

7211478/2023/EEMRT-ENE51



GR POWER SWITCHGEAR LIMITED
 PLOT NO:27/B IDA JEEDIMETLA
 HYDERABAD

LIST OF 145 KV STD ISOLATOR DRAWINGS/DOCUMENTS

| | | | | |
|--|--------------|----------------|------------|--|
| CUSTOMER : M/s TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED Chief Engineer/Projects APTRANSCO/VS/Vijayawada. | SLNO. | DRG.NO. | REV | DESCRIPTION OF DRAWINGS/DOCUMENTS |
| | 1 | 3. FR AP 01 | 0 | 145 KV , 1200 AMPS,TP,DB,RT,ISOLATOR WITH OUT E. S |
| | 2 | 4. FRM AP 02 | 0 | MAIN SWITCH CONTACT ASSEMBLY (1200 A) |
| | 3 | 4. FN AP 03 | 0 | MANUAL OPERATING MECHANISM FOR 145 KV M.S. |
| | 6 | 4. FZ AP 04 | 0 | NAME PLATE DETAILS FOR 145 KV M/S |
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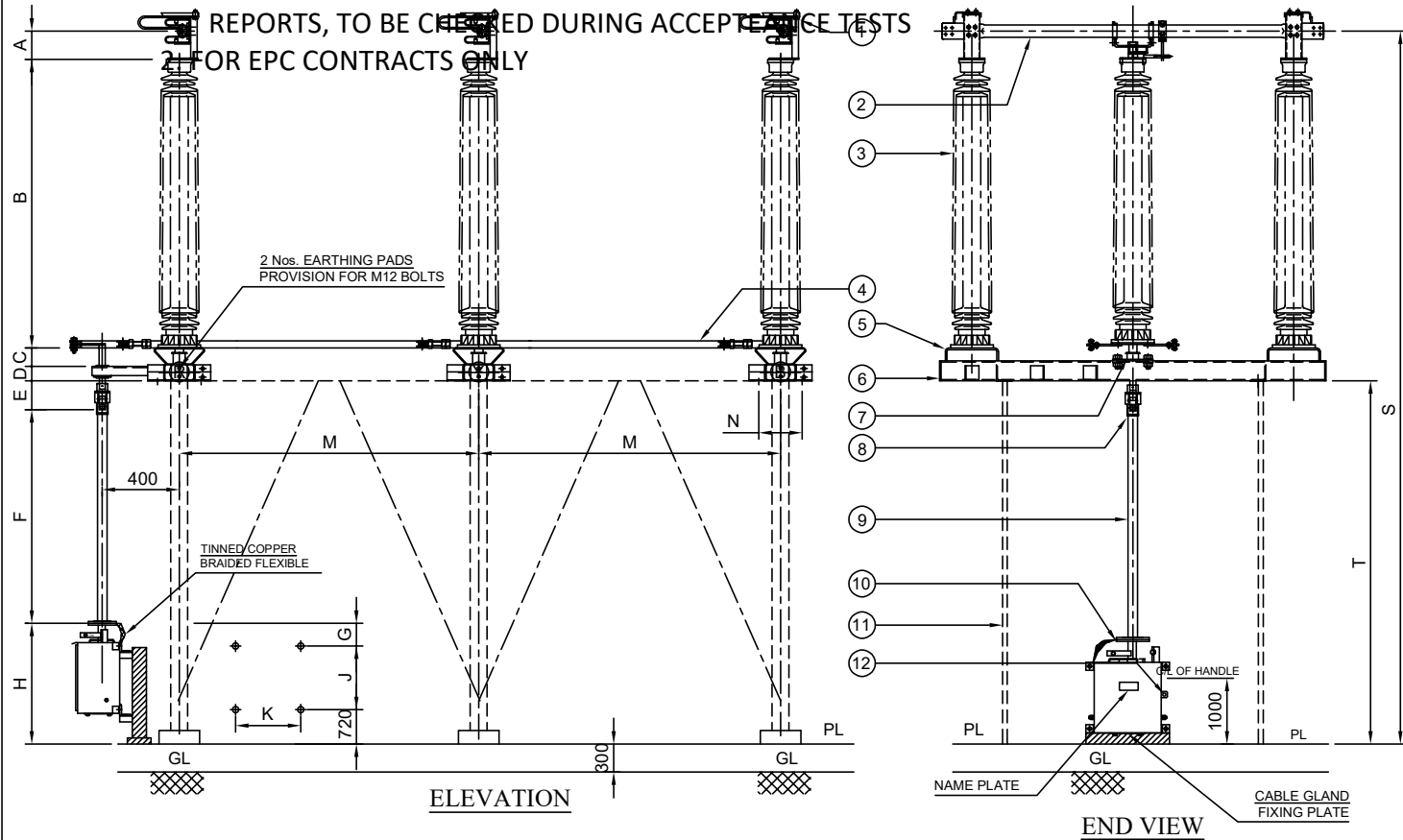
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| | | |
| PREPARED BY | CHECKED BY | APPROVED BY |

- Minimum 300mm plinth shall be maintained for CT/PT/CVT/ Isolators/IVT in the substation during foundation works to ensure Safe live to ground clearance as per IE rules.
- since the supply of terminal connectors is not in the scope of Manufacturer as mentioned in the drawings. The EPC contractor Shall be instructed to supply the same in line with CT/PT/CVT/Isolator /IVTs requirement and compatibility.

**NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
 2. FOR EPC CONTRACTS ONLY**

Drawing approval subject to valid vendor registration

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST



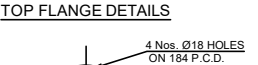
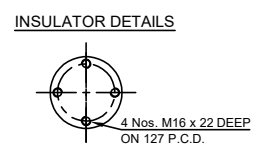
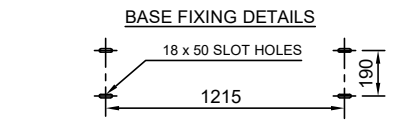
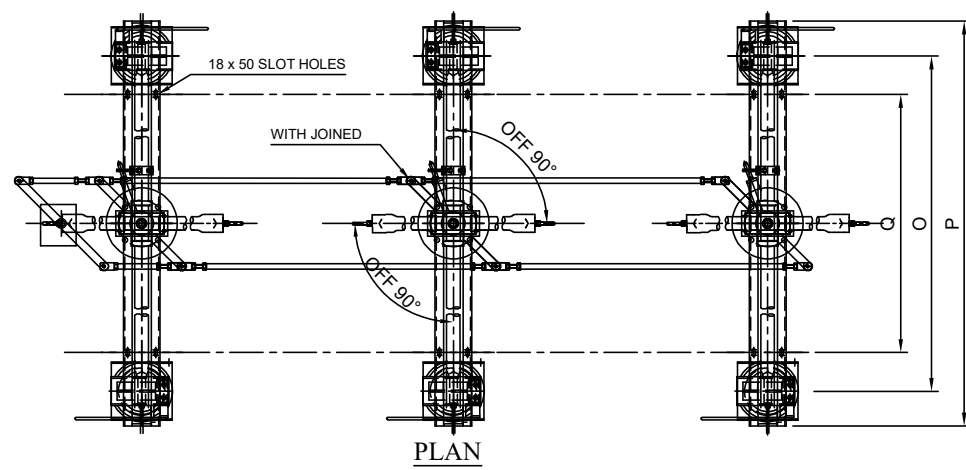
- PART LIST:**
1. FIXED CONTACT ASSEMBLY
 2. MOVING CONTACT ASSEMBLY
 3. INSULATOR STACK (NOT IN OUR SCOPE OF SUPPLY)
 4. TANDEM PIPE (CLASS " B " G.I. PIPE)
 5. ELEVATOR CHANNEL (10 mm THK)
 6. BASE CHANNEL (125 x 65 x 5 mm THICK CHANNEL)
 7. ROTATING SHAFT WITH LEVER ARM & CLAMP (M.S. HDG)
 8. UNIVERSAL JOINT ARRANGEMENT
 9. DOWN OPERATING PIPE (50 NB, CLASS " B " G.I. PIPE)
 10. OPERATING MECHANISM FOR MAIN SWITCH (MANUAL)
 11. SUPPORTING STRUCTURE (NOT IN OUR SCOPE OF SUPPLY)
 12. PROVISION FOR PADLOCK
- Tandem Pipe size of Isolator /E.S./Aux Tandem Pipe Shall be Minimum 32 mm NB

REFERENCE DRAWINGS:
 FOR ISOLATOR CONTACT DETAILS (1200A) ----- 4. RM AP 02
 FOR OPERATING MECHANISM DETAILS (M.S) ----- 4. N AP 03
 FOR NAME PLATED DETAILS ----- 4. Z AP 04

Thickness of Silver plating : 15 Microns Minimum

- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETERS
 2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED (87 MICRONS)
 3. ALL NON-FERROUS CONTACT POINTS ARE SILVER PLATED (MIN)
 4. THE INDICATED DIMENSIONS ARE SUBJECT TO THE MANUFACTURING TOLERANCE:
 UP TO 50 mm $\pm 3\%$; 51 TO 100 mm $\pm 2\%$;
 101 TO 300 mm $\pm 1\%$; ABOVE 300 mm $\pm 0.5\%$;
 5. SHORT TIME CURRENT RATING 31.5 KA ms. FOR 3 Sec.
 6. APPLICABLE STANDARD : IS:9921 PART I TO V ; IEC : 62271 - 102
 7. MAIN ROTATING POST HAVING 2 Nos. BALL BEARINGS OF ADEQUATE SIZE
 8. SUPPORT STRUCTURE & INSULATORS INCLUDING FIXING HARDWARE NOT IN OUR SCOPE OF SUPPLY

WEIGHT:
 NET WEIGHT OF THE ISOLATOR
 EXCLUDING INSULATOR : 550 Kg (Approx.)



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DIMENSIONS

| A | B | C | D | E | F | G | H | J | K | M | N | O | P | Q | S | T |
|-----|------|----|-----|-----|------|-----|------|-----|-----|------|-----|------|------|------|------|------|
| 175 | 1500 | 75 | 125 | 180 | 1420 | 120 | 1200 | 360 | 400 | 3000 | 190 | 2135 | 2500 | 1215 | 4675 | 2800 |

| REVISIONS | | | |
|-----------|---|---|---|
| D | C | B | A |
| | | | |

TITLE:
G.A. OF 145 kV, 1200 AMPS,
TP, HDB, RT, ISOLATOR WITH OUT E.S.
(MANUAL OPERATING MECHANISM)

SCALE: N.T.S.

DATE: 27-03-2023

DRAWN: [Signature]

CHECKED: [Signature]

APPROVED: [Signature]

DRG.NO: 3. FR AP 01

REV

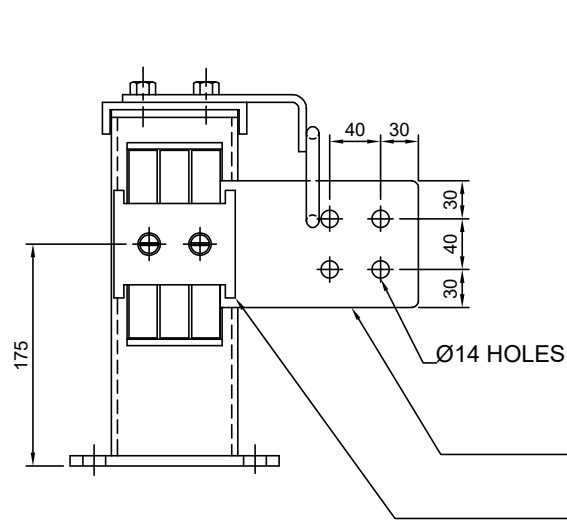
GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST

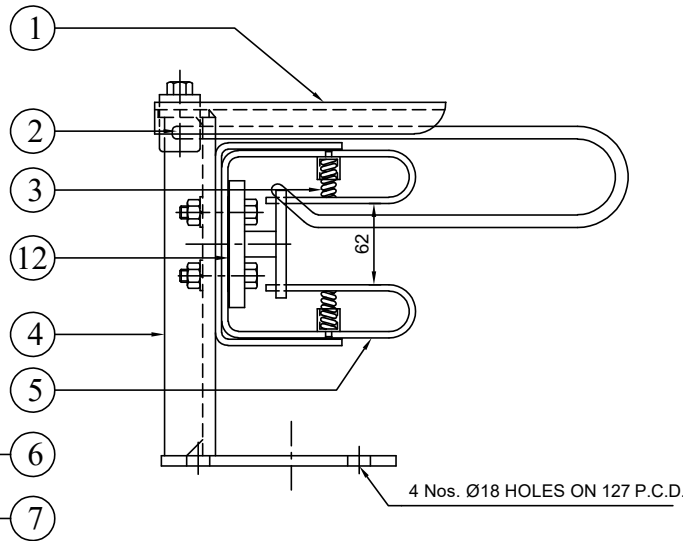
REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS

2. FOR EPC CONTRACTS ONLY

FIXED CONTACT ASSEMBLY:

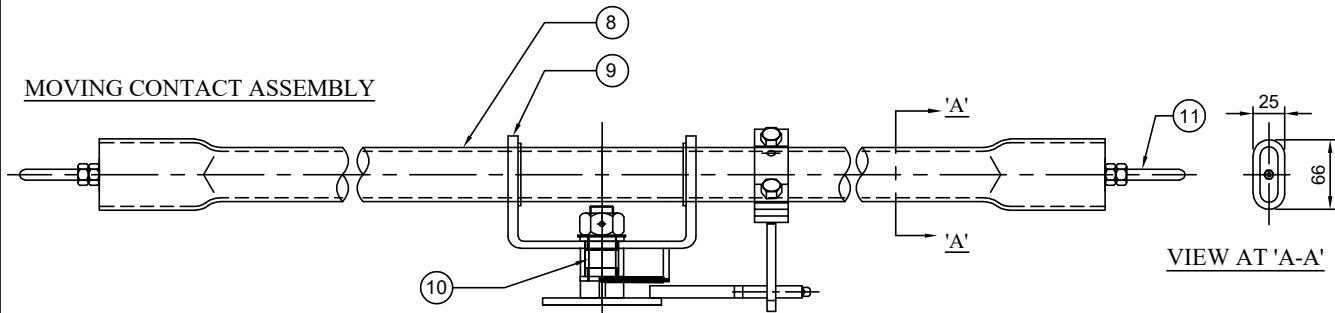


ELEVATION



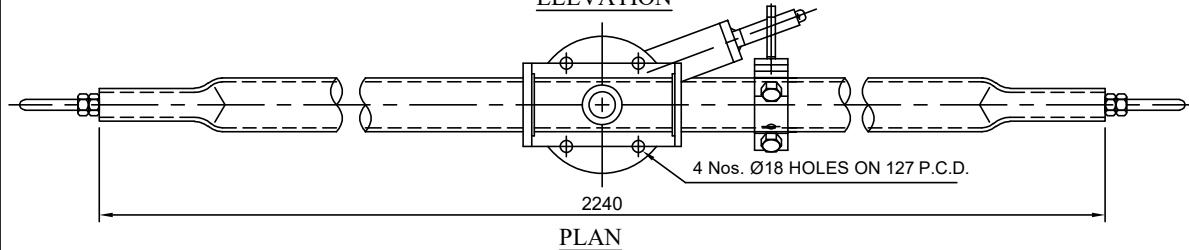
END VIEW

MOVING CONTACT ASSEMBLY



ELEVATION

VIEW AT 'A-A'



PLAN

PART LIST:

1. HOOD (18 SWG M.S. HDG)
2. ARCING HORNS (Ø10 ROD M.S. HDG)
3. SPRINGS (Ø2 mm STAINLESS STEEL.)
4. SUPPORTING CHANNEL (115 x 40 mm M.S. HDG)
5. JAWS (32 x 4 HDEC STRIP 3 Nos. SILVER PLATED)
6. JUMPER PLATE (100 x 12 ALU. FLAT)
7. SPACER (ALUMINUM)
8. MOVING CONTACT ARM (50 OD x 41 ID CU. TUBE)
9. MC SUPPORT WITH NYLON BUSH
10. CENTER MECHANISM (M.S. HDG, TURN & TWIST MECHANISM)
11. ARCING HORN FOR MOVING CONTACT(Ø10 ROD M.S. HDG)
12. BI-METALLIC SHEET (2 mm THICK Alu. + Cu.)

| |
|--------|
| 198 |
| BOQ |
| 721 |
| 06 Nos |
| 06 Nos |
| 36 Nos |
| 06 Nos |
| 18 Nos |
| 06 Nos |
| 06 Nos |
| 03 Nos |
| 06 Nos |
| 03 Nos |
| 06 Nos |
| 06 Nos |

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER
2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
3. ALL NON-FERROUS CONTACT POINTS ARE SILVER PLATED
MICRONS REMAINING CONTACT AREA TIN PLATED.
4. THE MOVING CONTACT ASSEMBLY SHOWN FOR TURN & TWIST ASSEMBLY

Thickness of Silver plating : 15 Microns Minimum

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| REVISIONS | | | |
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| D | C | B | A |
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TITLE:

MAIN CONTACT ASSEMBLY
(FOR 145 kV 1200 Amps)

| | |
|-------------|------------|
| SCALE:N.T.S | |
| DATE | 21-08-2023 |
| DRAWN | |
| CHECKED | |
| APPROVED | |



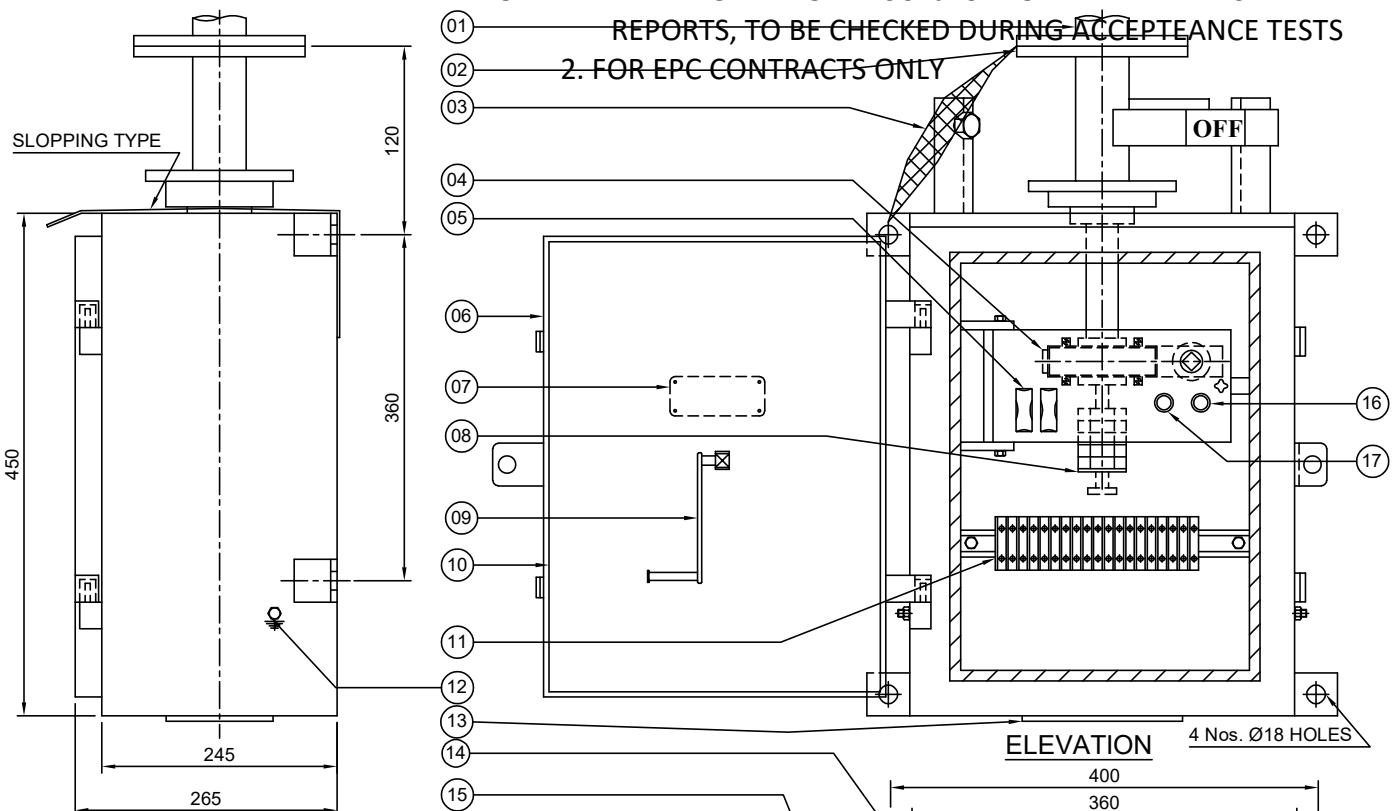
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JEEDIMETLA HYDERABAD-500 055 INDIA

| | |
|--------------|-----|
| DRG.NO: | REV |
| 4. FRM AP 02 | |

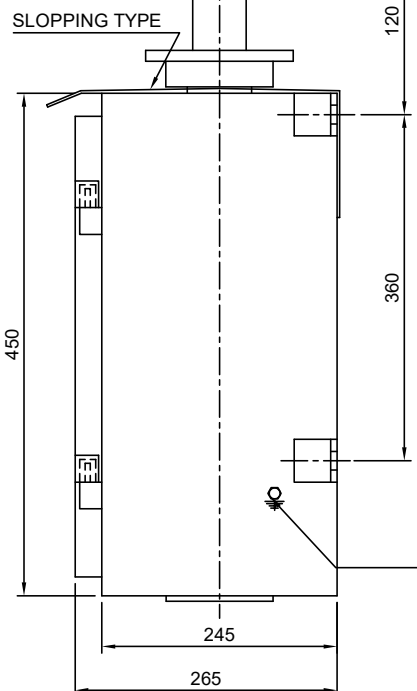
NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST

REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS

2. FOR EPC CONTRACTS ONLY



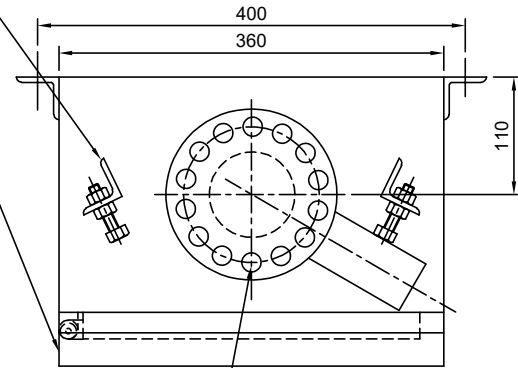
SLOPPING TYPE



END VIEW

ELEVATION

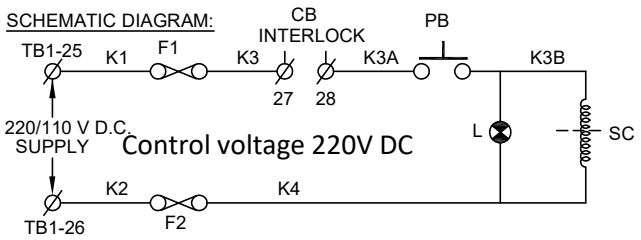
4 Nos. Ø18 HOLES



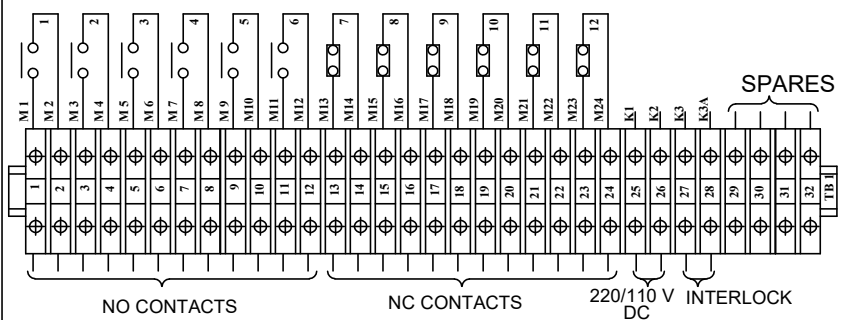
PLAN

14 Nos. Ø18 HOLES ON 127 PCD

SCHMATIC DIAGRAM:



AUX. SWITCH CONTACT DETAILS FOR ISOLATOR (6 NO + 6 NC)



PART LIST

- 01. DOWN OPERATING PIPE
- 02. OUTPUT FLANGE (08 MM THICK M.S. PLATE)
- 03. COPPER FLEXIBLE (25 x 3 mm TINNED Cu. FLEXIBLE)
- 04. REDUCTION GEAR BOX (MATERIAL : EN8 / FORGED STEEL)
- 05. FUSES (2 A)
- 06. CUBICLE WITH DOOR (3 mm THICK, ALU. SHEET)
- 07. NAME PLATE
- 08. AUXILIARY SWITCH (6 NO + 6 NC)
- 09. OPERATING HANDLE
- 10. GASKET (EPDM)
- 11. TERMINAL BLOCKS (UBT - 4 OF ELEM X / VIN MECH OR ITS EQVT.)
- 12. PROVISION FOR EARTHING TERMINALS
- 13. DETACHABLE CABLE GLAND FIXING PLATE (WITHOUT GLANDS)
- 14. ON - OFF STOPPERS (M.S. ANGLE PAINTED)
- 15. RAIN SHADE
- 16. INDICATION LAMP
- 17. PUSH BUTTON (4 A)

NOTES:

- 1. ALL DIMENSIONS ARE IN MILLIMETER
- 2. CUBICLE WILL BE NATURAL FINISH FOR INSIDE AND OUTSIDE
- 3. DEGREE OF PROTECTION IP:55 AS PER IS:2147
- 4. WEIGHT OF THE BOX :28 Kg (Approx.)
- 5. WIRING WILL BE DONE WITH 1100 V GRADE 2.5 Sq. mm Cu. STANDED P.V.C. INSULATED CONDUCTOR
- 6. 20% SPARE TERMINALS PROVIDED
- 7. REDUCTION GEAR RATIO 20 : 1 MAKE GRPS MATERIAL OF GEAR EN8 / STEEL
- 8. LUBRICATION OF GARES : NON HARDENED GEARS FILLED GEAR BOX

LEGEND:

- F1,F2 ----- FUSES (2 Amp Rating)
- PB ----- PUSH BUTTON
- L ----- INDICATION LAMP
- SC ----- SOLENOID COIL

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| REVISIONS | | | |
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| D | C | B | A |
| | | | |

TITLE: **OPERATING MECHANISM FOR MAIN SWITCH (FOR 132 KV)**

GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

| | |
|-------------|-------------|
| SCALE:N.T.S | |
| DATE | 21-03-2023 |
| DRAWN | |
| CHECKED | |
| APPROVED | |
| DRG.NO: | 4. FN AP 03 |
| REV | |

| | | |
|-----------------------|--|---|
| | MANUFACTURED & SUPPLIED BY | |
| | GR POWER SWITCHGEAR LTD., JEEDIMETLA, HYDERABAD - 500 055 | |
| CUSTOMER : | M/s. TRANSMISSION CORPORATION OF AP LIMITED | |
| PROJECT : | ----- | |
| CONTRACTOR : | ----- | |
| P.O. NO : | ----- | Dt. : ----- |
| TYPE : | HDB | SL. NO : AS APPLICABLE YEAR OF Mfg. : ----- |
| RATING : | Un 145 KV ; In : 1200 A ; | WEIGHT IN KG : ----- |
| IMPLUSE(UI) : | 650 KV Peak ; SWITCHING(Us) : | NA KV Peak ; |
| P.F : | 275 KV rms ; STC(lth) : | 31.5 KA rms ; DURATION : 3 Sec ; |
| OPERATING MECHANISM : | MANUAL (RG) | |
| CONTROL VOLTAGE : | 220/110 V DC | CREEPAGE : ----- |

Control voltage 220V DC

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Project, contractor, PO, date ,year of MFG shall be stamped during inspection

- Minimum 300mm plinth shall be maintained for CT/PT/CVT/ Isolators/IVT in the substation during foundation works to ensure Safe live to ground clearance as per IE rules.
- since the supply of terminal connectors is not in the scope of Manufacturer as mentioned in the drawings. The EPC contractor Shall be instructed to supply the same in line with CT/PT/CVT/Isolator /IVTs requirement and compatibility.

Drawing approval subject to valid vendor registration

NOTES :


- ENGRAVED LETTER SIZE : 3 mm
- LETTER ETCHED WHITE ON BLACK BACKGROUND
- MATERIAL : ALUMINIUM
- THICKNESS : 1 mm

| | | | | | | |
|------------------|----------|----------|----------|---|--------------------|------------|
| REVISIONS | | | | TITLE: NAME PLATE DETAILS FOR 132 KV ISOLATOR | SCALE:N.T.S | |
| D | C | B | A | | DATE | 21-03-2023 |
| | | | | DRAWN | | |
| | | | | CHECKED | | |
| | | | | APPROVED | | |
| | | | | DRG.NO: | REV | |
| | | | | GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA | 4. FZ AP 04 | |

SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS FOR 145 KV, 1200A WITHOUT EARTH SWITCH



| S.No | DESCRIPTION | 145 KV |
|------|---|--|
| 1 | Type/Installation | "DB" Double Break - OUTDOOR |
| 2 | Manufacturer's Name and country of manufacture | GR POWER SWITCHGEAR LTD., |
| 3 | Standards according to which the isolators are manufactured. | IS 9921Part I to V.& IEC 62271-102 |
| 4 | Maximum design voltage at which the isolator can operate (kV). | 145 KV |
| 5 | Frequency (Hz) | 50 Hz |
| 6 | Rated voltage (kV) | 145KV |
| 7 | Maximum current that can be safely interrupted by the Isolator inductive (A & % PF) Capacitive (A & % PF) | 0.7 Amps at 0.15 p.f. |
| 8 | Continuous current rating normal (Amps) under site conditions (Amps). | 1200 Amps |
| 9 | Rated short time current | <u>MAIN SWITCH</u> |
| | i) For 3 Seconds (kA rms) | 31.5 KA rms |
| | ii) For 1 Second (kA rms) | Not Applicable |
| | iii) Rated peak short time current (KV P) | 78.75 KA rms |
| 10 | Current density at the minimum cross section of | |
| | a) Moving blade (Amps/Sq.mm) | 2.0 Amps/Sq.mm for HDE Cu. Tube |
| | b) Terminal pad | 1.0 Amp/Sq.mm for EC grade Alu. Flat. |
| | c) Contacts | 1.6 Amps/Sq.mm for HDE Cu. Flat. |
| 11 | Maximum temperature rise of current carrying parts when carrying rated current continuously (Deg.C). | Within the specified limits of IS/IEC 62271-102. |
| 12 | Insulation levels | |
| | i) Impulse withstand voltage (kV Peak) Phase to Earth Isolating Distance. | 650/750 KV Peak |
| | ii) Switching surge withstand voltage (kV Peak) Phase to Earth isolating distance. | Not applicable |

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| S.No | DESCRIPTION | | 145 KV |
|------|---|---|---|
| | iii) Power Frequency withstand voltage (kV rms) Phase to Earth isolating distance. | : | 275/315 KV rms |
| 13 | Minimum clearance in air | | |
| | i) Between poles (mm) | : | 2700 mm for a phase spacing of 3000 mm |
| | ii) Between live parts and earth (mm) | : | 1300 mm |
| | iii) Between live parts when switch is open. | | |
| | a) On the same pole (mm) | : | 1735 mm |
| | b) Between adjacent poles (mm) | : | 2090 mm |
| 14 | Rated mechanical terminal load | | |
| | i) Load along the terminal connector side (Kg). | : | 51 Kgs |
| | ii) Load across the terminal connector side (Kg). | : | 17.3 Kgs |
| 15 | Torque required to operate the switch in Kg.m. | : | 40 Kg m |
| 16 | Contact Zone | | |
| | i) Horizontal deflection (mm) | | |
| | ii) Vertical deflection (mm) | : | Not applicable |
| | iii) Total amplitude of longitudinal movement w.r.t conductor supporting fixed contact | | |
| 17 | Design and construction | | |
| | i) No. of insulators per pole | : | Three |
| | ii) No. of breaks per pole | : | Two |
| | iii) Type of closing / opening mechanism (Horizontal / vertical break straight etc.). | : | Horizontal break for Isolator |
| | iv. Contacts | | |
| | a) Material and grade | : | Thickness of Silver plating : 15 Microns Minimum Hard Drawn Electrolytic Copper flat, silver plated  micron thickness. |
| | b) Cross-sectional area (Sq.mm) | : | 768 Sq.mm for 1200A |

Drawing approval subject to valid vendor registration

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APTRANSCO/VS/Vijayawada.

| S.No | DESCRIPTION | 145 KV |
|-------|---|--|
| v | Moving blades | Thickness of Silver plating : 15 Microns Minimum |
| | a) Material and grade | : Hard Drawn Electrolytic Copper tube, silver plated  micron thickness. |
| | b) Cross-sectional area (Sq.mm) | : 643 Sq.mm for 1200A |
| vi) | Contact support | |
| | a) Material and size of channel / block. | : 8 mm Thick MS HDG |
| vii) | Rain hood-material grade and size | : MS HDG |
| viii) | Turn and twist mechanism | |
| | a) Material and size of clamps | : 40 x 10 MS HDG Flat |
| | b) Material size of springs | : 10 swg SS wire |
| | c) Whether springs are encased | : Not encased |
| ix) | Nuts and bolts | |
| | a) Size, material and grade in live parts. | : Lessthan M8 are of stainless steel |
| | b) Size, material and grade in other parts. | : M8 and above are of MS HDG. |
| x) | Insulator base plate material and size of plate below insulators. | : 10 mm thick M.S. Hot dip galvanised plate |
| xi) | Bearings | |
| | a) Material and size of housing | : MS HDG suitable for 40 ID Ball Bearing |
| | b) No. of bearings, location & size | : 2 Nos. below centre rotating post insulator |
| xii) | Tandem pipe | Tandem Pipe size of Isolator /E.S/Aux Tandem Pipe Shall be Minimum 32 mm NB |
| | a) Size, length class and No. of pipes | : As per GA drawings |
| | b) Size of shackle screw | : Suitable for  |
| | c) No. of bearings / bush and its material and size. | : 6 Nos. bush bearings, brass, 16 mm ID Size. |
| xiii) | Type of interlock | : Not Applicable |

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APTRANSCO/VIS/Vijayawada.

| S.No | DESCRIPTION | | 145 KV |
|------|---|---|--|
| | xiv) Down pipe size, length and class | : | 50 mm NB Class B GI Pipe. |
| | xv) Type of universal/swivel joint | | |
| | a) Between bearing & down pipe | : | Universal joint |
| | b) Between down pipe and operating mechanism. | : | Vernier Flange |
| | xvi) Operating mechanism | | Manual operated mechanism for M.S |
| | a) Control cabinet | | |
| | Material and thickness | : | 3 MM Thick ALU Sheet |
| | Degree of protection | : | IP : 55 as per IS 2147 |
| | Type size and no. of cable glands. | : | Compression type, 2 Nos. 19 mm. (Contractor scope of supply) |
| | Whether removable gland plate provided. | : | Yes, removable gland plate provided. |
| | b) Make type, rating and Qty. of Motors | : | Not Applicable |
| | Auxiliary blocks | : | 6 NO / 6 NC contacts for Manual operated Main Switch |
| | | | Mani 10 A, 2 A DC breaking with 2A - 1 No. |
| | Terminal blocks | : | UBT-4 |
| | Insulated Wires | : | 1100 V grades, 2.5 Sq.mm PVC |
| | HRC Fuse | : | Applicable for RG Box |
| | Space Heater | : | Not applicable |
| | Interlocks | : | 1 Set PSI / 20 Watts magnetic - 1 No. |
| | xvii) Base | | |
| | a) Size of steel sections used | : | 125 X 65 mm |
| | b) Overall size | : | 2500 x 125 x 65 mm x 5 mm |
| | c) Total weight | : | 28 Kgs approx |

for GR POWER SWITCHGEAR LTD.,

Drawing approval subject to valid vendor registration


AUTHORIZED SIGNATORY

Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.