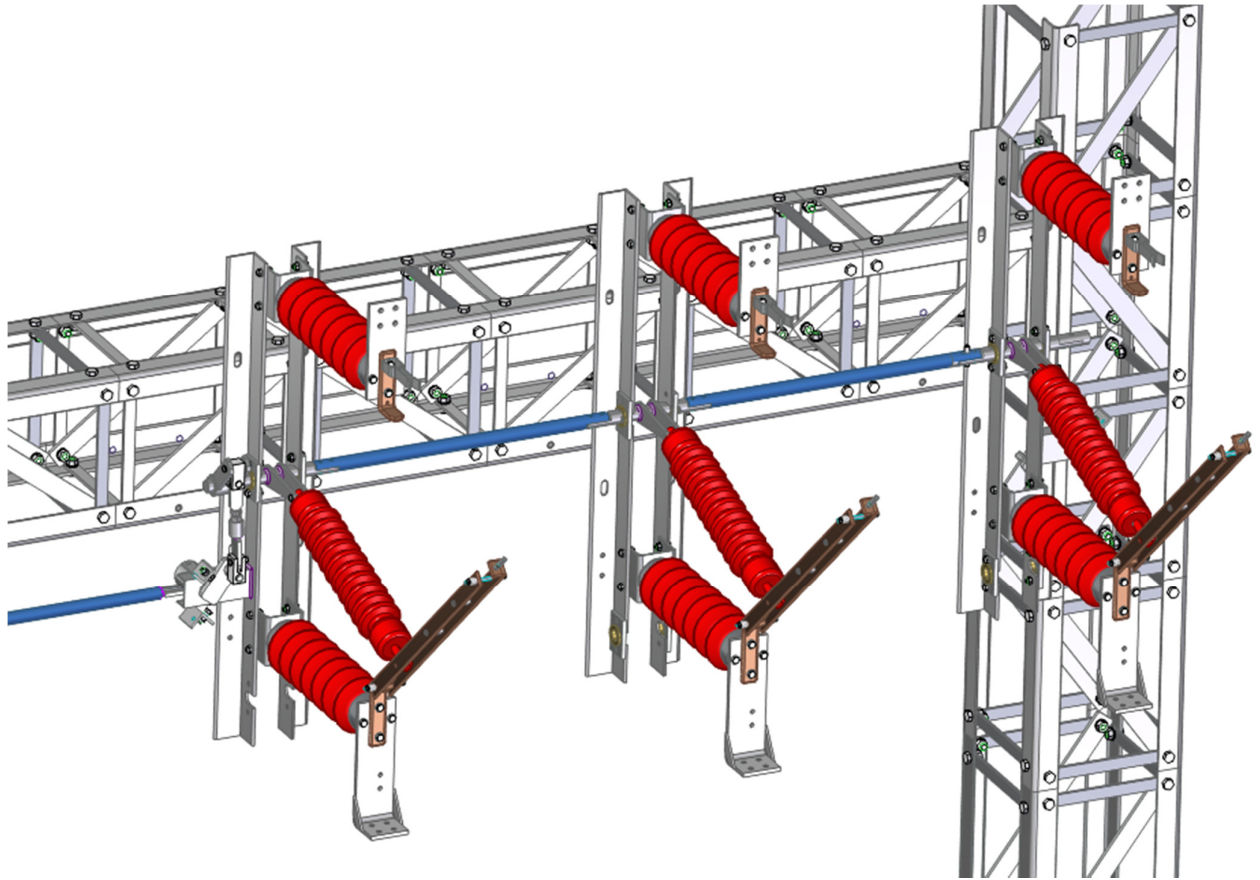


**UNLOADING, STORAGE, ERECTION,
INSTALLATION & MAINTENANCE MANUAL**



**VERTICAL BREAK DISCONNECTOR
(TYPE: RV36kV)**



Dear customer!

Thank sincerely for purchasing our product. We are glad to deliver you an outdoor disconnecter, which has been designed in order to meet your usable needs. We are deeply convinced that advantages of the apparatus would be confirmed during exploitation. The instruction is intended for outdoor disconnectors type RV 36. The instruction has been issued with an intention to help in proper installation, servicing and operation of the disconnectors. Follow carefully requirements specified in this instruction ensures trouble free service of disconnectors and determines the validity of manufacturer's guarantee. Carefully read and understand this instruction sheet before installation, operation and maintenance of disconnectors. Would you have any questions, please contact at sales@sspower.com.



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No.4, EVR Street, Sedarapet , Pudhucherry-605 111.

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Web: www.sspower.com



Disconnectors are remarkable pieces of equipment. They can stay in the same position for years before they have to switch. But, then at the critical movement they have to work perfectly. No matter what the conditions are, whether they are in the freezing cold or in the extreme heat.

**OUR VISION: TO BECOME A PREFERRED SWITCHGEAR & P&C SOLUTIONS
COMPANY TO OUR PARTNERS**

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1.0 PREAMBLE:

The Disconnecter described in this publication is designed, manufactured and tested with care and will give satisfactory service if it is installed, operated and maintained in accordance with the instructions, by fully skilled personnel duly authorized to carryout this work.

Efforts are constantly being made to improve design and manufacturing. Hence the equipment supplied may differ in minor detail from the data given in this publication.

2.0 GENERAL DESCRIPTION OF THE DISCONNECTOR:

- Disconnectors are primarily off- load mechanical switching device used to isolate equipments and lines in electrical network. They are able to make or break the magnetizing current and line charging current of 0.7Amps at 0.15 power factors.
- Vertical Break Disconnecter is designed for independent single pole operation or three poles electrically / mechanically ganged operation. Disconnectors can be supplied with or without earth switches. Where earth switch is required, single or double earth switch can be provided. Disconnecter and earth switches can be operated either manually or by motor.
- Vertical Break Disconnecter is checked for satisfactory operation at the works. They are supplied in knock down condition ready for assembly at site. The relevant standards for disconnectors are IEC: 62271-102/62271-1 and IS: 9921 and for insulators IEC: 60273 / 60168 and IS: 2544.

SECTION-A

UNLOADING AND STORAGE INSTRUCTIONS

3.0 UNLOADING:

- Unload the crates / boxes using crane / fork lift truck, as appropriate.
- **Do not roll the crates. Do not drop the crates over tiers / rubber mats. Etc.**
- Use proper lifting tools / tackles like nylon belts / ropes etc.
- Count the number of crates / boxes and tally them against the shipping document.
- Inspect thoroughly all the crates / boxes for damages.
- In case of damage, identify the crate / box and keep it separately.
- Take adequate photos of the damage.
- Kindly report the damage to the transporter in writing.
- Also mail the damage report (along with the photographs) to **S&S Power Switchgear Equipment Limited**. Email: sales@sspower.com.

3.1 STORAGE:

“Failure to properly store and protect disconnectors / parts may cause damage to equipment. Such damage could cause hard operation, mal-operation and contact resistance issue when equipment is installed / tested and mal-function in service.”

- Storage shall be made in an area that is well ventilated and provided with drains to prevent water stagnation.
- It is advisable to leave all crates / boxes in packed condition until the start of erection.
- All crates / boxes shall be properly stored / stacked with proper covers.
- Disconnector and operating mechanism crates / boxes should always be stored in elevated position (at least two feet above ground) to prevent water entry.
- In case of longer storage period / damp atmosphere, the operating mechanism boxes shall be removed from packing and electrical space heating is to be provided.
- Space heating should continue till complete removal of moisture / condensation.
- Adequate care to be taken to prevent entry / ingress of dirt, moisture, cement, sand and other corrosive material.

3.2 LONG TERM STORAGE INSTRUCTIONS:

General instruction (for all materials):

Ground clearance:

All materials, including operating mechanisms, should be kept at a minimum of 600 mm (two feet) height from the ground level using pallets or cement concrete bed, to avoid water entry during rainy season. However, the water level rise at the respective site / storage locations shall be considered for fixing the ground clearance (but shall not be less than 600 mm).

Other contacts and steel materials:

- Clean all the contact surfaces thoroughly with a lint-free cloth.
- Protect all contact surfaces with a thin layer of petroleum gel.
- Cover all Copper flats and Aluminium flats with polythene sheets / covers.
- Ensure that the inside surfaces of the polythene coverings are pasted with foam based adhesive strip.
- Provide volatile corrosion inhibitors sheets and paste them along the inner surfaces.
- Kindly repeat the above steps once in every three months.

Galvanized steel items:

These are to be wrapped / covered with waterproof / dust proof covering and sufficient bags of silica gels to be placed in various places inside the covering. Once in 3 months all materials to be cleaned and replaced with silica gel bags.

SECTION – B

CONSTRUCTION

4.0 SCOPE OF SUPPLY

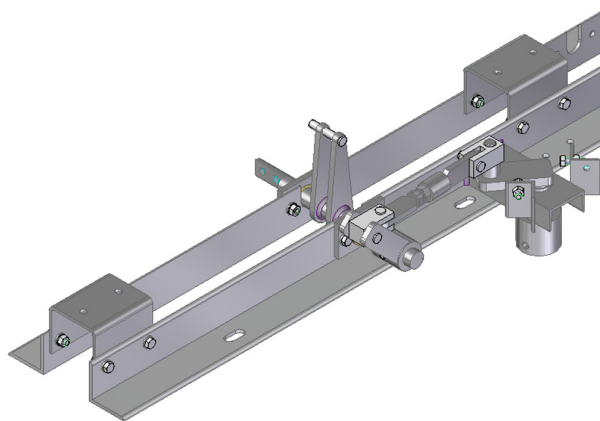
Our Vertical Break Disconnecter consists of the following components:

Disconnecter:

- Base assembly.
- Moving blade assembly.
- Fixed contact assembly.
- Tandem pipe assembly (phase to phase coupling pipes) in case of three pole arrangement
- Down operating pipe.
- Operating drive.
- Support insulators
- Operating Pin Type insulator
- Support structure (Optional).
- Terminal connectors (Optional).

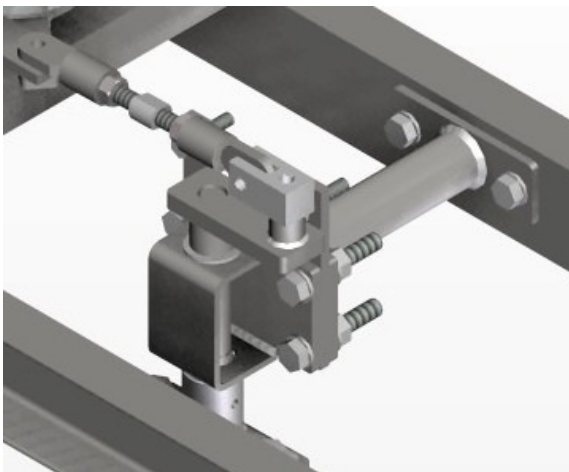
5.0 BASE ASSEMBLY:

- Each 3 pole disconnecter (R, Y, B) is supplied with two types of base assemblies.
 - a. One base Assembly (say R pole) with drive arrangement.
 - b. Other two bases (i.e. Y&B) without drive arrangement.
- The base consists of a hot-dip-galvanized steel Angle.
- All ferrous parts in base assembly are hot-dip galvanized as per IS 4759-1984.
- Base assemblies are supplied with:
 - a. Lever and hinges with pins, Friction washer, Brass washers and Split pins.
 - b. Four slots in base channel for fixing the base channel to the supporting structure.
 - c. One lifting pin insulator with two fixed support insulators.
- Each base is provided with two holes for M12 grounding bolts for earthing purpose.



Sl. No.	Item Description	Qty / Switch	Remarks
1	Base – Drive End Base – Middle pole Base – End pole	1 1 1	Galvanized Steel two ISMC angle Section having provision for rotating shaft, Drive coupling arrangement for main.
2	Base fixing slots	4 per base	For fixing the base angle to the supporting structure.
3	Torque Bearing	1	Torque bearing assembly in per-set condition
4 & 5	Mechanical limit stop	2	The mechanical limit stop of the disconnecter in “closed” position and another limit stop in “open” position for disconnectors
6	Support Insulator	6	Solid core
7	Operating pin insulator	3	Solid core
8	Moving Blade Assembly & fixed contact LHS	3	Spring Loaded Two Copper flats consists of Silver plated both the contact ends & Rest of the area filled with Tin plating.
9	Fixed Contact Assembly-RHS	3	A bended copper flat inserted with moving blade stopper.
10	Terminal pads	6	Aluminum pad fixed to the fixed contact mounting bracket.
11	DOP – Main	WOE – 1 WSE – 2 WDE – 3	Galvanized Steel Pipe(Optional for elevated structures).
12	DOP Guide	2	Galvanized Steel Plate.
13	DOP Coupling	1	Galvanized Steel Plate with U-Bolts.
14	Operating Drive	1	Aluminium
15	Main Push Pipe	2	Galvanized

Torque Bearing Fixing



Main Push Pipe

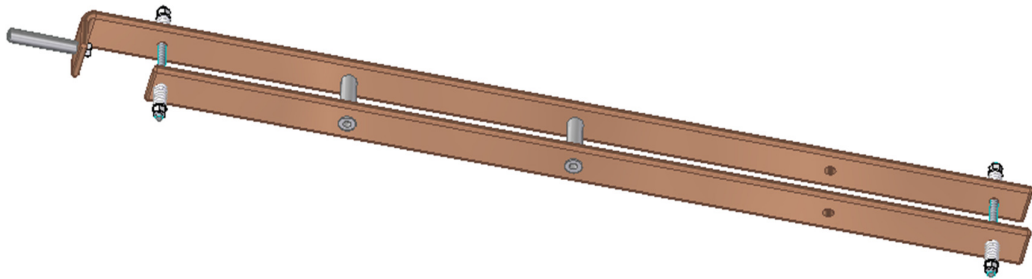


Note:

- Suitable arrangement should be provide in your structure for item:3
- Push is used to connect the torque bearing with drive end base.

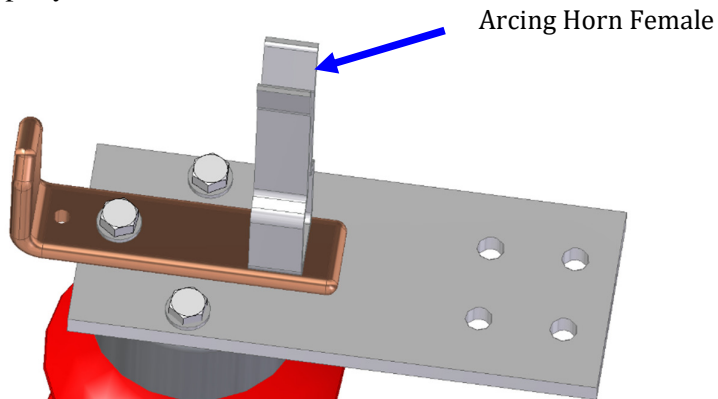
6.0 MOVING BLADE ASSEMBLY & FIXED CONTACT LHS:

- The current carrying moving blade is made of Copper flats.
- At the end of the flat, it is applied by silver plating on contact side and tin plating in Rest of the contact area. Contact pressure is applied to each individual flats by an insulated stainless steel spring. This Moving Blade assembly contain with one flat type fixed contact, which is used to operate the moving blade.
- Depending on the current rating the size of the contact may vary.



7.0 FIXED CONTACT ASSEMBLY:

- The Fixed contact made by copper flats. And it was mounted on an aluminium flat which is used for a terminal pad. And arcing horn female was acting as a guide to close the disconnector properly.



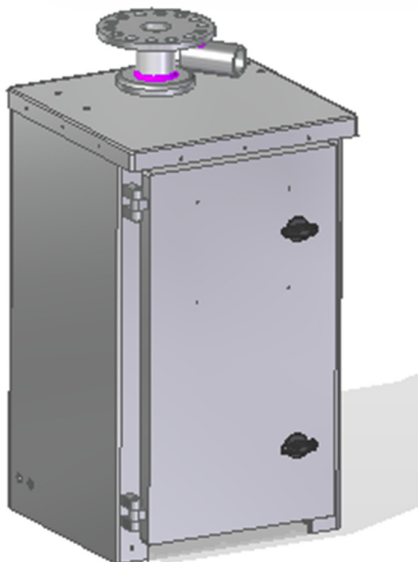
8.0 TANDEM PIPE:

- The tandem pipe assembly is used to connect adjacent poles for gang operation of all the three poles with one drive mechanism.
- These parts are hot-dip galvanized and assembled with necessary screws & washers etc.



9.0 DOWN OPERATING PIPE(DOP):

- This assembly is used to connect the operating drive in the base assembly
- The above assemblies are made out of steel pipe with one plain end and T-bar plate welded at other end.
- The above welded assembly is hot dip galvanized.
 - Excess length of DOP to be cut at site depending upon the requirement.



10.0 OPERATING DRIVE:

- This assembly is used to open and close the main disconnector.
- This aluminium box contain operating mechanism.
- This operating mechanism consists of locking facility at both open and close condition.
- Open and close indicators are provided for identification.
- This drive is operated manually.

11.0 INSULATOR ASSEMBLY:

- Insulators are selected to meet the basic insulation level, minimum creepage and minimum bending load to suit the Customer / Design requirement.

SECTION – C

INSTALLATION & SETTING INSTRUCTION

12.0 ERECTION SEQUENCE:

- Structure
- Bases
- Insulators(support & operating)
- Fixed contact assembly
- Moving blade assembly
- Operating drive
- Down Operating pipes
- Tandem pipe
- Terminal connectors

13.0 BASE ASSEMBLY:

- Identify the base drive & non drive end.
- Remove the base fixing hardware from bases and keep it in proper place.
- Identify the drive end base and place in the proper position on top of the structure. Fix the hardware; do not tighten fully.
- Place the other two bases on top of the structure in the proper position. Fix the hardware; do not tighten fully.
- Check with spirit level on top of bearing shaft and give shims if required on the leg of the bases.
- Check the diagonal distances.
- Tighten all the bolts. After complete tightening once again check with spirit level.

Note:

- Ensure the correctness of centre line of same pole and centre line of other phases.

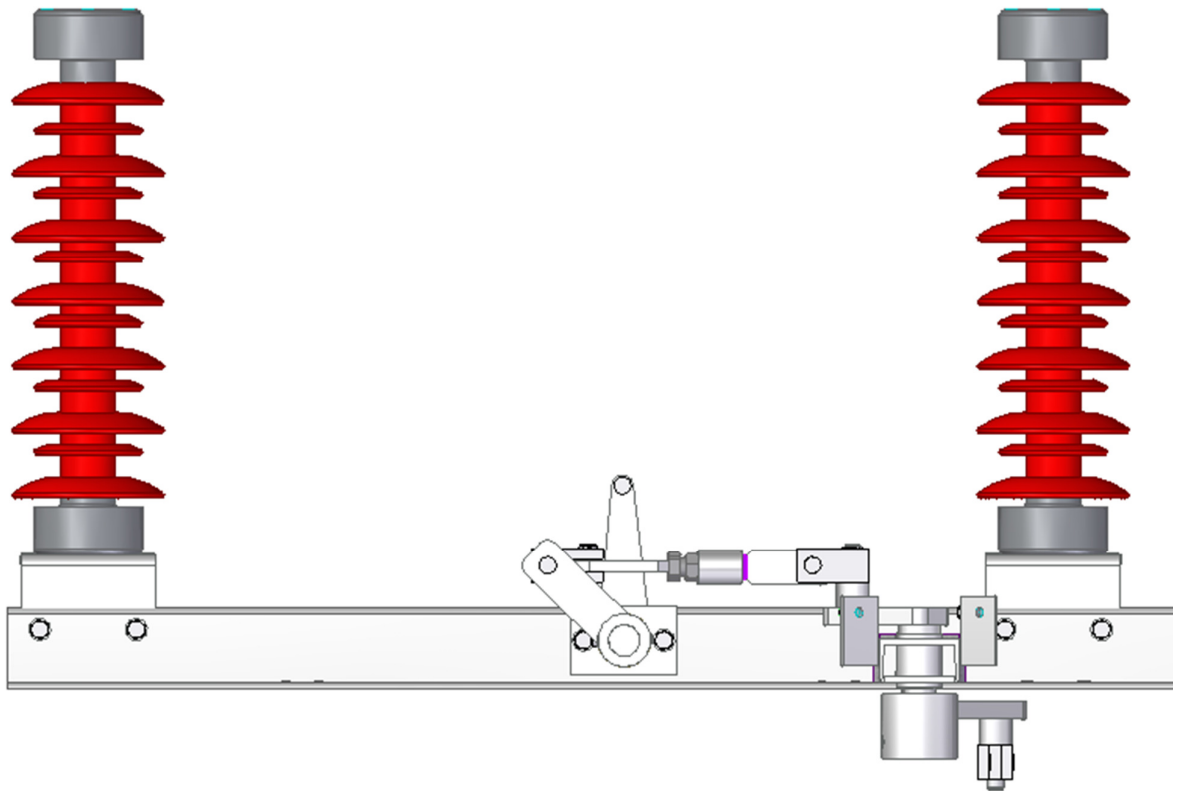
14.0 INSULATORS:

Before Start of erection

- Clean the insulator thoroughly.
- Keep the fixing hardware in respective places.
- Identify the Insulator and keep them in respective position.

ERECTION

- Lift the insulator by using proper Cloth / Nylon sling and place it over the base assembly (both the ends). (Ensure top 4 holes of insulator are parallel to base center line).
- Without removing the sling match the bottom fixing holes and fix all bolts.
- Remove the sling and check for level of the top surface of insulator by spirit level / plumb.
- If necessary add shims below the bottom flange of the insulator.
- Repeat the same for other stacks also.
- Use the C-shim for minor adjustment to get perfect alignment.



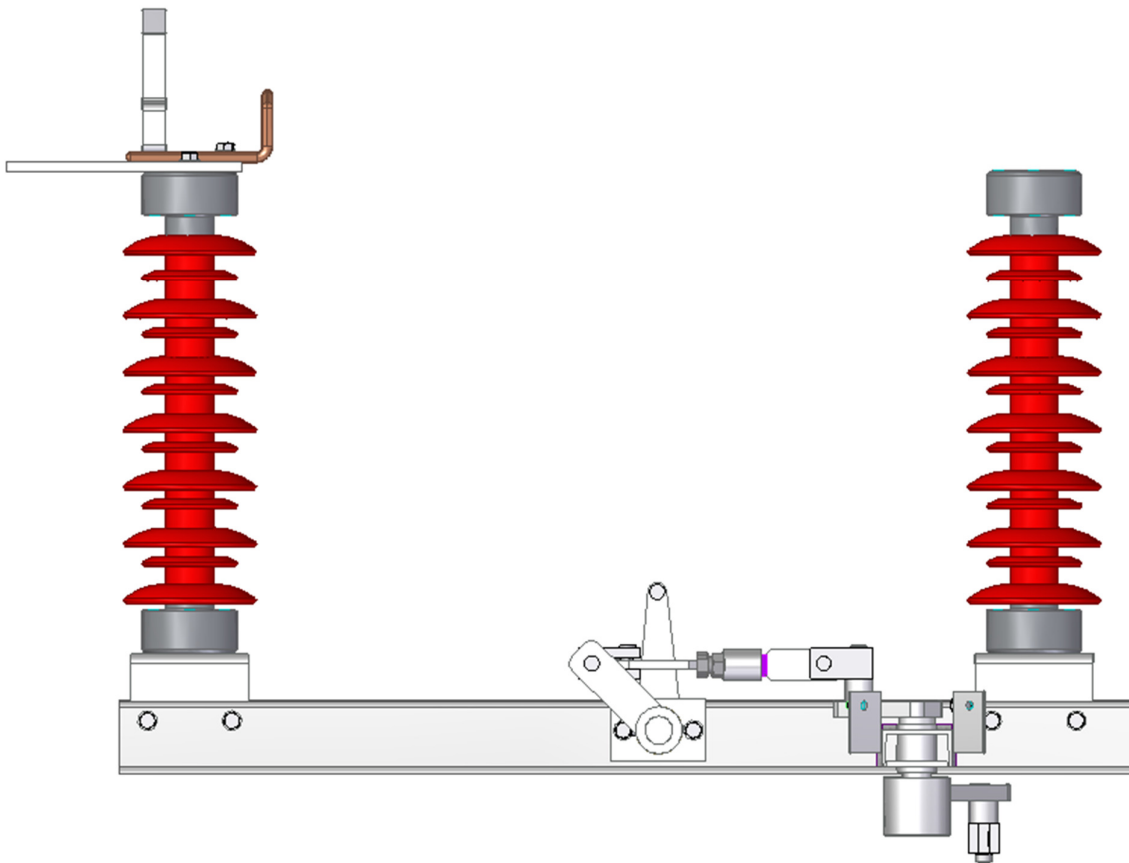
15.0 FIXED CONTACT ASSEMBLY:

Before Erection

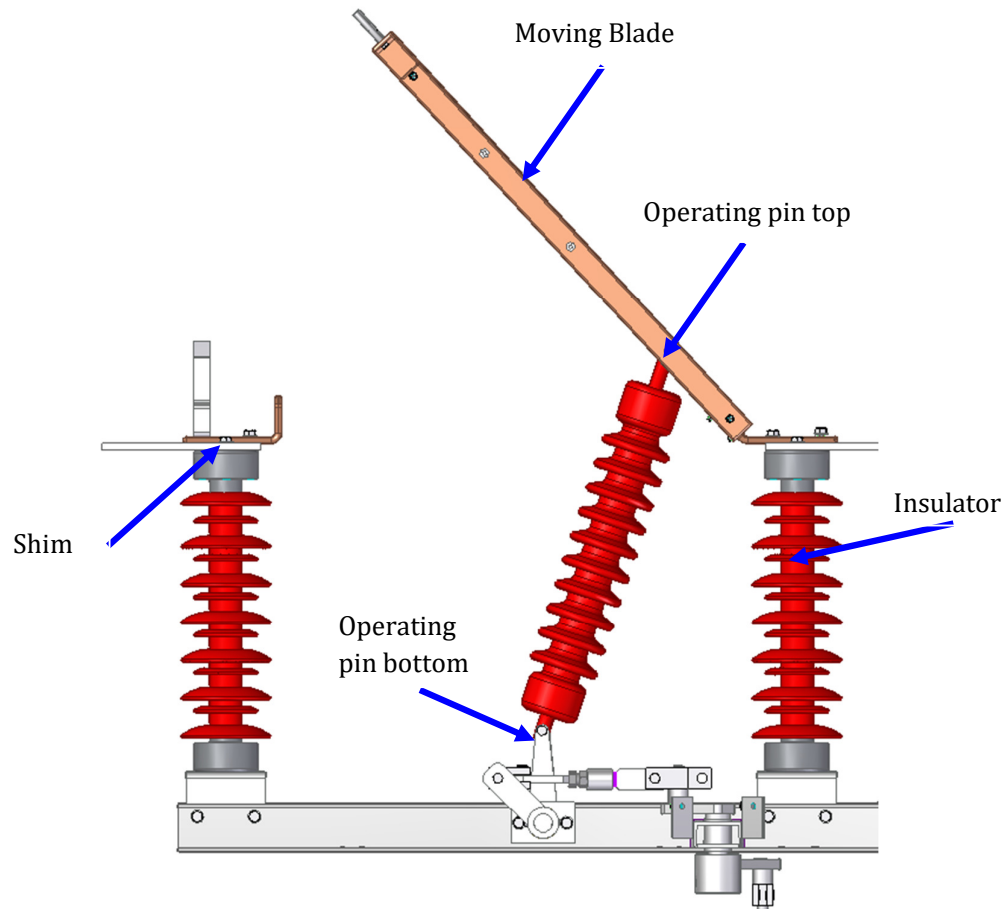
- Identify the Moving blade & fixed contacts.
- Keep the fixing hardware.

ERECTION

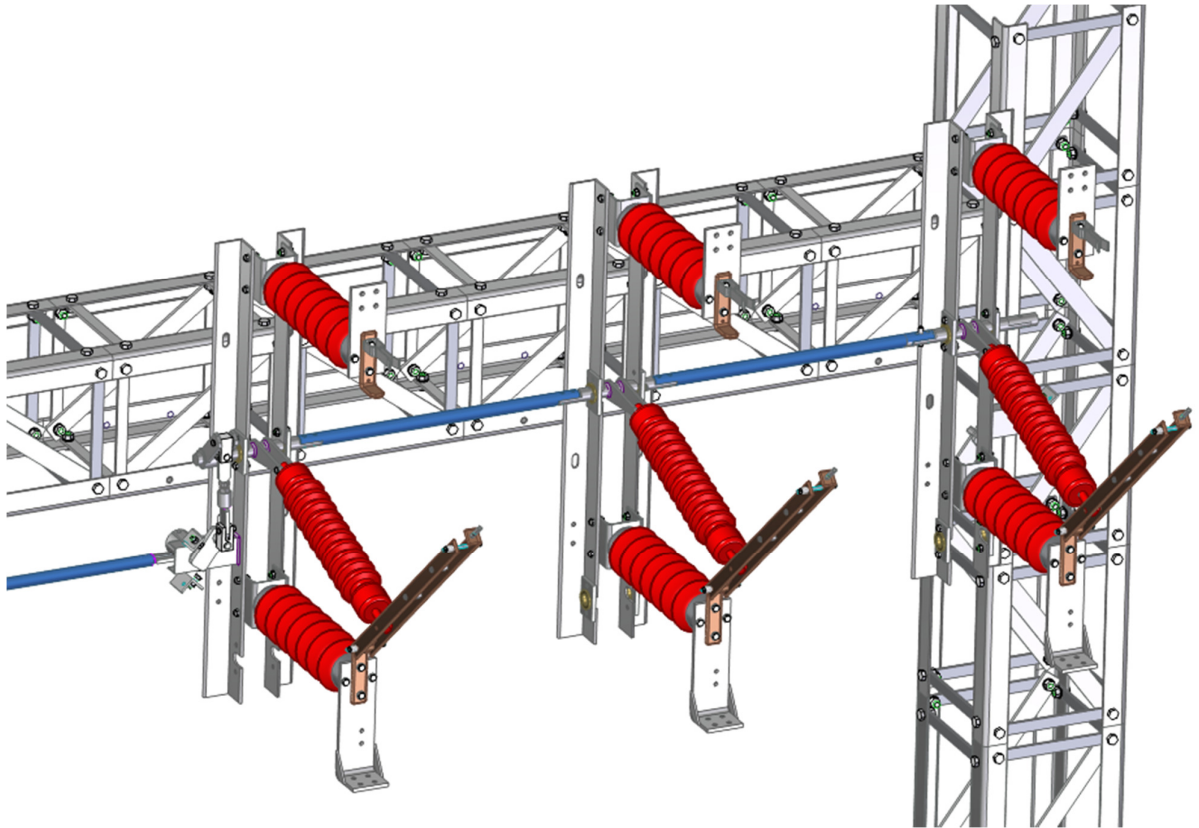
- Take the terminal pad and place over an insulator. And put two M12 screws with necessary washers on two holes.
- Take the fixed contact , arcing horn and place over the terminal pad and tighten by recommended screws.
- Repeat the same for the other side & three poles also.



16.0 MOVING BLADE ASSEMBLY:



- Identify the opening position of the moving blade by referring general assembly drawing.
- Take the terminal pad and place over an insulator. And put two M12 screws with necessary washers on two holes.
- In moving blade assembly, the fixed contact to be place over the terminal pad and tighten with necessary hardware.
- In assembly of moving blade an operating pin top to be connected with operating rod insulator top.
- The operating rod insulator bottom to be connected with rotating pin, which is already assembled in base operating lever.
- After alignment check for free entry and after full close check for equal contact pressure.
- Repeat 2 to 3 times and ensure the alignment and full tight all bolts.
- Repeat the same for other two poles also.
- Finally the tandem pipe will connect to these three poles to operate parallelly.



17.0 OPERATING DRIVE AND DOWN OPERATING PIPE (MAIN):

Identify the drive with the help of drawing and packinglist and open the case carefully.

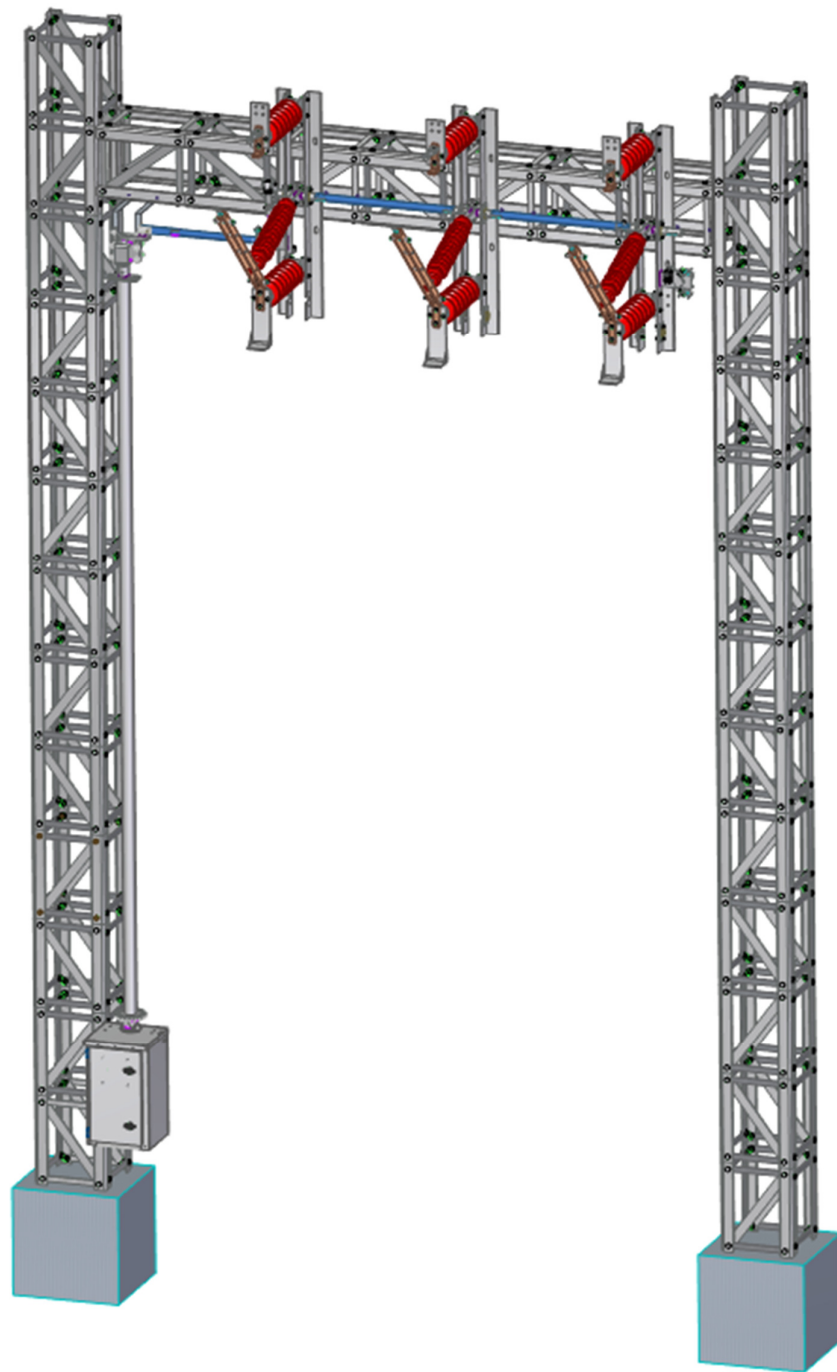
MOUNTING:

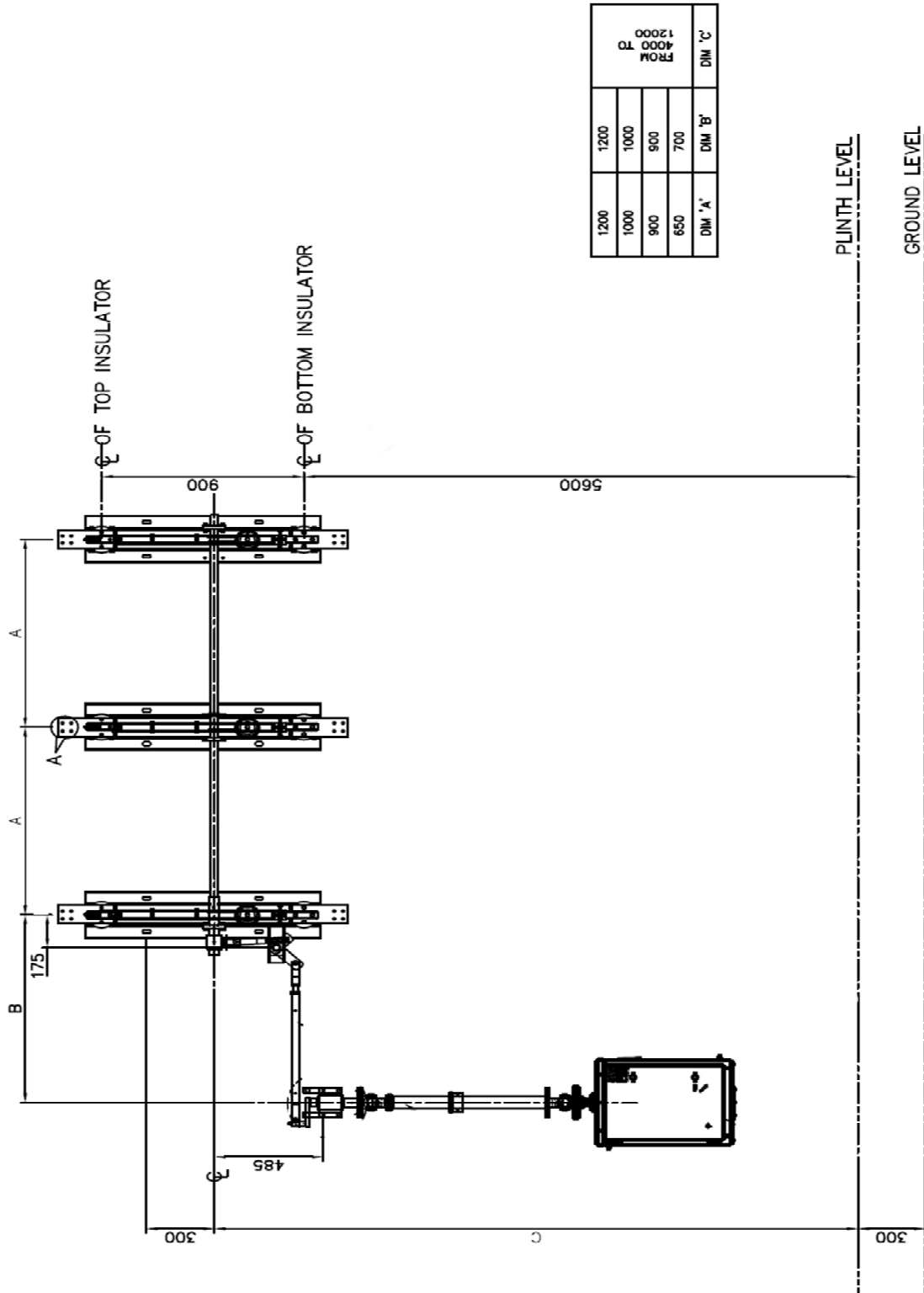
Do not attempt to lift mechanism by drive coupling flange. Lift the drive position and fix with structure. At this stage fixing bolts should only be hand tightened.

CONNECTING DOWN OPERATING PIPE (DOP):

- Check for centre line and vertical line between torque bearing flange and drive flange with a plumb.
- Fix the tee bar end of the one down operating pipe to the tee bar of the torque bearing assembly
- Now fix the other down operating pipe tee bar to the tee bar of operating drive. Cut the down operating pipe to required length.
- Tighten all bolts.
- Operate the pole manually and ensure open/close label is in proper position.

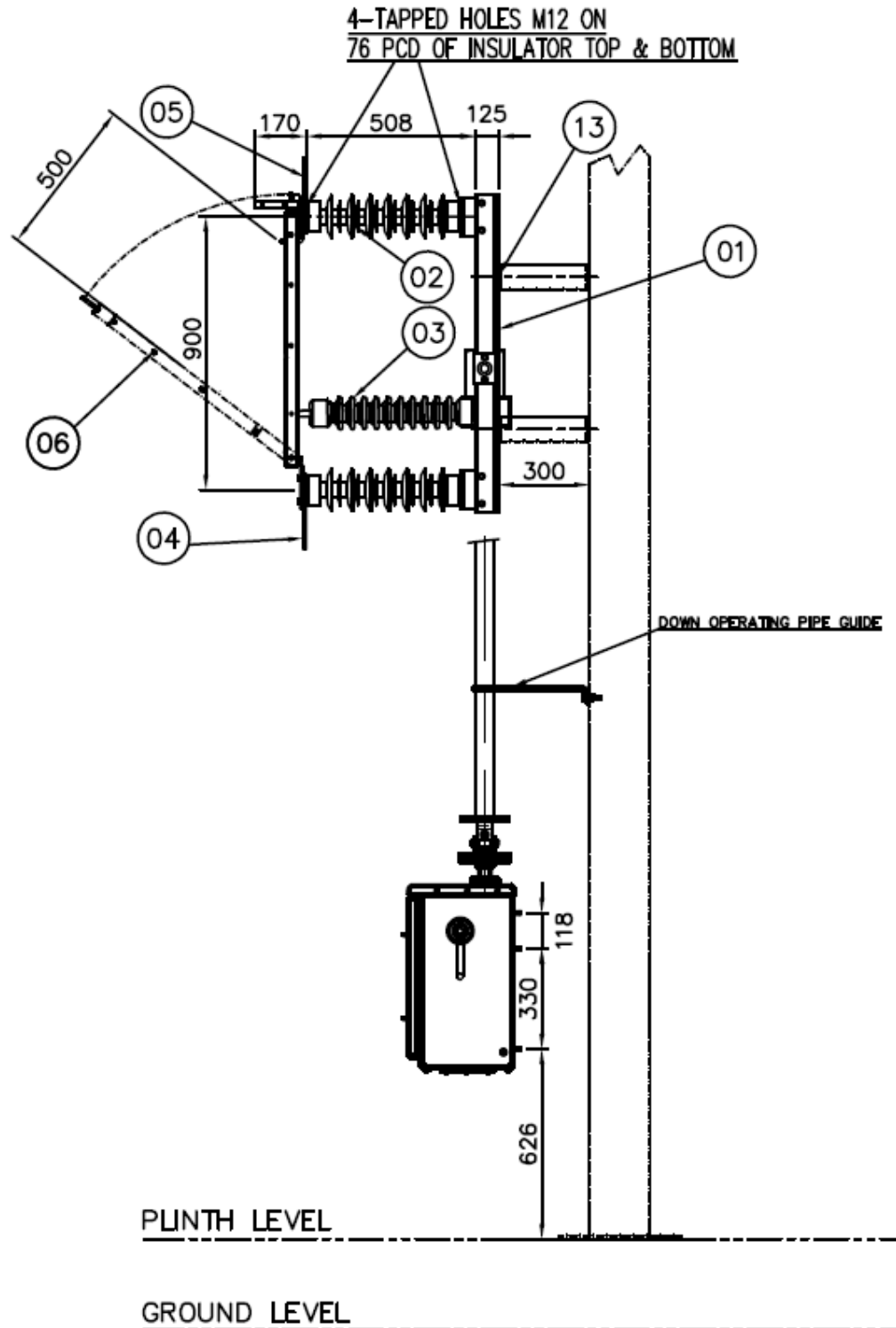
DISCONNECTOR ASSEMBLY WITH OPERATING DRIVE MECHANISM





Q. NO.	DIM 'B'	DIM 'A'
FROM 12000 TO 4000	1200	1200
	1000	1000
	900	900
	700	650

Technical Details



SECTION – D COMMISSIONING AND MAINTENANCE

18.0 COMMISSIONING OF DISCONNECTOR:

- Carry out test operation manually; ensure satisfactory engagement of contacts for all three poles. If necessary, align the contacts.
- Apply contact grease.

19.0 MAINTENANCE:

Caution:

- **Working on high-voltage is very dangerous; hence follow substation and other standard safety rules.**
- Don't use emery paper for cleaning the contacts.
- Don't try to operate the Earth switch when Disconnector is in closed condition.

Do:

- Ensure disconnection of circuits before doing maintenance activity.
- Do proper earthing of the circuit.
- Stay clear of adjacent live parts; wherever possible, earth the adjacent live parts.
- Use proper tools.

We recommend the following inspection intervals

- Normal ambient condition: After every 5 years or after every 1000 operations (Close/open cycle).
- Extreme ambient conditions i.e. Climate (tropical) and heavy contamination (dust, salt, rust and sulphur): After every 2 years or after every 500 operations (Close/open cycle).

20.0 TOOLS AND TACKLES:

Apart from standard tools, the following are required

- Brass wire brush for cleaning of Copper surfaces.
- Steel wire brush for cleaning for Aluminum and steel surfaces.
- Contact grease (Petroleum jelly).
- Cold cleaning agent for Silver plated surfaces.
- Lint – free cloth's

21.0 Cleaning:

Bolted or sliding contact surfaces that conduct current have an effect on the electrical resistance of the current path. Dirty or oxidized contact surfaces increase the electrical resistance. This will result in damage to main contacts. Hence the following cleaning procedure shall be strictly adhered to:

Bolted Contact Surfaces: Aluminum

- Grease lightly.
- With steel wire brush, remove oxide film fully (Do not use emery paper).
- Wipe off contaminated grease immediately using lint – free cloth.
- Re-apply grease again (Immediately after cleaning with lint –free cloth).
- Bolt together treated surfaces and grease joints.

Silver plated contact surfaces.

- Clean with cold cleaning agent (do not destroy silver surfaces).
- Grease immediately.
- Bolt together treated surfaces and grease joints.

Silver plated contact surfaces (Sliding)

- Clean with cold cleaning agent (do not destroy silver surfaces).
- Grease immediately

22.0 Inspection checks:

The following operations must be carried out during inspection

Disconnecter:

- Clean contact area (Male and Female contacts). Check for any damage; if required, change the contacts.
- Apply grease on contact surfaces.
- Clean the insulators. Check for any damage; if required, change.
- Check all bolted connections.
- Carry out three or four test operations manually.
- Reconnect the power supplies and control voltage.
- Carry out three or four test operations electrically.

23.0 RECOMMENDED SPARES:

Keep adequate quantity of following spares at all times.

- Fixed contacts.
- Moving contacts.
- Clevis pins with nylon washers, split pins.
- Control springs.



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