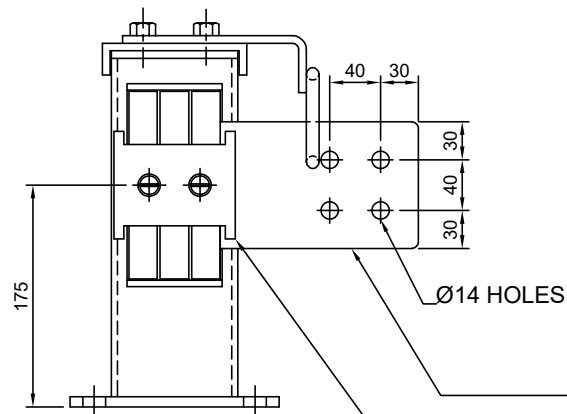


NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST

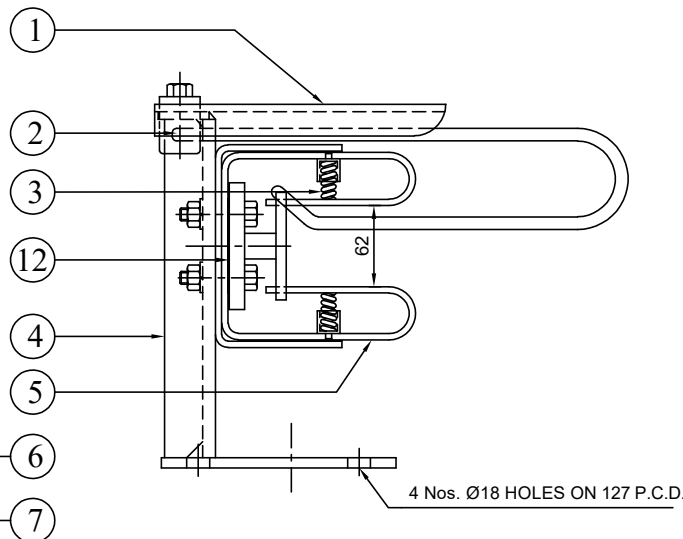
REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS

2. FOR EPC CONTRACTS ONLY

FIXED CONTACT ASSEMBLY:

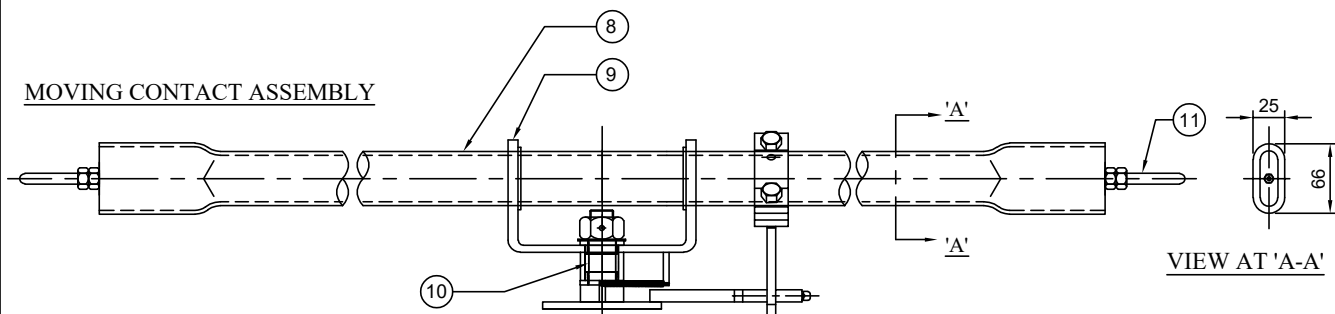


ELEVATION

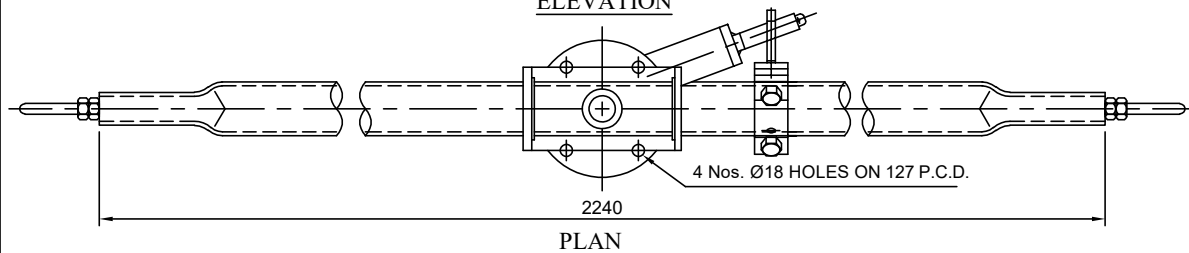


END VIEW

MOVING CONTACT ASSEMBLY



ELEVATION



PLAN

PART LIST:

- | | |
|---|--------|
| 1. HOOD (18 SWG M.S. HDG) | 06 Nos |
| 2. ARCING HORNS (Ø10 ROD M.S. HDG) | 06 Nos |
| 3. SPRINGS (Ø2 mm STAINLESS STEEL.) | 36 Nos |
| 4. SUPPORTING CHANNEL (115 x 40 mm M.S. HDG) | 06 Nos |
| 5. JAWS (32 x 4 HDEC STRIP 3 Nos. SILVER PLATED) | 18 Nos |
| 6. JUMPER PLATE (100 x 12 ALU. FLAT) | 06 Nos |
| 7. SPACER (ALUMINUM) | 06 Nos |
| 8. MOVING CONTACT ARM (50 OD x 41 ID CU. TUBE) | 03 Nos |
| 9. MC SUPPORT WITH NYLON BUSH | 06 Nos |
| 10. CENTER MECHANISM (M.S. HDG, TURN & TWIST MECHANISM) | 03 Nos |
| 11. ARCING HORN FOR MOVING CONTACT (Ø10 ROD M.S. HDG) | 06 Nos |
| 12. BI-METALLIC SHEET (2 mm THICK Alu. + Cu.) | 06 Nos |

NOTE:

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

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REVISIONS			
D	C	B	A

TITLE:

MAIN CONTACT ASSEMBLY
(FOR 145 kV 1200 Amps)

SCALE:N.T.S

DATE: 21-07-2023

DRAWN: [Signature]

CHECKED: [Signature]

APPROVED: [Signature]



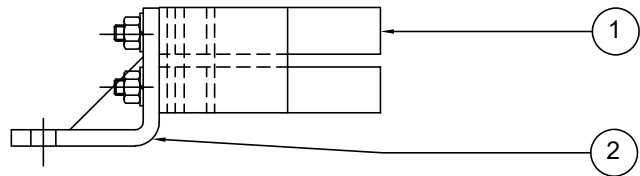
GR POWER SWITCHGEAR LTD.,
JEEDIMETLA HYDERABAD-500 055 INDIA

DRG.NO:

4. FRM AP 02

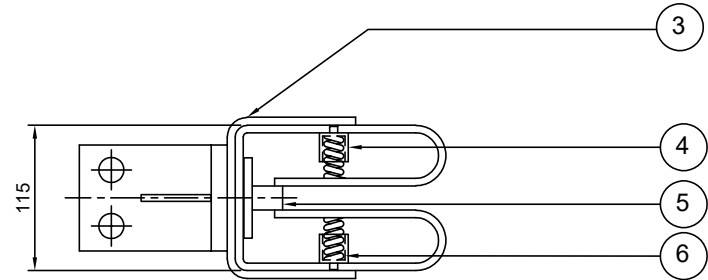
REV

FIXED CONTACT ASSEMBLY:



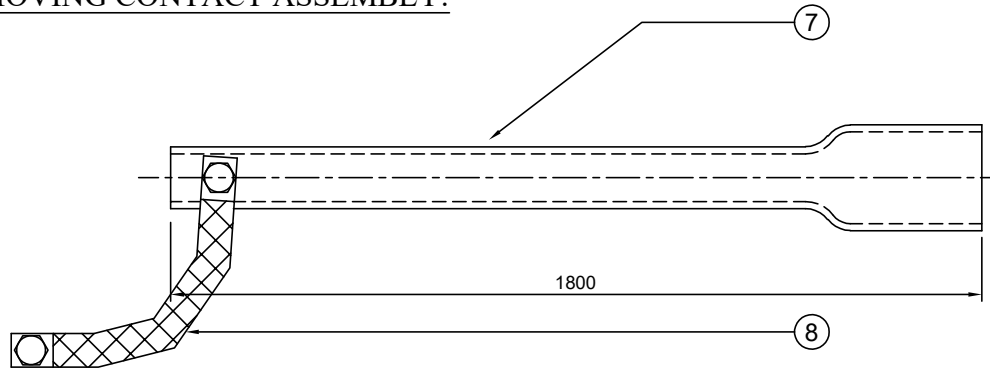
ELEVATION

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



PLAN

MOVING CONTACT ASSEMBLY:



Drawing approval subject to valid vendor registration

PART LIST:

1. JAWS (2 Nos. 32 x 4 mm, Cu. FLAT SILVER PLATED)
2. F.C. SUPPORT PLATE (M.S. HDG)
3. JAW BRACKET (M.S. HDG)
4. SPRING HOLDER BUSH (NYLON)
5. SPACER (AL)
6. SPRINGS (14 SWG S.S. WIRE)
7. MOVING CONTACT ARM (38 OD x 30 ID CU. PIPE)
8. COPPER FLEXIBLE (25 x 4 mm, 4 Nos)

NOTE:

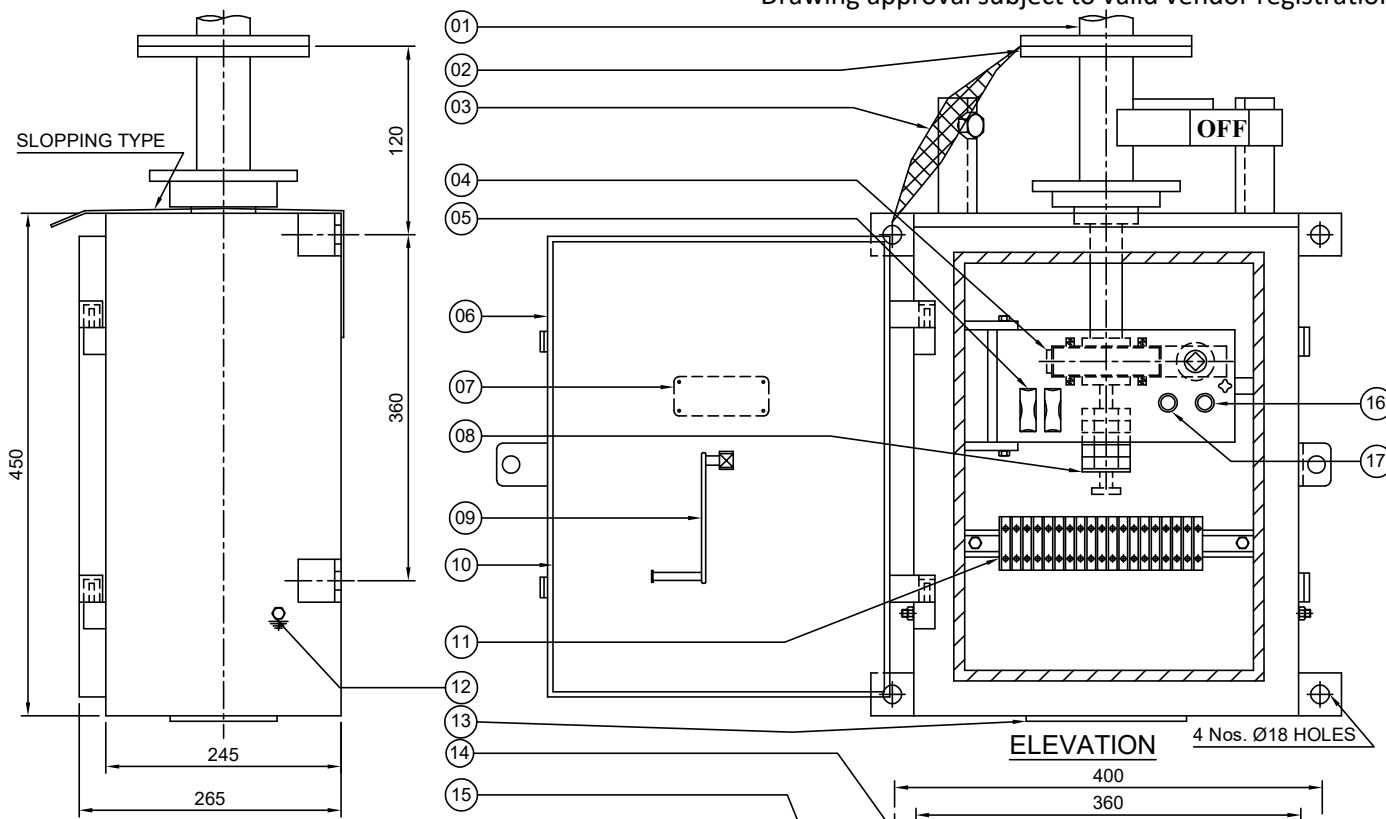
1. ALL DIMENSIONS ARE IN MILLIMETER
 2. ALL FERROUS PARTS ARE HOT DIP GALVANIZED
 3. ALL NON FERROUS CONTACT POINTS ARE SILVER PLATED
 - MICRONS REMAINING CONTACT AREA TIN PLATED
- Thickness of Silver plating : 15 Microns Minimum

**Chief Engineer/Projects
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REVISIONS			
D	C	B	A

TITLE:	
EARTH SWITCH CONTACT ASSEMBLY 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. FRE AP 03
REV	



PART LIST

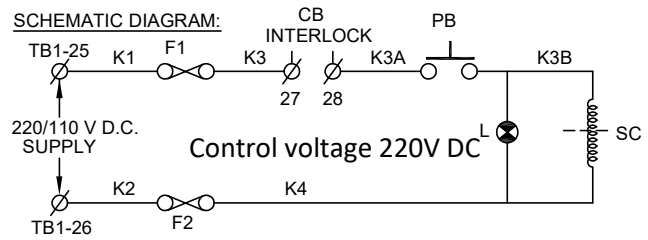
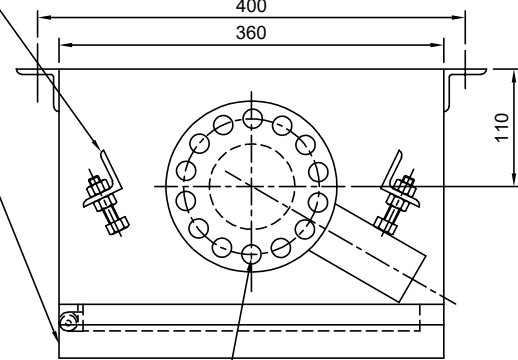
01. DOWN OPERATING PIPE
02. OUTPUT FLANGE (08 MM THICK M.S. PLATE)
03. COPPER FLEXIBLE (25 x 3 mm TINNED Cu. FLEXIBLE)
04. REDUCTION GEAR BOX (MATERIAL : EN8 / FORGED STEEL)
05. FUSES (2 A)
06. CUBICLE WITH DOOR (3 mm THICK, ALU. SHEET)
07. NAME PLATE
08. AUXILIARY SWITCH (6 NO + 6 NC)
09. OPERATING 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

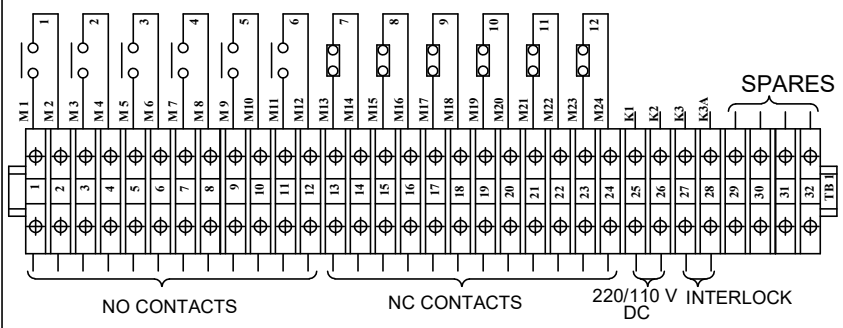
LEGEND:

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



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

14 Nos. Ø18 HOLES ON 127 PCD



PLAN

REVISIONS			
D	C	B	A

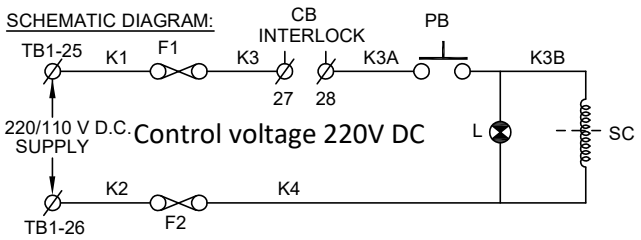
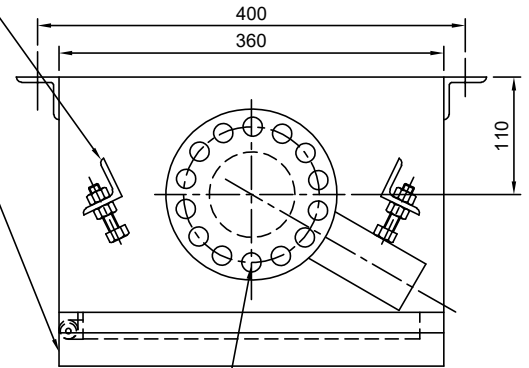
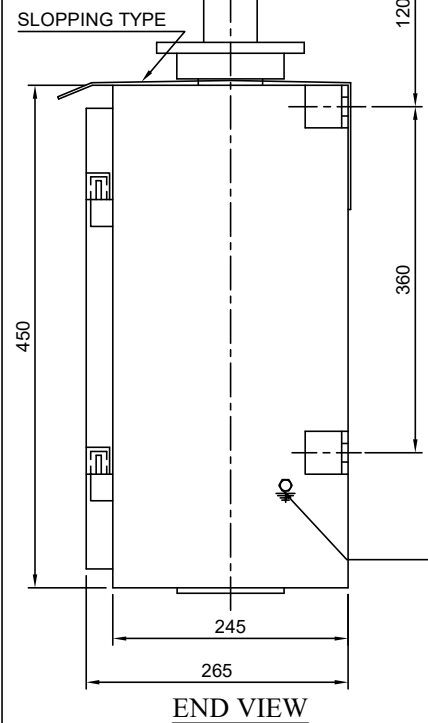
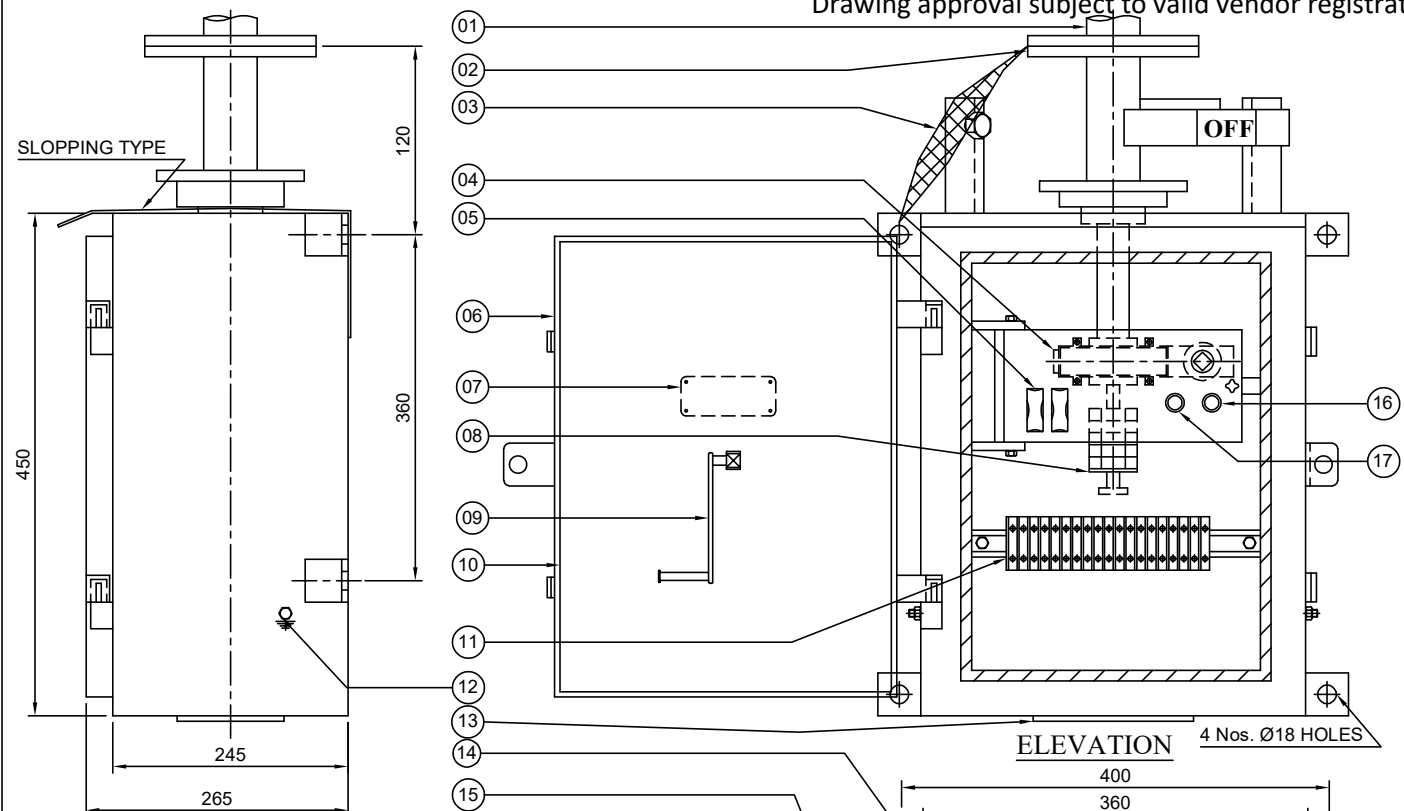
Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

OPERATING MECHANISM FOR MAIN SWITCH (FOR 132 KV)

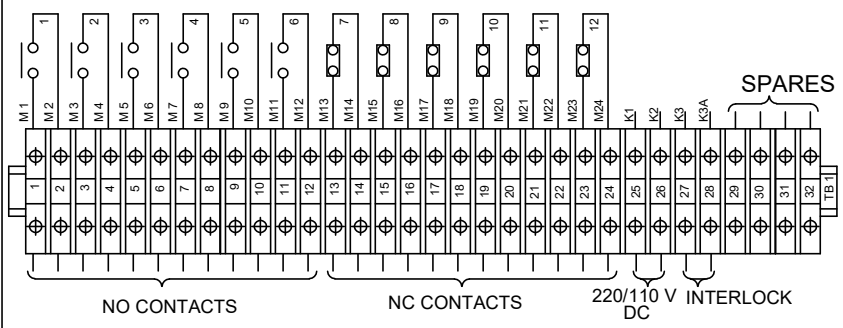
GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA

SCALE:N.T.S	
DATE	21-03-2023
DRAWN	
CHECKED	
APPROVED	
DRG.NO:	4. FN AP 04
REV	

Drawing approval subject to valid vendor registration



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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PLAN

REVISIONS			
D	C	B	A


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

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


SCALE:N.T.S	
DATE	21/05/23
DRAWN	
CHECKED	
APPROVED	
DRG.NO:	4. FN AP 05
REV	

NAME PLATE DETAILS FOR ISOLATOR

NAME PLATE DETAILS FOR EARTH SWITCH

 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
150

 MANUFACTURED & SUPPLIED BY GR POWER SWITCHGEAR LTD., JEEDIMETLA, HYDERABAD - 500 055	
CUSTOMER :	M/s. TRANSMISSION CORPORATION OF AP LIMITED
PROJECT :	-----
CONTRACTOR :	-----
L.O.A./ P.O. NO :	----- Dt. : -----
TYPE :	VB SL. NO : AS APPLICABLE YEAR OF Mfg. : -----
RATING :	Un 145 KV ; In : ----- 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 : -----

150

Project, contractor, PO, date ,year of MFG shall be stamped during inspection NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS

- 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.

- FOR EPC CONTRACTS ONLY


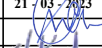
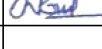

Drawing approval subject to valid vendor registration

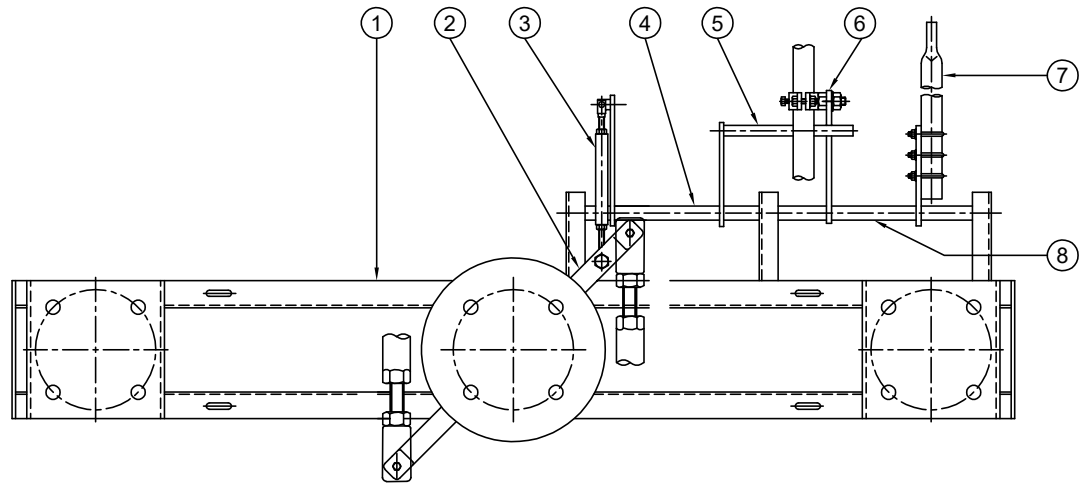
NOTES :

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

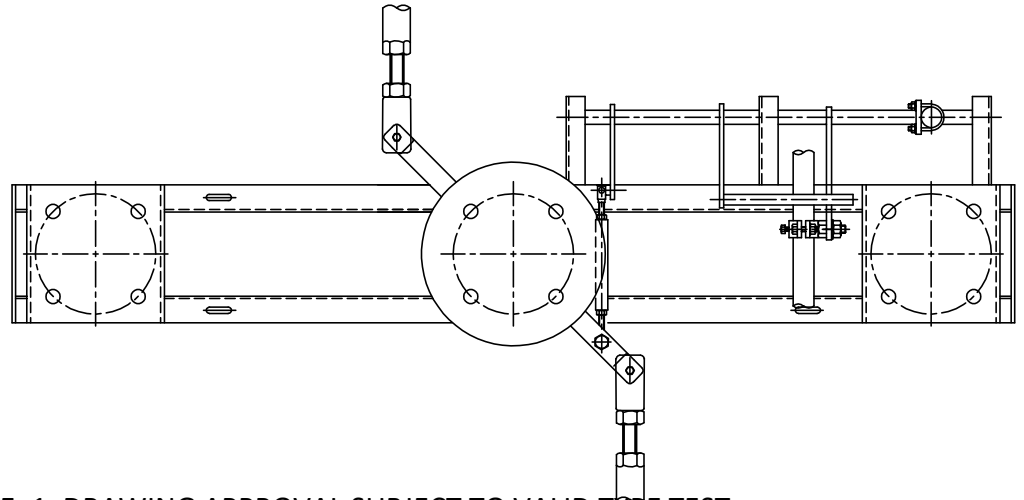
Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

REVISIONS			
D	C	B	A

TITLE:		SCALE:N.T.S	
NAME PLATE DETAILS FOR 132 KV ISOLATOR & E.S		DATE	21 / 03 / 2023
		DRAWN	
		CHECKED	
		APPROVED	
 GR POWER SWITCHGEAR LTD., JEEDIMETLA HYDERABAD-500 055 INDIA		DRG.NO:	REV
		4. FZ AP 06	



**FIG - 1 : ISOLATOR IN "CLOSE" POSITION
EARTH SWITCH IN "OPEN" POSITION**



**FIG - 2 : ISOLATOR IN "OPEN" POSITION
EARTH SWITCH IN "CLOSE" POSITION**

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

CONSTRUCTION :

ISOLATOR OPERATING LEVER (2) IS CONNECTED TO THE ROTATION PIPE - 1 (4) THROUGH THE LINK ROD (3), THE STOPPER ROD (5) ALSO MOVES ALONG WITH THE ROTATING PIPE (4) EARTH SWITCH OPERATING LEVER (6) MOVES THE ROTATING PIPE - 2 (8) WITH EARTH SWITCH MOVING CONTACT (7) INDIVIDUALLY

FUNCTION :

IN FIG - 1 : IN THIS CONDITION THE ISOLATOR OPERATING LEVER (2) IS CONNECTED TO THE ROTATING PIPE - 1 (4) SUCH THAT THE STOPPER ROD (5) IS ABOVE THE EARTH SWITCH OPERATING LEVER (6) AS A RESULT THE STOPPER (5) WILL NOT PERMIT EARTH SWITCH OPERATING LEVER (6) TO MOVE AND THE E.S. MOVING CONTACT WILL REMAIN IN OPEN POSITION.

IN FIG - 2 : IN THIS CONDITION THE ISOLATOR OPERATING LEVER IS CONNECTED TO THE ROTATING PIPE - 1(4) SUCH THAT THE STOPPER ROD (5) WILL BE BELOW THE EARTH SWITCH OPERATING LEVER (6) AS A RESULT THE EARTH SWITCH OPERATING LEVER (6) WILL NOT PERMIT THE STOPPER ROD TO MOVE(5) AND ISOLATOR OPERATING LEVER (2) WILL REMAIN IN OPEN POSITION.

NOTES :

1. BASE CHANNEL 125 x 65 x 5 THK CHANNEL (HOT DIP GALVANIZED)
2. ISOLATOR OPERATING LEVER (40 x 10 mm THIK MS FLATTE)
3. LINK ROD (25 NB MS PIPE HDG)
4. ROTATING PIPE - 1 (25 NB MS PIPE HDG)
5. STOPPER ROD (20 Ø MS ROD HDG)
6. E.S. OPERATING LEVER (50 x 8 MS FLAT HDG)
7. E.S. MOVING CONTACT (38 OD x 30 ID CU. PIPE)
8. ROTATING PIPE - 2 (25 NB MS PIPE HDG)

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REVISIONS			
D	C	B	A

TITLE: **MECHANICAL INTERLOCK BETWEEN MAIN SWITCH AND EARTH SWITCH**

SCALE:N.T.S	
DATE	21/03/23
DRAWN	
CHECKED	
APPROVED	

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


DRG.NO:	REV
4. FZ AP 07	

SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS FOR 145 KV, 1200A WITH ONE EARTH SWITCH

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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/ EARTH 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)	
	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	Thickness of Silver plating : 15 Microns Minimum Hard Drawn Electrolytic Copper flat, silver plated  micron thickness.
	a) Material and grade	
	b) Cross-sectional area (Sq.mm)	: 768 Sq.mm for 1200A

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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 of 15 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 3
	c) No. of bearings / bush and its material and size.	: 6 Nos. bush bearings, brass, 16 mm ID Size.
xiii)	Type of interlock	: Mechanical interlock between Isolator and Earth Switch.

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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. & E.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 6 NO / 6 NC contacts for Earth 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.