Corrigendum 1 dated July 22, 2019 to Tender Specification BHEL: PSSR: SCT: 1837

Corrigendum 1 dated July 22, 2019 to Tender Specification BHEL: PSSR: SCT: 1837- Work covers Civil, Structural and Architectural works of the FGD (Flue gas desulphurization) area including supply of all materials (excluding Cement and Structural steel & Reinforcement steel), labour, tools and plants for all units- 1, 2, 3, 4 & 5 at 5 x 800 MW Yadadri TPS Thermal Power Station, Nalgonda district, Telangana

A. The following clauses are changed as below:

Sl No.	Clause No.	Existing Clause	Revised Clause
1	Techno commercial bid Volume-I Book-I Notice Inviting Tender, Clause No. 1.0- Salient Features of NIT, Sl No. v and vi	v) Due Date & Time of Offer Submission: Date 22.07.2019, Time 15.00 Hrs vi) Opening of Tender: Date 22.07.2019, Time 15.30 Hrs	v) Due Date & Time of Offer Submission: Date 01.08.2019, Time 15.00 Hrs vi) Opening of Tender: Date 01.08.2019, Time 15.30 Hrs

B. Some of the Bidders had raised clarification in the published Tender Specification and BHEL's clarifications are furnished below:

Sl No.	Reference Clause No.	Bidder Query	BHEL Reply
1	Volume-II Price Bid Item Ref. No. 802	For BOQ item no. 802 , Grouting with cement & sand mix (1:1) , Pl. clarify whether the cement is to be supplied by Contractor	BOQ Item No. 802 description is revised and may be read as below:- "Providing & grouting of pocket holes, pipe sleeves under base plates, machinery, pipe supporting structures etc. with mix 1:1 (1 cement :1 sand) using non shrink admixture etc. all complete. Cement shall be supplied by BHEL free of cost."
2	Volume-II Price Bid Item Ref. No. A1808, A1809, 1810,1811	For BOQ item no. A1808, A1809, 1810, 1811, 1812, A1813, A1814 electrical items, pl furnish the concerned drawing as these are not available with tender documents.	Typical drawings enclosed herewith for tendering purpose only.

Note:

1) All other conditions of the tender specification remains unchanged.
2) Bidders are requested to consider this corrigendum as part of tender specification and quote accordingly.

-Sd-
Vinod Jaseja
DGM / Subcontracts

TYPICAL ABOVE GROUND EARTHING DETAILS

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA, INDIA
5 x 800 MW YADADRI TPS,

OWNER'S CONSULTANT: TATA CONSULTING ENGINEERS LIMITED
BANGALORE INDIA

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

JOB NO. 417
STATUS CONTRACT
DISTRIBUTION

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD

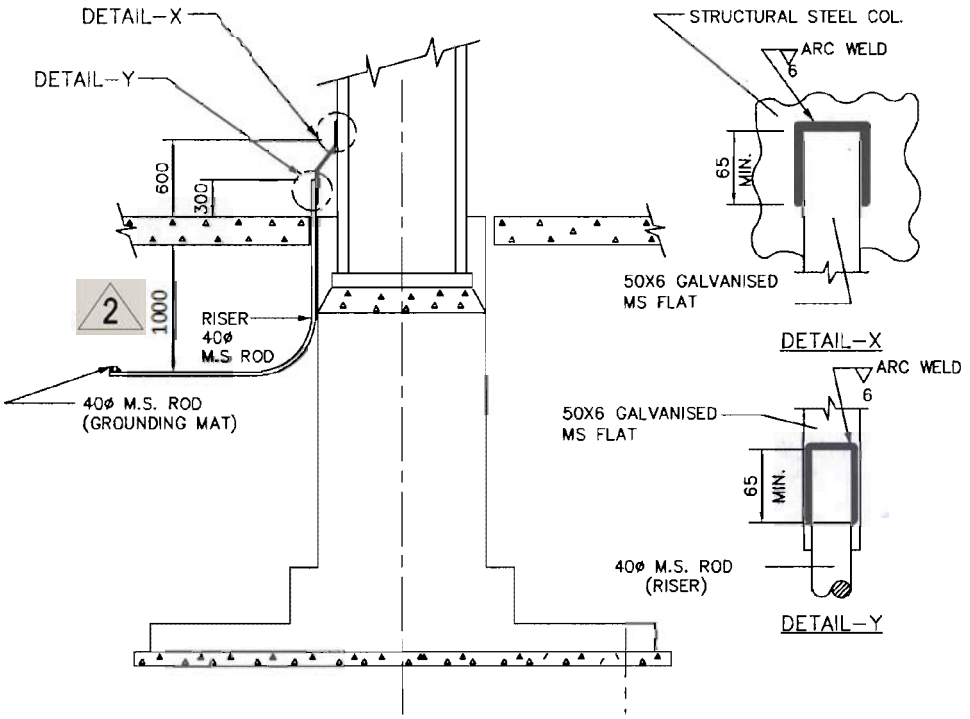
DEPT CODE		NAME	SIGN	DATE
E	DRN	AV		04.08.18
	DESN	AV		04.08.18
	CHD	NNI		04.08.18
	APPD	PD		04.08.18

TITLE: TYPICAL ABOVE GROUND EARTHING DETAILS

DEPT. | SCALE | SIGN

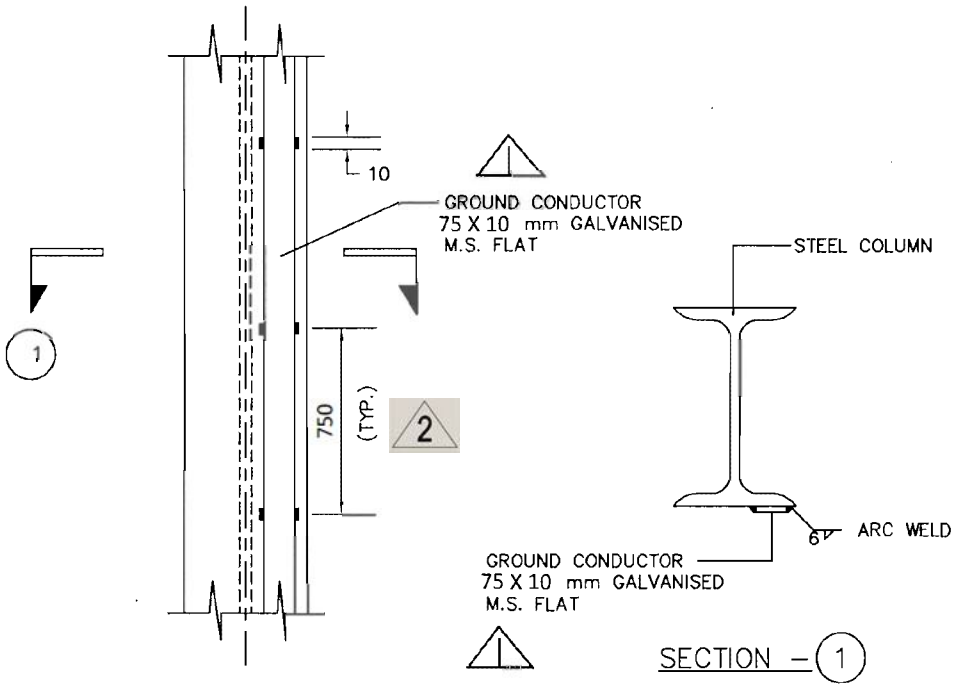
DRAWING NO. PE-DG-417-509-E004

SHEET 1 OF 24 REV. 4



GROUNDING OF STEEL COL.

TITLE TYPICAL ABOVE GROUND EARTHING DETAILS	BHEL DRAWING No. PE-DG-417-509-E004
	REV. No. 4
	SHEET 2 OF 24

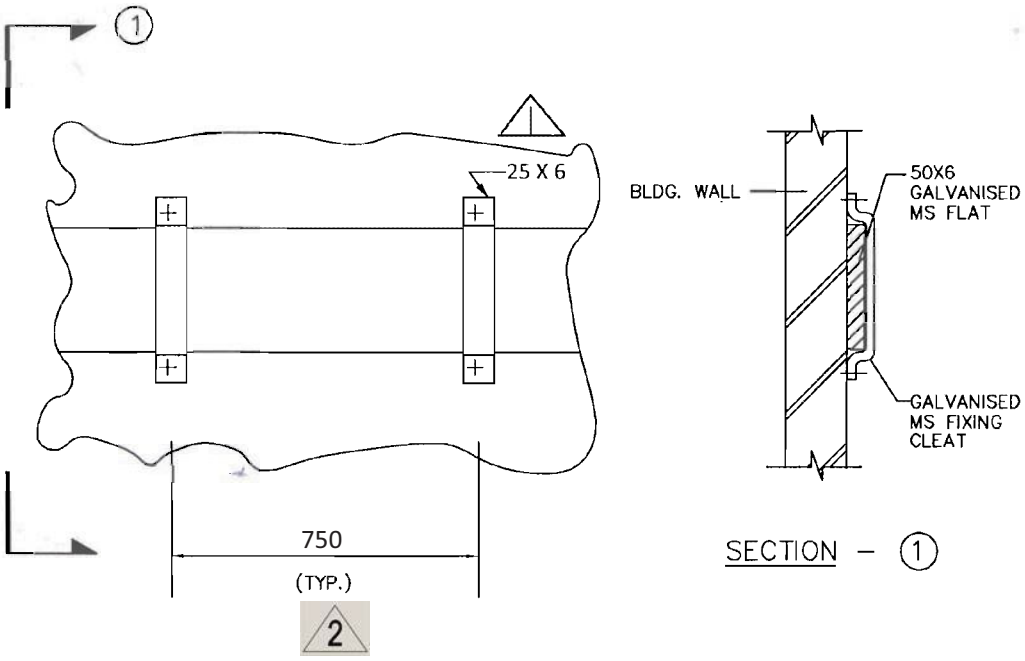


750

EARTHING CONDUCTOR
ALONG STEEL COLUMN

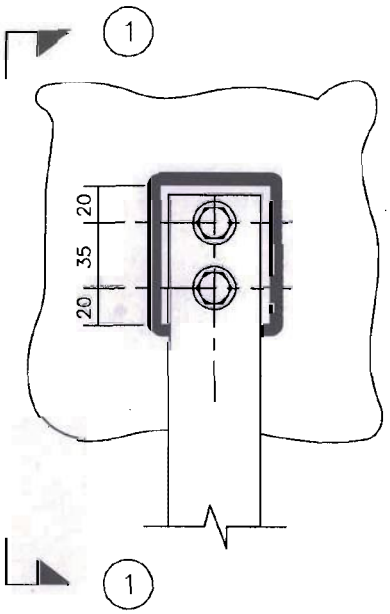
NOTE : This conductor may be avoided if the different sections of steel columns are bolted/ welded to ensure electrical continuity.

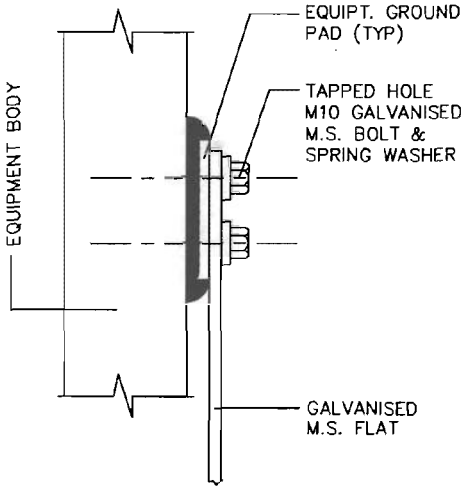
TITLE	BHEL DRAWING No.
TYPICAL ABOVE GROUND EARTHING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 3 OF 24



EARTHING CONDUCTOR
ALONG BUILDING WALL

TITLE TYPICAL ABOVE GROUND EARTHING DETAILS	BHEL DRAWING No. PE-DG-417-509-E004
	REV. No. 4
	SHEET 4 OF 24





SECTION – (1)–(1)

EQUIPMENT GROUNDING

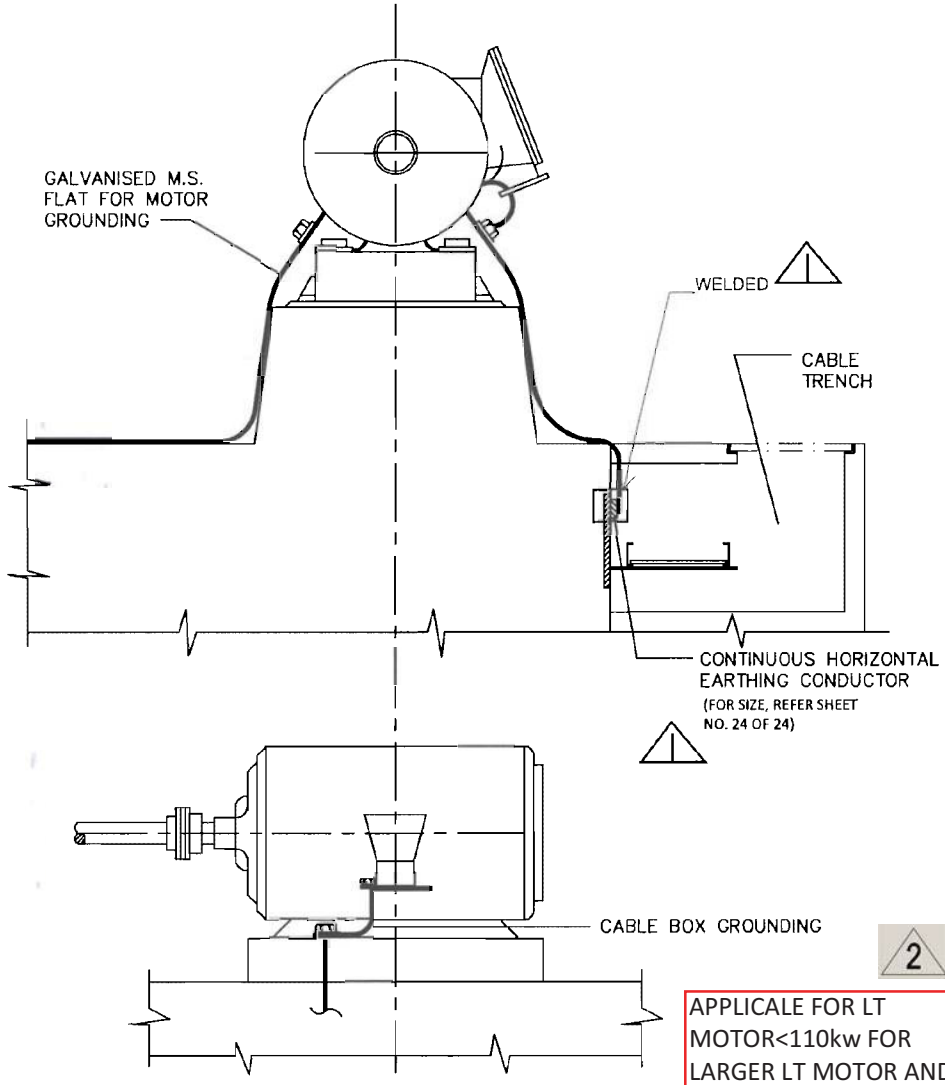
TITLE

TYPICAL ABOVE GROUND EARTHING DETAILS

BHEL DRAWING No.
PE-DG-417-509-E004

REV. No. 4

SHEET 5 OF 24



2

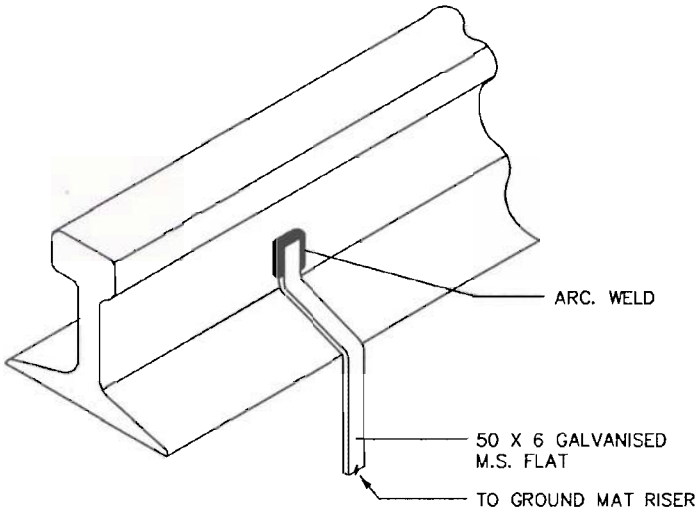
APPLICALE FOR LT MOTOR<110kw FOR LARGER LT MOTOR AND HT OTOR REFER NOTE.

MOTOR GROUNDING

2

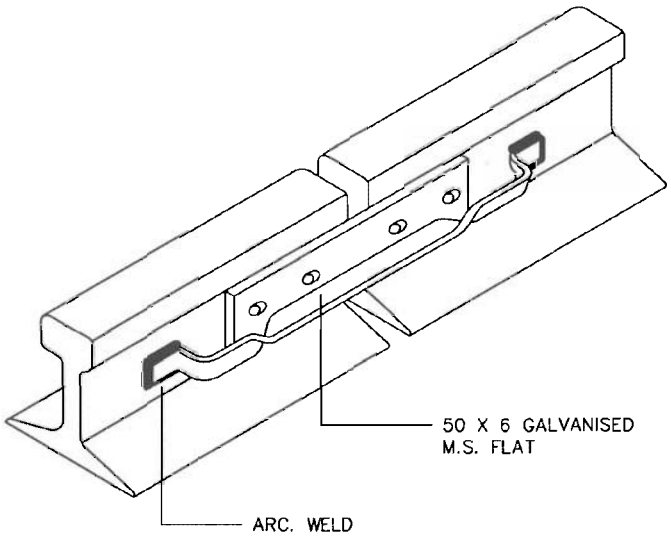
NOTE: LT Motor >=110kW and 11KV/3.3KV MOTORS CABLE BOX TO BE EARTHED AT TWO POINT BY 75X10 mm GALVANISED MS FLAT DIRECTLY FROM EMBEDDED FLOOR EARTH GRID.

TITLE	BHEL DRAWING No.
TYPICAL ABOVE GROUND EARTHING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 6 OF 24



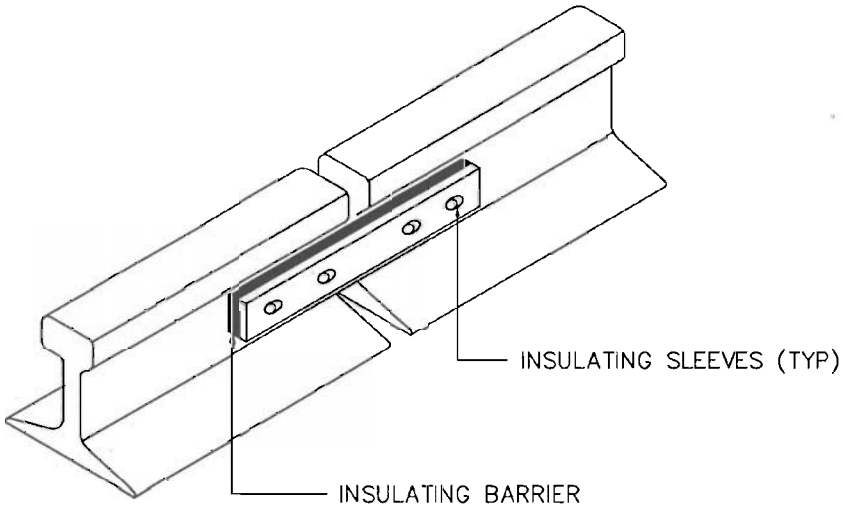
RAIL GROUNDING

TITLE	BHEL DRAWING No.
TYPICAL ABOVE GROUND EARTHING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 7 OF 24



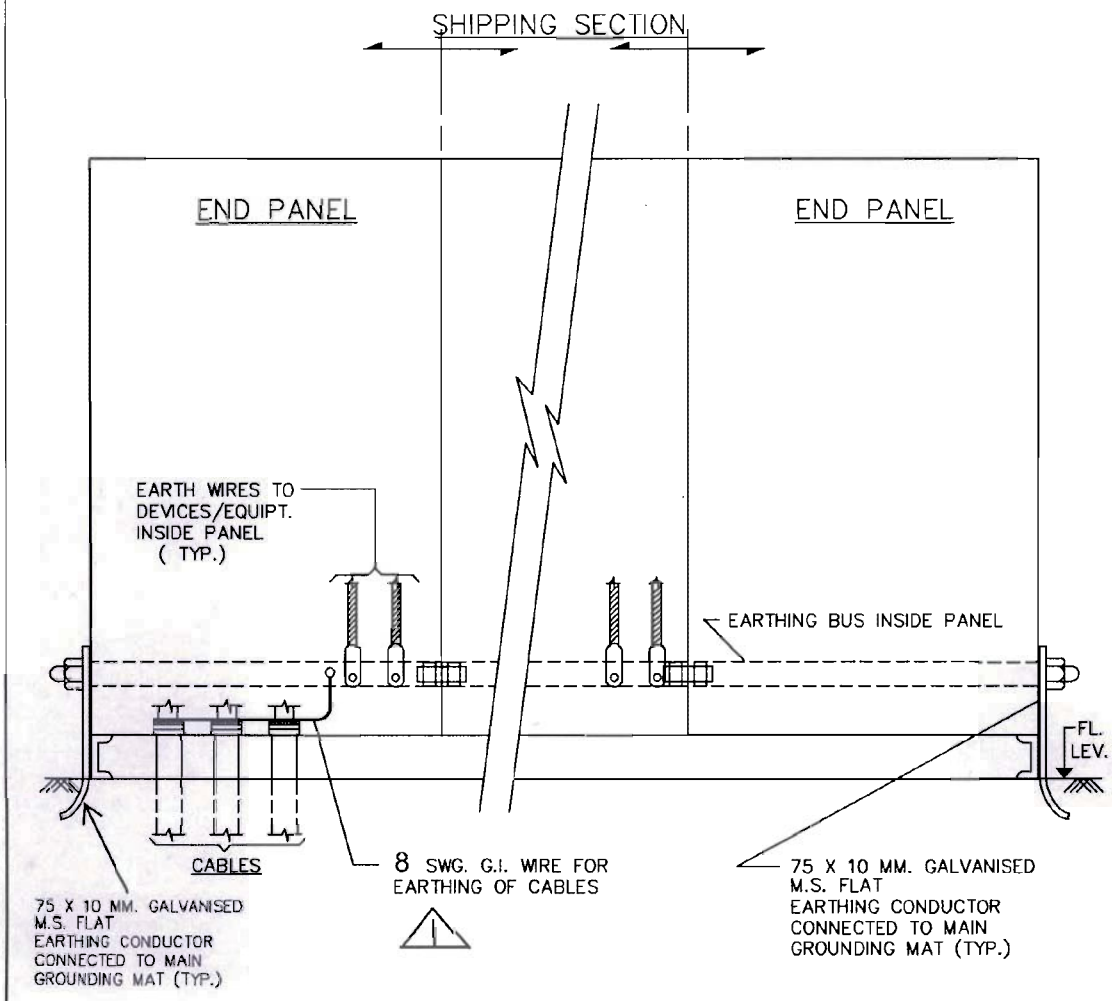
RAIL BONDING

TITLE TYPICAL ABOVE GROUND EARTHING DETAILS	BHEL DRAWING No. PE-DG-417-509-E004
	REV. No. 4
	SHEET 8 OF 24



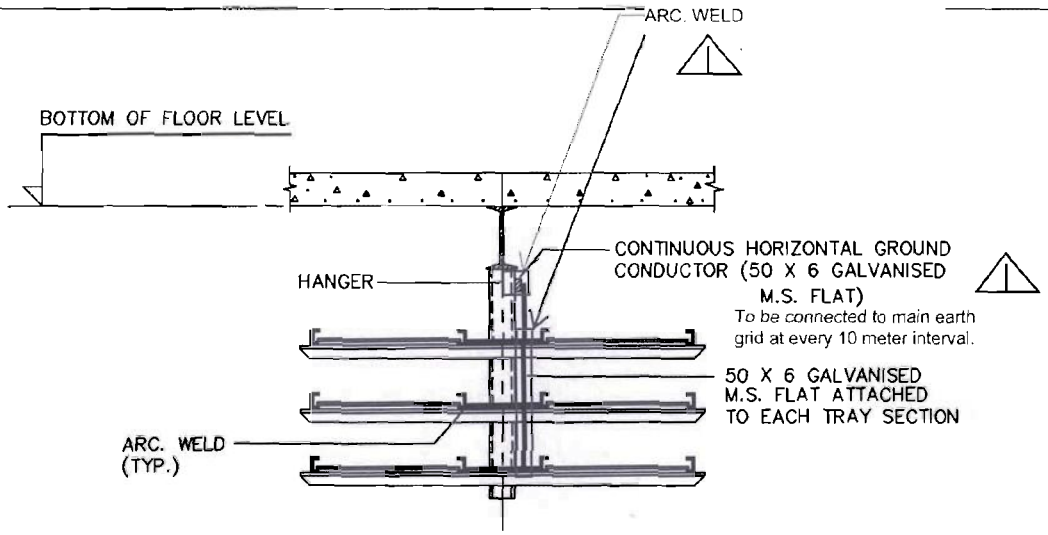
RAIL SECTIONS
LEAVING THE GROUND MAT

TITLE	BHEL DRAWING No.
TYPICAL ABOVE GROUND EARTHING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 9 OF 24

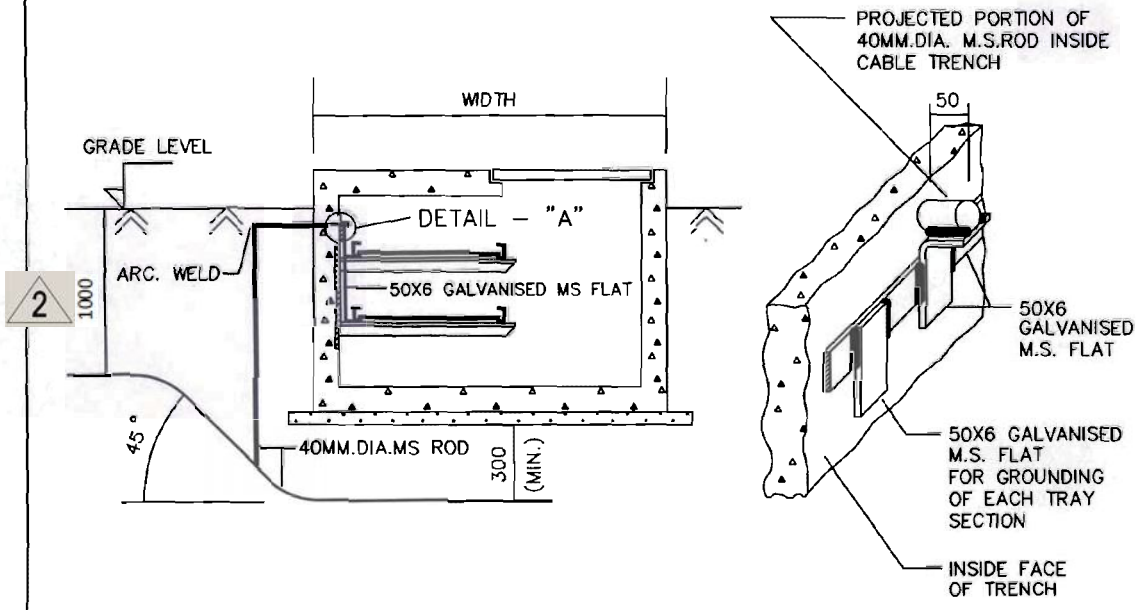


GROUNDING OF MCC, SWITCHGEAR

TITLE	BHEL DRAWING No.
TYPICAL ABOVE GROUND EARTHING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 10 OF 24



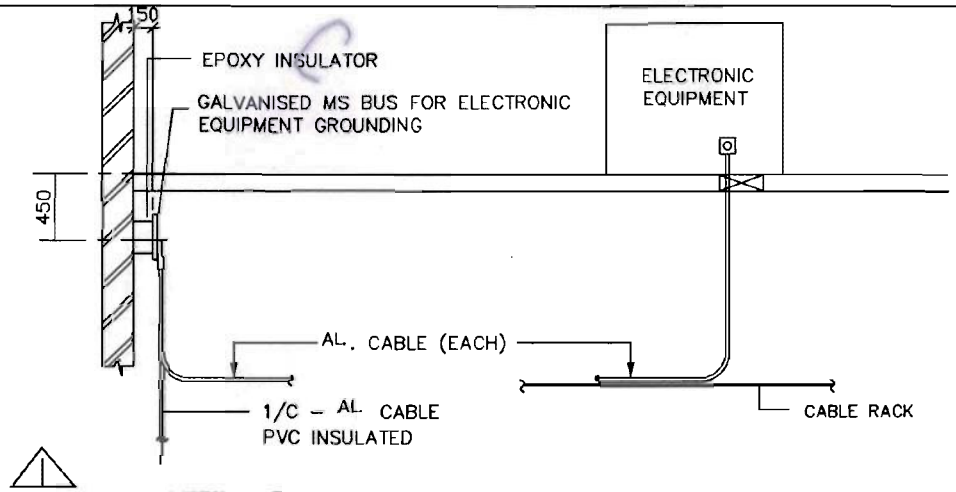
OVERHEAD CABLE TRAY GROUNDING

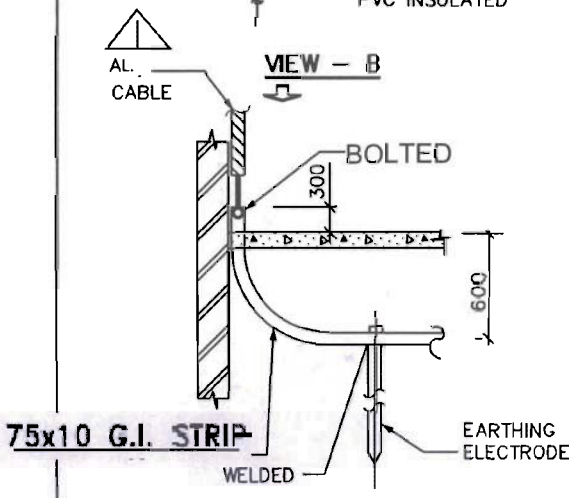


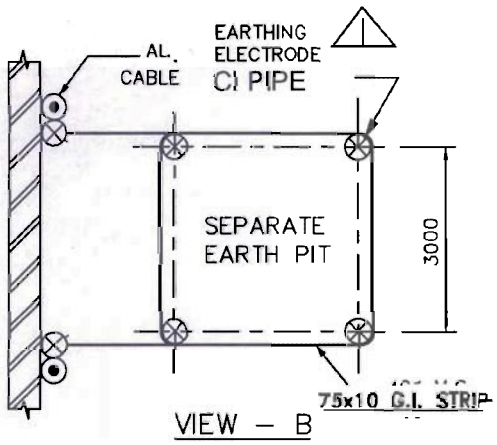
DETAIL – A

CABLE TRENCH GROUNDING

TITLE **TYPICAL ABOVE GROUND EARTHING DETAILS**	BHEL DRAWING No. **PE-DG-417-509-E004**
	REV. No. 4
	SHEET 11 OF 24

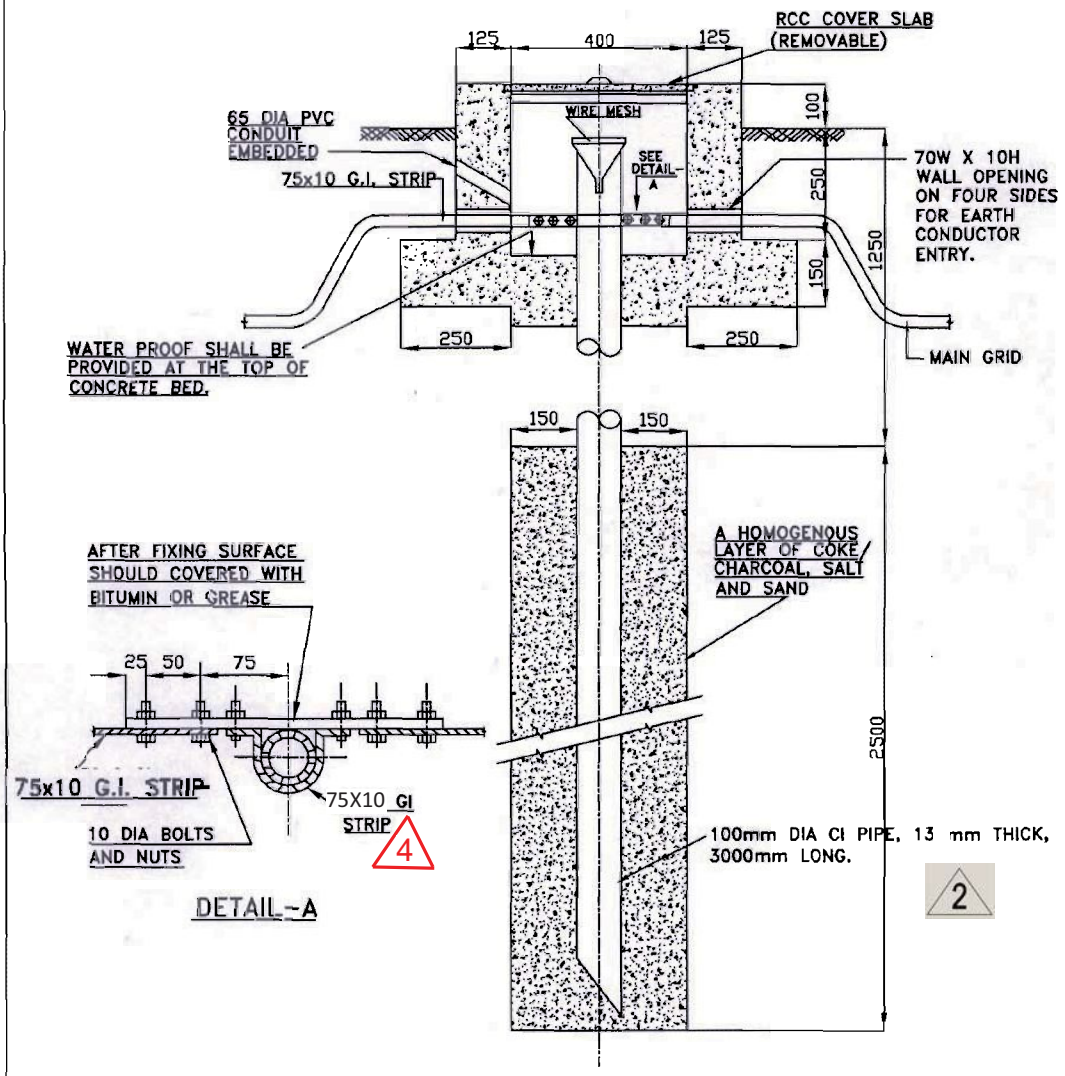






ELECTRONIC EQUIPMENT GROUNDING.

TITLE TYPICAL ABOVE GROUND EARTHING DETAILS	BHEL DRAWING No. PE-DG-417-509-E004
	REV. No. 4
	SHEET 12 OF 24



NOTE:

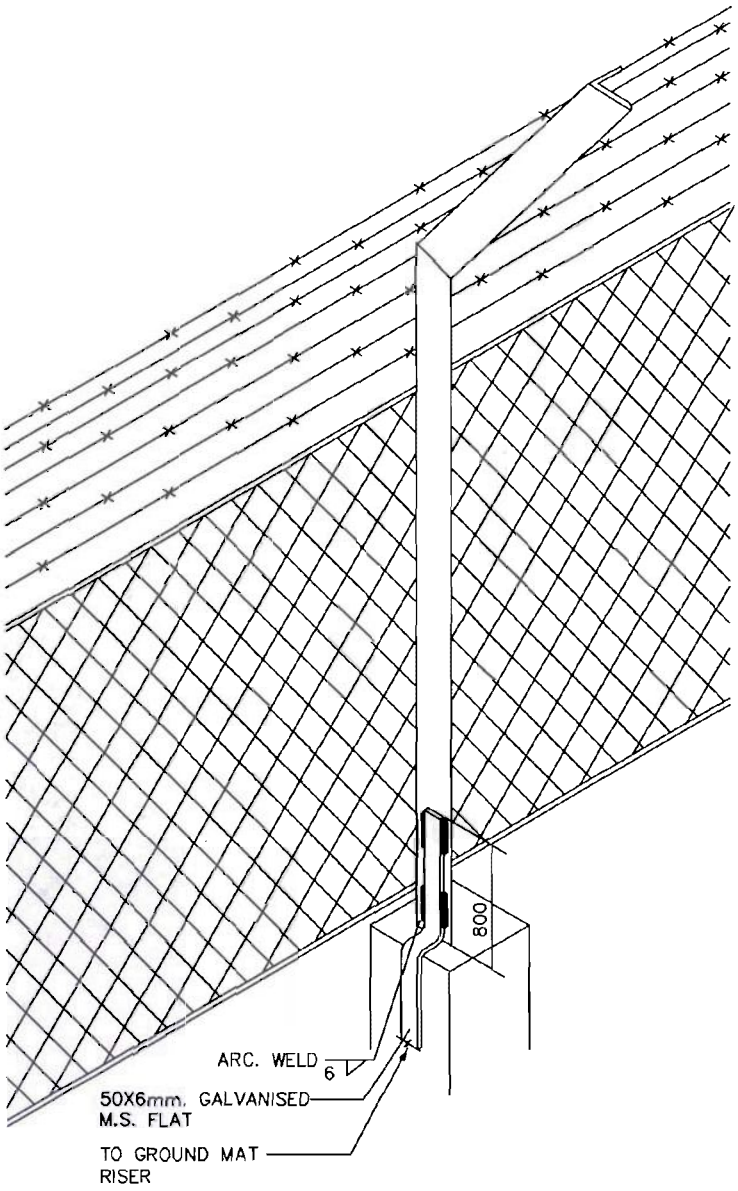
1. ALL DIMENSIONS ARE IN MM.
2. TOP OF PIT SHALL BE ALIGNED WITH GRADE LEVEL IN PAVED AREA.
3. If desired resistivity is not achieved then Bentonite mix may be used.

4

TYPICAL ARRANGEMENT OF PIPE ELECTRODE IN TREATED EARTH PIT

1

BHEL	TYPICAL BELOW GROUND EARTHING DETAILS	BHEL DRAWING NO. PE-DG-417-509-E004
		SH 13 OF 24



FENCE GROUNDING

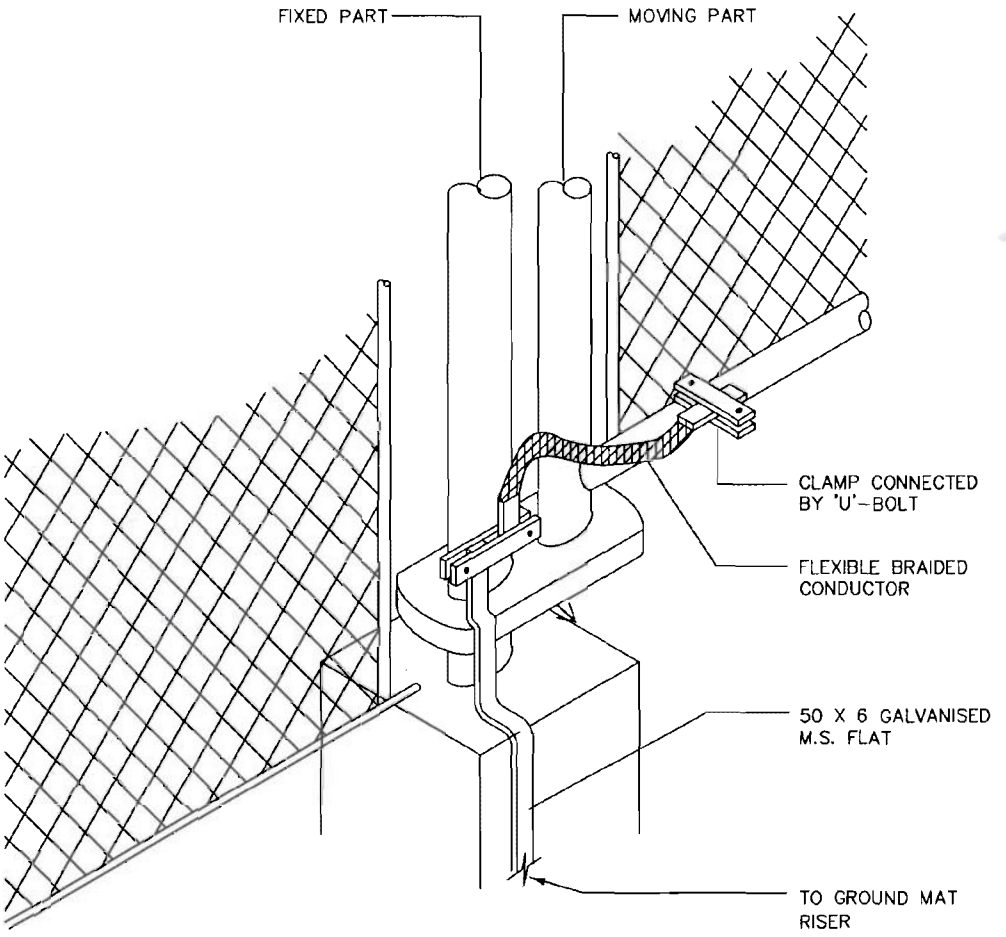
TITLE

TYPICAL ABOVE GROUND EARTHING DETAILS

BHEL DRAWING No.
PE-DG-417-509-E004

REV. No. 4

SHEET 14 OF 24



FENCE GATE GROUNDING

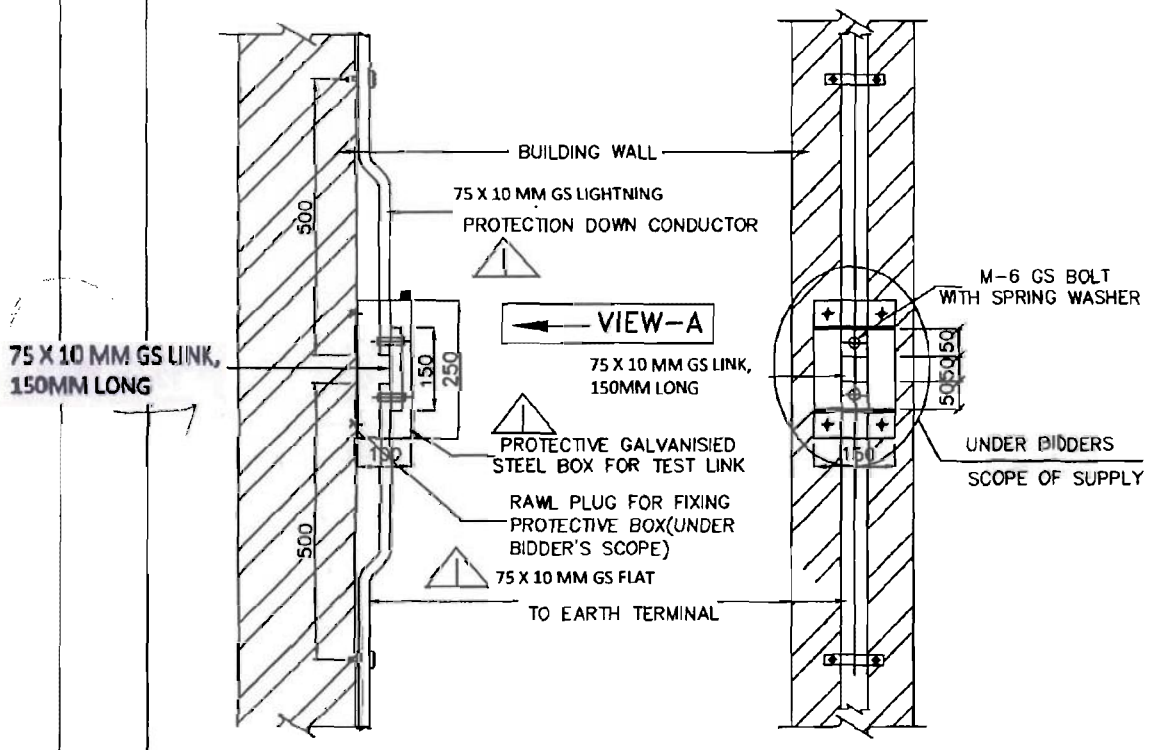
TITLE

TYPICAL ABOVE GROUND EARTHING DETAILS

BHEL DRAWING No.
PE-DG-417-509-E004

REV. No. 4

SHEET 15 OF 23



75 X 10 MM GS LINK,
150MM LONG

TEST LINK DETAILS

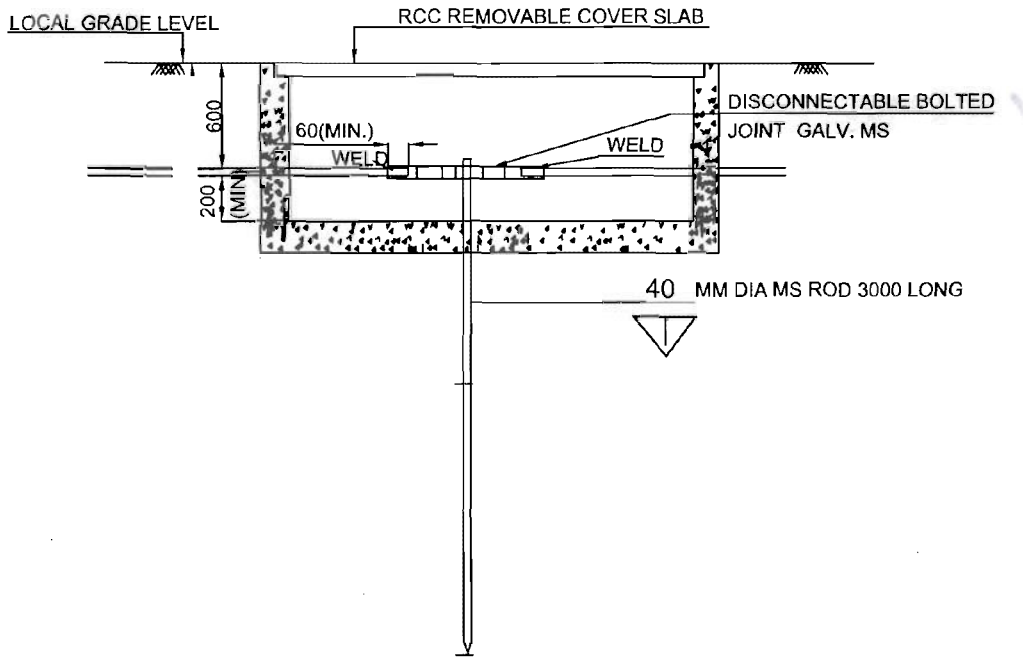
VIEW-A

TITLE

TYPICAL DETAILS OF TEST LINK WITH PROTECTIVE BOX

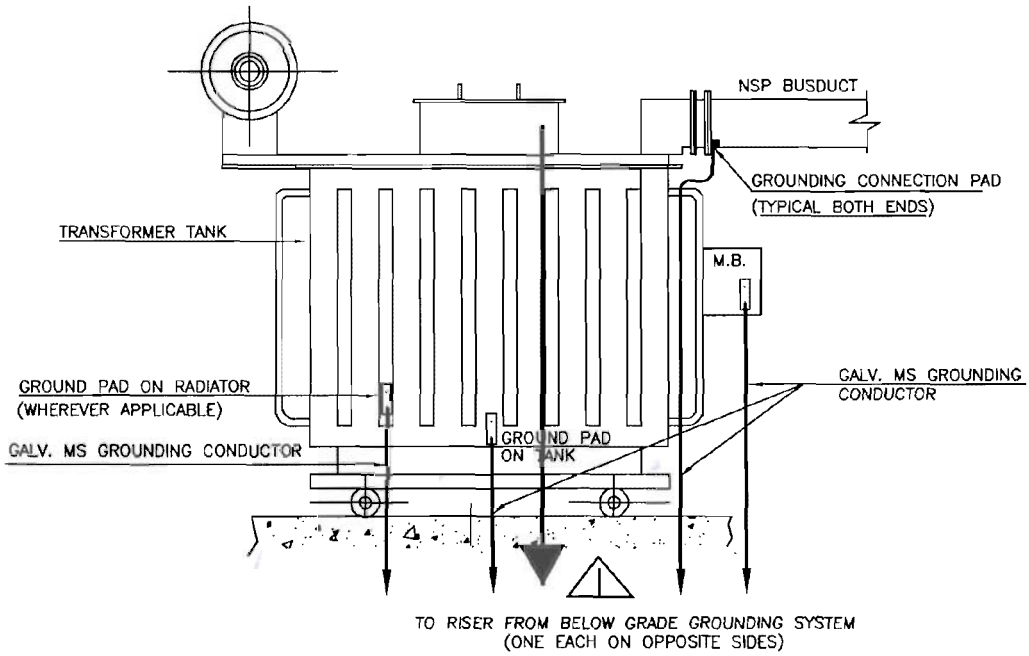
PE-DG-417-509-E004

SH 16 OF 24 | REV 4



TEST EARTH PIT

TITLE	BHEL DRAWING No.
TYPICAL BELOW GROUND EARTHING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 17 OF 24



TRANSFORMER GROUNDING

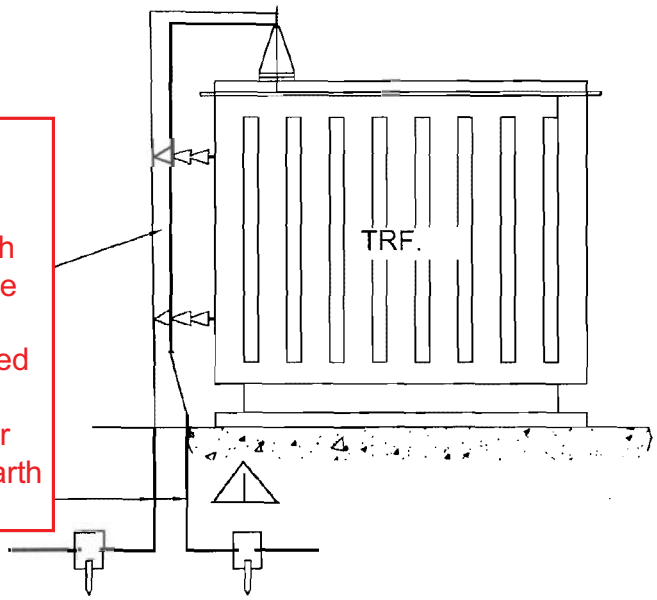
Note:

1. Transformer body, Marshalling box, bus-duct shall be earthed at two points as per the earthing point provided in Transformer Drawing.

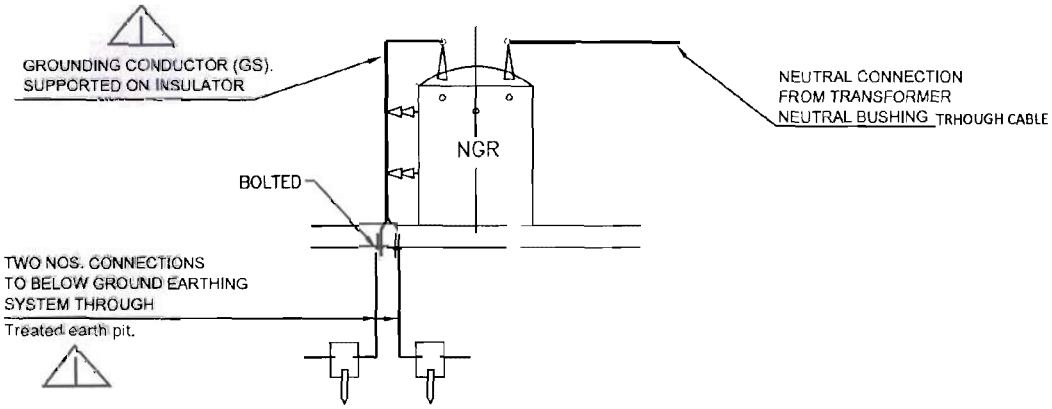
TITLE	BHEL DRAWING No.
TYPICAL ABOVE GRADE LEVEL GROUNDING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 18 OF 24

All 11kV and 3.3 kV transformer neutral earth connection to NGR shall be through Cable and all dry type transformer neutral points shall be earthed through duplicate cables only upto their respective treated earth pits.

4

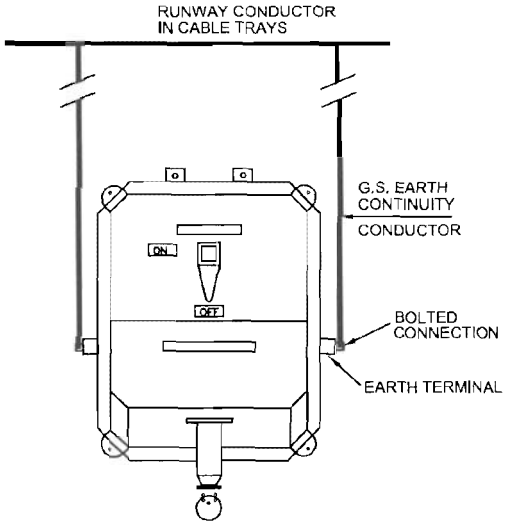


E3A : NEUTRAL EARTHING (DIRECTLY GROUNDED)



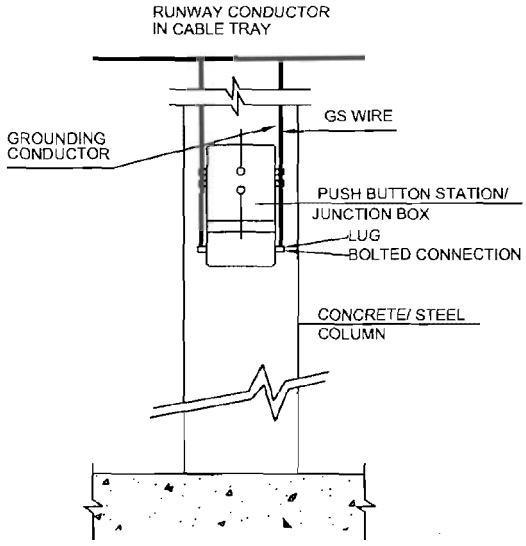
E3B : NEUTRAL EARTHING (THROUGH RESISTOR)

TITLE	BHEL DRAWING No.
TYPICAL ABOVE GROUND EARTHING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 19 OF 24



3-PHASE WELDING

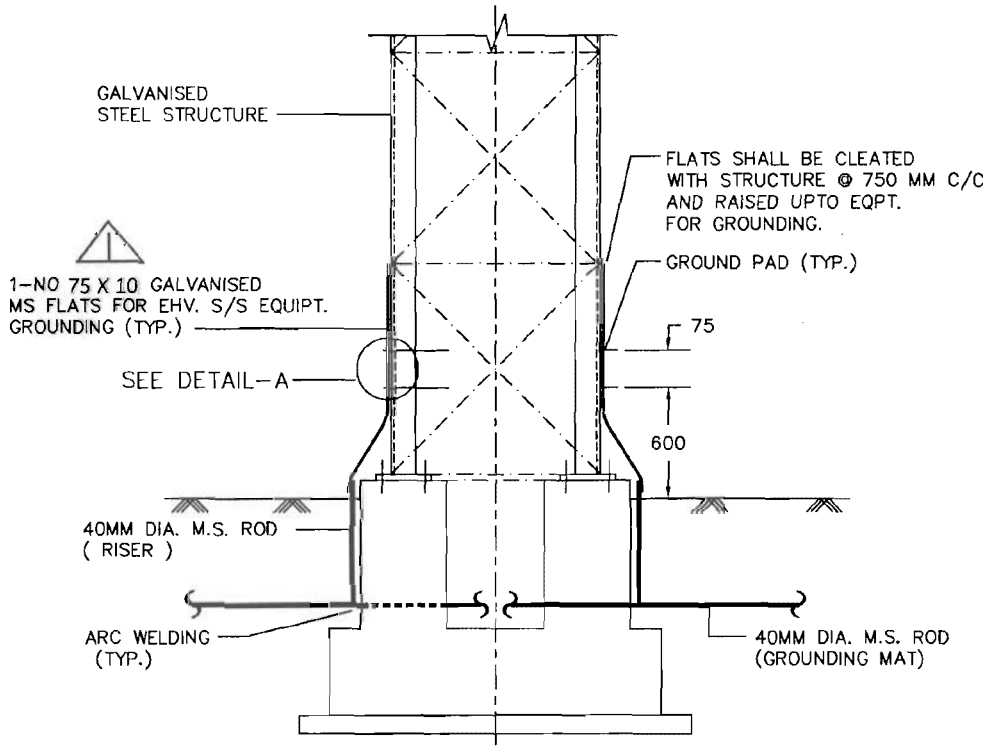
RECEPTACLE GROUNDING



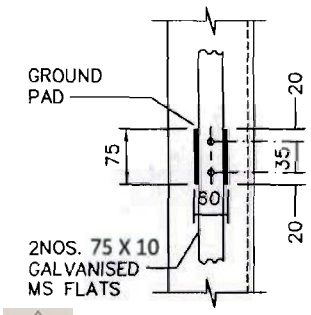
PUSH BUTTON STATION/

JUNCTION BOX GROUNDING

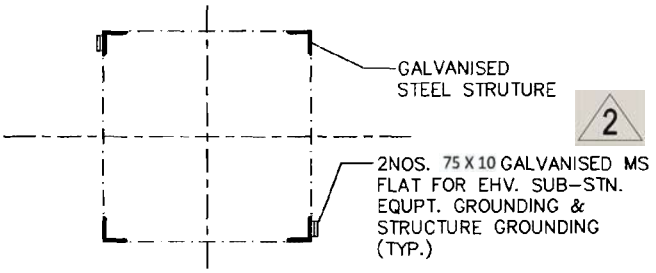
TITLE	BHEL DRAWING No. PE-DG-417-509-E004
TYPICAL ABOVE GROUND EARTHING DETAILS	REV. No. 4
	SHEET 20 OF 24



SECTION



DETAIL – 'A'



PLAN

NOTE:-
For down comers from shield wires/ lightning mast, a ground electrode shall be provided.

GALVANISED STRUCTURE AND EQUIPMENT GROUNDING

TITLE	BHEL DRAWING No.
TYPICAL ABOVE GROUND EARTHING DETAILS	PE-DG-417-509-E004
	REV. No. 4
	SHEET 21 OF 24

GROUNDING NOTES

1.0 These grounding notes and details shall be read and construed in conjunction with grounding drawings and contract specification.

2.0 The grounding installation work shall conform to the requirements of the Indian Electricity Rules and code of Practice for Earthing (IS:3043) as amended up-to-date in India. For the work in other country, the statutury rules and code of practice in vogue there in shall be followed.

2 3.0 The main ground grid shall be buried in earth at a minimum depth of 1000 mm below grade. A minimum earth coverage of 300 mm shall be provided between the ground grid conductor and the bottom of trench/foundation/underground pipe at the crossing.

4.0 Ground grid conductors around a building/switchyard fence shall be buried outside the boundary at a minium distance of 1200 mm.

5.0 The ground grid conductor below grade shall be of bare 40mm Ø mild steel rod. Ground electrode shall be 40mm Ø x 3000 mm long mild steel rod, driven into the ground and connected to the ground grid conductor.

6.0 Riser/pigtail from the ground grid shall be 40mm Ø mild steel rod and shall prroject 300 mm above grade/concrete floor level unless otherwise shown.

7.0 All ground connections below grade shall be made by electric arc welding with low hydrogen content electrode. Bending of the conductor where necessary shall be done by gas heating.

2 8.0 Above grade, 50 x 6 mm galvanised mild steel flats shall be run as main ground conductors along walls and cable trays and securely fixed to the same by welding/clamping at intervals not exceeding 750 mm.
The ground conductors shall be interconnected between them and to the main ground grid through risers.
75X10 mm galvasied steel flats shall be run as main ground conductor along building steels.

2 9.0 75x10 mm GS flat shall be used in the sub-mat layout in SWGR. room.

TITLE TYPICAL ABOVE GROUND EARTHING DETAILS	BHEL DRAWING No. PE-DG-417-509-E004
	REV. No. 4
	SHEET 22 OF 24

10. *All electrical equipment and associated non-current carrying metal works, supporting structures, building/boiler columns,fence, system neutrals, lighting masts/arresters shall be connected to the plant ground system.*

11. *Two seperate and distinct ground connections shall be provided for grounding of electrical equipment frameworks.*

12. *Miscellaneous devices such as junction boxes, pull boxes, push-button stations, lockout switches, cable end boxes etc. shall be effectively grounded whether specifically shown or not.*

13. *Ground conductor connections above grade shall be generally made by electric are welding. The connection shall be coated with cold galvanising/weather resistant paints.*

14. *Bolted connection shall be made only for grounding of equipment/ devices and some removable structures. The contact surfaces shall be throughly cleaned before connection to ensure good electrical contact.*

15. *A continuous 50 x 6 mm galvanised M.S flat ground conductor shall be installed along the cable raceway and securely attched to each tray section, forming a solidly grounded tray system.*

16. *A 16 Swg G.I. wire shall be run along the metalic conduit and shall be securely tied with the same at an internal 300 mm.*

Grounding connection or wire jumpers shall be installed where flexible conduit is used to connect rigid conduit to equipment.

17. *Crane rails shall be grounded at both ends. in addition all joints shall be bonded to provide electrical continuity.*

18. *Fence within the ground grid shall be bonded to the plant ground system at regular interval not exceeding ten(10) meters. Fence gate shall be separately grounded with flexible connection to permit movement.*

19. *For shielding, the ground conductors shall be taken right upto the top along the structure/chimney and connected directly to the lightning masts.*

20. *The poles used for distribution line and / or street light shall be grounded at the bottom.*

21.Use of earth pits shall be as follows:-
a) Treated earth pit: All neutrals of transformer, LA, NGR and Generator, PT's, reactors.
b) Test earth pits: At interconnection of different area grids (eg, station building with EHV grid).
c) Rod earth electrodes: Lightning down conductor, cable trench, earth continuity conductor, isolated auxiliary building, earth grid resistivity improvement.
d) connection intervals for 50x6 grid runners for cable trays/ racks/ trenches to main grid shall be 30M.

3

22. AS PER IS:3043 HOMOGENOUS MIXTURE OF CHARCOL/COKE & SALT SHALL BE USED. FURTHER CHEMICAL SHALL BE ADDED IF REQUIRED TO MEET THE RESISTANCE ≤ 0.5 OHM.

TITLE

TYPICAL ABOVE GROUND EARTHING DETAILS

BHEL DRAWING No.
PE-DG-417-509-E004

REV. No. 4

ABOVE GROUND EARTHING SYSTEM - CONDUCTOR SIZES

SL.NO.	TYPE OF EQUIPMENT	SIZE (MM)	MATERIAL	MINIMUM NO. OF LEADS
1	RISERS	40	MS ROD 40 MM DIA (3M LONG)	N.A.
2	SUB-MAT BURIED IN FLOOR FINISH (If applicable)	75X10	GALVANISED MS FLAT	N.A.
3	RUNWAY CONDUCTOR/ MAIN EARTH LEAD ALONG COLUMNS	75X10	GALVANISED MS FLAT	N.A.
4	11 KV / 3.3 KV SWITCHGEAR / MCC	75X10	GALVANISED MS FLAT	TWO
5	SYSTEM NEUTRALS	75X10	GALVANISED MS FLAT	TWO
6	415 V DISTRIBUTION BOARDS	75X10	GALVANISED MS FLAT	TWO
7	FUSE DISTRIBUTION BOARDS	75X10	GALVANISED MS FLAT	TWO
8	11KV / 3.3 KV MOTORS	75X10	GALVANISED MS FLAT	TWO
9	415 V MOTORS : 110 KW and ABOVE	75x10	GALVANISED MS FLAT	TWO
10	415 V MOTORS : ABOVE 23KW UPTO 110KW	50X6	GALVANISED MS FLAT	TWO
11	415 V MOTORS : ABOVE 5.5KW & UPTO 22KW	25x6	GALVANISED MS FLAT	TWO
12	415 V MOTORS : UPTO 5.5KW	8SWG	G S WIRE	TWO
13	CONTROL PANEL & CONTROL DESK	50X6	GALVANISED MS FLAT	TWO
14	PUSH BUTTON STATION & JUNCTION BOX	8 SWG	G S WIRE	ONE
15	CABLE TRAYS, COLUMNS & STRUCTURES	50 X 6	GALVANISED MS FLAT	TWO
16	BUS DUCT ENCLOSURES			
(I)	ISOLATED PHASE BUS DUCT	75X10	GALVANISED MS FLAT	TWO
(II)	SEGREGATED PHASE/ NON SEGREGATED PHASE BUS DUCT	75X10	GALVANISED MS FLAT	TWO
17	RAILS & METAL PARTS, FENCE, STEEL GATES	50 X 6	GALVANISED MS FLAT	ONE
18	TRANSFORMER TANKS/ RADIATORS	75X10	GALVANISED MS FLAT	TWO
19	GENERATOR ENCLOSURE	75x10	GALVANISED MS FLAT	TWO
20	WELDING OUTLETS 3-PHASE RECEPTACLES	25x6	GALVANISED MS FLAT	TWO
21	LIGHTING DISTRIBUTION BOARDS	50 X 6	GALVANISED MS FLAT	TWO
22	LOCAL PANELS, LIGHTING PANELS	50X6	GALVANISED MS FLAT	TWO
23	IN CASE OF FALSE CEILING LIGHTING FIXTURES, SINGLE - PHASE RECEPTACLES	8SWG	G S WIRE	ONE
24	11KV / 3.3 KV MOTORS CABLE BOX	75X10	GALVANISED MS FLAT	TWO

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BHEL	TYPICAL ABOVE GROUND EARTHING DETAILS	BHEL DRAWING NO. PE-DG-417-509-E004
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