

## **CHAPTER:-E21-II**

<b>Sl No.</b>	<b>Drawing Name</b>	<b>Drawing Number</b>
1	Single Line Diagram (GIS)	ODSSP/SS/SLD/1-REV-B
2	Single Line Diagram (AIS)	ODSSP/SS/SLD/2-REV-B
3	Sub-Station Layout	ODSSP/SS/1-REV-A
4	Control Room Layout	ODSSP / SS /2-REV-A
5	Cable Trench	ODSSP/ SS /10-REV-A
6	4 Bolted Tension Clamp	ODSSP/ SS /11-REV-A
7	33kV 1250 A Double Break with Double Tandem Center Rotating Isolator with one Earth Switch	ODSSP / SS /12
8	11kV 1250 A Double Break with Double Tandem Center Rotating Isolator with one Earth Switch	ODSSP / SS /13
9	33kV 1250 A Double Break with Double Tandem Center Rotating Isolator without Earth Switch	ODSSP / SS /14
10	11kV 1250 A Double Break with Double Tandem Center	ODSSP / SS /15

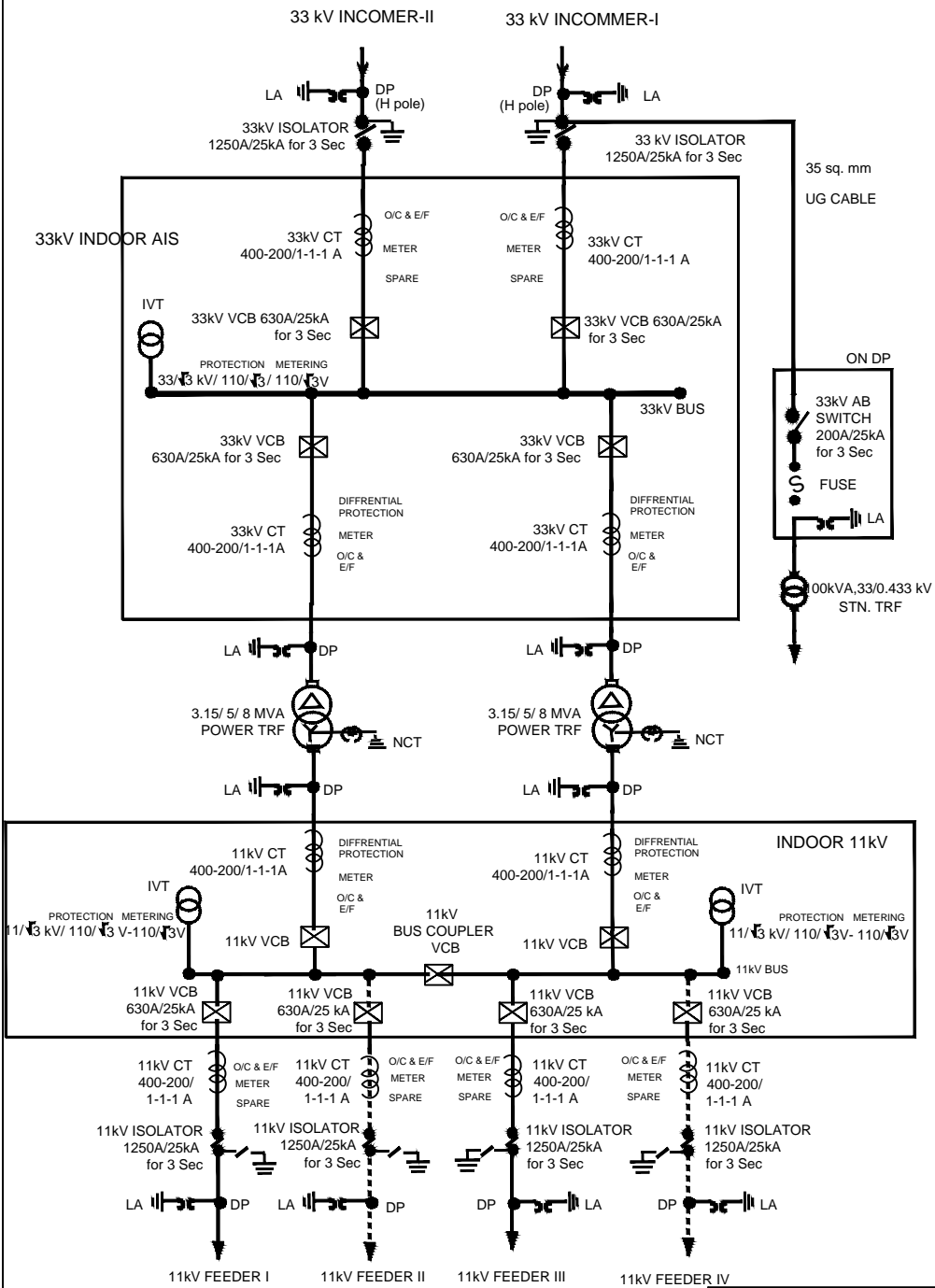
	Rotating Isolator without Earth Switch	
11	Structural Detail of 33kV Tower Type-T8 & T9	ODSSP / SS /16
12	Structural Detail of Beam-G4	ODSSP / SS /17
13	Structural Detail of Beam -G6	ODSSP / SS /18
14	Structural Detail of 33kV Single Isolator Without Earth Switch	ODSSP / SS /19
15	Structural Detail of 33kV Double Isolator With & Without Earth Switch	ODSSP / SS /20
16	Structural Detail of 33kV CT & PI	ODSSP / SS /21
17	DP Structure	ODSSP/LINE/1-REV-A
18	11kV V Cross arm for PSC Pole	ODSSP/LINE/5-REV-A
19	Tension Assembly for Earthwire	ODSSP /LINE/8
20	Suspension Assembly for Earthwire	ODSSP /LINE/9
21	PC+6 Tower Structure	ODSSP /LINE/10
22	Jointing of GI R.S Joist Pole	ODSSP /LINE/11
23	Cross Sectional View of 11kV/33kV Cable (1C/3C,Armoured Type)	ODSSP /LINE/12

24	11 kV Line Conductor Formation & Arrangement of Guys for 60 to 90 Angle Location	ODSSP /LINE/13
25	33 kV Line Conductor Formation & Arrangement of Guys for 60 to 90 Angle Location	ODSSP /LINE/14
26	Danger Board	ODSSP /LINE/15
27	PC Tower Structure-Top	ODSSP /LINE/16
28	PC Tower Structure-Template	ODSSP /LINE/17
29	PC Tower Structure-Bottom	ODSSP /LINE/18
30	Foundation of PC Tower Structure	ODSSP /LINE/19
31	Single Tension Hardware Assembly	ODSSP /LINE/20
32	Double Tension Hardware Assembly	ODSSP /LINE/21
33	Foundation for PSC Pole	ODSSP/ CIVIL /1-REV-A
34	Foundation for RS Joist Pole	ODSSP/ CIVIL /2-REV-A
35	Retaining Wall	ODSSP/ CIVIL /6-REV-A
36	Drain	ODSSP/ CIVIL /7-REV-A
37	Road Inside Sub-Station	ODSSP/ CIVIL /11-REV-A

38	Compound Wall for Pile Foundation	ODSSP/ CIVIL /12
39	Compound Wall for Open Foundation	ODSSP/ CIVIL /13
40	Culvert Drawing	ODSSP/ CIVIL /14
41	Control Room Elevation (Type-A)-2 SHEETS	ODSSP/ CIVIL /15
42	Control Room Design & Foundation for $SBC \leq 10 \text{ MT/Sq}$ Mtr.-6 SHEET	ODSSP/ CIVIL /16
43	Control Room Design & Foundation for $SBC > 10 \text{ MT/Sq}$ Mtr.-5 SHEETS	ODSSP/ CIVIL /17

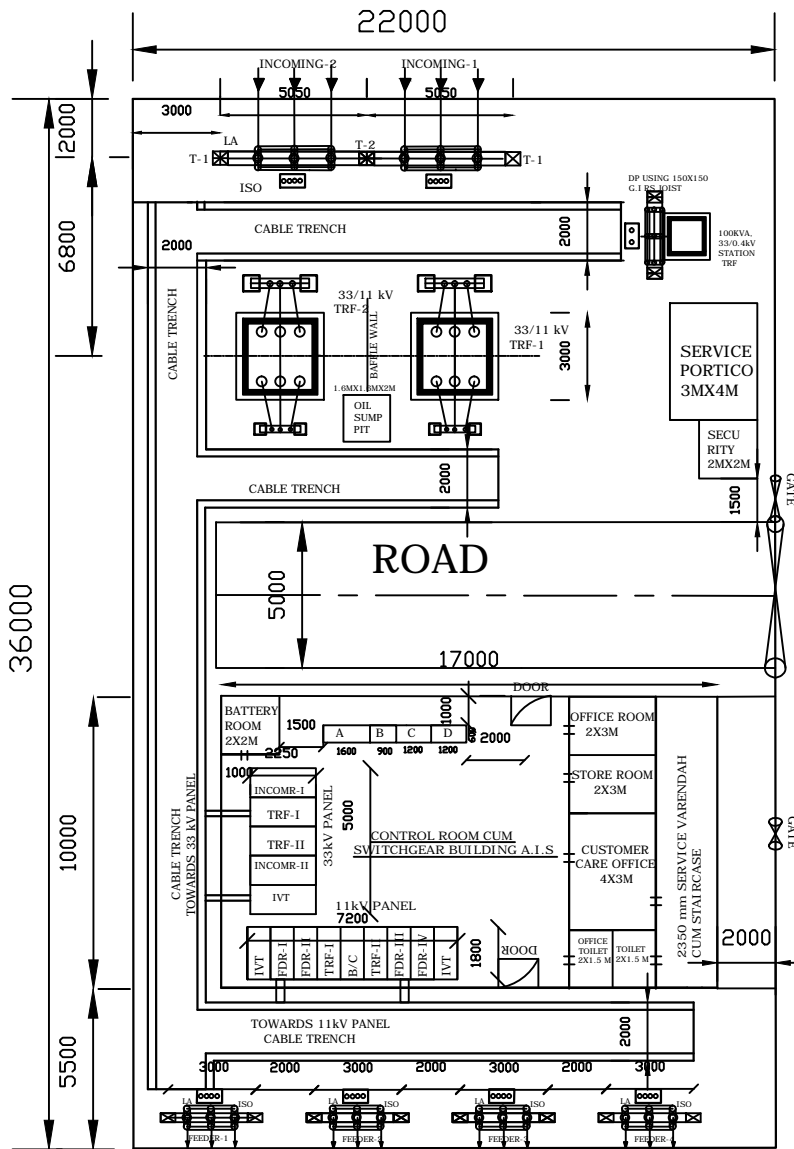


PROPOSED SINGLE LINE DIAGRAM FOR 2X3.15/ 5/ 8 MVA, 33/11 kV AIS INDOOR S/S  
(33 kV AIS INDOOR, 11 kV AIS INDOOR)



MAJOR CHANGES:-  
1. CT-RATIO HAS CHANGED BY SHOWING THREE CORE SYSTEM.

DRAWING NO - ODSSP/ SS/ SLD/ 2-REV-B



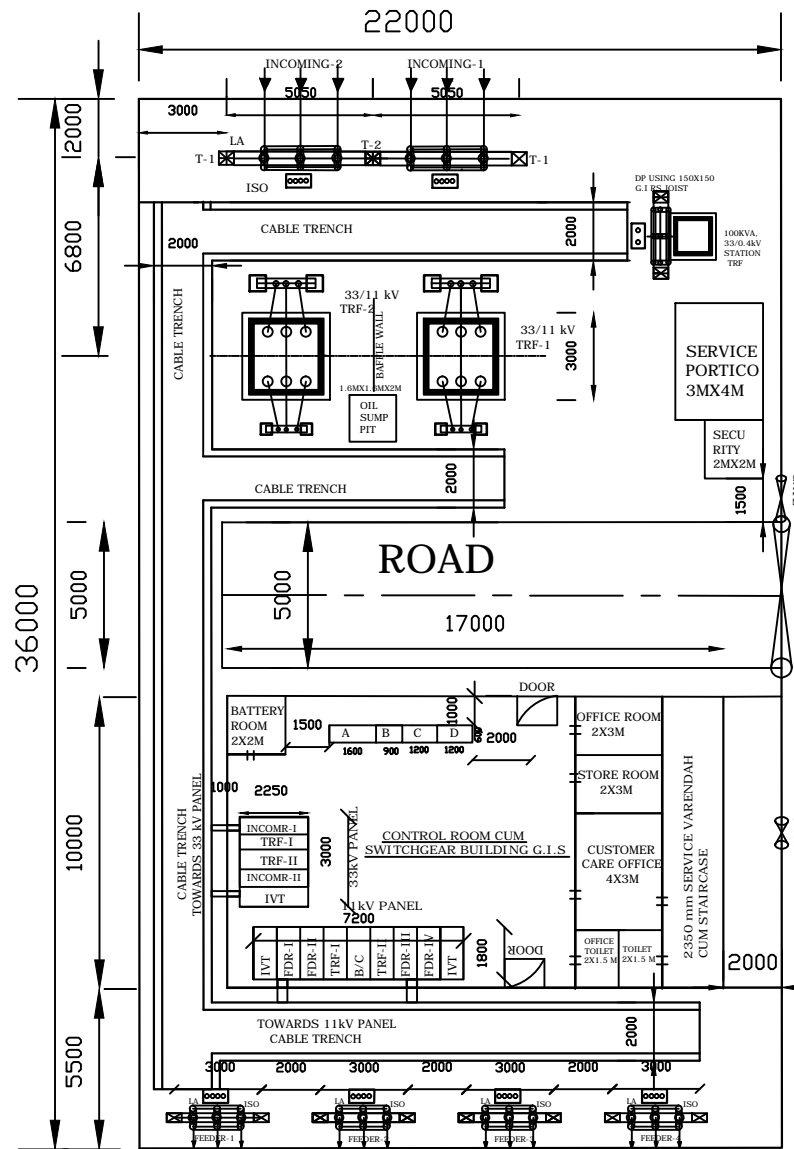
**SUB-STATION LAYOUT(AIS)**

NOTE:-

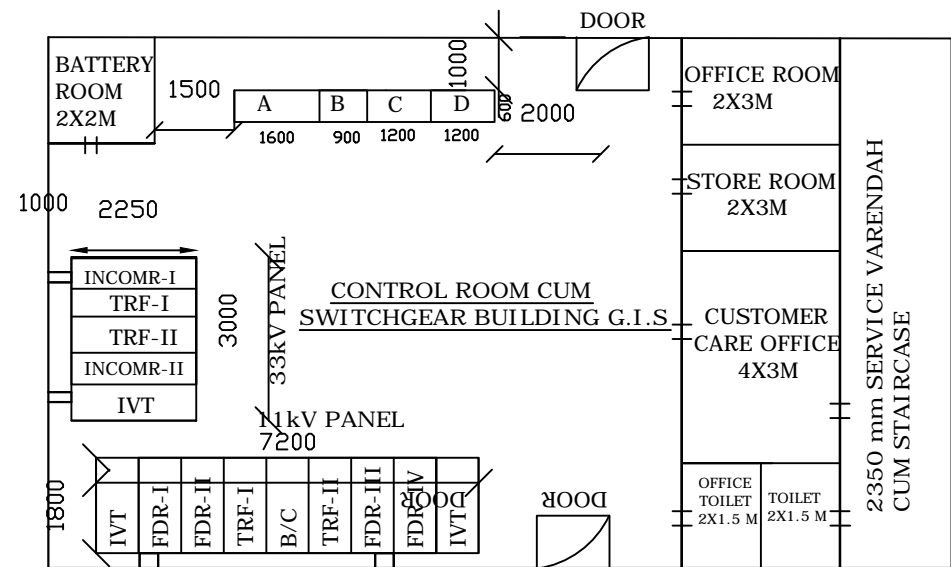
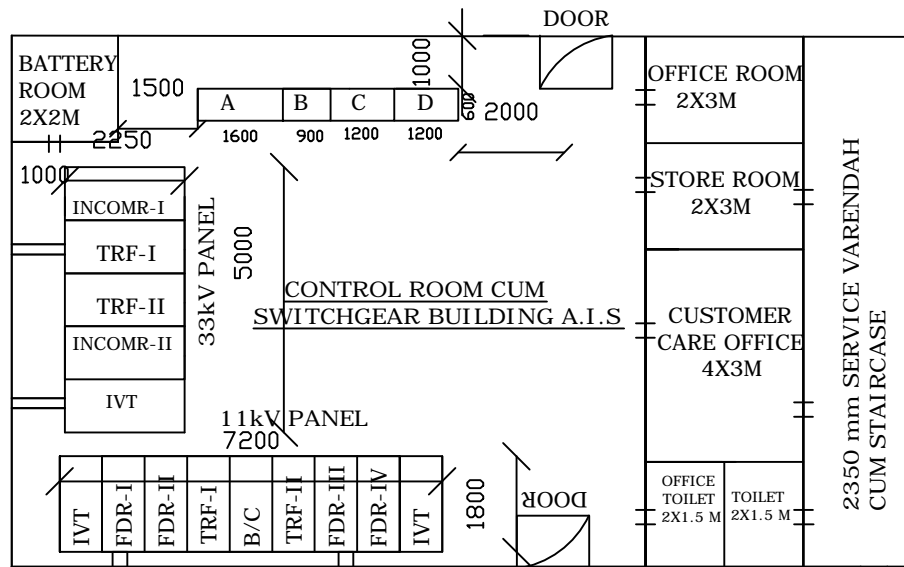
- A-CHARGER ROOM
- B-ACDB ROOM
- C-RTCC 1 ROOM & RTCC 2 ROOM
- D-RTU ROOM

MAJOR CHANGES:-

- 1.Road inside switchyard area is minimised to 5M.
- 2.Size of Rooms inside Control Room is adjusted.
- 3.Service Varendah cum Staircase,Cable trench showing layout,Service Portico,Baffle Wall,Oil Sump Pit are incorporated
- 4.Overall Switchyard area is maximize as per our Scope i.e 36 M x 22 M



**SUB-STATION LAYOUT(GIS)**



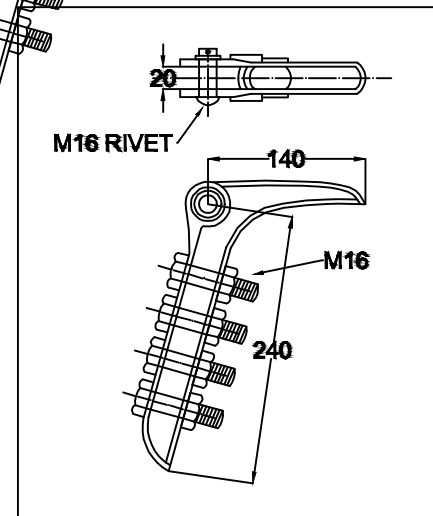
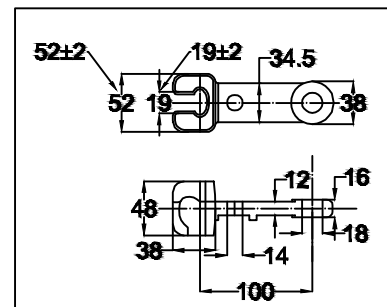
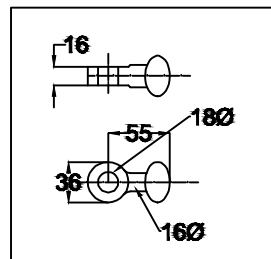
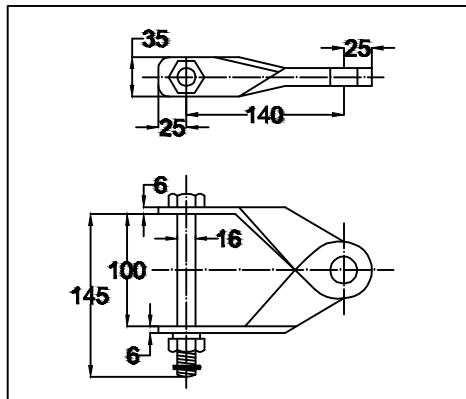
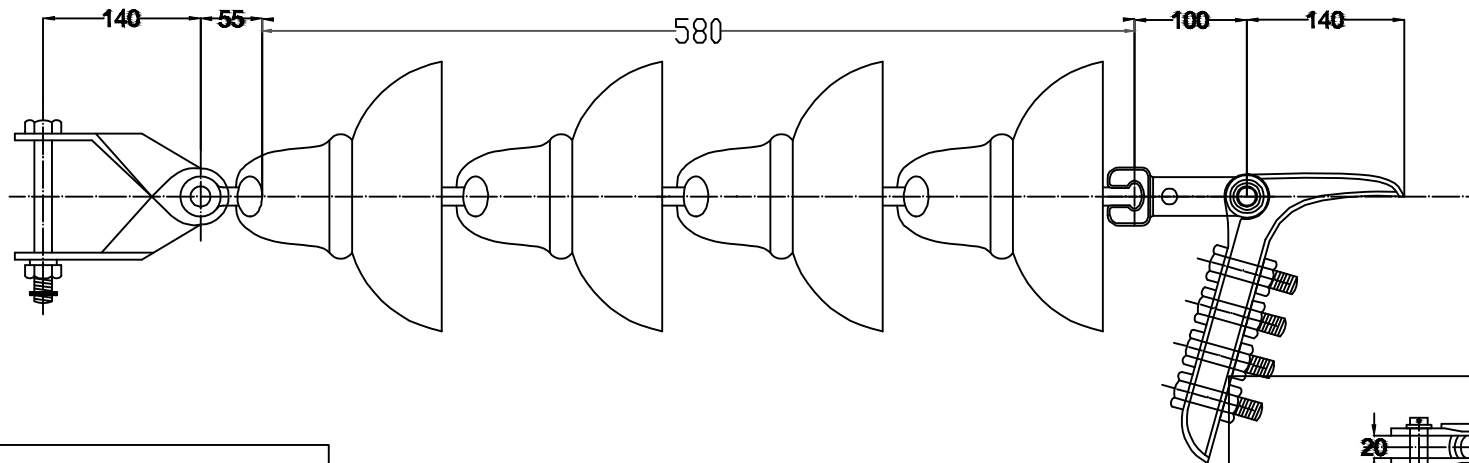
A-CHARGER , B-ACDB, C-RTCC 1 & RTCC 2 , D-RTU

## CONTROL ROOM CUM SWITCHGEAR BUILDING (AIS & GIS)



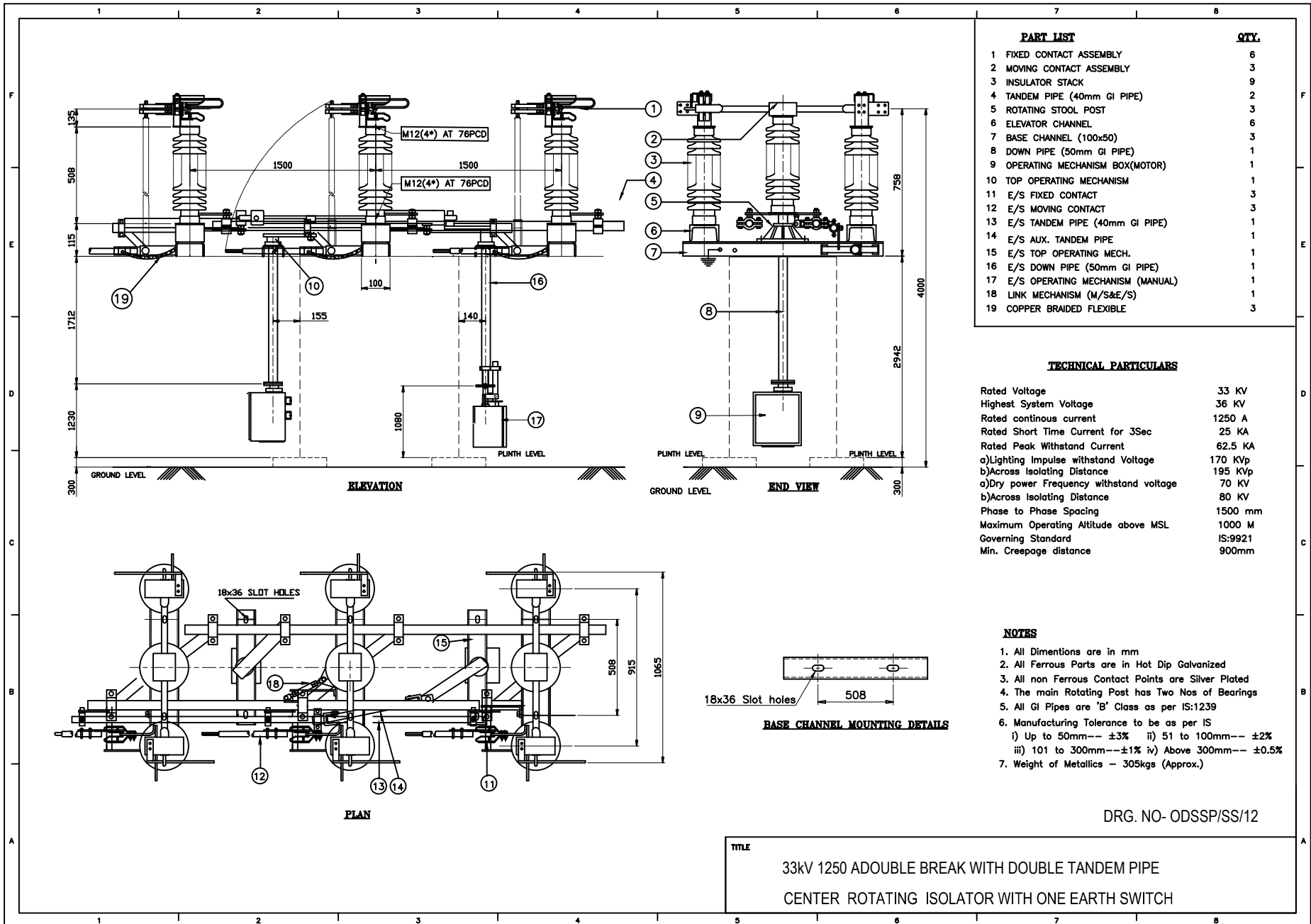


# 4 BOLTED TENSION CLAMP



Changes:  
Adding 1 no. of Disc Insulator for 33kV Sub-Station.

DRG NO .- ODSSP / SS / 11-REV-A



PART LIST		QTY.
1	FIXED CONTACT ASSEMBLY	6
2	MOVING CONTACT ASSEMBLY	3
3	INSULATOR STACK	9
4	TANDEM PIPE (40mm GI PIPE)	2
5	ROTATING STOOL POST	3
6	ELEVATOR CHANNEL	6
7	BASE CHANNEL (100x50)	3
8	DOWN PIPE (50mm GI PIPE)	1
9	OPERATING MECHANISM BOX(MOTOR)	1
10	TOP OPERATING MECHANISM	1
11	E/S FIXED CONTACT	3
12	E/S MOVING CONTACT	3
13	E/S TANDEM PIPE (40mm GI PIPE)	1
14	E/S AUX. TANDEM PIPE	1
15	E/S TOP OPERATING MECH.	1
16	E/S DOWN PIPE (50mm GI PIPE)	1
17	E/S OPERATING MECHANISM (MANUAL)	1
18	LINK MECHANISM (M/S&E/S)	1
19	COPPER BRAIDED FLEXIBLE	3

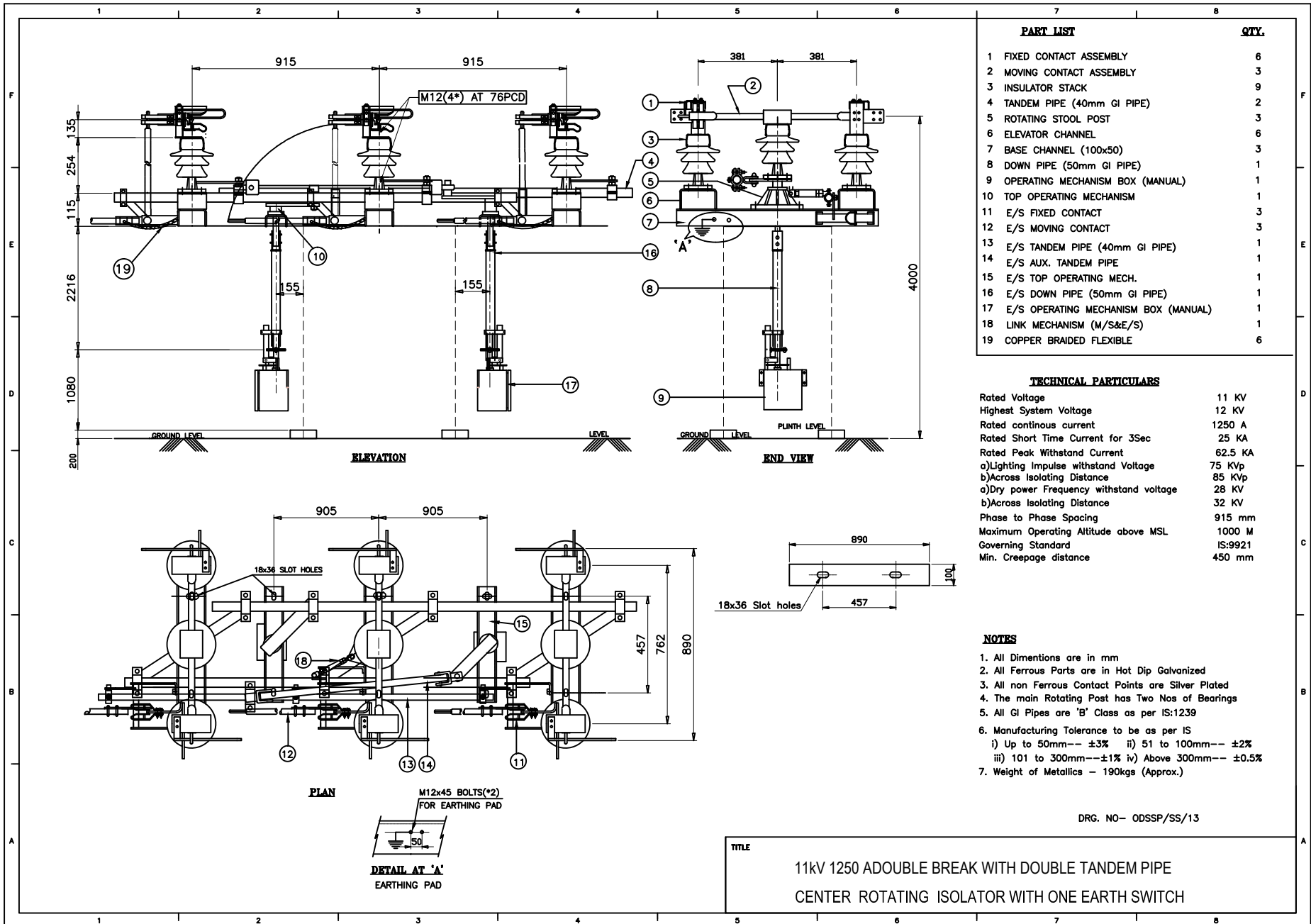
**TECHNICAL PARTICULARS**

Rated Voltage	33 KV
Highest System Voltage	36 KV
Rated continuous current	1250 A
Rated Short Time Current for 3Sec	25 KA
Rated Peak Withstand Current	62.5 KA
a)Lighting impulse withstand Voltage	170 KVp
b)Across Isolating Distance	195 KVp
a)Dry power Frequency withstand voltage	70 KV
b)Across Isolating Distance	80 KV
Phase to Phase Spacing	1500 mm
Maximum Operating Altitude above MSL	1000 M
Governing Standard	IS:9921
Min. Creepage distance	900mm

- NOTES**
- All Dimensions are in mm
  - All Ferrous Parts are in Hot Dip Galvanized
  - All non Ferrous Contact Points are Silver Plated
  - The main Rotating Post has Two Nos of Bearings
  - All GI Pipes are 'B' Class as per IS:1239
  - Manufacturing Tolerance to be as per IS
    - Up to 50mm-- ±3%
    - 51 to 100mm-- ±2%
    - 101 to 300mm--±1%
    - Above 300mm-- ±0.5%
  - Weight of Metallics - 305kgs (Approx.)

DRG. NO- ODSSP/SS/12

TITLE  
 33kV 1250 A DOUBLE BREAK WITH DOUBLE TANDEM PIPE  
 CENTER ROTATING ISOLATOR WITH ONE EARTH SWITCH



**PART LIST**

	<b>QTY.</b>
1	6
2	3
3	9
4	2
5	3
6	6
7	3
8	1
9	1
10	1
11	3
12	3
13	1
14	1
15	1
16	1
17	1
18	1
19	6

**TECHNICAL PARTICULARS**

Rated Voltage	11 KV
Highest System Voltage	12 KV
Rated continuous current	1250 A
Rated Short Time Current for 3Sec	25 KA
Rated Peak Withstand Current	62.5 KA
a)Lighting Impulse withstand Voltage	75 KVp
b)Across Isolating Distance	85 KVp
a)Dry power Frequency withstand voltage	28 KV
b)Across Isolating Distance	32 KV
Phase to Phase Spacing	915 mm
Maximum Operating Altitude above MSL	1000 M
Governing Standard	IS:9921
Min. Creepage distance	450 mm

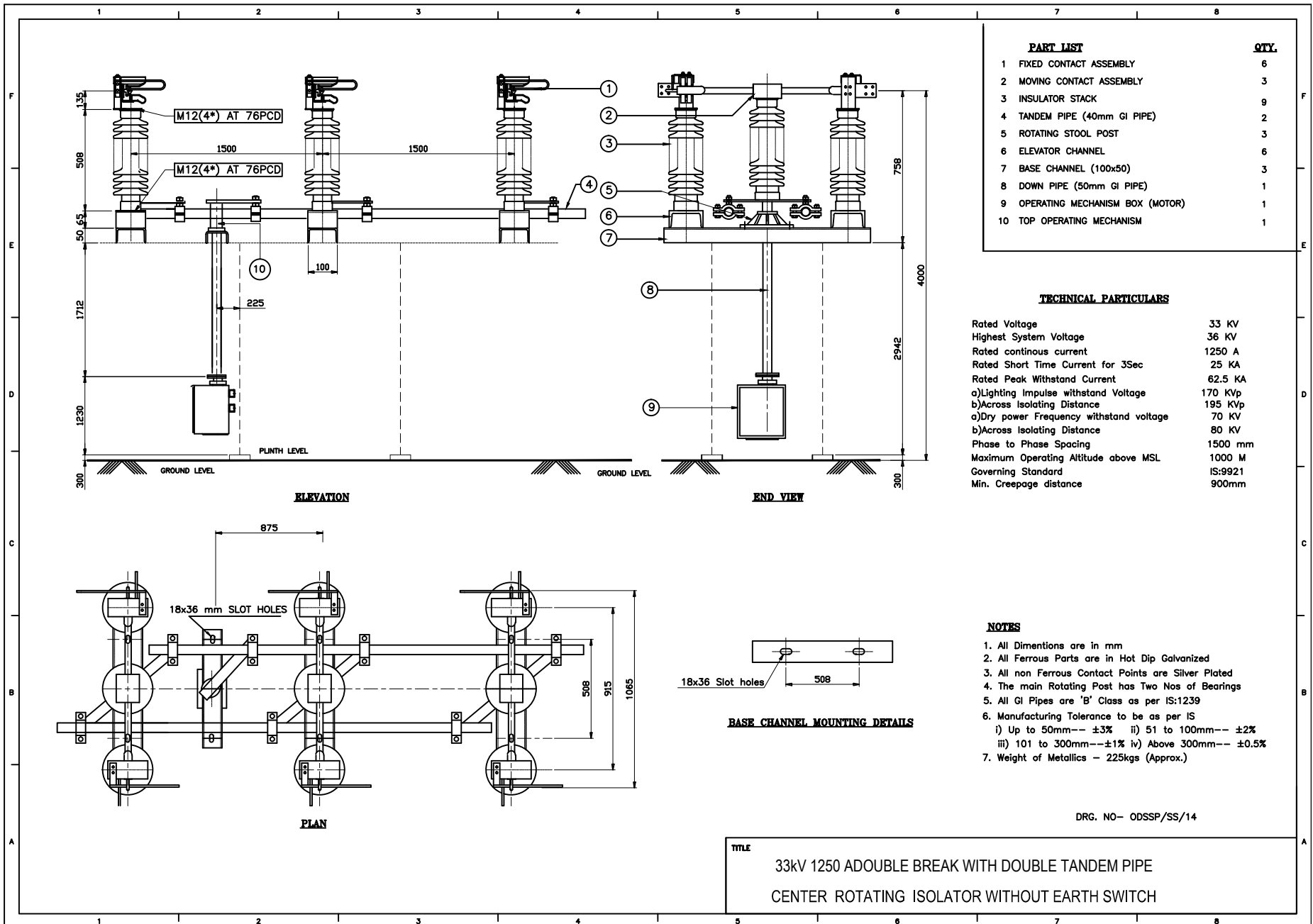
**NOTES**

1. All Dimensions are in mm
2. All Ferrous Parts are in Hot Dip Galvanized
3. All non Ferrous Contact Points are Silver Plated
4. The main Rotating Post has Two Nos of Bearings
5. All GI Pipes are 'B' Class as per IS:1239
6. Manufacturing Tolerance to be as per IS
  - i) Up to 50mm--- ±3%
  - ii) 51 to 100mm--- ±2%
  - iii) 101 to 300mm---±1%
  - iv) Above 300mm--- ±0.5%
7. Weight of Metallics - 190kgs (Approx.)

DRG. NO- ODSSP/SS/13

TITLE

11kV 1250 A DOUBLE BREAK WITH DOUBLE TANDEM PIPE  
CENTER ROTATING ISOLATOR WITH ONE EARTH SWITCH



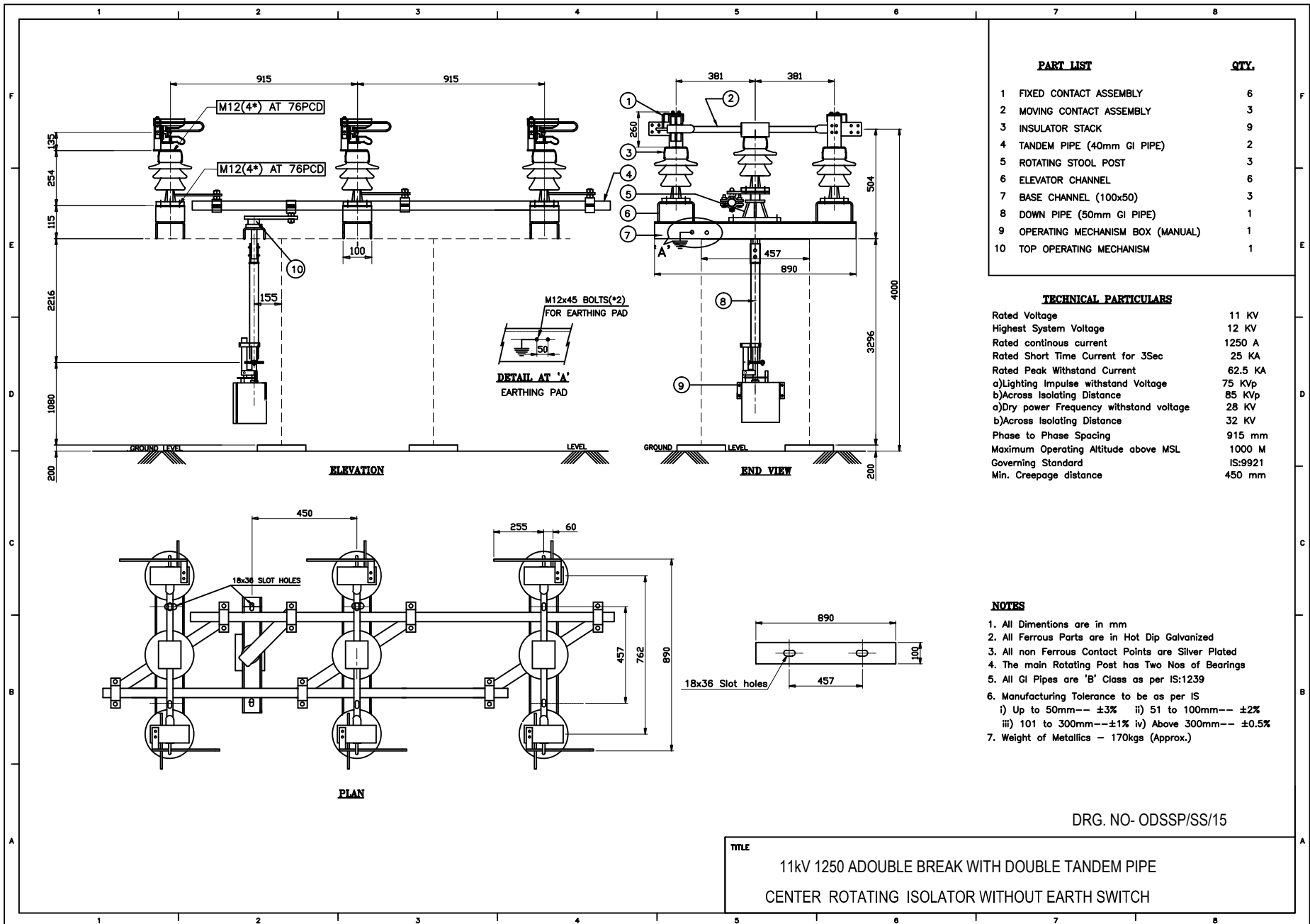
PART LIST		QTY.
1	FIXED CONTACT ASSEMBLY	6
2	MOVING CONTACT ASSEMBLY	3
3	INSULATOR STACK	9
4	TANDEM PIPE (40mm GI PIPE)	2
5	ROTATING STOOL POST	3
6	ELEVATOR CHANNEL	6
7	BASE CHANNEL (100x50)	3
8	DOWN PIPE (50mm GI PIPE)	1
9	OPERATING MECHANISM BOX (MOTOR)	1
10	TOP OPERATING MECHANISM	1

TECHNICAL PARTICULARS	
Rated Voltage	33 KV
Highest System Voltage	36 KV
Rated continuous current	1250 A
Rated Short Time Current for 3Sec	25 KA
Rated Peak Withstand Current	62.5 KA
a) Lighting impulse withstand Voltage	170 KvP
b) Across Isolating Distance	195 KvP
a) Dry power Frequency withstand voltage	70 KV
b) Across Isolating Distance	80 KV
Phase to Phase Spacing	1500 mm
Maximum Operating Altitude above MSL	1000 M
Governing Standard	IS:9921
Min. Creepage distance	900mm

- NOTES**
- All Dimensions are in mm
  - All Ferrous Parts are in Hot Dip Galvanized
  - All non Ferrous Contact Points are Silver Plated
  - The main Rotating Post has Two Nos of Bearings
  - All GI Pipes are 'B' Class as per IS:1239
  - Manufacturing Tolerance to be as per IS
    - Up to 50mm-- ±3%
    - 51 to 100mm-- ±2%
    - 101 to 300mm-- ±1%
    - Above 300mm-- ±0.5%
  - Weight of Metallics - 225kgs (Approx.)

DRG. NO- ODSSP/SS/14

TITLE  
 33kV 1250 A DOUBLE BREAK WITH DOUBLE TANDEM PIPE  
 CENTER ROTATING ISOLATOR WITHOUT EARTH SWITCH



PART LIST		QTY.
1	FIXED CONTACT ASSEMBLY	6
2	MOVING CONTACT ASSEMBLY	3
3	INSULATOR STACK	9
4	TANDEM PIPE (40mm GI PIPE)	2
5	ROTATING STOOL POST	3
6	ELEVATOR CHANNEL	6
7	BASE CHANNEL (100x50)	3
8	DOWN PIPE (50mm GI PIPE)	1
9	OPERATING MECHANISM BOX (MANUAL)	1
10	TOP OPERATING MECHANISM	1

TECHNICAL PARTICULARS	
Rated Voltage	11 KV
Highest System Voltage	12 KV
Rated continuous current	1250 A
Rated Short Time Current for 3Sec	25 KA
Rated Peak Withstand Current	62.5 KA
a)Lighting impulse withstand Voltage	75 KVp
b)Across Isolating Distance	85 KVp
a)Dry power Frequency withstand voltage	28 KV
b)Across Isolating Distance	32 KV
Phase to Phase Spacing	915 mm
Maximum Operating Altitude above MSL	1000 M
Governing Standard	IS:9921
Min. Creepage distance	450 mm

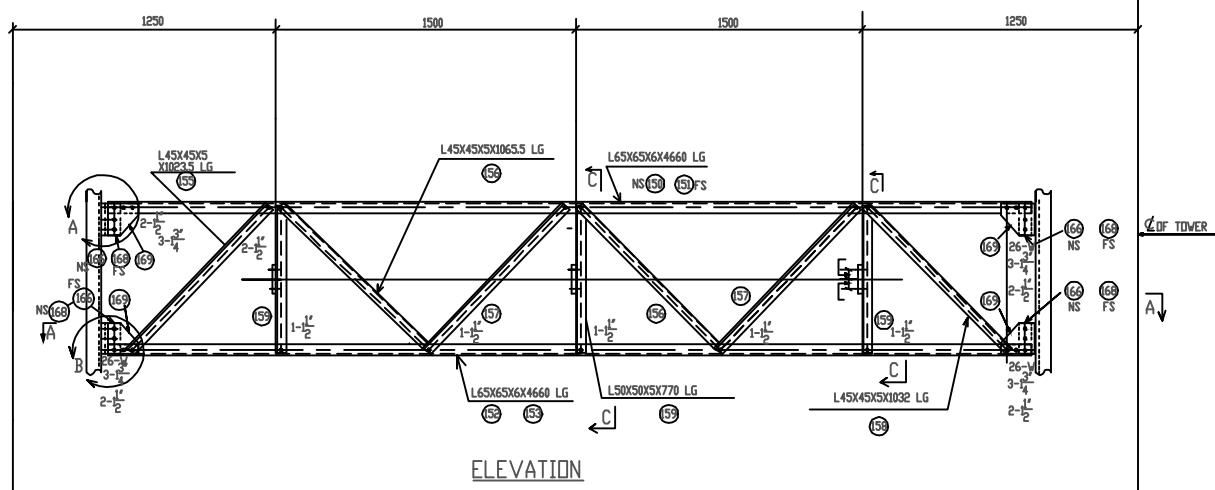
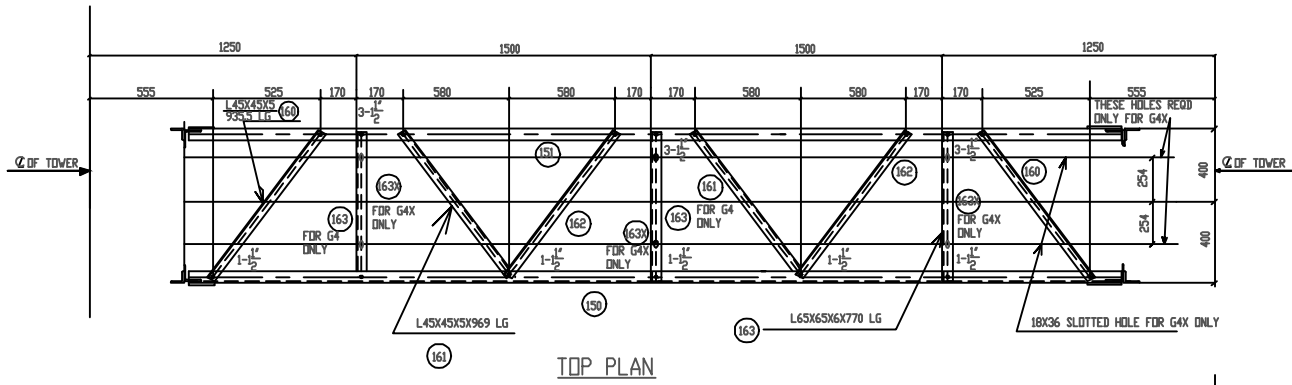
- NOTES**
- All Dimensions are in mm
  - All Ferrous Parts are in Hot Dip Galvanized
  - All non Ferrous Contact Points are Silver Plated
  - The main Rotating Post has Two Nos of Bearings
  - All GI Pipes are 'B' Class as per IS:1239
  - Manufacturing Tolerance to be as per IS
    - Up to 50mm--- ±3%
    - 51 to 100mm--- ±2%
    - 101 to 300mm---±1%
    - Above 300mm--- ±0.5%
  - Weight of Metallics - 170kgs (Approx.)

DRG. NO- ODSSP/SS/15

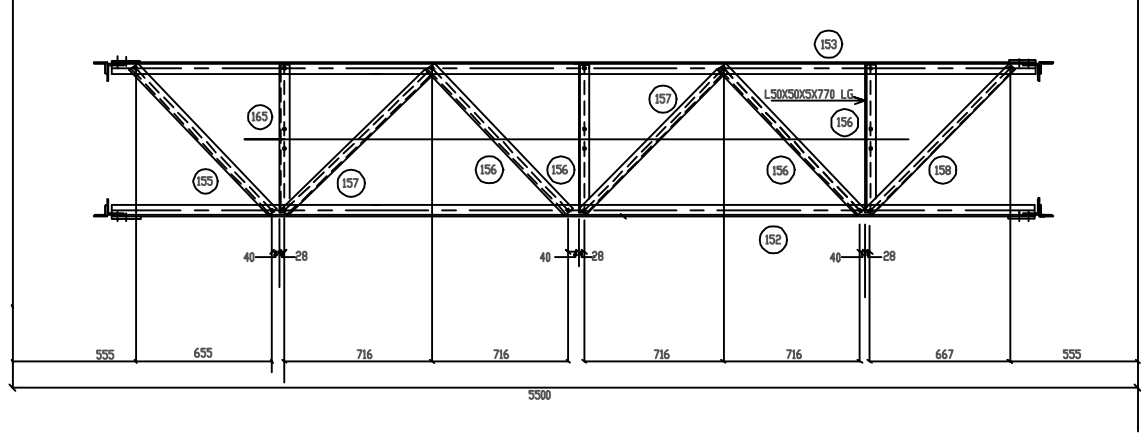
TITLE

11kV 1250 A DOUBLE BREAK WITH DOUBLE TANDEM PIPE  
CENTER ROTATING ISOLATOR WITHOUT EARTH SWITCH





GIRDER 'G4' WITH BOTH SIDE STRAIN PLATE AND SUSPENSION INSULATOR CONNECTION  
 'G4' SAME AS 'G4' EXCEPT ISOLATOR CONNECTION OF TOP

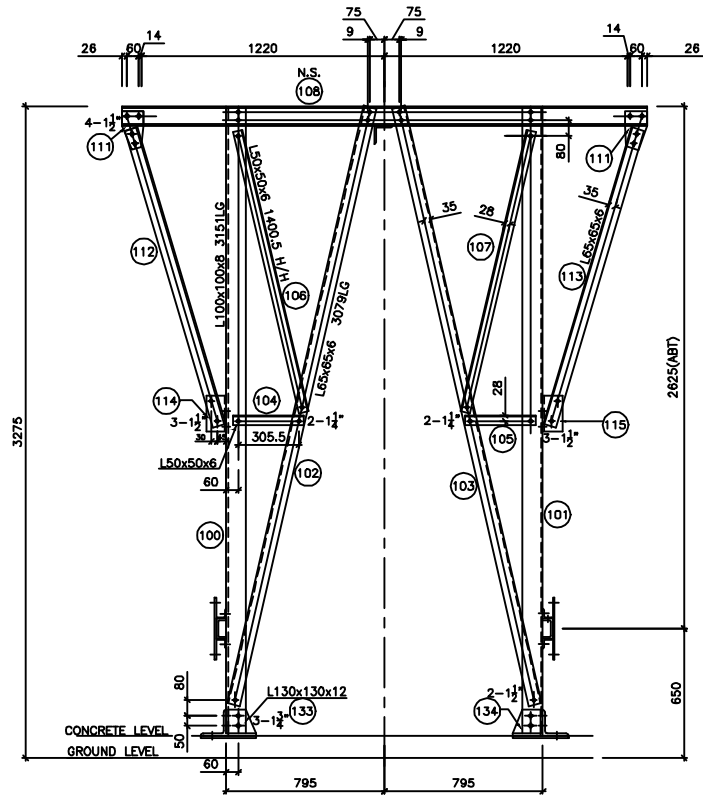


STRUCTURAL DETAIL OF BEAM TYPE G-4

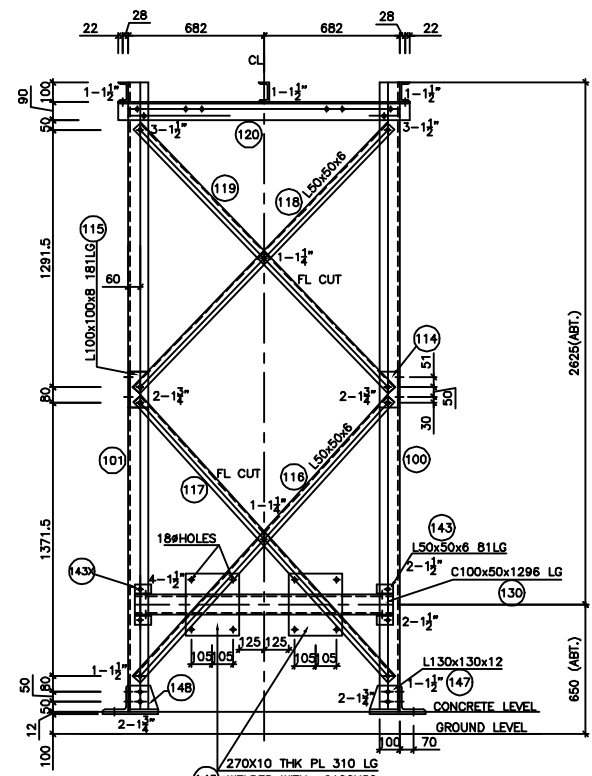




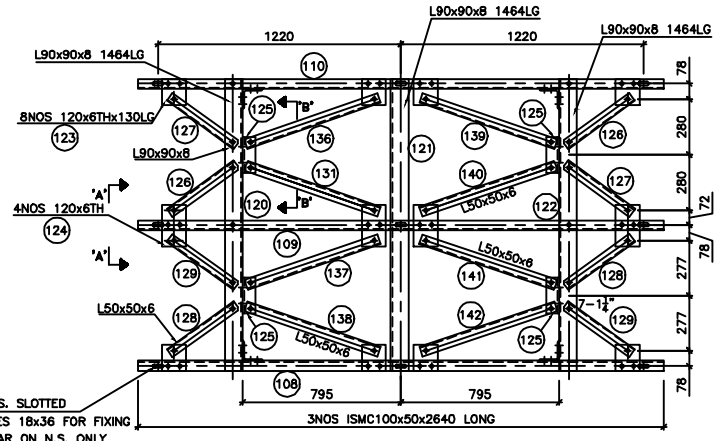
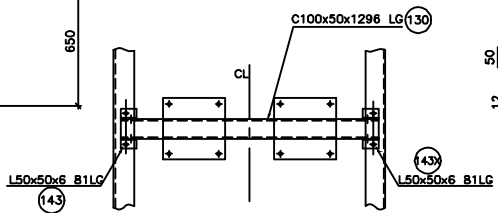




FRONT ELEVATION

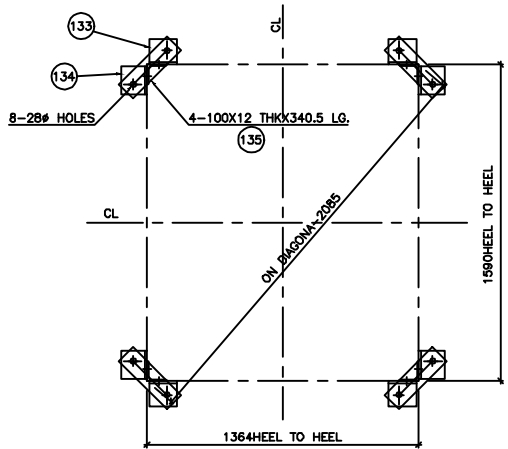


SIDE VIEW



PLAN

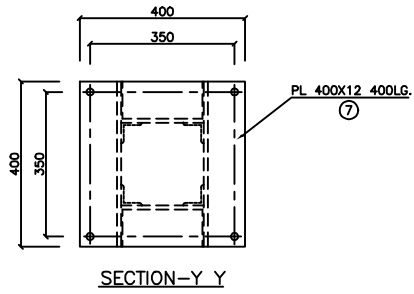
VIEW "C-C"  
(ONLY RECD FOR S5 STR)



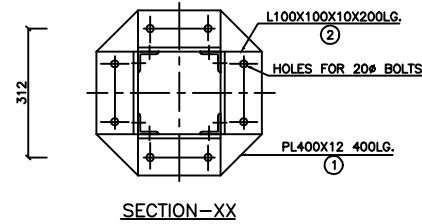
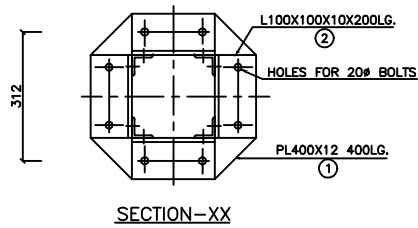
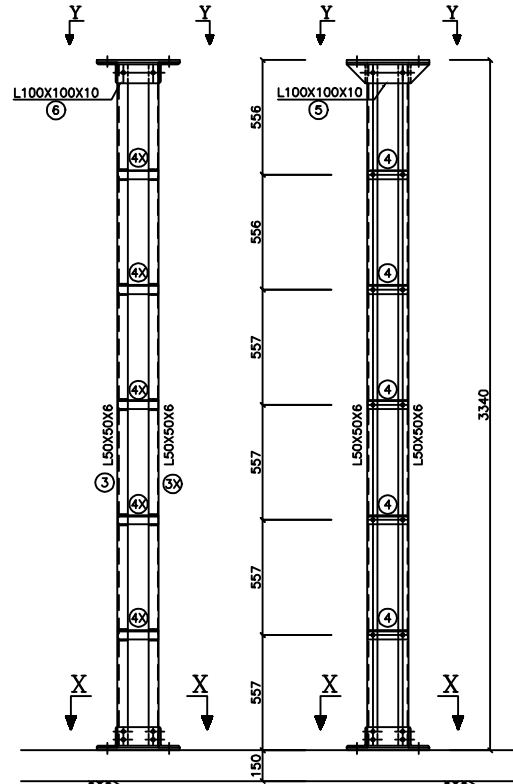
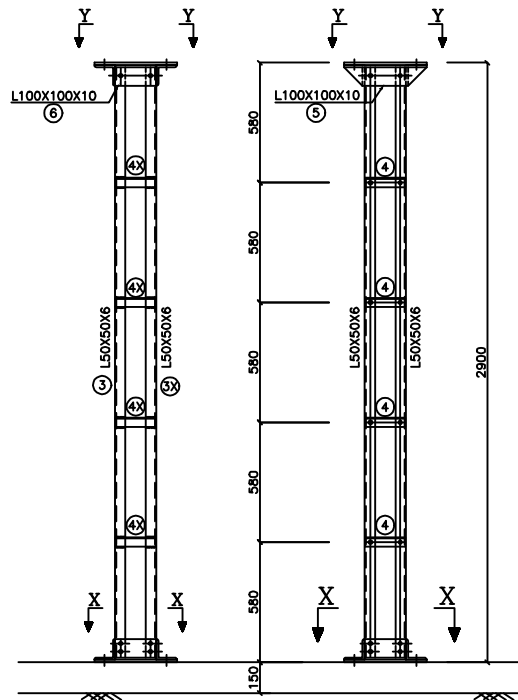
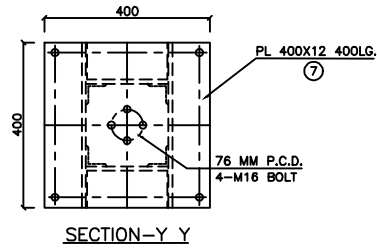
BASE PLAN

STRUCTURAL DETAIL OF 33kV DOUBLE ISOLATOR WITH & WITHOUT EARTH SWITCH

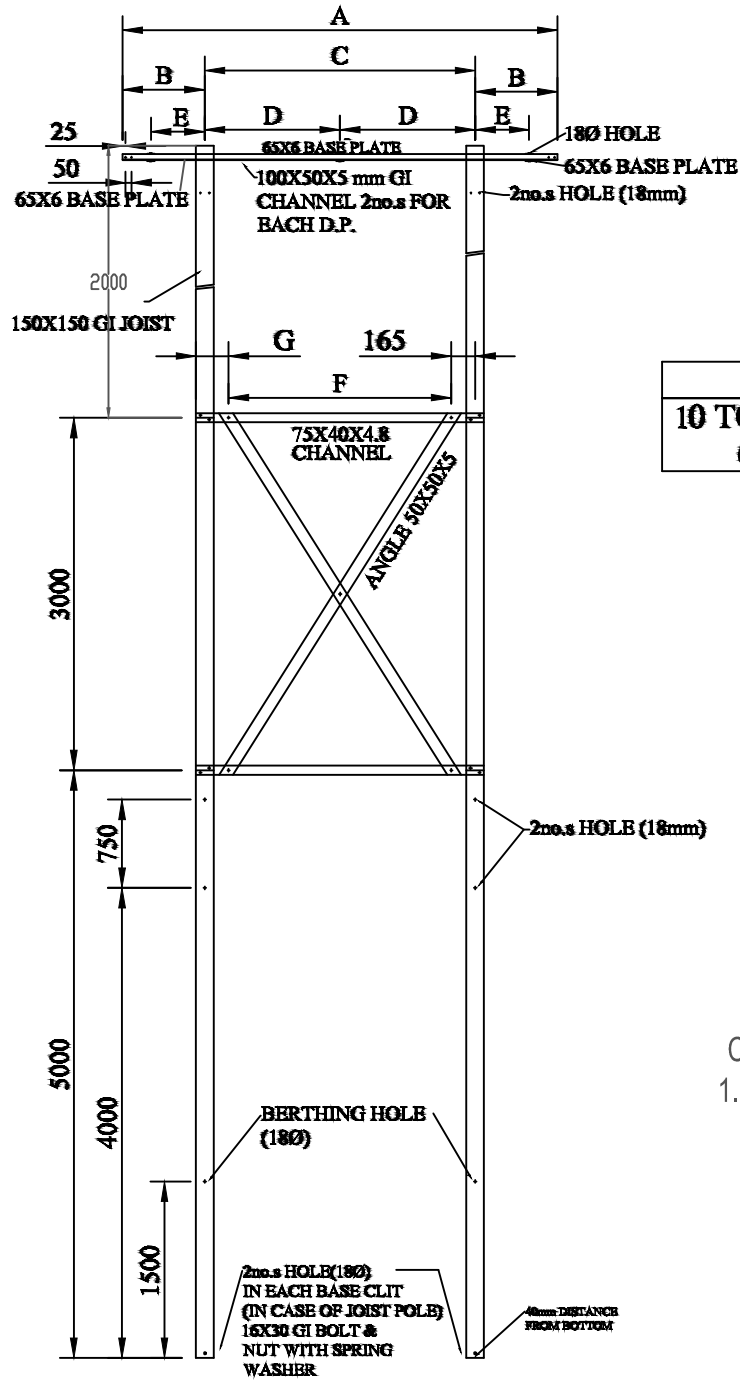
**C.T.**



**P.I.**



# DP STRUCTURE FOR 33 /11 kv(JOIST)



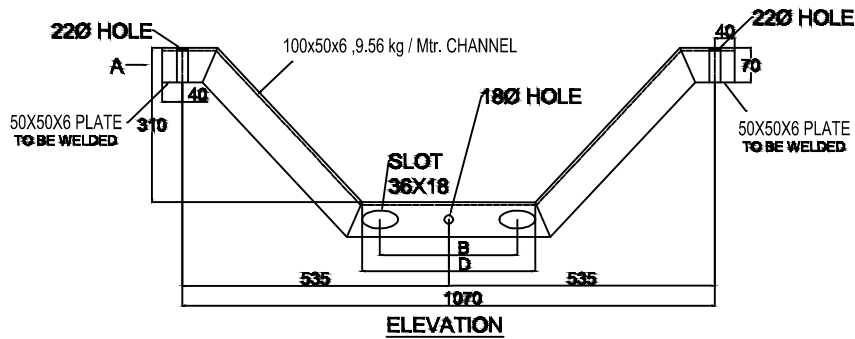
	A	B	C	D	E	F	G
10 TO 60	4200		2500		600		240
		850		1250			

CHANGES:  
1.DP STRUCTURE'S ONLY FOR ANGLE DEVIATION 10-60

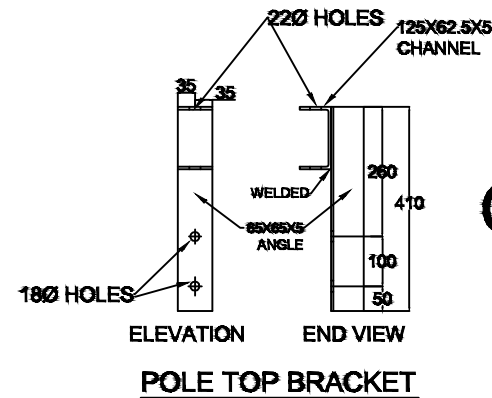
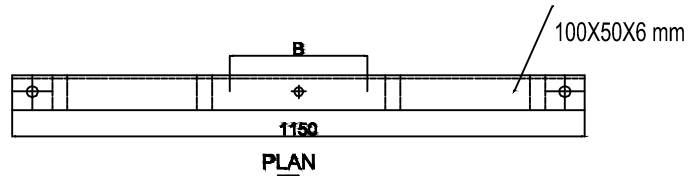
DRG NO .- ODSSP / LINE / 1-REV-A

# 11 KV V-CROSS ARMS WITH TOP BRACKET & BACK CLAMP FOR PSC POLE

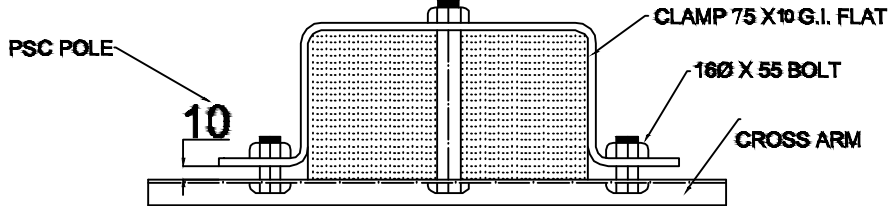
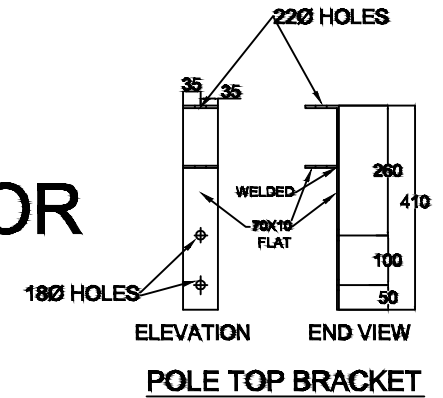
100x50x5 , 9.56 kg / Mtr. CHANNEL



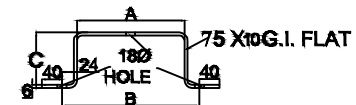
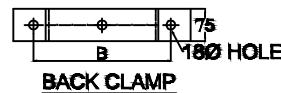
LENGTH OF POLE (L)	LOAD(KG)	A	B	C	D	BOTTOM LINE OF X-ARM FROM TOP OF THE POLE IN mm
10000 mm minimum	300	216	276	111	362	1170



OR



BACK CLAMPS & CROSS ARM ASSEMBLY

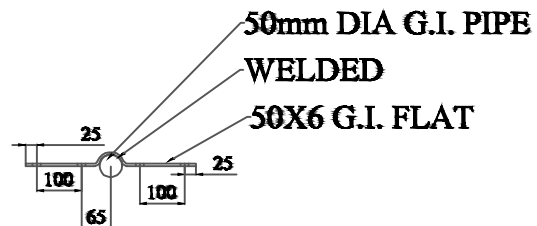
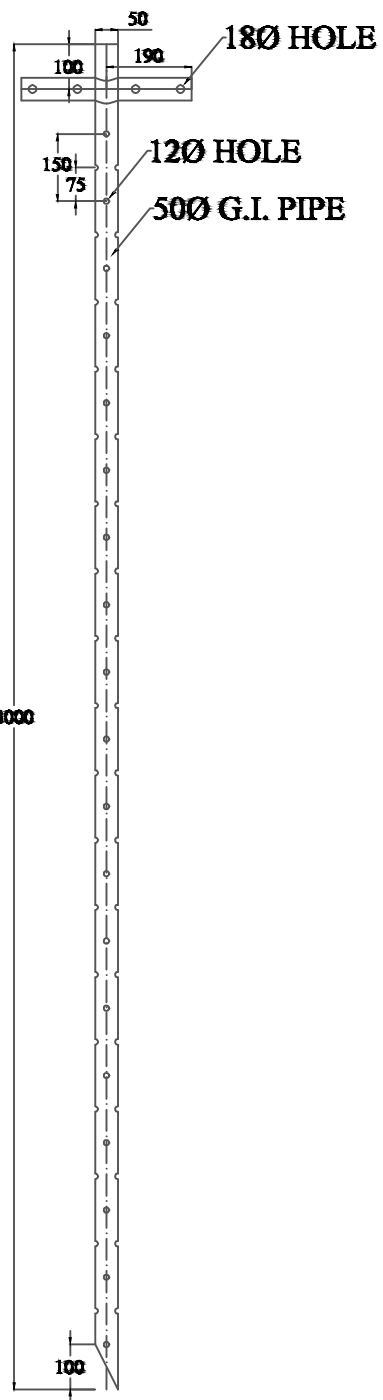


MAJOR CHANGES:-

1. ANGLE 70X70X6 IS REPLACED BY 100X50X6

DRG NO .- ODASSP / LINE / 5-REV-A

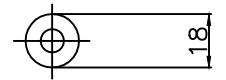
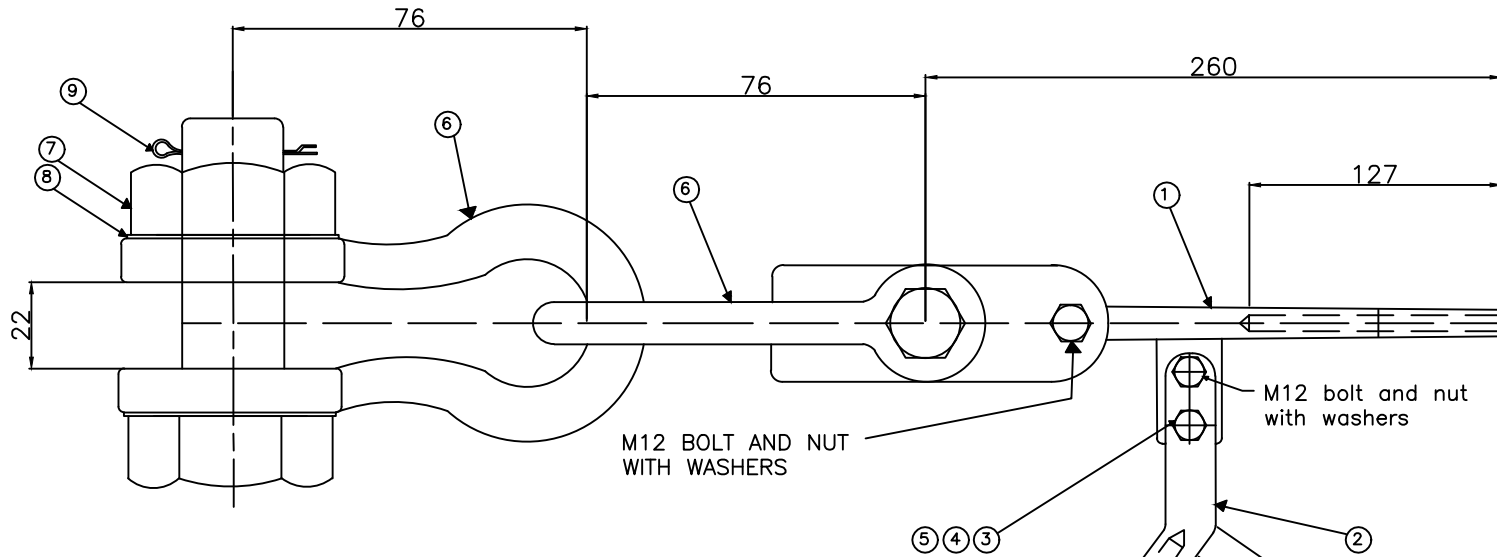
**EARTHING DEVICE  
HEAVY GAUGE (TATA/GINDL)**



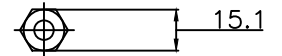
NOTE:-  
1.50 mm DIA GI PIPE FOR S/S  
2. 40 mm DIA GI PIPE FOR LINE

DRG NO .- ODASSP/ LINE / 6-REV-A

## TENSION ASSEMBLY FOR EART WIRE



BEFORE COMP.



AFTER COMP.

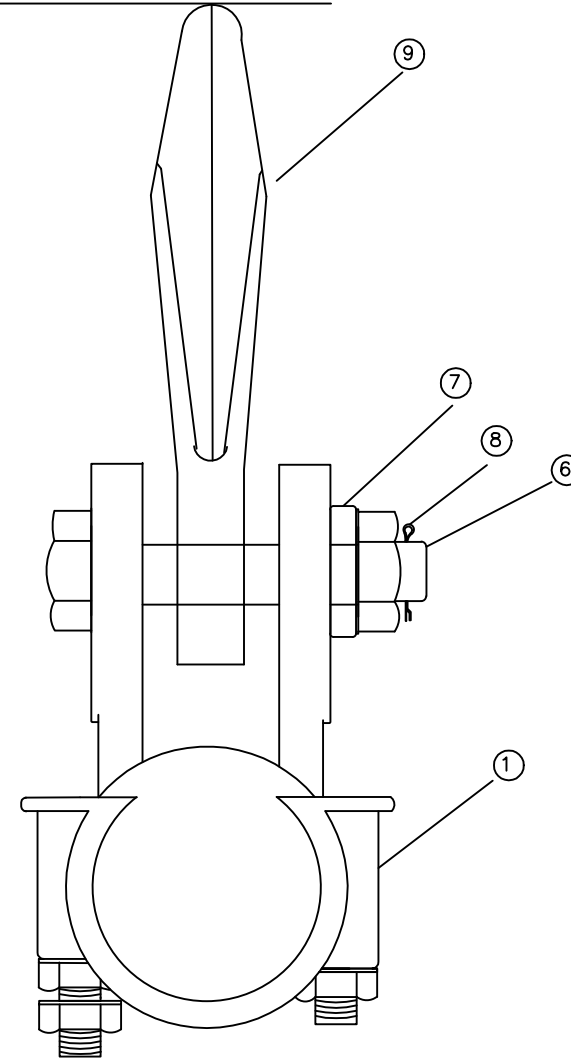
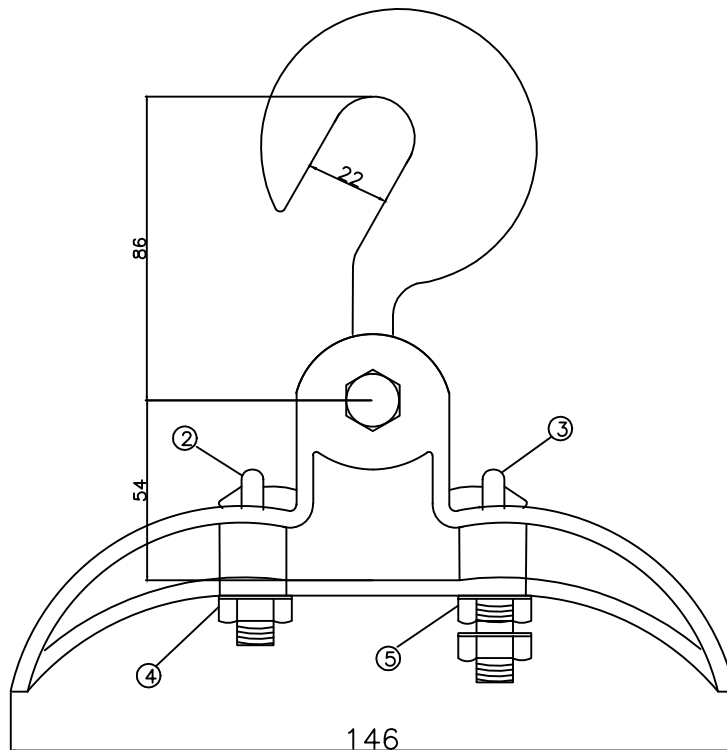
SL.	DESCRIPTION	MATERIAL	CAT NO.	QTY.
1.	CLAMP	FOGED STEEL GALVANISED		1
2.	JUMPER	FORGED STEEL GALVANISED	MGSS 10	1
3.	BOLTS WITH NUTS,M12	GALVANISED STEEL		3
4.	FLAT WASHER M12	GALVANISED STEEL		3
5.	SPRING WASHER,M12	SPRING STEEL ELECTRO GALV		3
6.	ANCHOR SHACKLE	FORGED STEEL GALVANISED		2
7.	BOLTS WITH NUTS,M16	GALVANISED STEEL	MGSS 10	2
8.	FLAT WASHER,M16	GALVANISED STEEL		2
9.	SPLIT PIN	STAINLESS STEEL/BRASS		2

NOTES:-  
 GENERAL TOLERANCE  $\pm 2\%$  UNLESS OTHERWISE SPECIFIED. APPLICABLE STANDARD IS: 2486 PART-I  
 FERROUS PART IS HOT DIP GALVANISED AS PER IS: 2629 SLIP STRENGTH 95 OF UTS OF EARTH WIRE MINIMUM BREAKING STRENGTH 7000 KG SPRING WASHER ARE ELECTRO GALVANISED FLAT WASHER ARE HOT DIP GALVANISED SUITABLE FOR EARTH WIRE 7/3.15 MM.

Drg No-ODSSP/LINE/8



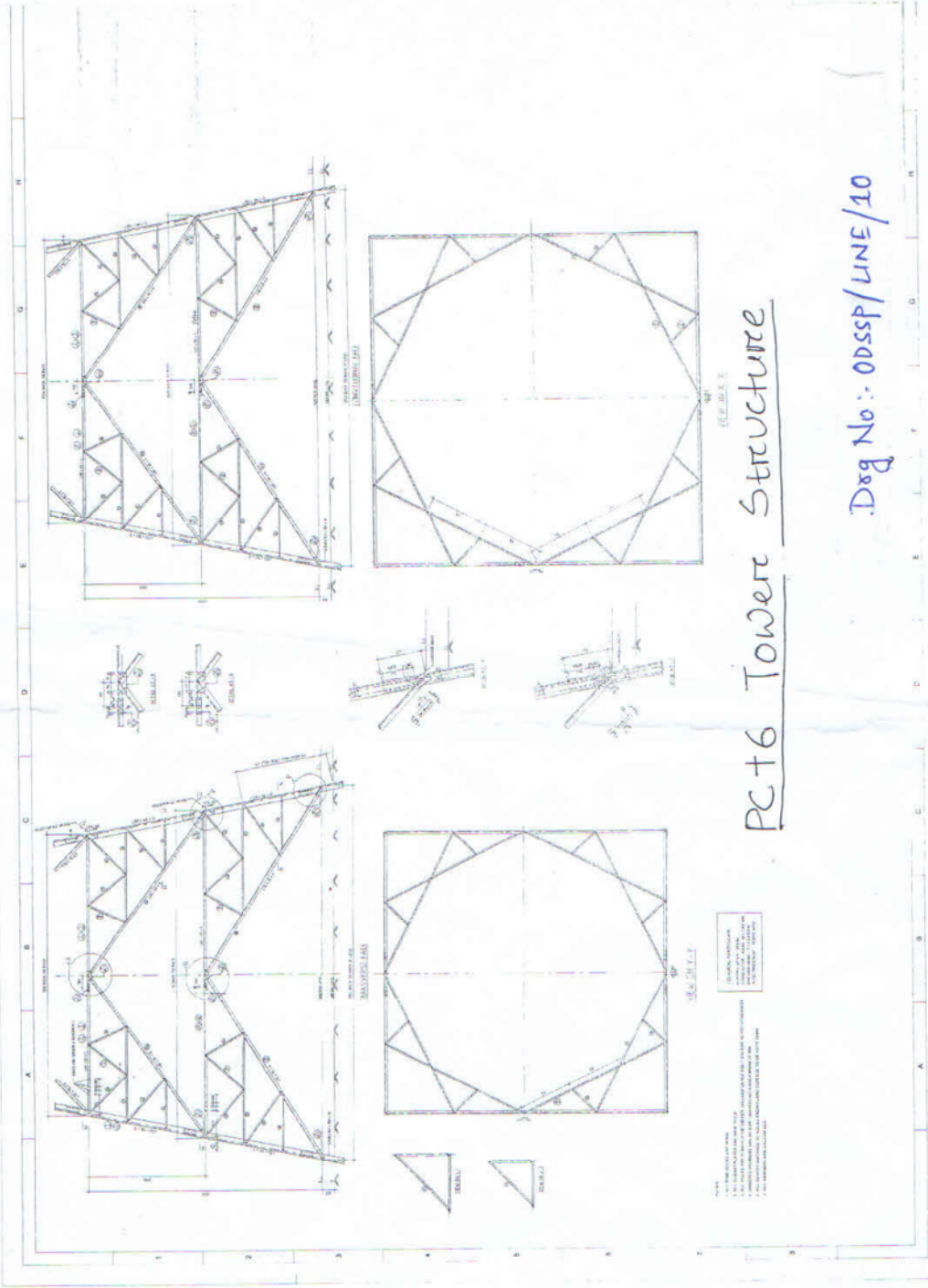
# SUSPENSION ASSEMBLE FOR EARTHWIRE



SL.	DESCRIPTION	MATERIAL	CAT NO.	QTY.
1.	CLAMP & KEEPER	MALLEABLE CAST IRON GALVANISED	B-11	1
2.	U BOLT WITH NUTS ,M12	GALVANISED STEEL		1
3.	J BOLT WITH NUTS ,M12	GALVANISED STEEL		1
4.	FLAT WASHER M12	GALVANISED STEEL		1
5.	SPRING WASHER,M12	SPRING STEEL ELECTRO GALV		4
6.	EYE HOOK	FORGED STEEL GALVANISED		6
7.	BOLTS WITH NUTS,M16	GALVANISED STEEL	1	1
8.	FLAT WASHER,M16	GALVANISED STEEL	1	1
9.	SPLIT PIN	STAINLESS STEEL/BRASS	S-4	1

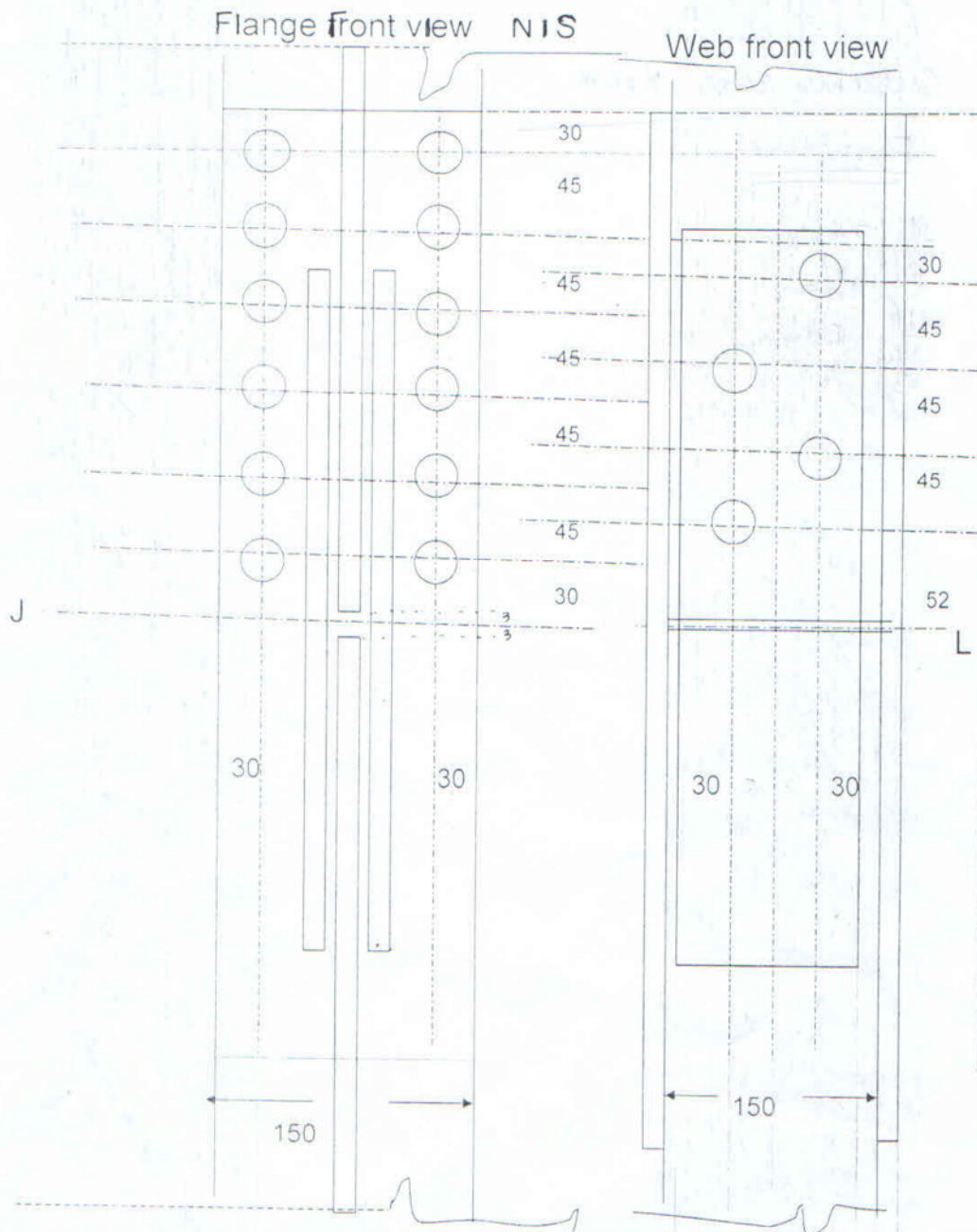
NOTES:-  
 GENERAL TOLERANCE  $\pm 2\%$  UNLESS OTHERWISE SPECIFIED.APPLICABLE  
 STANDARD IS: 2486 PART-I  
 FERROUS PART IS HOT DIP GALVANISED AS PER IS:2629 MINIMUM  
 BREAKING STRENGTH 7000 KG SPRING WASHER ARE ELECTRO  
 GALVANISED FLAT WASHER ARE HOT DIP GALVANISED SUITABLE FOR  
 EARTHWIRE 7/3.15 MM.

Drg No-ODSSP/LINE/9



PC16 Tower Structure

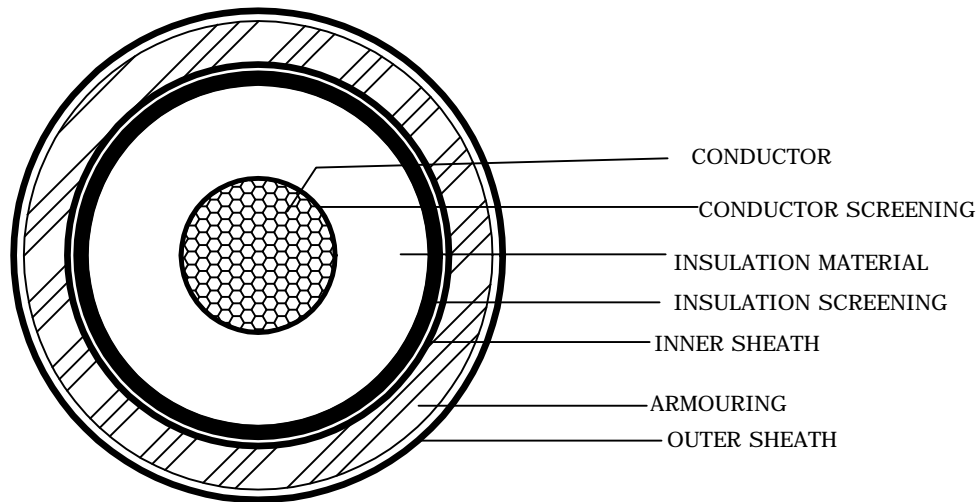
Desg No :- ODSSP/LINE/10



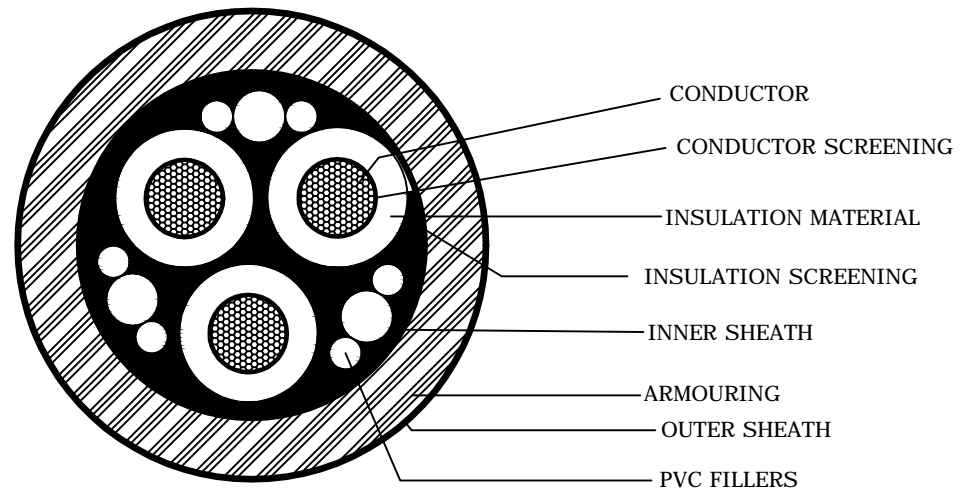
Length of Flange plate-  $2*(3+2*30+5*45)=576\text{mm}*12\text{mm}$   
 Length of Web plate -  $2*(3+52+3*45+30)=440\text{mm}*12\text{mm}$   
 JL- Joint line

(Joining of GI R.S Joist Pole)

DRG No-ODSSP/LINE/11

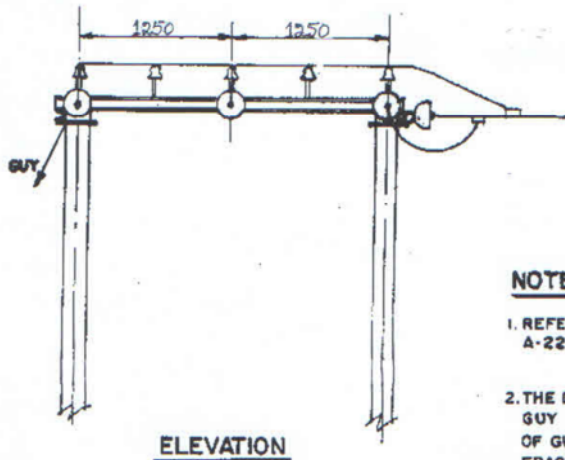


CROSS-SECTIONAL VIEW OF 11kV/33kV  
 1C, ARMoured CABLE



CROSS-SECTIONAL VIEW OF  
 11kV/33kV 3C, ARMoured CABLE

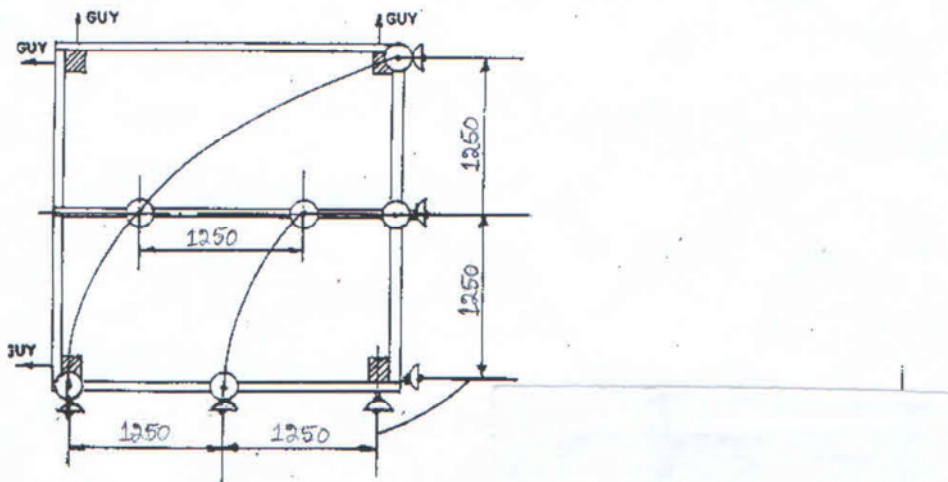
Drg No.-ODSSP/LINE/12



ELEVATION

**NOTE :-**

1. REFER REC CONSTRUCTION STANDARD A-22 FOR TYPE OF POLE TO BE USED.
2. THE DRAWING INDICATES THE POSITION OF GUY CLAMP ON THE POLE. THE DIRECTION OF GUY WIRE SHALL BE SUCH AS TO COUNTERACT THE RESULTANT TENSIONS OF THE CONDUCTORS.
3. GUY ANGLE SHALL BE  $30^\circ$  TO  $45^\circ$



PLAN

(11kV Line conductor Formation & Arrangement of Guys for  $60^\circ$  to  $90^\circ$  angle location)

Doc. No - ODSSP/LINE/13