



REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHECKED			CHECKED			CHECKED
		APPD			APPD			APPD
						JOB No.		

LEGEND

-  CONNECTION TO GROUND MAT THROUGH RISER/ SUBSIDIARY CONDUCTOR (65X8 MM G.S. FLAT)
 PE CONNECTION TO PIPE ELECTRODE

GENERAL NOTES:

- EARTH STRIP CLEATED TO LATTICE TYPE STRUCTURE AT AN INTERVAL OF 1.0M SUITABLE PROVISION SHALL BE MADE WITH SUPPORT STRUCTURE.
- ALL EARTH STRIPS SHALL BE TAKEN ALONG EDGE OF STRUCTURE. ALL DRAWING SHOWS TYPICAL ARRANGEMENT ONLY.
- ALL STRUCTURES/EQUIPMENTS SHALL BE EARTHED AS SHOWN IN THE FOLLOWING SHEETS.
- BOLT SIZE FOR CONNECTING EARTHING FLAT TO THE EQPT/STRUCTURE SHALL BE TO SUIT RESPECTIVE HOLE SIZE.
- FOR NOTES REFER SHEET 1A
- MAXIMUM OF TWO EARTHING STRIP SHALL BE CONNECTED TO ONE RISER.
- ALL EARTHING SHALL BE DONE IN ACCORDANCE WITH IS:3034 UNLESS OTHERWISE STATED IN TECHNICAL SPECIFICATION
- EACH RISER OF A PARTICULAR EQUIPMENT SHALL BE CONNECTED TO A DIFFERENT EARTHROD (EITHER HORIZONTAL OR VERTICAL EARTHROD)
- FOR WELDING DETAILS REFER SHEET #19 & 20
- E/WIRE DOWN CONDUCTOR SHALL BE CLEATED AT AN INTERVAL OF 2.0 M ALONG WITH STRUCTURE. NO HOLES IN STRUCTURE IS ALLOWED FOR THIS PURPOSE

SHEET NO. DESCRIPTION


- NOTES
- 132kV SF6 CIRCUIT BREAKER
- 132kV CVT
- 132kV POST INSULATOR (SOLID CORE TYPE)
- 120kV LIGHTNING ARRESTER
- MARSHALLING KIOSK
- 132kV HORIZONTAL CENTER BREAK ISOLATOR WITH ONE EARTH SWITCH
- 132kV HORIZONTAL CENTER BREAK ISOLATOR WITH TWO EARTH SWITCHES
- 132kV HORIZONTAL CENTER BREAK ISOLATOR WITHOUT EARTH SWITCH
- SHIELD WIRE TOWER
- TOWER WITHOUT PEAK
- 132kV CURRENT TRANSFORMER
- CABLE TRENCH
- DETAIL OF PIPE EARTH ELECTRODE IN TREATED EARTH PIT (ET)

SHEET NO. DESCRIPTION

- RISER DETAILS
- LIGHTNING MAST
- AUXILIARY EARTH MAT FOR ISOLATOR MAIN MECH.,E/S MECH. BOX (TYP.)
- SWITCHGEAR / MCC / CONTROL AND RELAY BOARD
- 132kV WAVE TRAP
- FENCE POST
- TYPICAL ARRANGEMENT OF BOLTED JOINTS
- WELDING DETAILS
- WELDING DETAILS

JOB NO.	CUSTOMER	NORTH EASTERN ELECTRIC POWER CORPORATION LTD.
STATUS CONTRACT	PROJECT	132 kV SWITCHYARD FOR 100 MW MONARCHAK GAS
DRG./REF. NO. (INTERNAL)		BASED COMBINED CYCLE POWER PROJECT

SIGN & DATE	REV.	DATE	ALTD	CHD	APPD	 भारत हेवी इलेक्ट्रिकल्स लिमिटेड दांसमिशन परियोजना विभाग BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	DEPT CODE	NAME	SIGN.	DATE
							DRN			
							DESIGN	SK		08.08.11
							CHD	SK		08.08.11
							APPD	DKM		08.08.11

REV.	DATE	ALTD	CHD	APPD	<div>07/06/11</div>									
					TITLE									
					EQUIPMENT EARTHING DETAILS									
											DEPT.	SCALE	DRAWING NO. TB-4-331-509-107	
											SIGN			
							DATE		SHEET	1	OF	24	REV.	00

NOTES:-

1. EARTHING CONDUCTORS RUNNING ON COLUMNS, BEAMS ETC. SHALL BE CLEATED SUITABLY AT EVERY 1000 mm INTERVAL APPROXIMATELY AND 2 M FOR EARTHWIRE DOWN CONDUCTOR UNLESS SHOWN OTHERWISE IN THE ENCLOSED SHEETS.
2. EARTH STRIPS TO BE LAID FLAT ALONG THE STRUCTURE AS FAR AS POSSIBLE.
3. A CONNECTION TO ALL EQUIPMENT AND TOWERS SHALL BE BY BOLTED JOINTS.
4. THE SURFACES TO BE WELDED SHALL BE CLEANED OF DIRT, OIL, GREASE AND OXIDES BEFORE WELDING.
5. ANY OXIDE FILMS THAT MAY HAVE FORMED DURING WELDING MUST BE REMOVED FROM THE WELDED JOINT.
6. EQUIPMENT EARTHING CONDUCTOR (SIZE 65x8mm) FOR EQUIPMENT AND TOWER EARTHING SHALL BE OF M.S. GALVANISED. THE CONDUCTOR BELOW THE GROUND LEVEL SHALL BE 40 mm DIA BLACK MS ROD.
7. IN THE ATTACHED DRAWINGS GL REPRESENTS GRAVEL LEVEL.
8. ALL THE EQUIPMENTS SHALL BE EARTHED AT TWO POINTS WITH 65x8mm G.S. FLAT EVEN THOUGH THEY ARE SHOWN OR NOT IN THE DRAWING DUE TO CLARITY.
9. ALL JUNCTION BOXES, OPERATING MECHANISM BOXES, MARSHALLING KIOSKS, GROUND MOUNTED PANELS AND CONTROL CABINETS, ETC. SHALL BE EARTHED AT TWO POINTS WITH 50x6 mm G.S. FLAT.
10. ALL WELDED JOINTS ABOVE GROUND LEVEL SHALL BE COATED WITH 2 COATS OF RED OXIDE AND FOLLOWED BY TWO COATS OF GALVOSEAL (COLD GALVANISING) PAINT AND UNDERGROUND WELDED JOINTS SHALL BE COATED WITH TWO COATS OF RED OXIDE PAINT FOLLOWED BY TWO COATS OF BITUMEN COMPOUND.
11. FOR WELDED JOINTS LOW HYDROGEN CONTENT ELECTRODES SHALL BE USED.
12. EARTHING CONDUCTORS FROM EQUIPMENT STRUCTURES SHALL BE CONNECTED TO THE NEAREST POSSIBLE EARTH MAT RISER. EQUIPMENT EARTHING SHALL BE AS PER IS 3043.
13. FOR ISOLATOR OPERATING BOX, AUXILIARY MESH SHALL BE 1500x1500 mm WITH 300 mm SUBCONDUCTOR. SPACING OF SUBCONDUCTOR SHALL BE 40 mm DIA M.S. BLACK ROD.
14. ALL JOINTS BETWEEN 40 DIA M.S. ROD AND 65x8mm G.S. FLAT SHALL BE BELOW GRAVEL LEVEL.



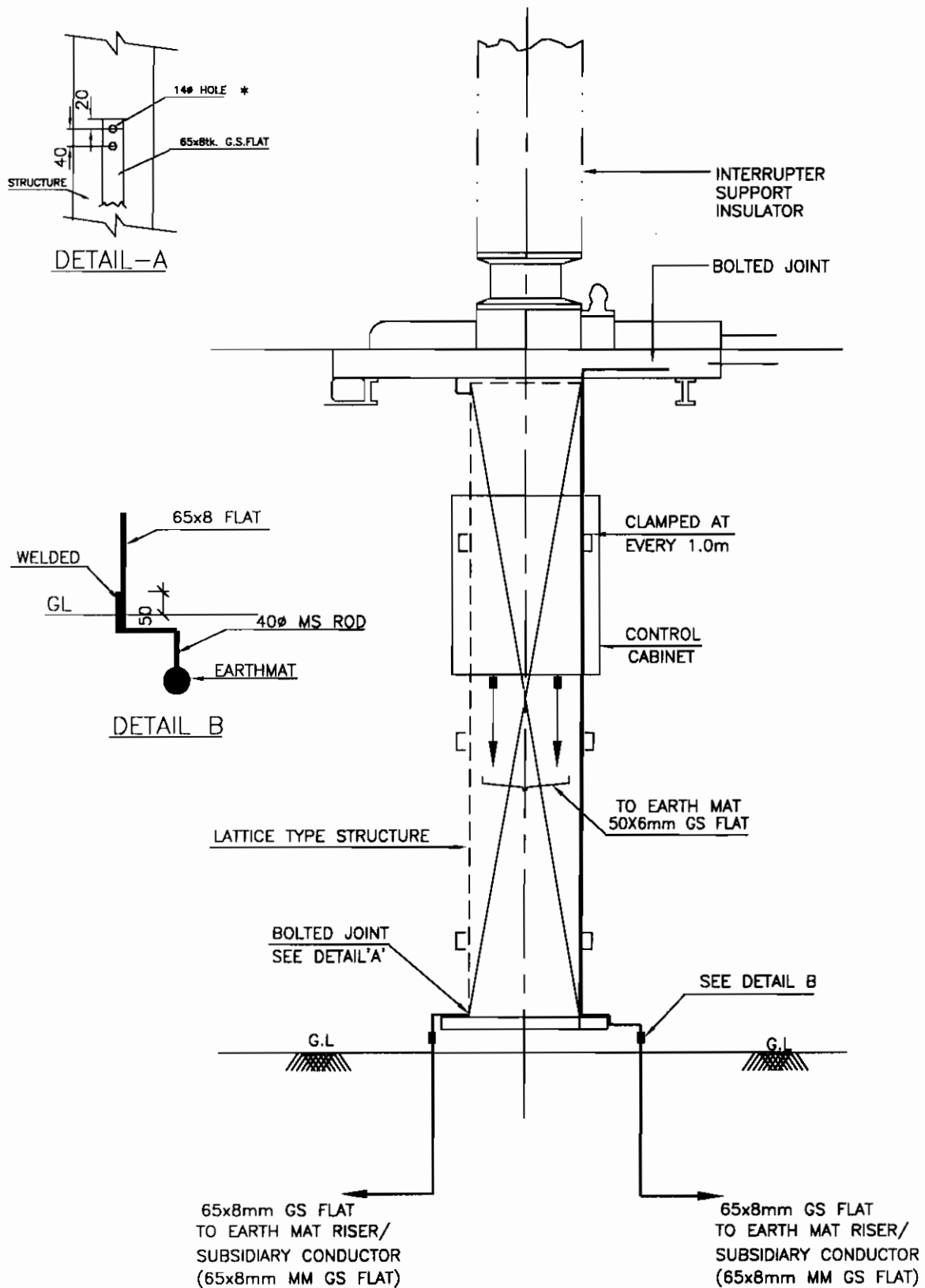
**EQUIPMENT EARTHING DETAILS
NOTES**

DRG. No.

TB-4-331-509-107

REV. 00

SHEET No.
1A



NOTE:

1) * BOLT SIZE AND HOLE SIZE SHALL BE TO SUIT RESPECTIVE EQPT./STRUCTURE.



EQUIPMENT EARTHING DETAILS

132kV SF6 CIRCUIT BREAKER

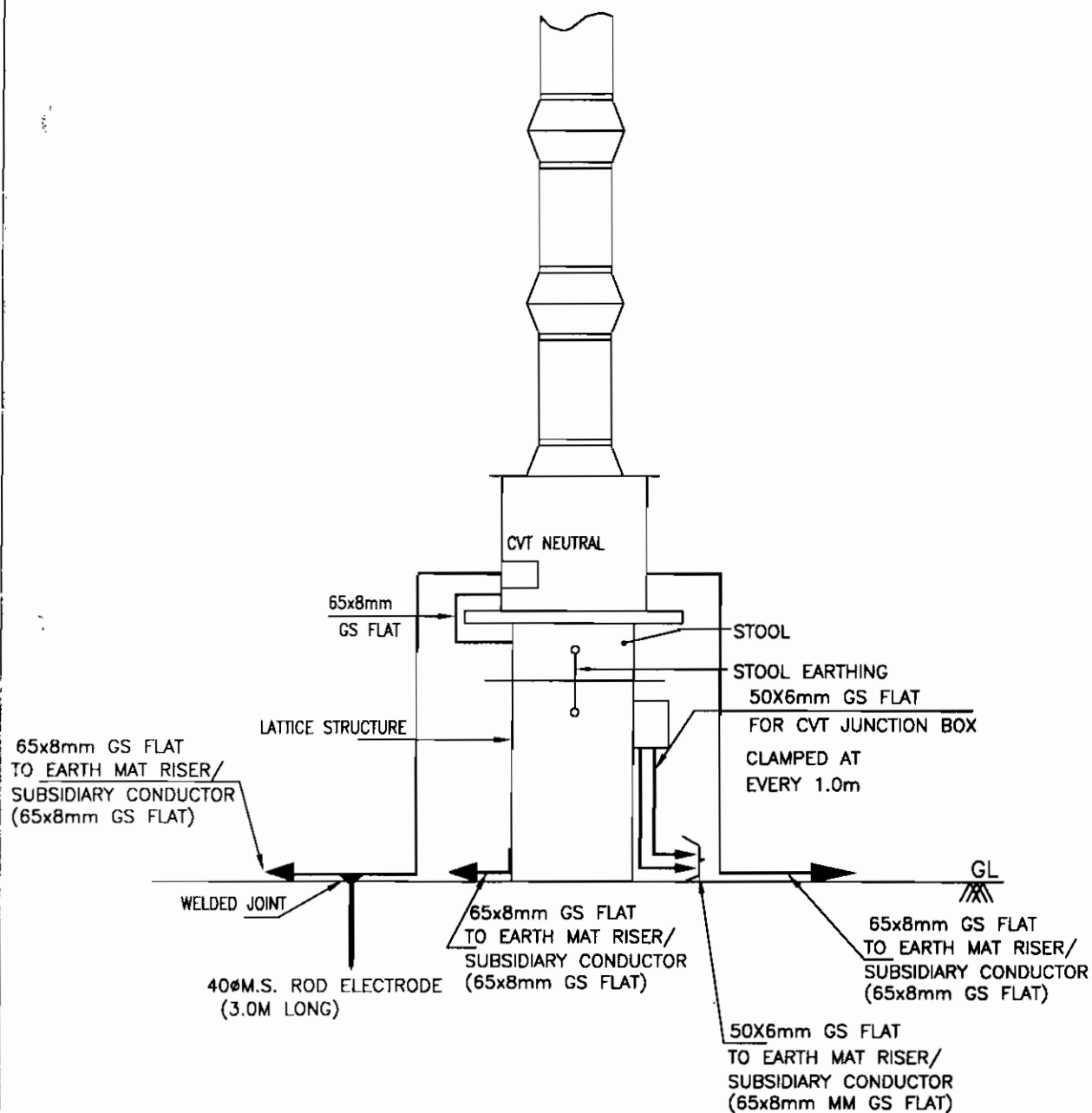
COMPUTER REF. NO.

DRG. No.

TB-4-331-509-107

REV. 00

SHEET No.
2



NOTE:

1) NO. OF ROD ELECTRODE = 1 NO. PER CVT



EQUIPMENT EARTHING DETAILS

132kV CVT/EMVT

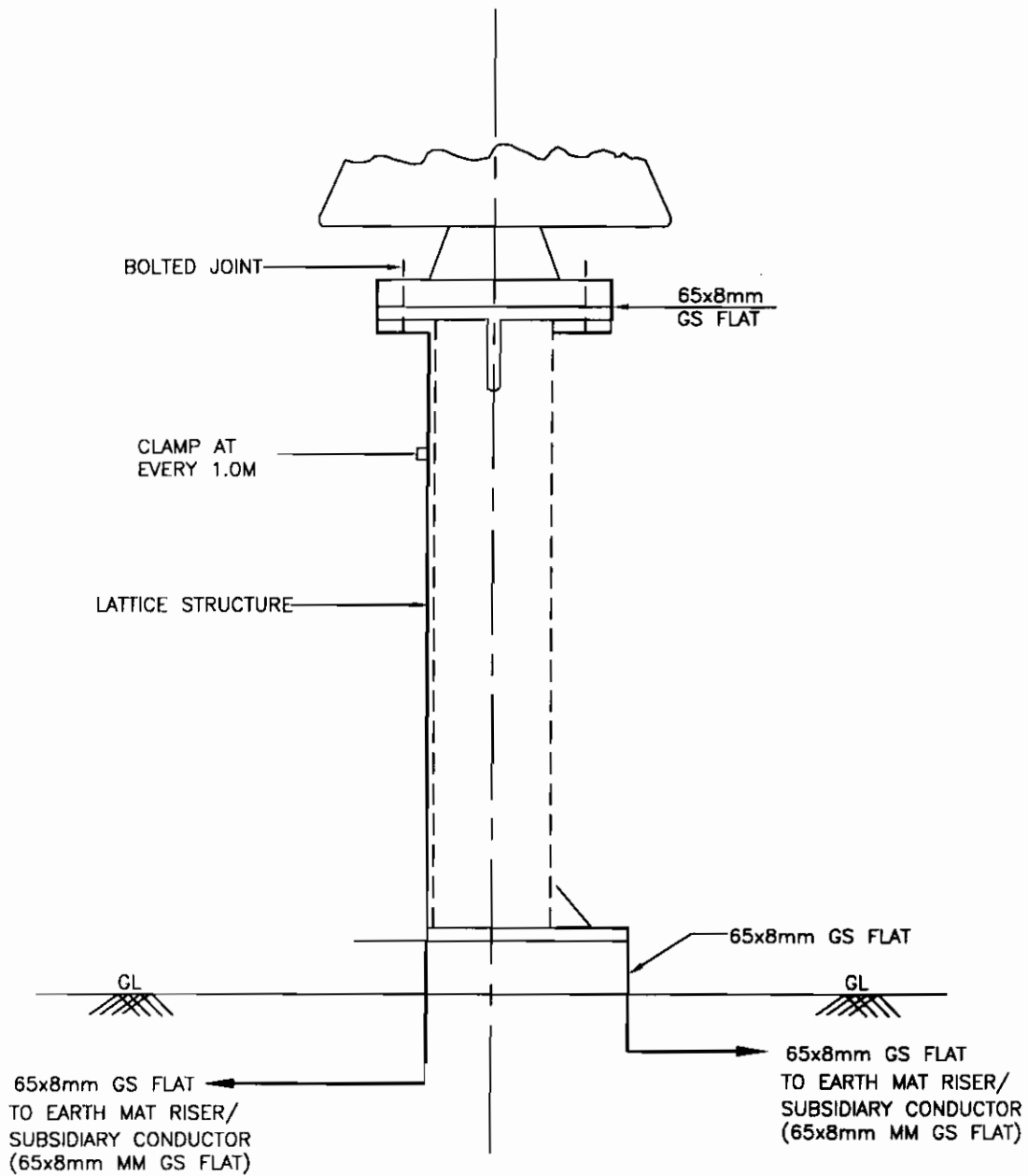
COMPUTER REF. NO.

DRG. No.

TB-4-331-509-107

REV. 00

SHEET No.
03



NOTES:

- 1) NO. OF RISERS = 2 PER PI.

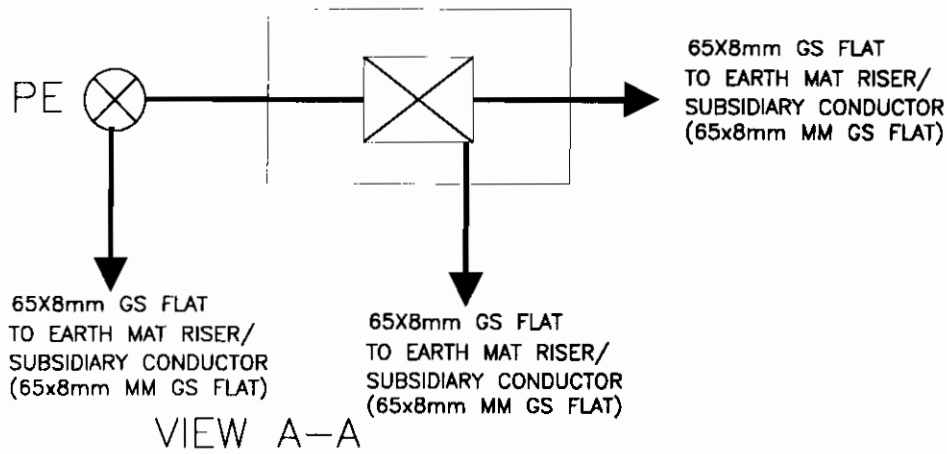
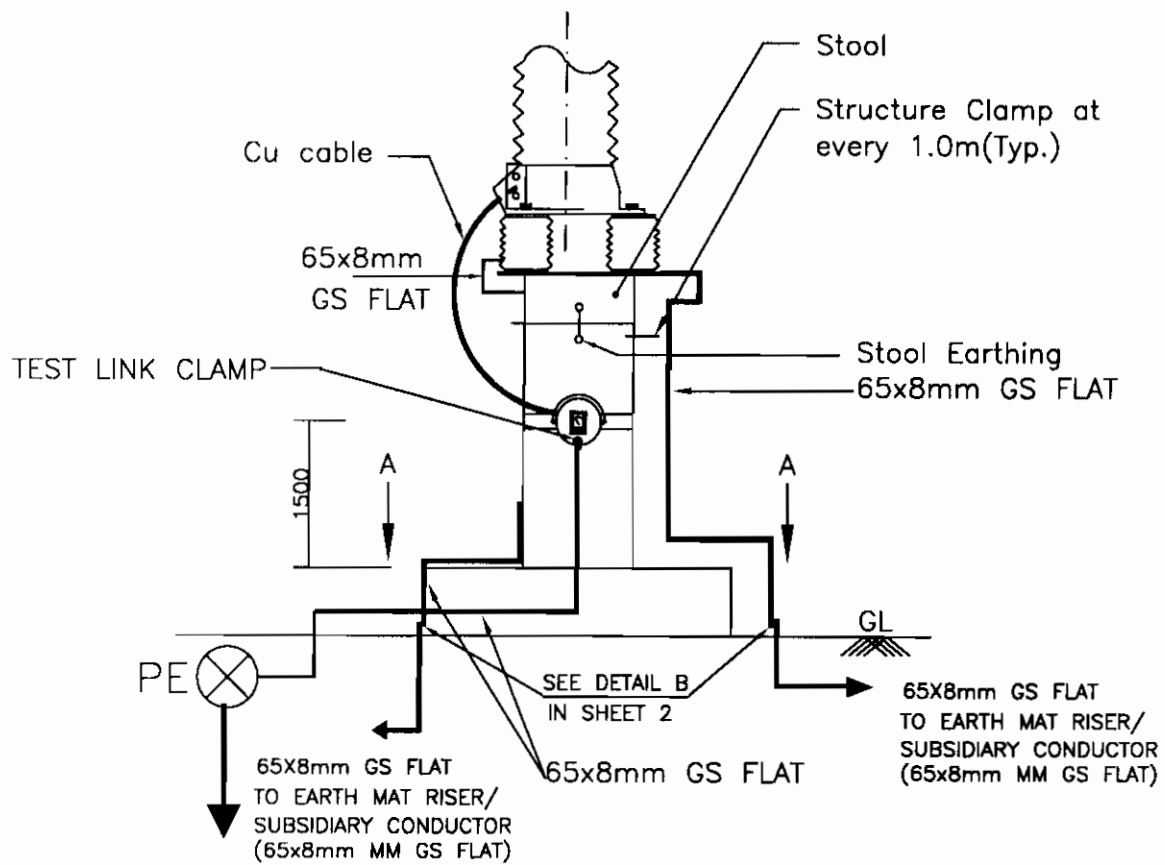


EQUIPMENT EARTHING DETAILS 132kV POST INSULATOR (SOLID CORE TYPE)

DRG. No. TB-4-331-509-107

REV. 00

SHEET No. 4



NOTES;

1. LA SHALL BE EARTHED THROUGH EARTH TERMINAL OF SURGE COUNTER
2. NO. OF PIPE ELECTRODE : 1 NO. PER PHASE.
3. TEST LINK SHALL HAVE PROVISION TO BOLT TEST LEAD BEFORE ISOLATING THE MAIN EARTHING CONNECTIONS (AS PER SKETCH ABOVE) = 1NO.



EQUIPMENT EARTHING DETAILS
LIGHTNING ARRESTER (120kV)

COMPU. DRG. REF.

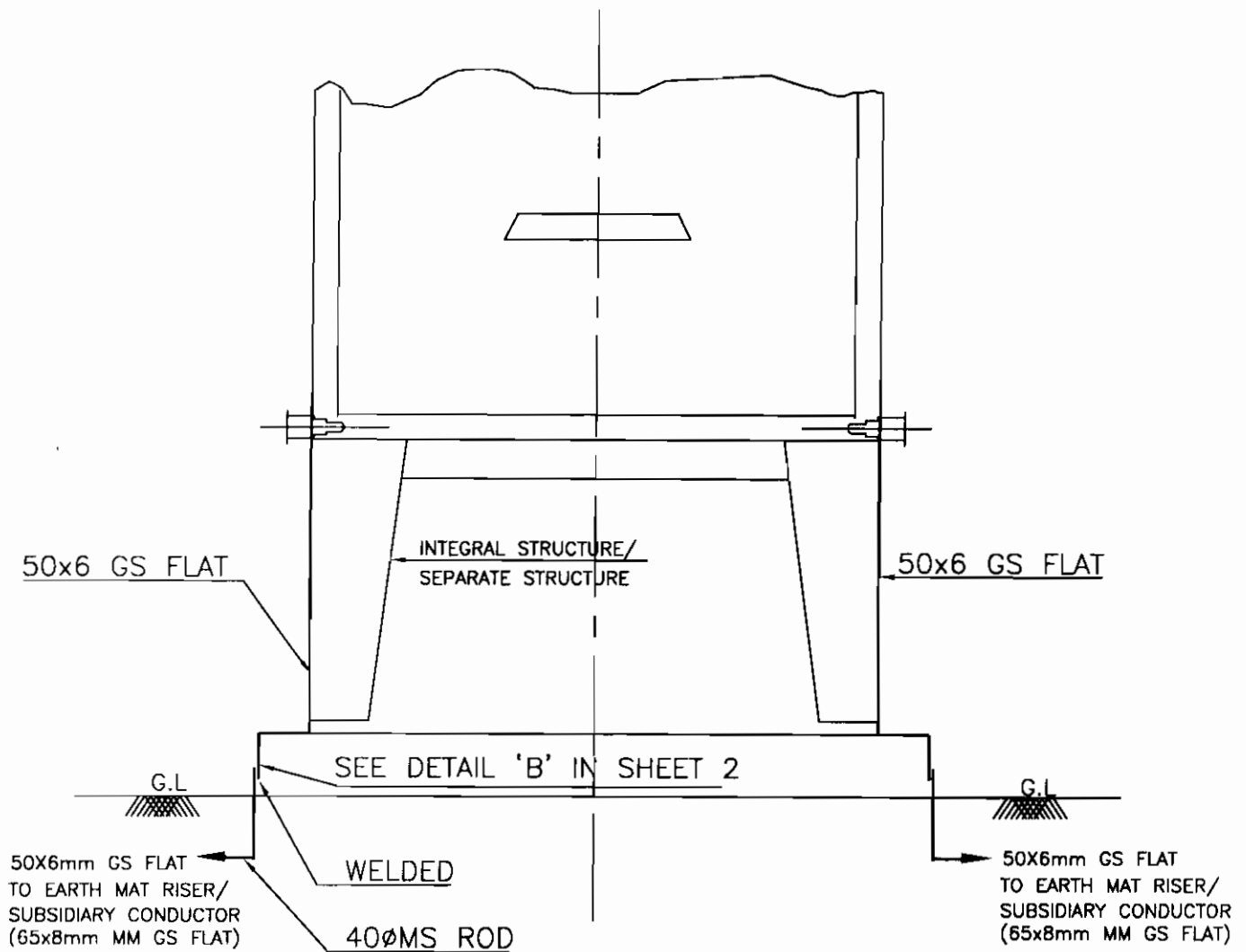
DRG.NO.

TB-4-331-509-107

REV. 00

SHEET No.

5



NOTE:

1. NO. OF RISERS = 2 PER MB.



EQUIPMENT EARTHING DETAILS MARSHALLING KIOSK

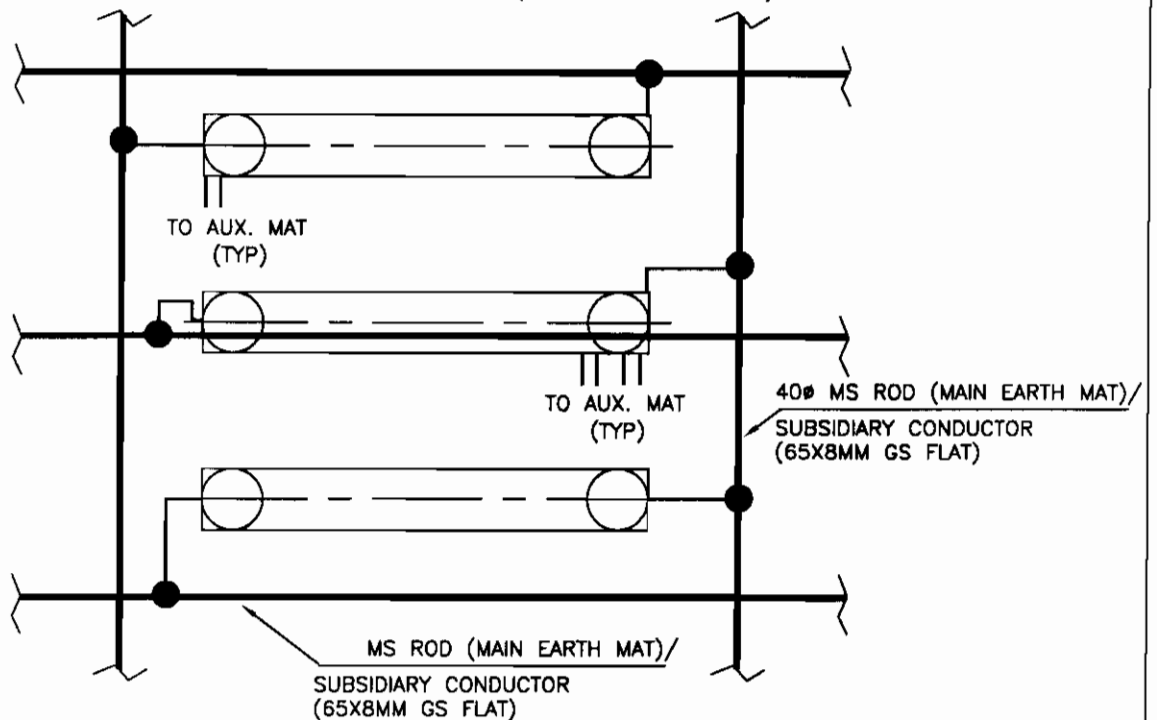
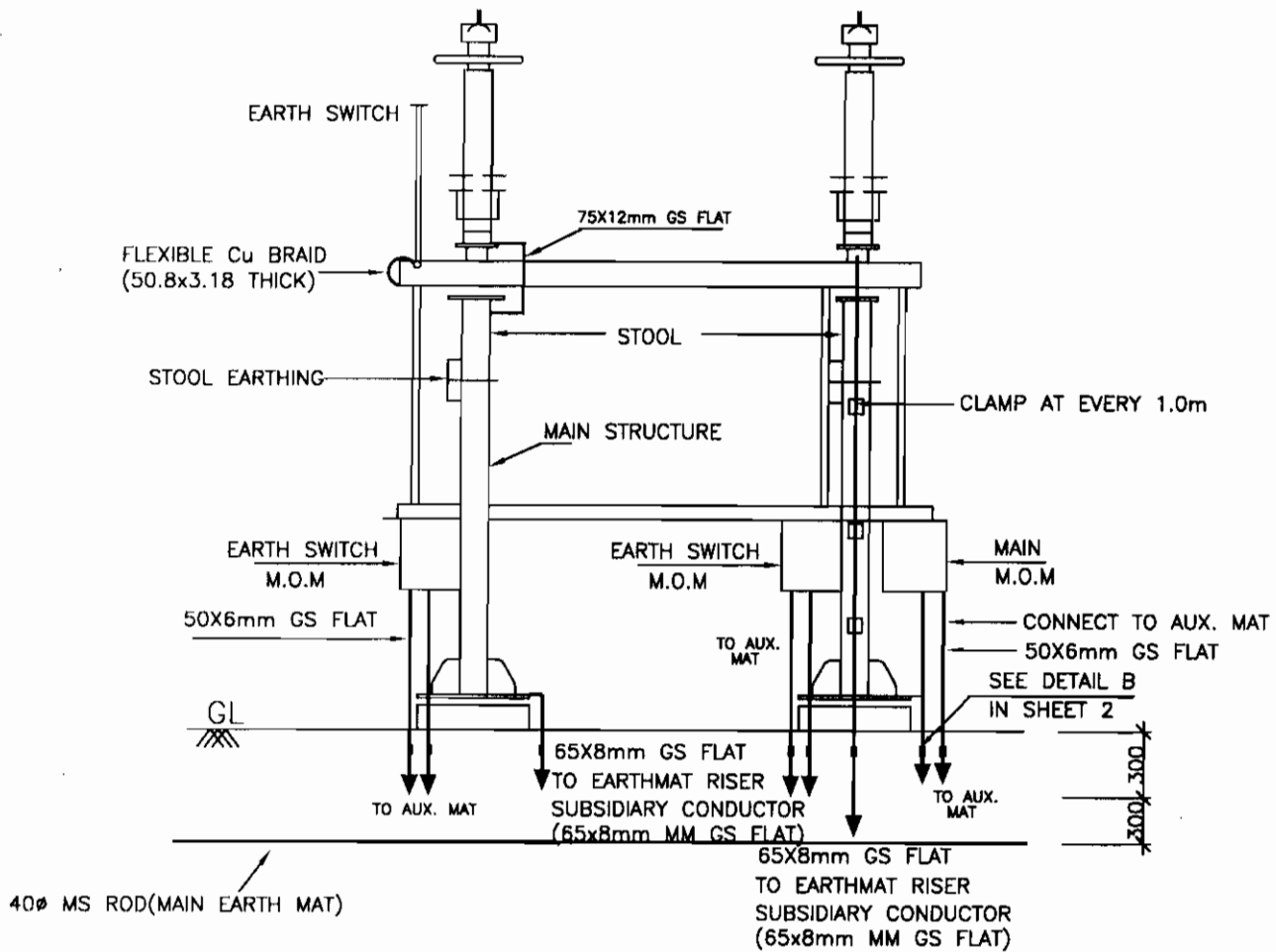
COMPUTER REF. NO.

DRG. No.

TB-4-331-509-107

REV. 00

SHEET No.
6



NOTES

- AUXILIARY EARTH MAT SHALL BE PROVIDED NEAR EVERY MOM BOX (REFER SHEET 14)
- RISER / CONNECTION TO SUBSIDIARY CONDUCTOR (65X8MM GS FLAT)



EQUIPMENT EARTHING DETAILS

HORIZONTAL CENTER BREAK 132kV ISOLATOR WITH TWO EARTHSWITCHES

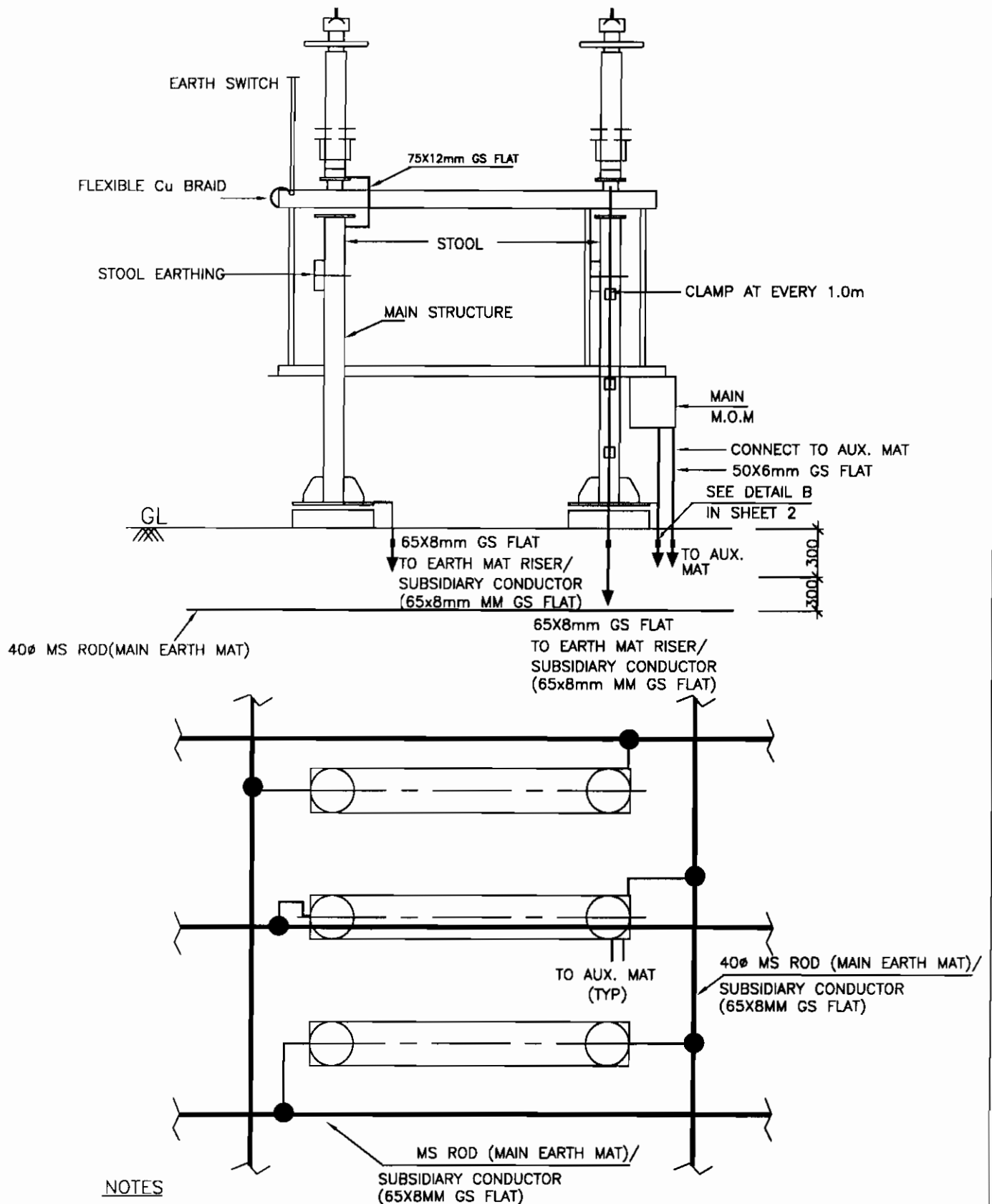
COMPUTERREF.NO.

DRG. No.

TB-4-331-509-107

REV. 00

SHEET No.
7A



NOTES

1. AUXILIARY EARTH MAT SHALL BE PROVIDED NEAR EVERY MOM BOX (REFER SHEET 14)
- RISER / CONNECTION TO SUBSIDIARY CONDUCTOR (65X8 MM GS FLAT)



EQUIPMENT EARTHING DETAILS

HORIZONTAL CENTER BREAK 132kV

ISOLATOR (TYPICAL) WITHOUT EARTHSWITCH

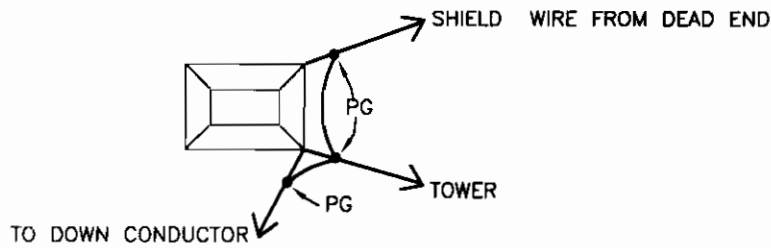
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DRG. No.

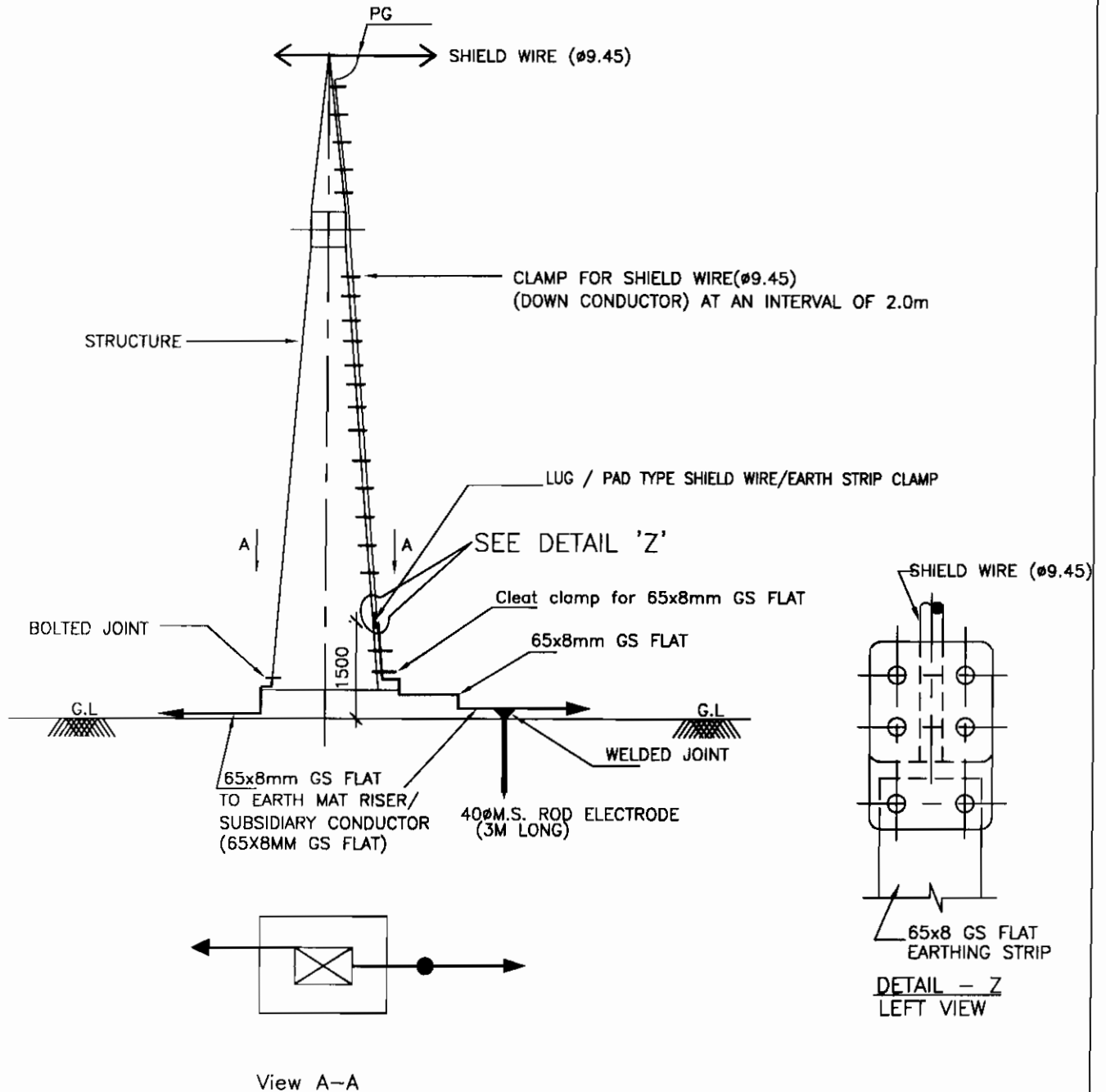
TB-4-331-509-107

REV. 00

SHEET No.
7B



DETAIL WHEN 2 E/WIRE TERMINATES A TOWER



NOTE:

1. NO. OF ROD ELECTRODE : 1 NO. PER TOWER WITH DOWN CONDUCTOR.



EQUIPMENT EARTHING DETAILS

SHIELD WIRE TOWER

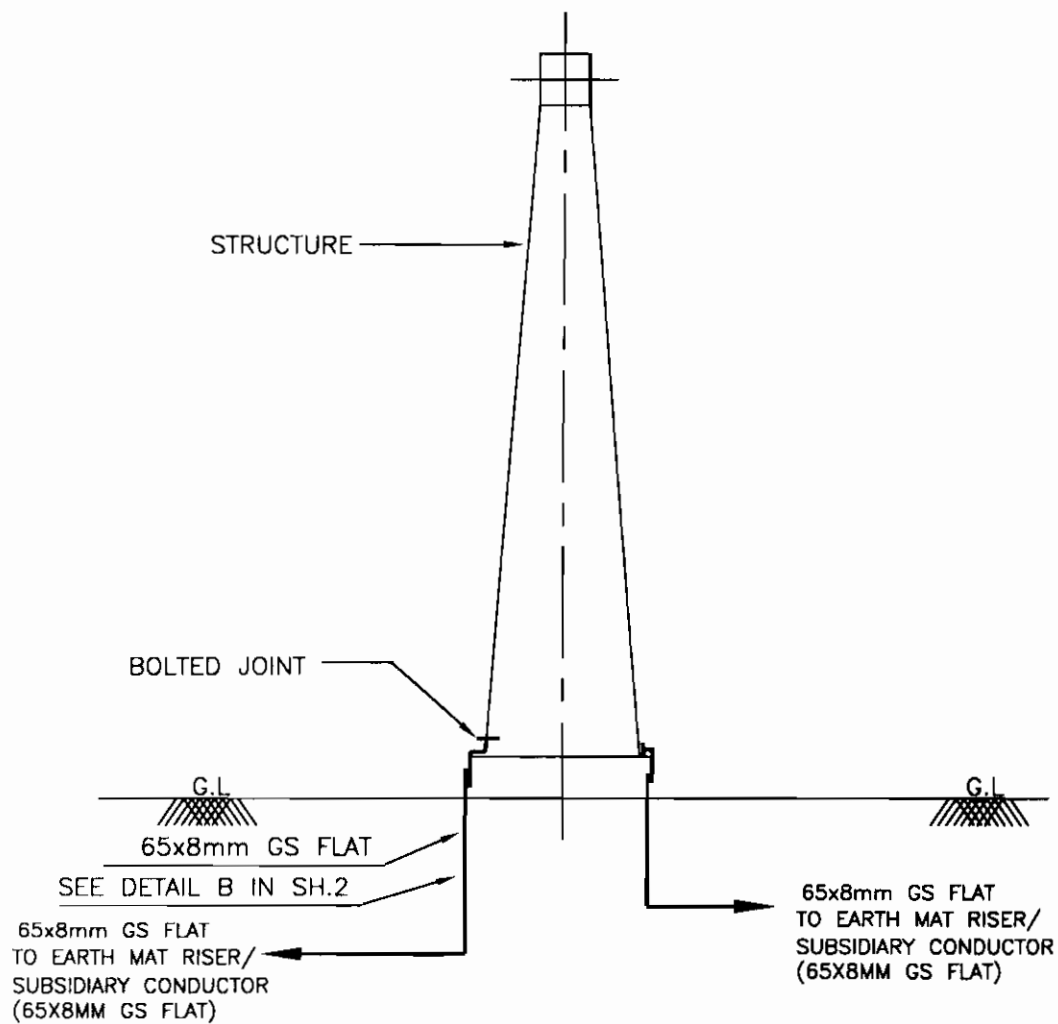
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DRG. No.

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SHEET No.
08



EQUIPMENT EARTHING DETAILS TOWER WITHOUT PEAK

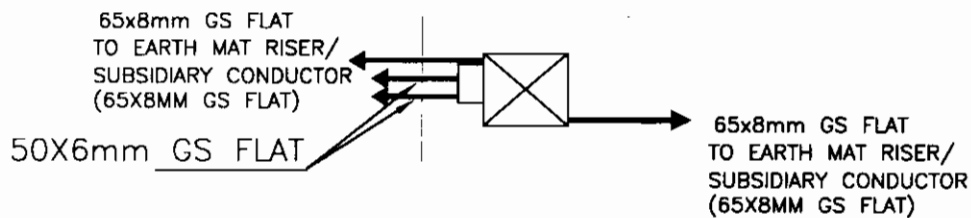
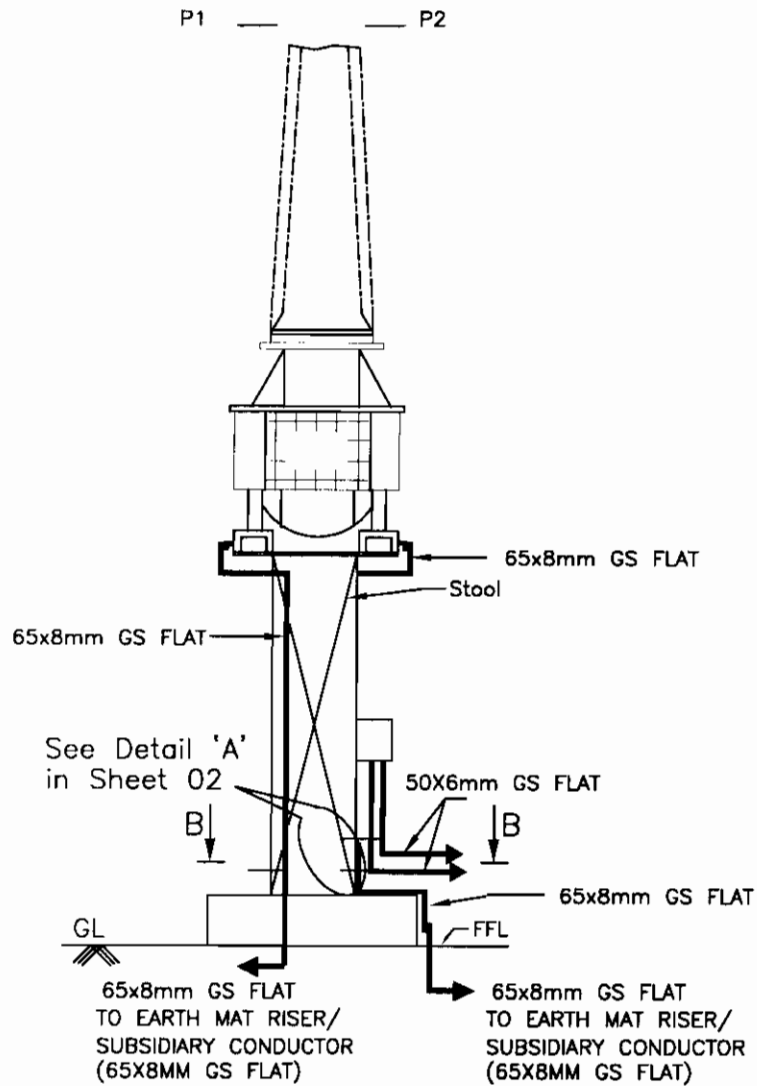
COMPUTER REF. NO.

DRG. No.

TB-4-331-509-107

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SHEET No.
8A



View B-B



EQUIPMENT EARTHING DETAILS 132kV Current Transformer

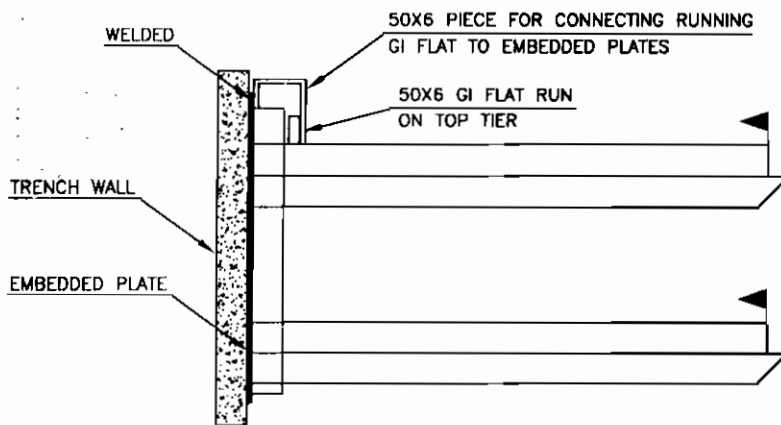
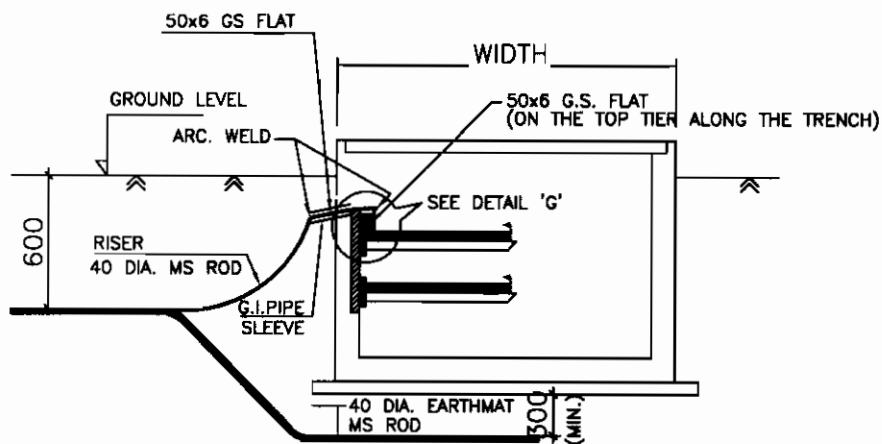
COMPU. DRG. REF.

DRG.NO.

TB-4-331-509-107

REV. 00

SHEET No.
9



DETAIL 'G'

DETAIL FOR CONNECTING GI FLAT RUNNING
ON TOP TIER TRENCH TO EMBEDDED PLATE.

NOTE:

1. ALL TRENCHES SHALL BE EARTHED AT AN INTERVAL OF 30M ALONG THE LENGTH OF TRENCH & FREE ENDS.
2. THE EARTH STRIP (50x6 G.S. FLAT) SHALL BE WELDED TO EMBEDDED PLATE AT EVERY 2M INTERVAL.
3. WHERE THE CABLE RACKS ARE PROVIDED ON BOTH SIDES OF THE TRENCH, BOTH SIDES SHALL BE EARTHED AS PER ABOVE.
4. CABLE AND CABLE TRAYS EARTHING WILL BE DONE AS PER SPECIFICATION.



EQUIPMENT EARTHING DETAILS CABLE TRENCH

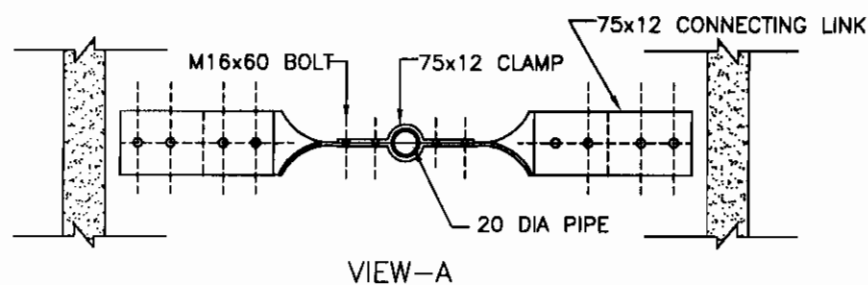
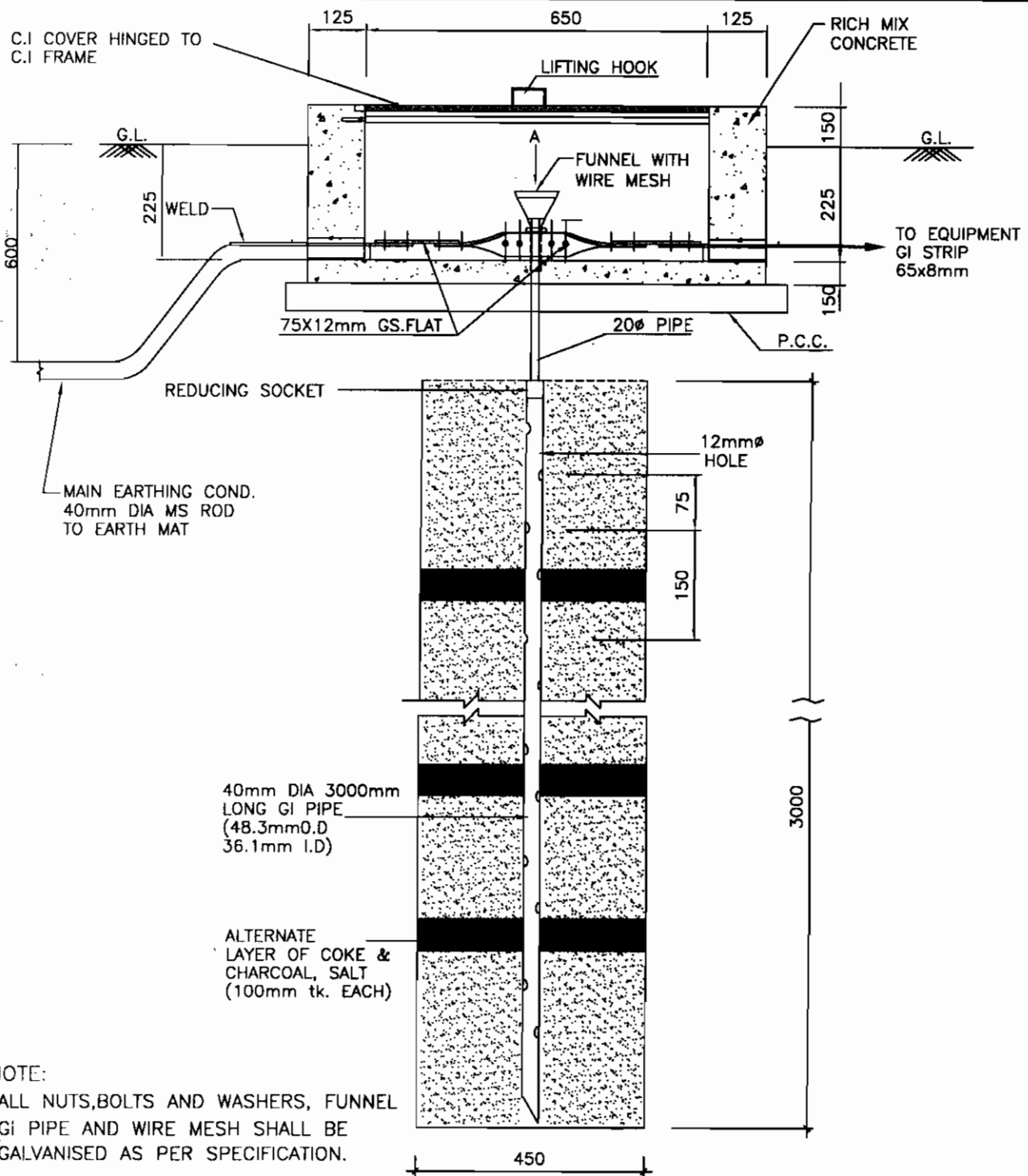
COMPU. DRG. REF.

DRG. NO.

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REV. 00

SHEET
10



EQUIPMENT EARTHING DETAILS
DETAILS OF PIPE EARTH ELECTRODE
IN TREATED EARTH PIT (PE)

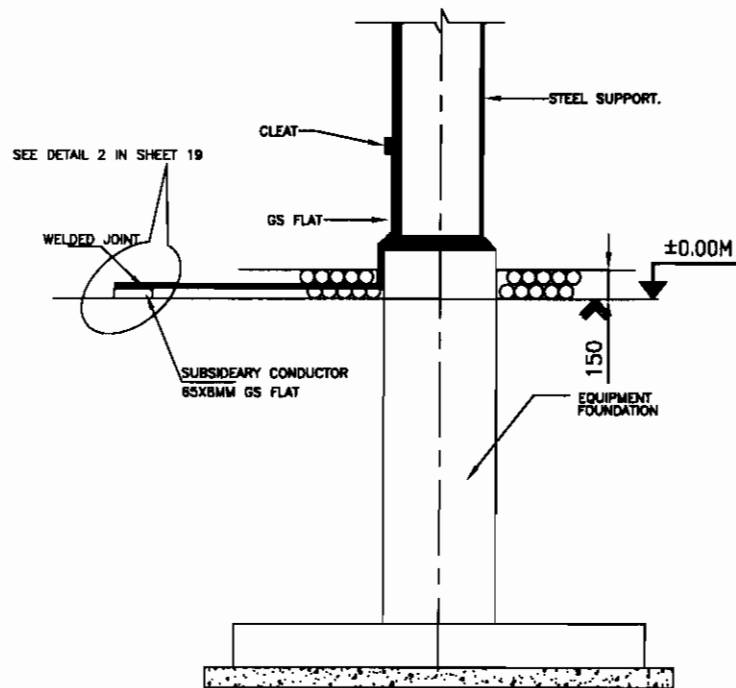
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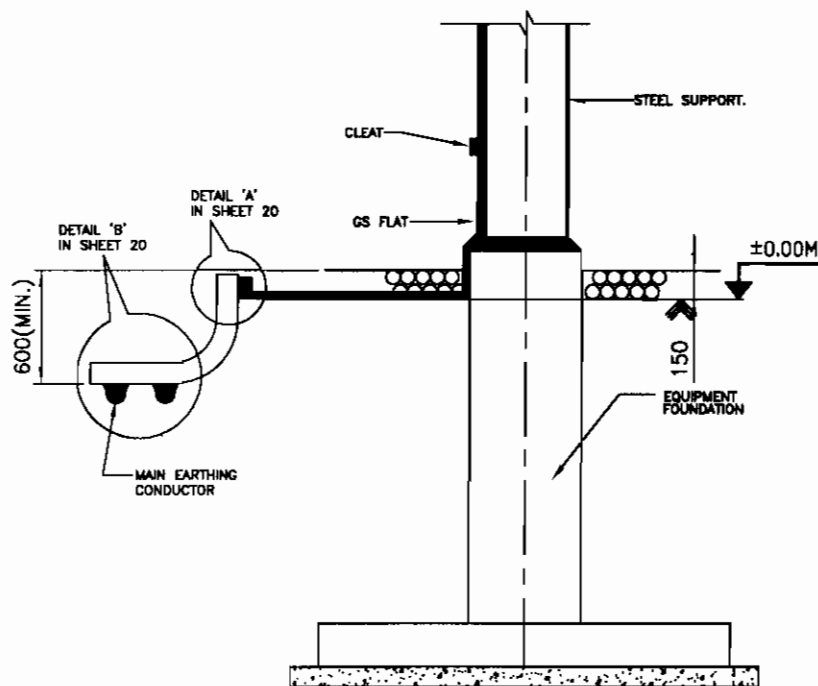
TB-4-331-509-107

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SHEET No.
11



USE OF SUBSIDIARY CONDUCTOR



TYPICAL DETAILS OF RISER



EQUIPMENT EARTHING DETAILS RISER DETAILS

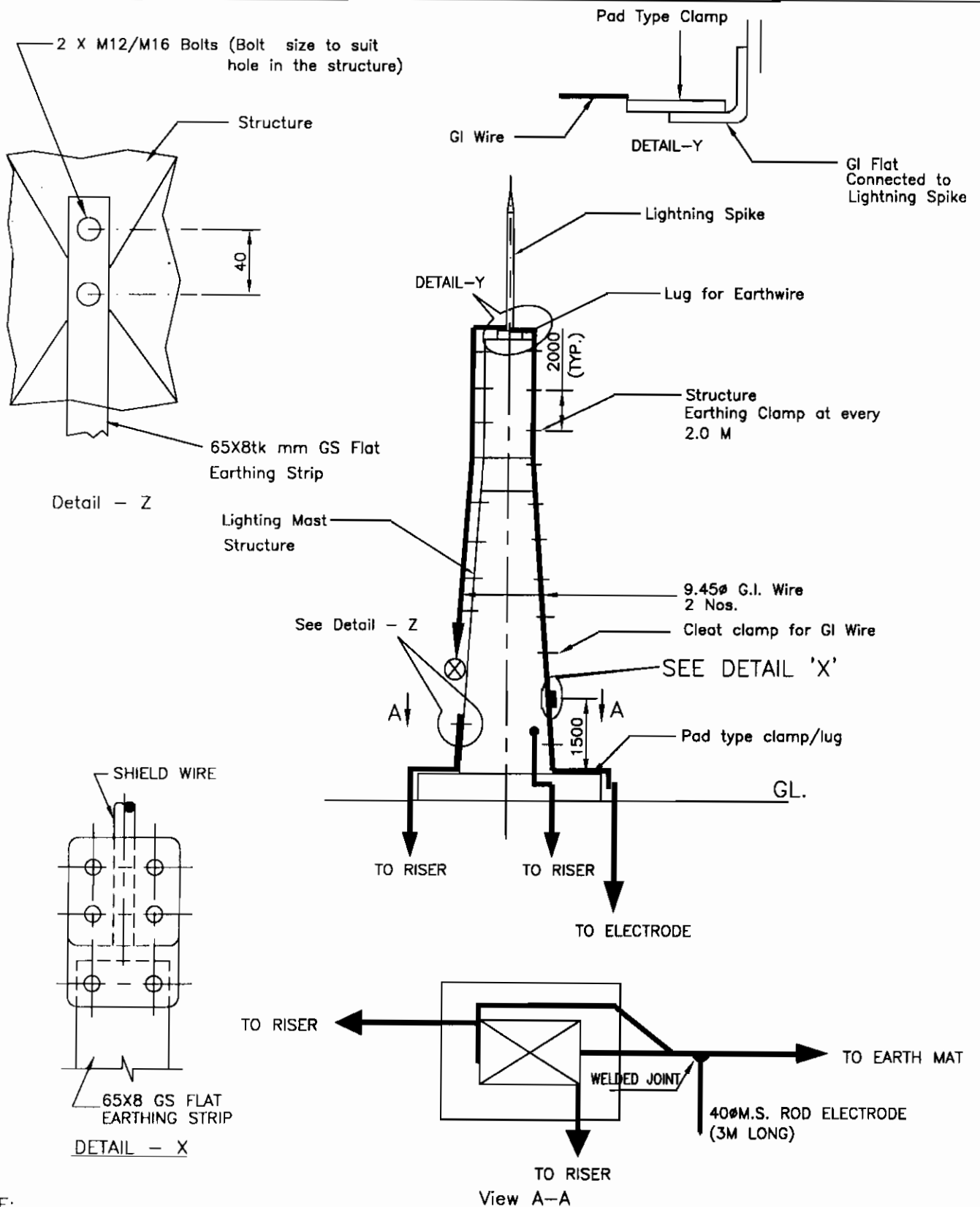
COMPUTERREF.NO.

DRG. No.

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12



NOTE:

1. NO. OF ROD ELECTRODE : 1 NO.
2. PAD TYPE CLAMP 2NOS.
3. BOTH THE DOWN CONDUCTORS (E/WIRE) SHALL BE CONNECTED TO COMMON ROD ELECTRODE.



EQUIPMENT EARTHING DETAILS

Lightning Mast

COMPU. DRG. REF.

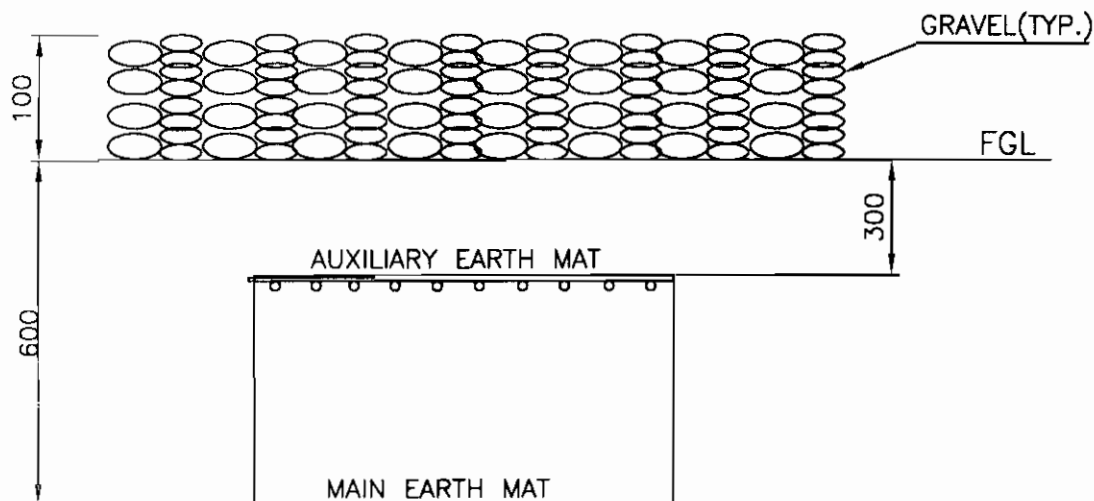
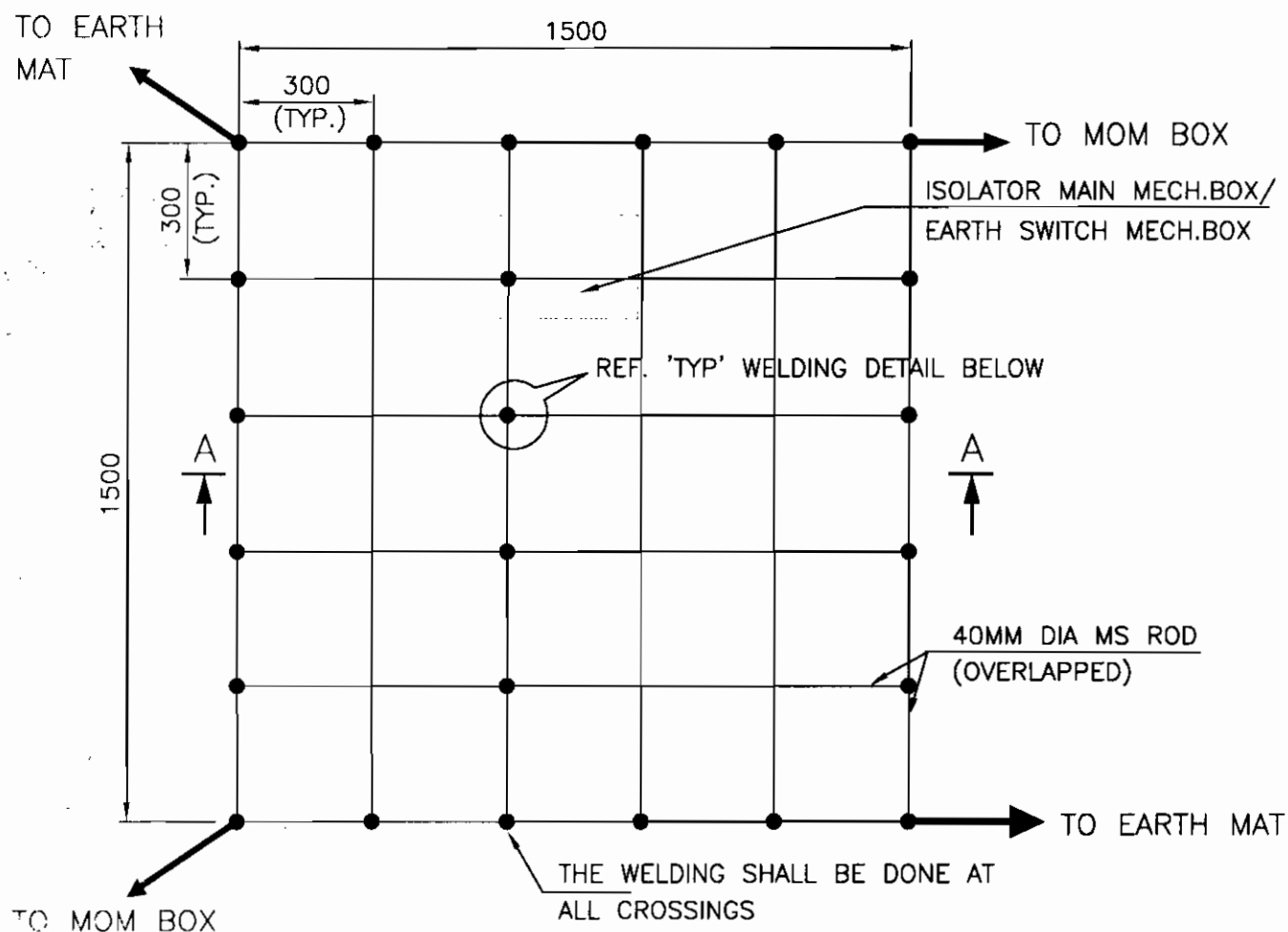
DRG.NO.

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SHEET No.

13



SECTION AA

NOTE:

AUX. EARTH MAT SHALL BE SO POSITIONED THAT THE FOOT OF THE OPERATOR ALWAYS LIE OVER THE AUX. EARTH MAT AREA WHILE ATTENDING / OPERATING THE MECH BOX.



EQUIPMENT EARTHING DETAILS

AUXILIARY EARTH MAT FOR ISOLATOR MAIN MECH., E/S MECH. BOX (TYP.)

COMPU. DRG. REF.

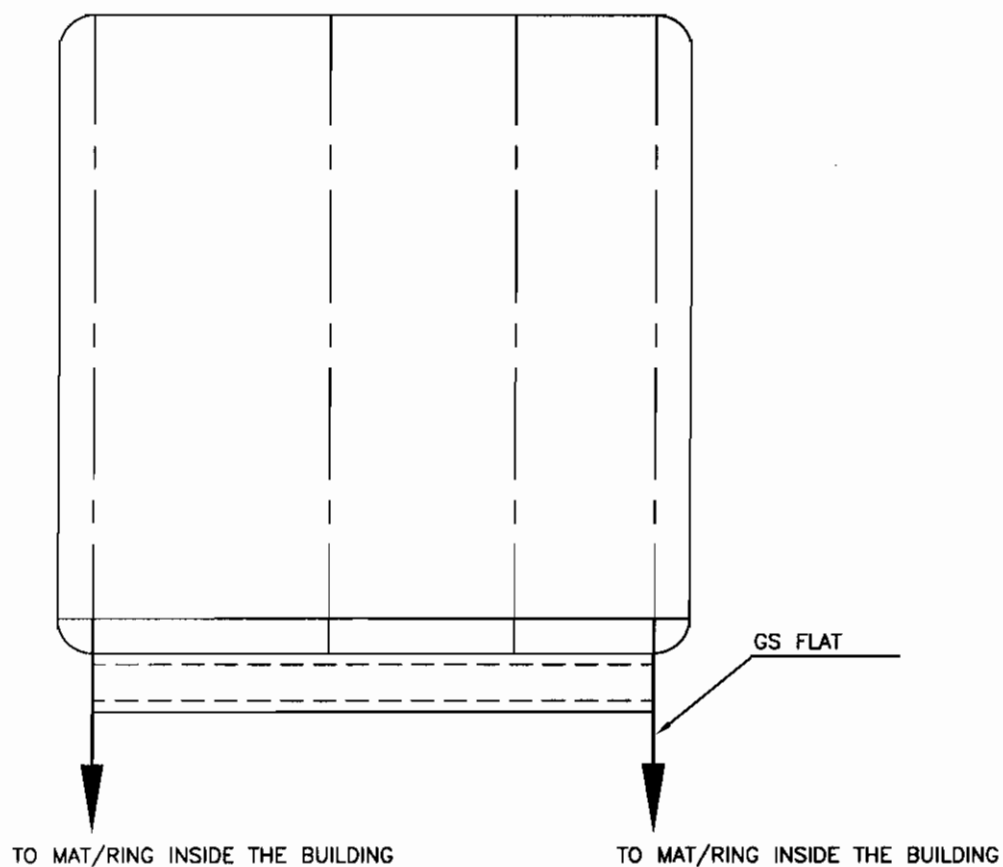
Report No.

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14



EQUIPMENT	FLAT SIZE
AC / DC DISTRIBUTION BOARDS	50X6 MM
CONTROL & RELAY PANELS	25X3 MM



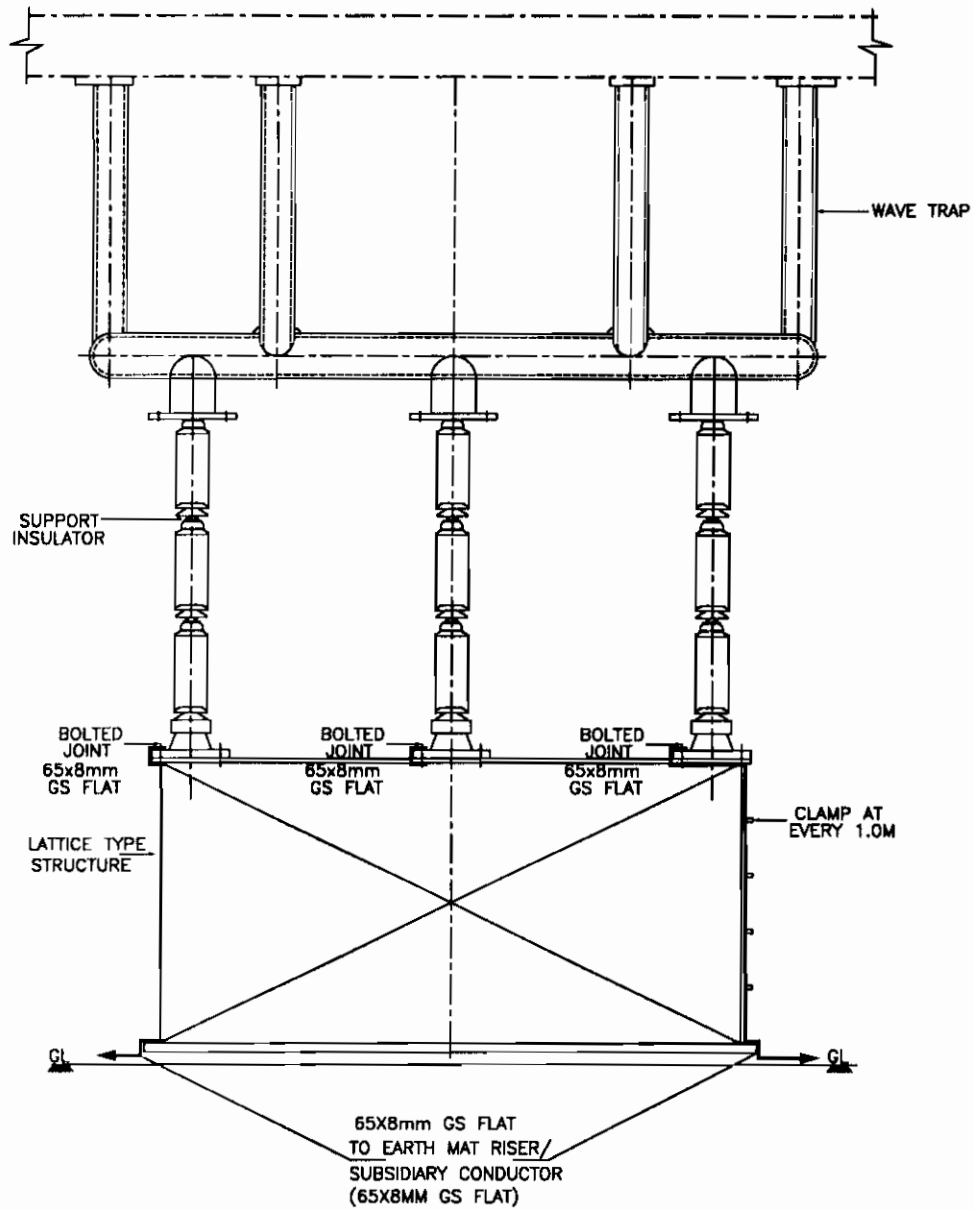
EQUIPMENT EARTHING DETAILS SWITCHGEAR / MCC / CONTROL AND RELAY BOARD

DRG. No.

TB-4-331-509-107

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SHEET No.
15



EQUIPMENT EARTHING DETAILS

132kV WAVE TRAP

COMPUTER REF. NO.

DRG. No.

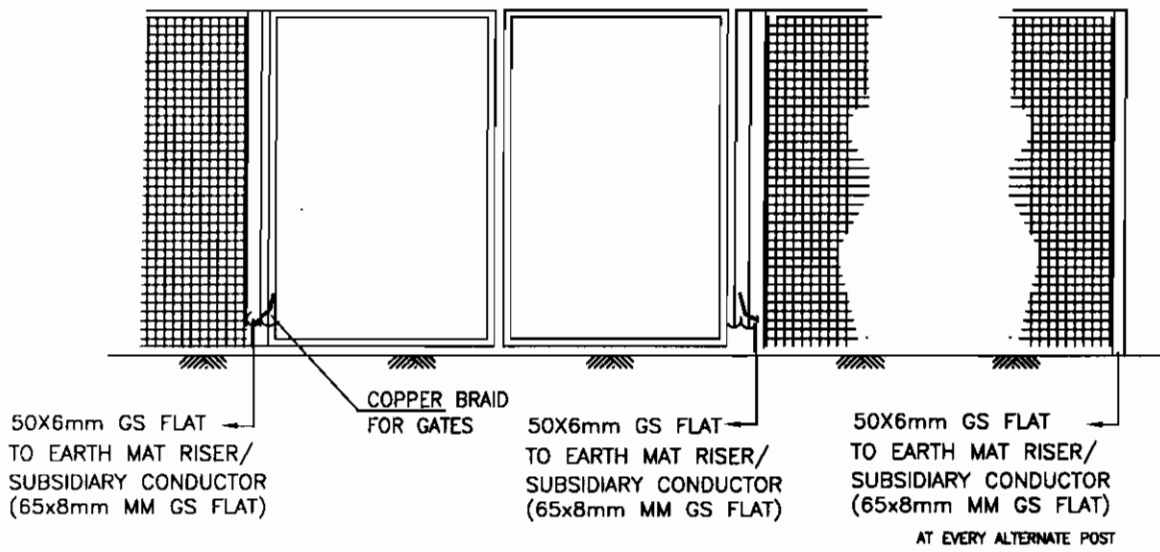
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REV. 00

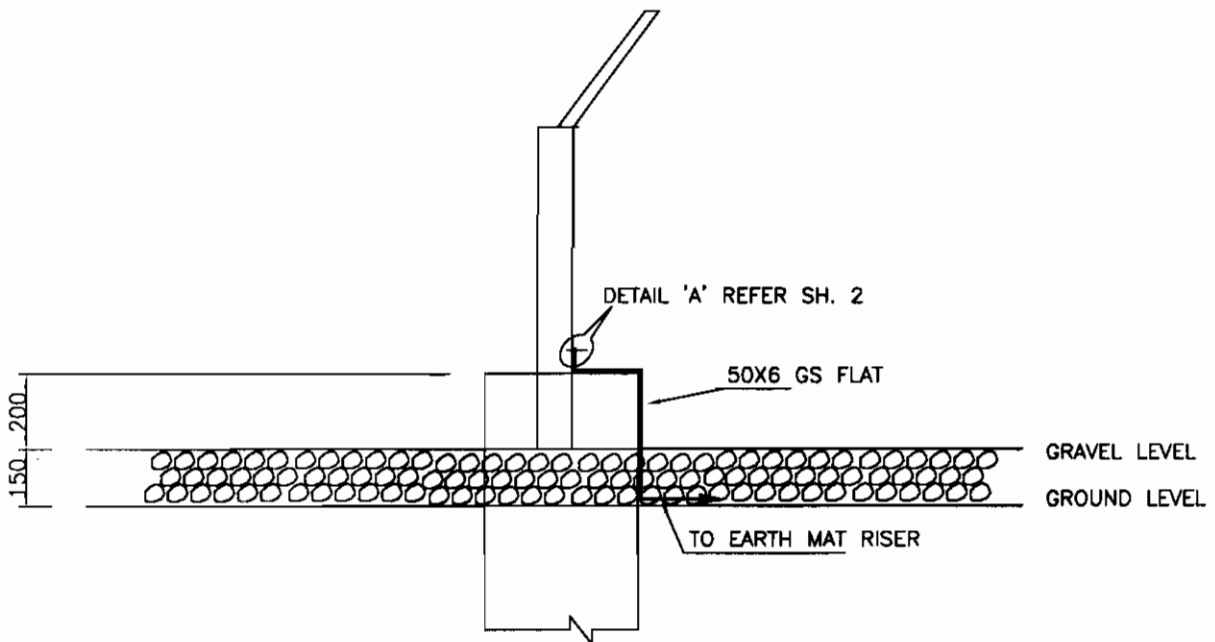
SHEET No.
16

FENCE GATE

FENCE GROUNDING



EVERY ALTERNATE FENCE POSTS SHALL BE EARTHED BY 50X6 MM GS FLAT.



FENCE EARTHING



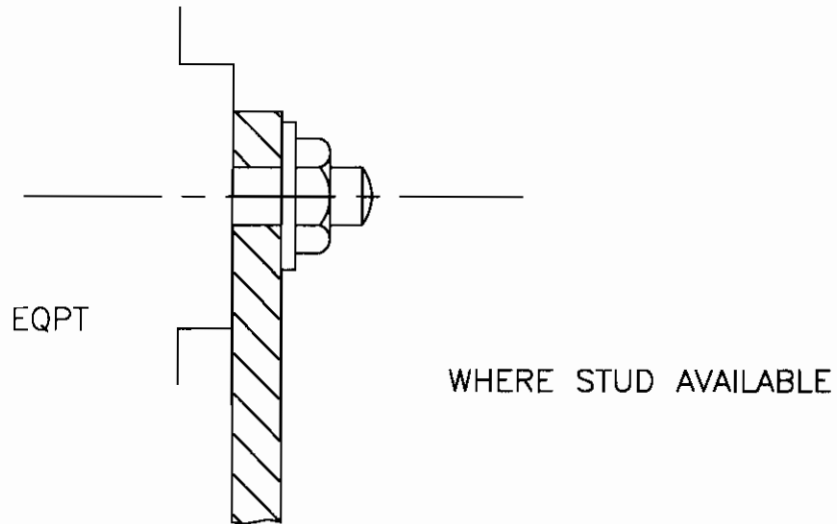
EQUIPMENT EARTHING DETAILS FENCE POST

DRG. No.

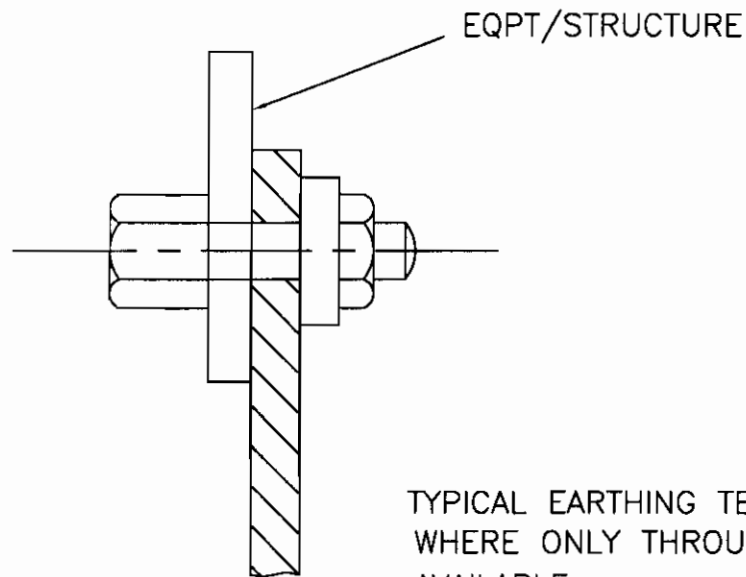
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SHEET No.
17



TYPICAL EARTHING TERMINAL JOINT



TYPICAL EARTHING TERMINAL JOINT
WHERE ONLY THROUGH HOLE IS
AVAILABLE

NOTE

1. THIS IS GENERAL TYPICAL BOLTING ARRANGEMENT APPLICABLE TO ALL PANELS, EQUIPMENT, ETC, WHERE BOLTING ARRANGEMENT IS PROVIDED.
2. IN CASE EARTHING TERMINAL COMPRISES ONLY A TAPPED HOLE SUITABLE BOLT/ SCREW WITH WASHER MAY BE USED FOR EARTHING CONDUCTOR TERMINATION



EQUIPMENT EARTHING DETAILS TYPICAL ARRANGEMENT OF BOLTED JOINTS

DRG. No.

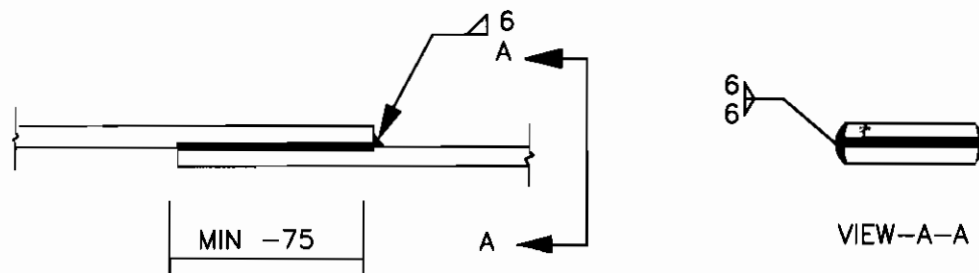
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REV. 00

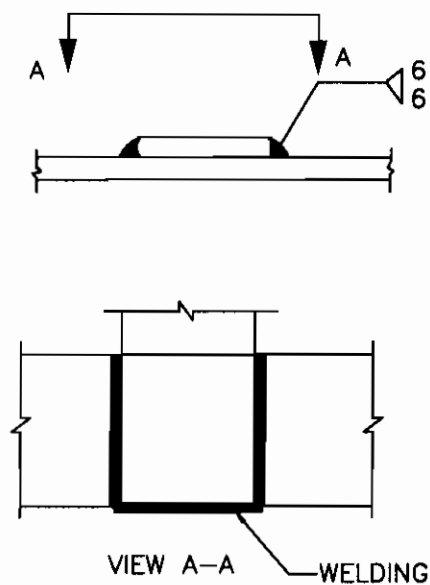
SHEET No.
18

C. STRIP TO STRIP (65X8 AND 50X6 MS FLAT ONLY)

1. STRAIGHT LAP JOINT/RISER



2. CROSS LAP JOINT



EQUIPMENT EARTHING DETAILS WELDING DETAIL

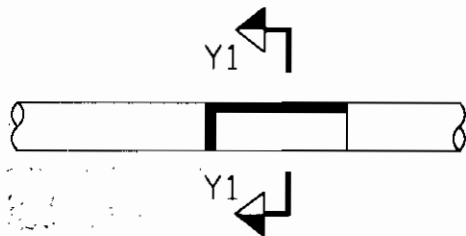
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TB-4-331-509-107

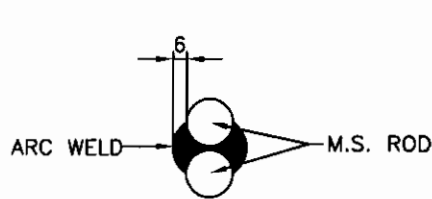
REV. 00

SHEET No.
19

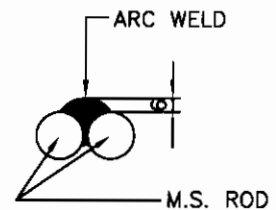


ELEVATION

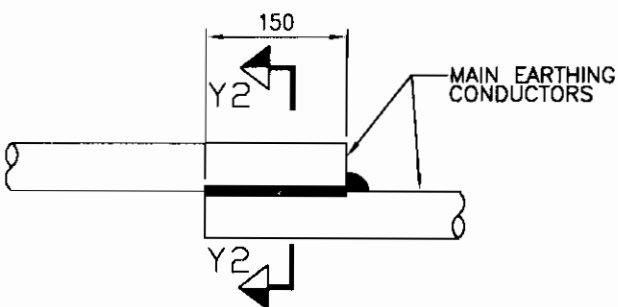
(CONDUCTOR IN HORIZONTAL PLANE)



SECTION Y2-Y2

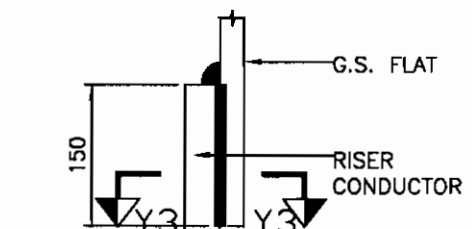
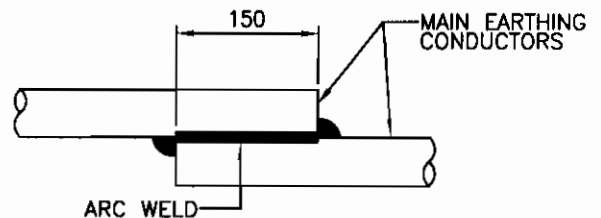


SECTION Y1-Y1

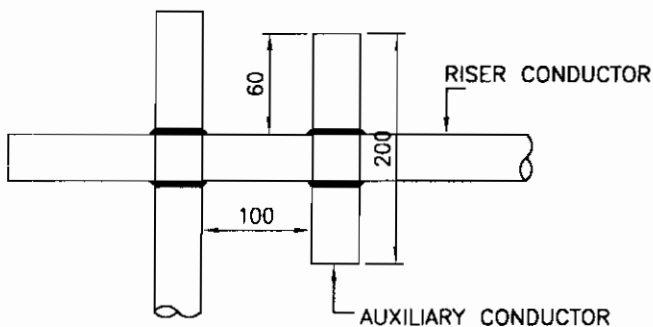


ELEVATION

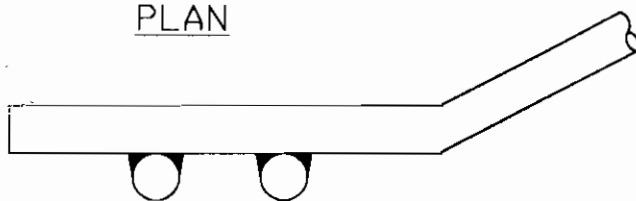
(CONDUCTOR IN VERTICAL PLANE)



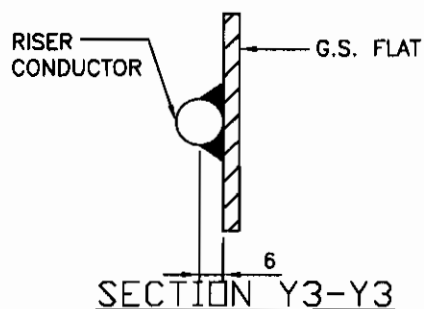
ELEVATION
DETAIL-A



PLAN



ELEVATION
DETAIL-B



SECTION Y3-Y3

TYPICAL OVERLAPPING JOINT OF TWO CONDUCTORS



EQUIPMENT EARTHING DETAILS

WELDING DETAILS

COMPUTER REF. NO.

DRG. No.

TB-4-331-509-107

REV. 00

SHEET No.
20