

COMMON SECTION										POWER STATION SECTION										TRANSMISSION SECTION									
REV. SHT.	0	1	2	3	4	5	6	7	8	REV. SHT.	0	1	2	3	4	5	6	7	8	REV. SHT.	0	1	2	3	4	5	6	7	8
C1	X	X	X	X	X	X	X	X		P1	X	X	X							T1	X	X	X						
C2	X	X	X	X	X	X	X	X		P2	X	X	X							T2	X	X	X						
C3	X	X	X	X	X	X	X	X		P3	X									T3	X	X	X						
C3A	X	X	X	X	X	X	X	X		P4	X									T4	X	X	X						
C3B	X	X	X	X	X	X	X	X		P5	X	X								T5	X	X	X						
C4	X	X	X	X	X	X	X	X		P6	X									T6	X	X	X						
C5	X	X	X	X	X	X	X	X		P7	X									T7	X	X	X						
C6	X	X	X	X	X	X	X	X		P8	X									T8	X	X	X						
C6A	X									P9	X									T9	X	X	X						
C7	X	X	X	X						P10	X									T10	X	X	X						
C8	X																			T11	X								
C9	X	X	X																	T12	X	X	X	X	X				
C10	X	X	X																	T13	X								
C11	X	X	X	X	X															T13A	X								
C12	X																			T14	X								
C13	X	X	X	X																T14A	X								
C14	X	X	X	X																T14B	X								
C15	X																			T15	X								
C16	X	X	X																	T16	X								
C17	X	X	X																	T17	X								
C18	X	X	X																										
C19	X	X	X																										
C20	X	X	X																										
C21	X																												
C22	X	X	X																										
C23	X	X	X																										
C24	X	X	X																										
C25	X	X	X																										
C26	X																												
C27	X																												
C28	X																												
C29	X																												
C30	X																												
C31	X																												
C32	X																												

**NOTE:**  
 THE SCHEDULE CONSISTS OF THIS COVER SHEET AND DETAIL SHEETS AS SHOWN ABOVE

C = COMMON DETAILS  
 P = POWER STATION DETAILS  
 T = TRANSMISSION DETAILS

25	SHEETS C3B, C32, T15, T16 AND T17 ADDED.	<i>[Signature]</i>	28/10/2005
24	SHEET T13A ADDED.	S.M.	C.T. A.A. 23.02 2010
23	SHT 0 & T5 REVISED. SHEET T14, T14A & T14B ADDED.	E.G.	P.C.B. I.HILL. 25.05 2007
22	SHEET C3A REVISED.	OJ	GAC DJCS 18.7. 2002
21	SHEET T13 ADDED.	OJ	GAC GAC 20.11. 2000
20	SHEETS C13 AND C14 REVISED.	OJ	PCB PCB 16.4. 1997
19	SHT C1 NOTE 5, C2, C3, C3A, C3B, C5 & C11 REV.D. SHT C4 SUPERSEDED.	WN	PCB PCB 2.8.96

REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	REF. DRGS

APPROVED BY  
AE JEANES

DATE 22/07/80

CHECKED BY

DATE

DRAWN BY  
FVD

DATE NOV.1979

SCALE: NTS

**Eskom**  
Transmission

Eskom Holdings SOC Ltd  
Reg No 2002/015527/30

EARTHING STANDARDS




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0.54/393

SHEET 0

SHEET NUMBER	REVISION
0	25

# EARTH MAT AND TAILS

- Main earth mat shown — — — — — to be { 10mm black annealed copper ( unless otherwise indicated) buried at least 1000mm below finished ground level wherever possible. Where passing under deeper foundations and drains, it is to be 150mm below concrete. Backfilling around such earth rods to be well compacted.  
Where a concrete blinding is cast under building foundations the earth mat meshes are to be installed on top of the blinding and under the concrete footing of columns etc.  
Where passing over drains with less than 1000mm of cover, it is to be buried as deeply as possible. To be 600mm outside safety fence, as indicated on foundation and/or earthmat layout.  
Rod transverse crossings are indicated thus  and these crossings must be jointed using crimpet, ( See Note 5) by the method shown on Sheet C5/3.  
Rod to rod perimeter joints ( tee) must be made using the method shown on Sheet C5/2 and are indicated thus 
- Earth tails shown thus ————— to be 2 x separate { 10mm black annealed copper rods ( unless otherwise indicated) Tails to be vertical at column or equipment support earthing points ( Sheet 31) clamped to the steelwork using clamp ( Sheet C6) by the method shown on Sheet C7, then run at a depth of 150mm below ground level, dropping down and jointed to main earth mat at points shown thus  using crimpets ( Sheet Note 5) and by the method shown on Sheet C5/2.
- Where earth tails cross they should be crimped together.
- Where main earth mat is not dimensioned, it is to be placed as close to the main column foundations as possible.
- Only connections complying to IEEE Std 837-1989 " IEEE standard for qualifying permanent connections used in Substation grounding" are acceptable. Crimped connections that comply are shown in the table with it associated compression tool and die.

Make	Connector	Compression Tool	Die	No. of Crimpung Operations
Simel	C75E	Simabloc C12	12SX260CU	1
Simel	C75E	Burndy Y35	U-F	1
Burndy	YGHC26C26	Burndy Y35	U-O	1
Burndy	YC26C26	Burndy Y35	U-O	1
Burndy	YC26C26	Burndy Y35	U-E	3

THE C.A.D. REFERENCE NUMBER IS:  
[100,164100393EC01.R06



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EARTHING STANDARDS

0.54/393

SHEET C1

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393C01.DGN

## EARTH MAT AND TAILS

- . Compression tool shall not release until the full compression of 12 tonne has been achieved.
- . The correct tool and die, as given in the table, shall be used for crimping the chosen connector.
- . Internal surfaces of the connector shall be wiped clean before installation, except in cases where connectors are filled with anti-oxidising grease.

6. Brazed joints to be oxy -acetylene brazed using 3mm dia silbralloy brazing rods as supplied by African Oxygen Ltd., or equivalent, no flux is required.

7. Where an earth clamp ( Sheet C6) is used to clamp earth tails to equipment steelwork a bolt torque of 75 Nm is to be used.

8. All above ground connections to be made with steel bolts, washers and nuts that are not hot dip galvanised for outdoor installations, ( Supplied by civil contractor) and electrogalvanised for indoor installations ( Supplied by the contractor responsible for relevant earth mat portions in Power Stations) . The minimum thickness of zinc coating to be in accordance with the latest issue of SABS 763.


9. Number of support steel earthing connections ( unless otherwise stated)

to be: 12,5 kA - one connections per support

16 kA	}	- two connections per support
20 kA		
25 kA		
31.5 kA	}	- three connection per support
40 kA		
50 kA		- four connection per support

Main steel	}	- one connection per column for all fault levels
Columns		

Note - Each connection to be 150mm<sup>2</sup> min. cross sectional area.  
One connection consists of 2 x 10mm dia Cu rods.

10. Sacrificial eathmat anodes shown thus  are to be manufactured and connected to the main earth mat as per Sheet T12 for mild to very severe corrosive soil conditions.
- The application of these anodes will be determined by the results of soil tests carried out by ESKOM or an appointed representative.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164100393EC02.R05



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0.54/393

SHEET C2

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## EARTH MAT AND TAILS

11. Roof earthing strap of at least 25 x 3mm annealed flap copper to be run on outside surface of brick building wall to the roof and joined to metal roof sheeting with at least M8 bolts.
12. Earth connections to sheet metal clad building sidewalls can be done on inside as detailed on Sheet C12.
13. Where connection is made to painted steelwork the paint shall be removed over a minimum area to allow good contact between surfaces. Surfaces shall be coated with petroleum jelly before bolting. After bolting any scraped area not covered by the copper connection shall be made good by using the original types and colours of paints.
14. Where connection is made to galvanised steelwork the surface shall be coated with petroleum jelly prior to bolting.
15. Flat copper strap is to be secured to Detail "A" on Sheet C10, at all corners, intersections and at not more than 1000mm intervals where the strap runs across vertical or horizontal flat surfaces of concrete plinths or brickwalls.
16. For earth strap arrangement in cable trenches see Detail "B" on Sheet C10.  
For earth mat portions run along cable racking, separate instructions will be issued.
17. Where flat copper earth straps have to run on top of the finished floor surface across walkways the strap is to be screwed to the floor as shown on Sheet C10 Detail "A".
18. Earthtails at foundations where no equipment steelwork is fitted are to be clamped together ( Sheet C6)
19. Connections of 10mm dia Cu rod onto mild steel earthtails provided by the civil contractor for bonding reinforcing steel in columns and floors are to be done by an exothermic welding process ( Cadweld, Exoweld or equivalent) . Refer to detail Sheet C11.
20. Electrical apparatus mounted on any structure shall be earthed in accordance with the apparatus sheets in this standard.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC03.R05



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0.54/393

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## EARTH MAT AND TAILS

21. Isolator and earthing switch drive shafts are to be earthed through a flexible copper strap connected between a point just above the mechanism box and the steel support structure. Pantograph isolator drive shafts (Rotating not more than 90°) are to be earthed through a flexible copper strap connected between the drive shaft/insulator flange and the steel support structure. Where the drive shaft rotates more than 90° a method of earthing will be specified to suit such cases individually.
22. Flexible protective earth connections to equipment must be either of braided copper or of finely stranded copper wire with green/yellow insulation. The rated conductor area shall not be less than one half of the main conductors feeding the equipment with a maximum of 70 (75) mm<sup>2</sup>. The length of such flexible connection shall not exceed 1000mm.
23. Two external earths on LV motors are not necessary. One earth via a fourth cable core or one visible external earth is sufficient. For large motors (MV + LV) local earthing via flexible earth connection is required.
24. Earthing requirements for equipment such as metalclad SF<sub>6</sub> switchgear installation, phase isolated busbars and generators will be shown on detailed project drawings.
25. Typical earth strap details for Power Stations are covered in the appropriate information manuals.

### 26. YARD STONING

As indicated in S.L.D.G. 13-1, the surface resistivity plays an important part in ensuring the safety of personnel as required by the O.H.S. act.

H.V. Yards should have a stone layer of at least 100mm thick to achieve safe 'STEP AND TOUCH' potentials.

This stone layer should be formed from clean, hard, sound crushed stone of 26,5mm nominal size as approved by ESKOM.

The final installation should be verified by testing for safe 'STEP AND TOUCH' potentials.

THE C.A.D. REFERENCE NUMBER IS:  
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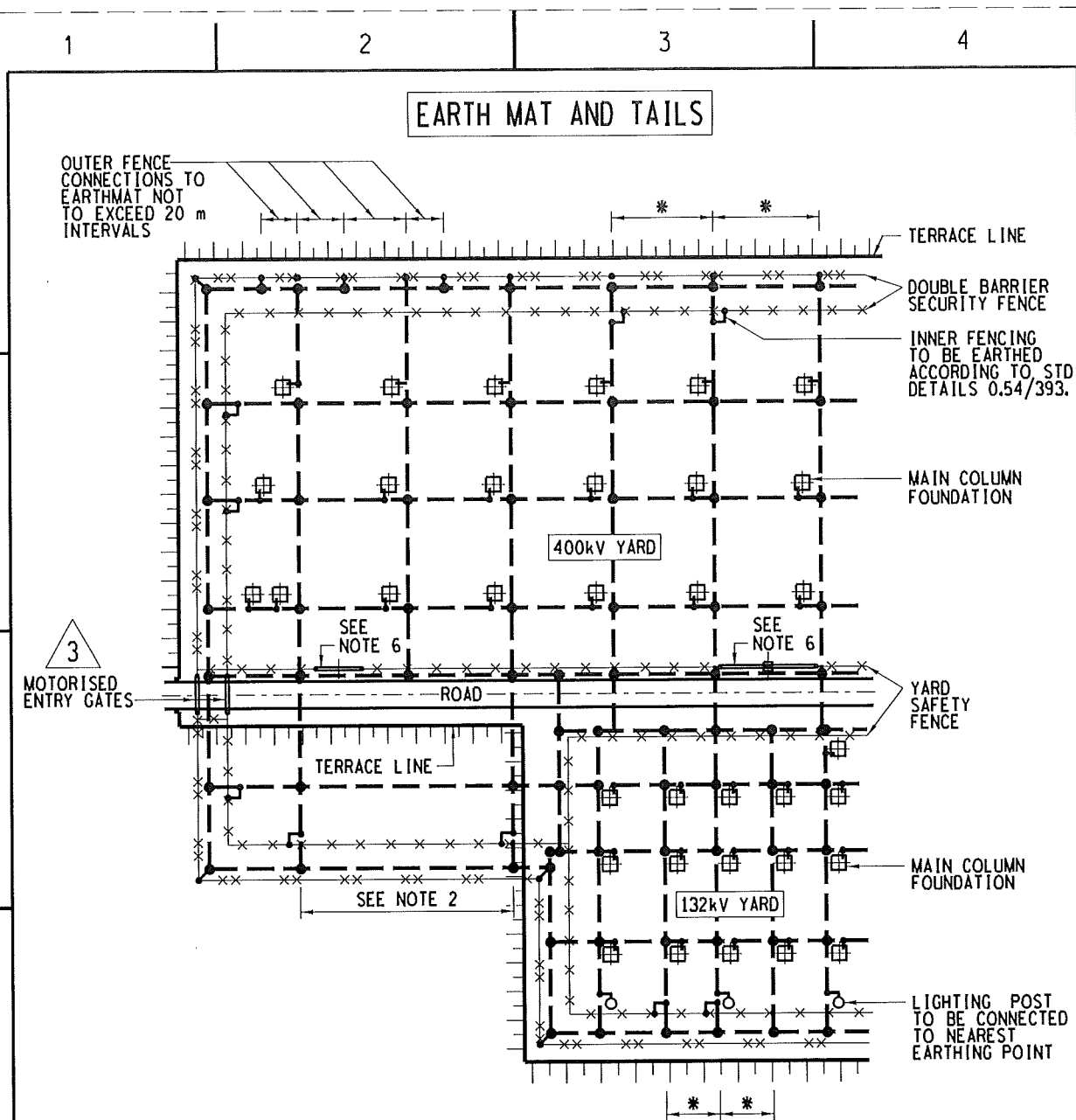
## EARTHING STANDARDS

0.54/393

SHEET C3A

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393C03A.DGN

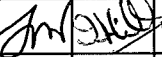


**TYPICAL EARTHMAT APPLICATION FOR NEW SUBSTATIONS.  
(AFTER NOVEMBER 1990)**

- 1.) \* INTERVALS BETWEEN EARTHING RUNS TO COINCIDE WITH MAIN COLUMN FOUNDATIONS IN SUBSTATION YARDS. eg. 400kV = 24m; 132kV = 12m or 15m.
- 2.) IF THE SECURITY FENCING IS OFF THE TERRACE THEN THE EARTHGRID BEYOND THE SUBSTATION SAFETY FENCE NEEDS ONLY TO BE AT  $\pm 45$  M INTERVALS.
- 3.) WHERE THERE ARE TWO OR MORE YARDS IN CLOSE PROXIMITY, THE EARTH GRIDS ARE TO BE INTEGRAL.
- 4.) FOR SECURITY AND SAFETY FENCING APPLICATIONS REFER TO S.L.D.G. 15-5; "SUBSTATION FENCING".
- 5.) FOR EARTHING DETAILS REFER TO THIS STANDARD ie. 0.54/393.
- 6.) ALL GATES AND REMOVABLE PANELS ARE TO BE BONDED WITH AN EARTH CONNECTION IN ACCORDANCE TO 0.54/4963.

**Eskom**  
FIRST ISSUE

Eskom Holdings SOC Ltd  
Reg No 2002/015527/30

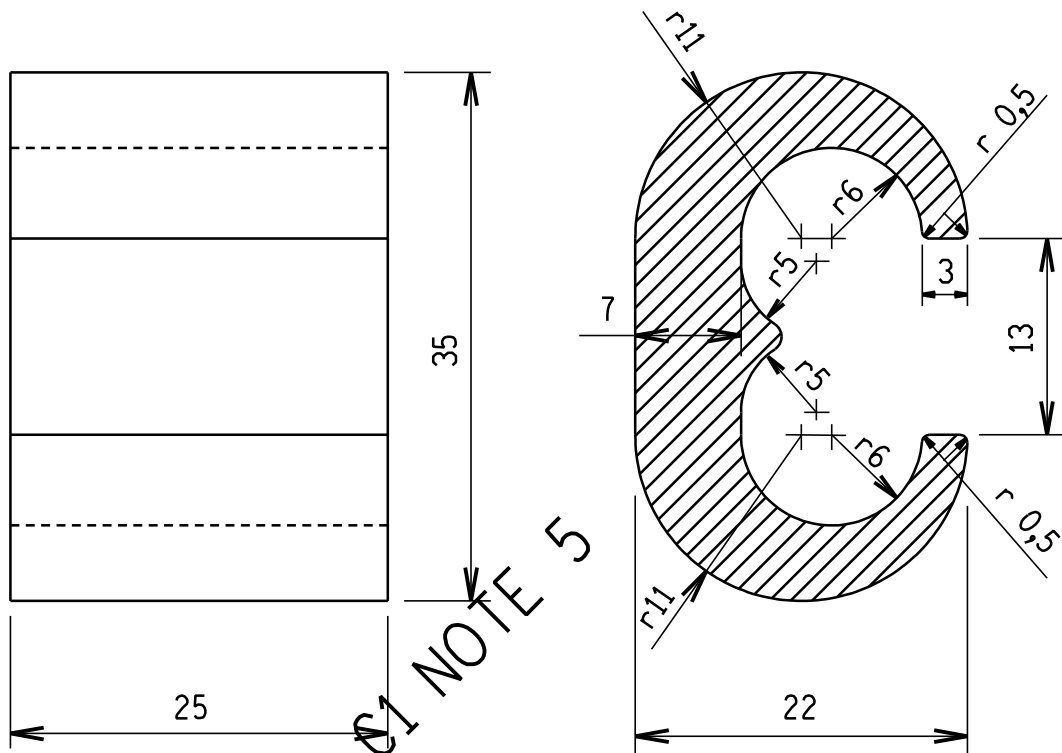
3	NOTE 6 AND MOTORISED ENTRY GATES ADDED.			20/10/2015	
REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE
EARTHING STANDARDS		0.54/393			
		SHEET NUMBER		REVISION	
		C3B		3	

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# COPPER CRIMPET

( FOR CRIMPED JOINTS 10mm DIA TO 10mm DIA  
BLACK COPPER ROD )



MATERIAL: ELECTROLYTIC COPPER (ANNEALED)

MASS: 8 kg/100 UNITS.

NOTE: ALL DIMENSIONS  $\pm 0,5\text{mm}$

SCALE 2:1

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC04.R03



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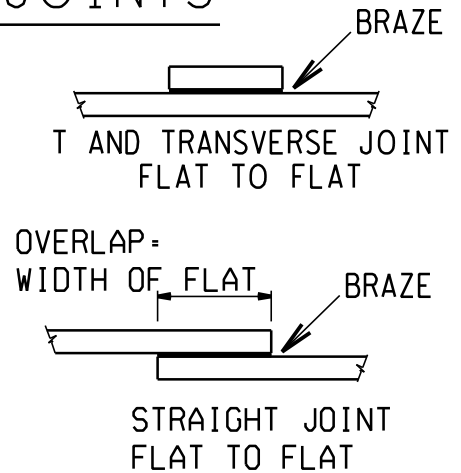
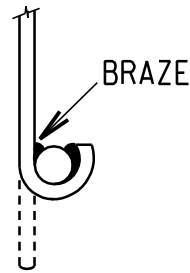
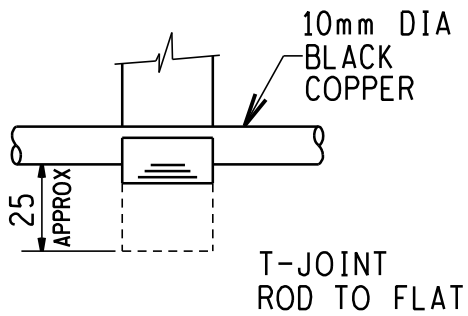
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SHEET C4

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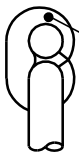
393C04.DGN

# BRAZED COPPER JOINTS



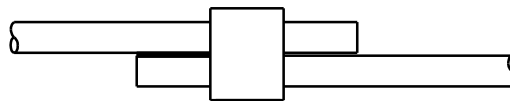
1. JOINTS TO BE OXY-ACETYLENE BRAZED, USING 3mm DIA SILBRALLOY BRAZING ROD AS SUPPLIED BY AFRICAN OXYGEN LTD. NO FLUX IS REQUIRED.
2. EXOTHERMIC WELDING PROCESSES (SEE NOTE 19 ON SHEET C3)

# CRIMPED JOINTS

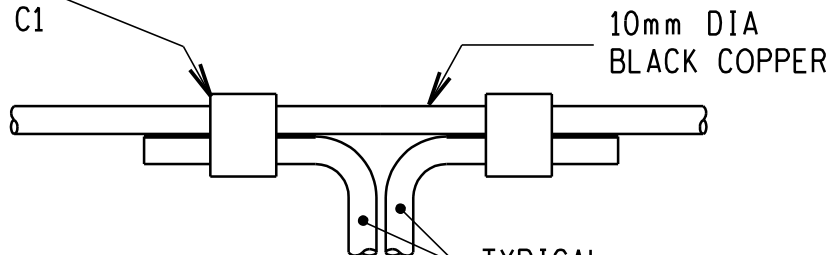


NOTE:  
CRIMPED AS  
PER NOTE 5  
ON SHEET C1

COPPER  
CRIMPET  
(SEE SHT C1  
NOTE 5)

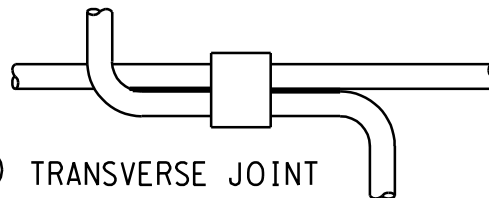


- ① STRAIGHT JOINT  
ROD TO ROD  
TYPICAL: MAIN EARTHMAT &  
EARTHTAIL EXTENSIONS.



- ② T-JOINT  
ROD TO ROD

TYPICAL:  
ONE FOR MAIN EARTHMAT  
PERIMETER JOINTS OR  
FENCE EARTHTAIL  
TWO FOR COLUMN AND  
EQUIPMENT SUPPORTS



- ③ TRANSVERSE JOINT  
ROD TO ROD  
TYPICAL: MAIN EARTHMAT

THE C.A.D. REFERENCE NUMBER IS:  
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EARTHING STANDARDS

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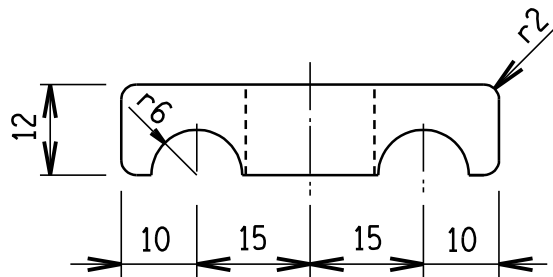
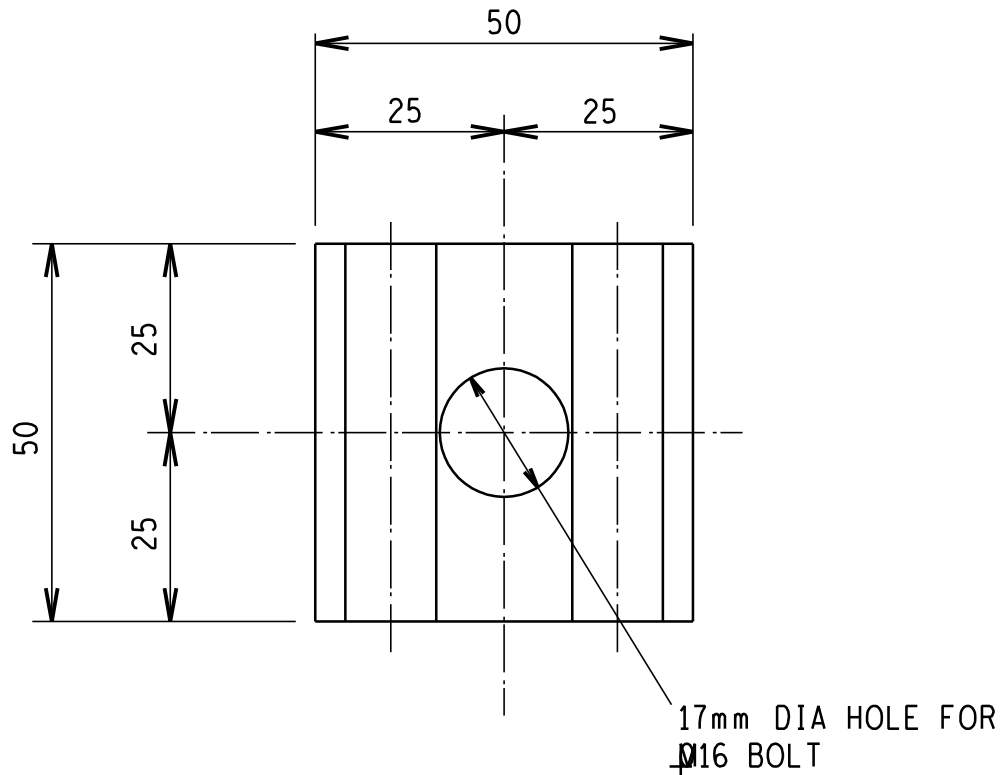
SHEET C5

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REGISTR

PLOT SCALE: 10



# EARTHTAIL CLAMP



SCALE 1 : 1

MATERIAL: ELECTROLYTIC COPPER

MASS: 16kg/100 UNITS

(FOR TYPICAL APPLICATIONS SEE SHT.C7)

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC06.R01]



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EARTHING STANDARDS

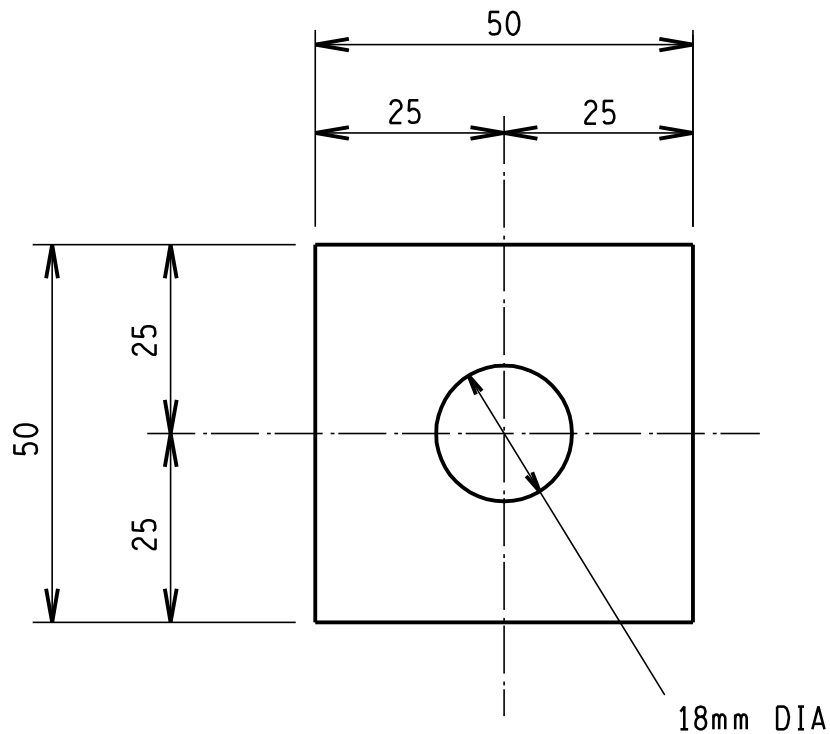
0.54/393

SHEET C6

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REGISTR

393C06.DGN

# EARTHTAIL CLAMPING PLATE



MATERIAL: 6TH M.S. PLATE HOT DIP  
GALVANISED TO SABS 1431

APPLICATION: USED WITH EARTHTAIL CLAMP  
SHEET C6 TO CLAMP TOGETHER SPARE  
EARTHTAILS IN ORDER TO MAINTAIN  
EARTHING CONTINUITY.

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC06A.R00



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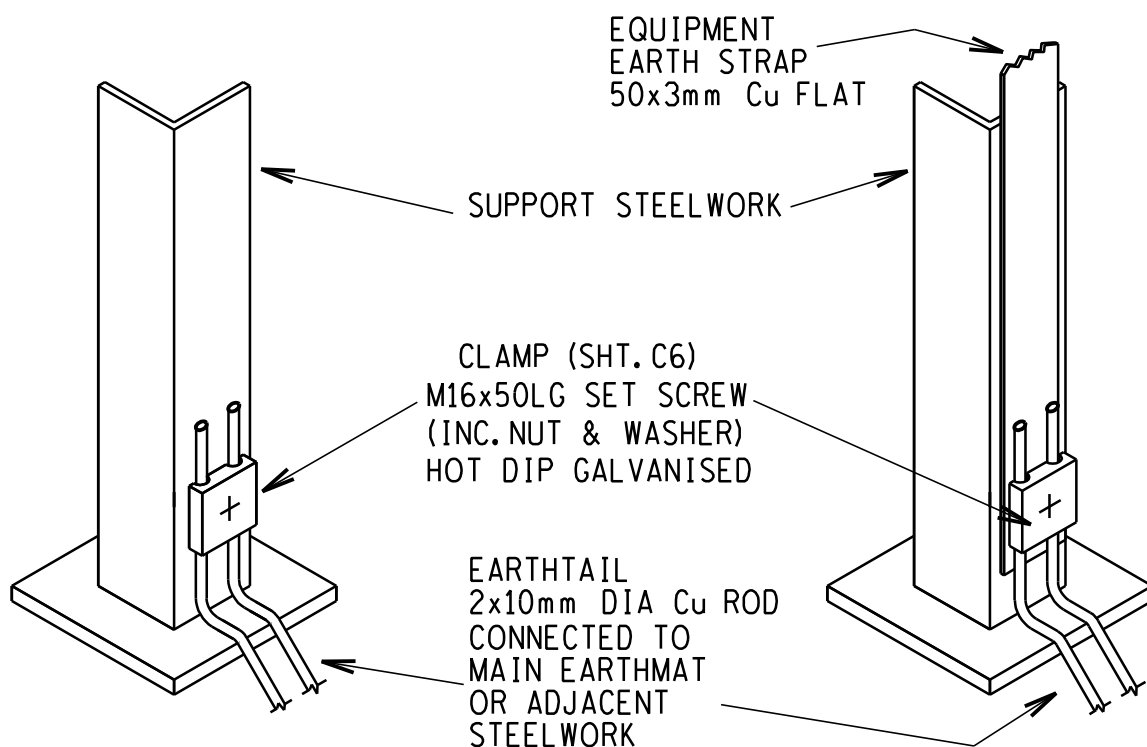
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SHEET C6A

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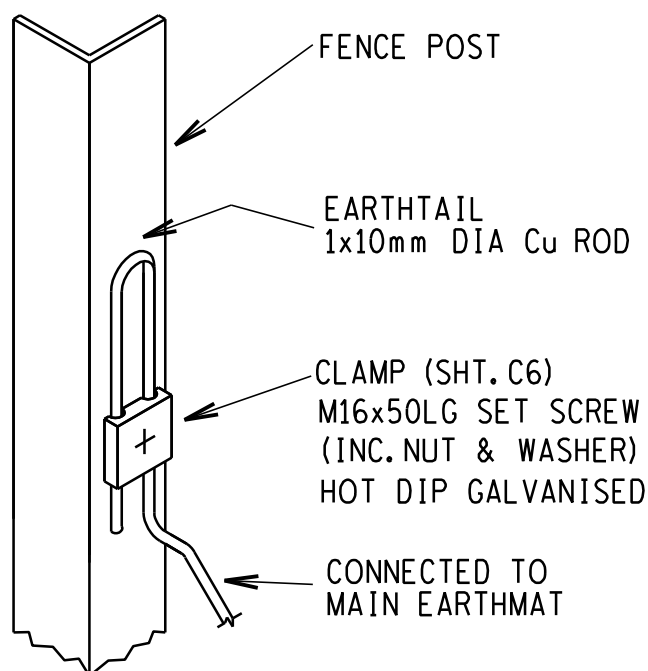
393C06A.DGN

# EARTHTAIL CLAMP (TYPICAL APPLICATIONS)



## SUPPORT STEELWORK EARTHING

(SEE ALSO SHEET C31)



## STEEL POST FENCE EARTHING

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC07.R02



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EARTHING STANDARDS

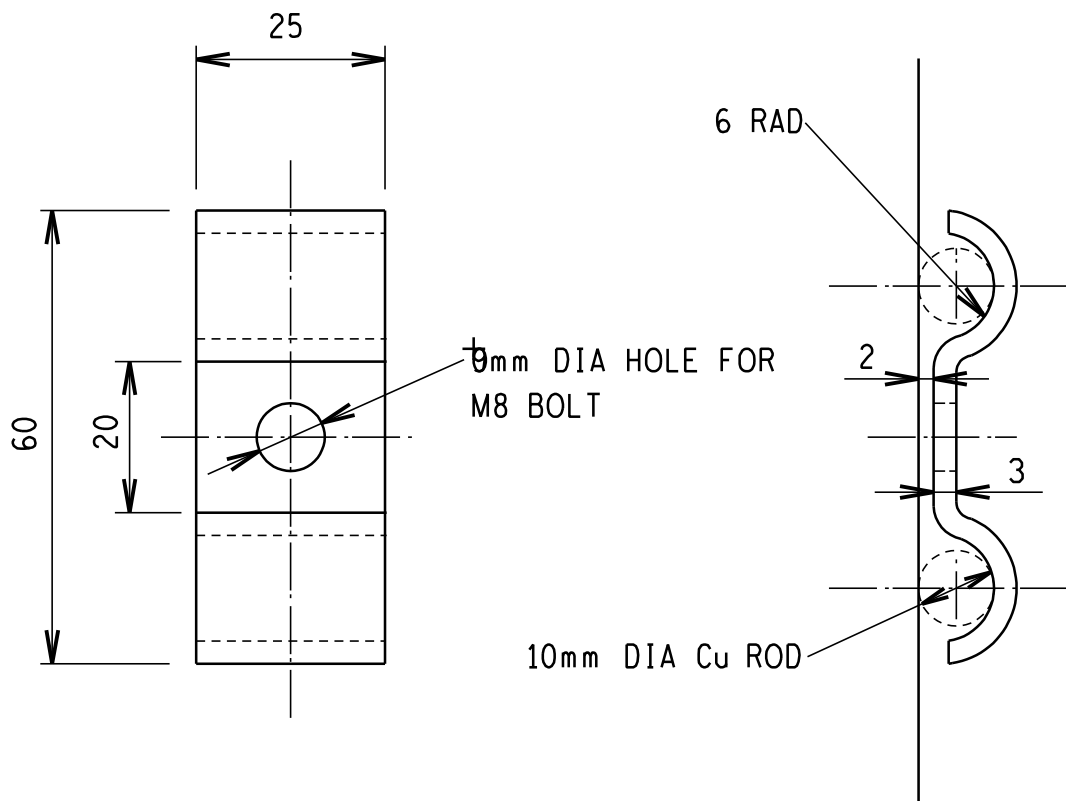
0.54/393

SHEET C7

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393C07.DGN

# SADDLE FOR 2x10mm DIA, EARTHING Cu RODS



MATERIAL: HOT DIP GALVANISED STEEL

SCALE 1:1

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC08.R00



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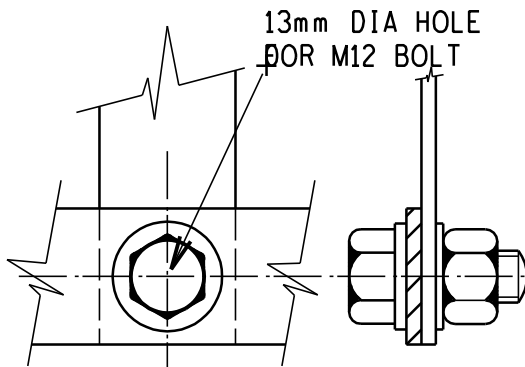
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SHEET 08

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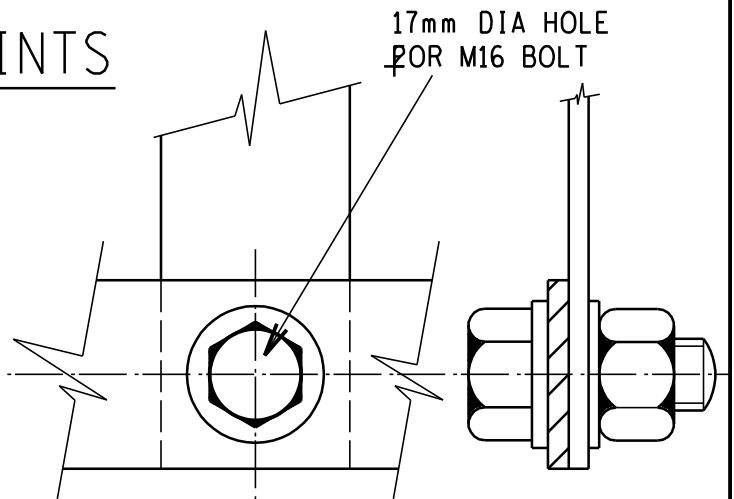
393C08.DGN

## BOLTED JOINTS



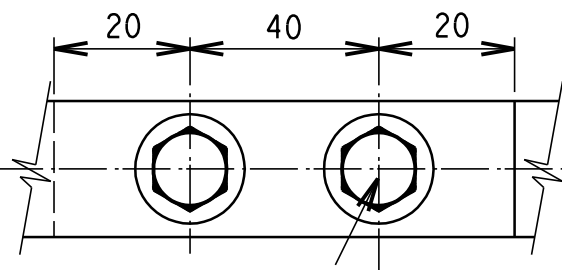
T-JOINT

25x3mm FLAT BOLTED  
TO 25x3mm FLAT

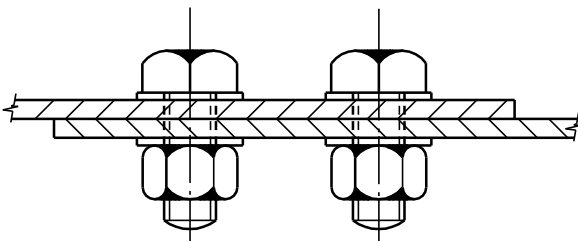


T-JOINT

50x3mm FLAT BOLTED TO 50x3mm FLAT  
40x3mm FLAT BOLTED TO 40x3mm FLAT

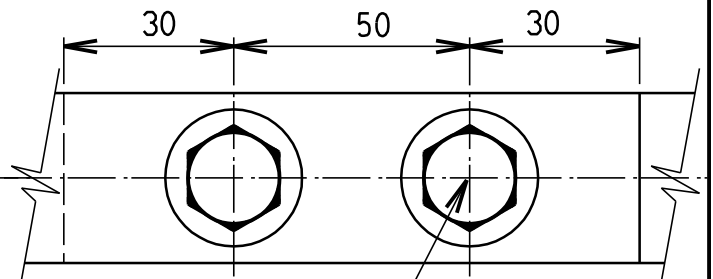


13mm DIA HOLE  
FOR M12 BOLT

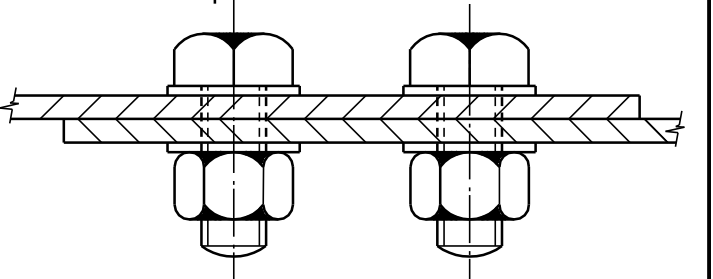


STRAIGHT JOINT

25x3mm FLAT BOLTED  
TO 25x3mm FLAT



17mm DIA HOLE  
FOR M16 BOLT



STRAIGHT JOINT

50x3mm FLAT BOLTED TO 50x3mm FLAT  
40x3mm FLAT BOLTED TO 40x3mm FLAT

1. CONNECTIONS TO CONSIST OF STEEL BOLTS, 2 FLAT WASHERS AND A NUT.
2. CONNECTION SURFACES TO BE CLEANED AND COATED WITH PETROLEUM JELLY BEFORE BOLTING.
3. SEE SHEET C2 NOTE 8 FOR FURTHER NOTES.

THE C.A.D. REFERENCE NUMBER IS:  
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1995

EARTHING STANDARDS

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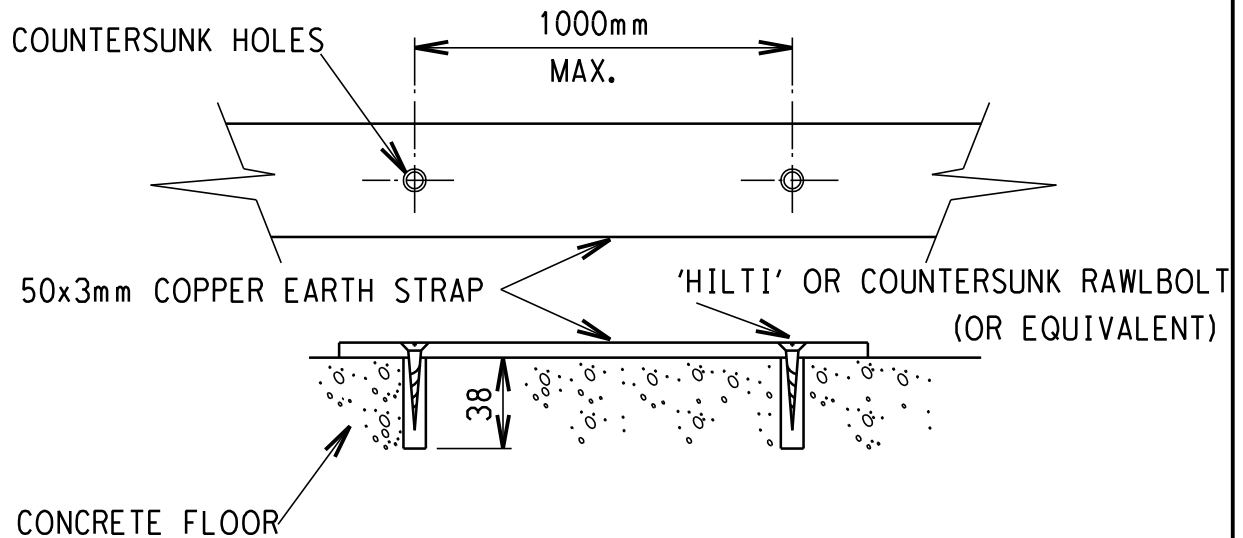
SHEET C9

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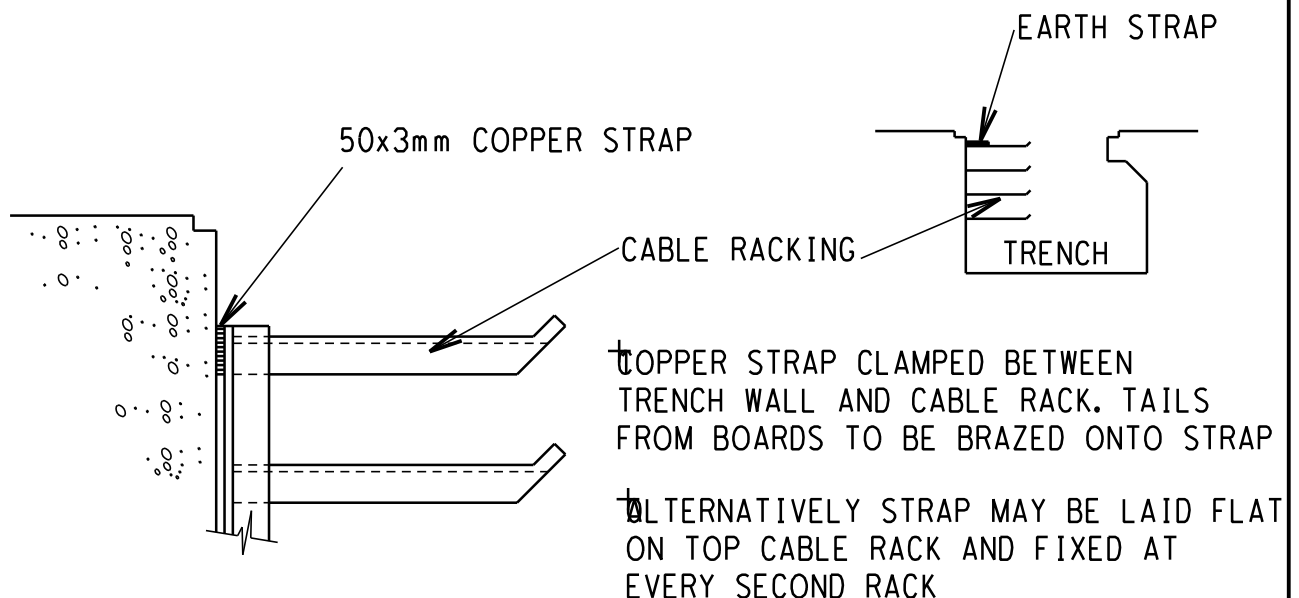
393C09.DGN

## EARTH STRAP FIXING-DETAIL 'A'

USED WHERE STRAP HAS TO RUN ON TOP OF FINISHED FLOOR IN WALKWAYS.  
ONLY COUNTERSUNK SCREWS TO BE USED.



## CONTROL ROOM TRENCH EARTH STRAP -DETAIL 'B'



THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC10.R01



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

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FEB 88

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FEB 88

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DATE  
DATUM

10.11.  
1988

EARTHING STANDARDS

0.54/393

SHEET C10

DRG. TEK  
REGISTR

393C10.DGN

Diagram illustrating the connection of the earth mat to the 1000mm x 1000mm x 100mm concrete slab. The slab is shown with a grid of reinforcement bars. The earth mat is connected to the slab via a 10mm diameter mild steel rod, which is taken up to 500mm above the +0,000 level. The connection is made using copper crimpets, for detail, see sheet C1 Note 5. The copper crimpets are connected to the earth mat via a copper crimpet connection to the earth mat. The connection is made using a 10mm diameter copper rod, which is taken up to 500mm above the +0,000 level. The connection is made using a copper crimpet connection to the earth mat. The connection is made using a copper crimpet connection to the earth mat.

ONE 10mm DIAMETER REINFORCING ROD TO BE CONNECTED TO MAJOR VERTICAL REINFORCING RODS BY MEANS OF BINDING WIRE AND TO SERVE AS EARTH CONNECTION.

THE FREE LENGTH OF THE MILD STEEL ROD TO BE 200mm OUTSIDE THE CONCRETE. THIS TAIL MUST BE WRAPPED WITH DENSOMASTIC TAPE, OVERLAPPING BY HALF IT'S WIDTH, TO AT LEAST 50mm ON EITHER SIDE OF ITS PENETRATION POINT INTO THE CONCRETE.

THE BRAZED JOINT, OR EXOTHERMIC WELD ( SEE NOTE 19 ON SHT C3 ) MUST ALSO BE COVERED WITH DENSOMASTIC TAPE, TO AT LEAST 30mm BEYOND EITHER SIDE OF THE JOINT.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC11.R03



ESKOM

2.8.  
1996

# EARTHING STANDARDS

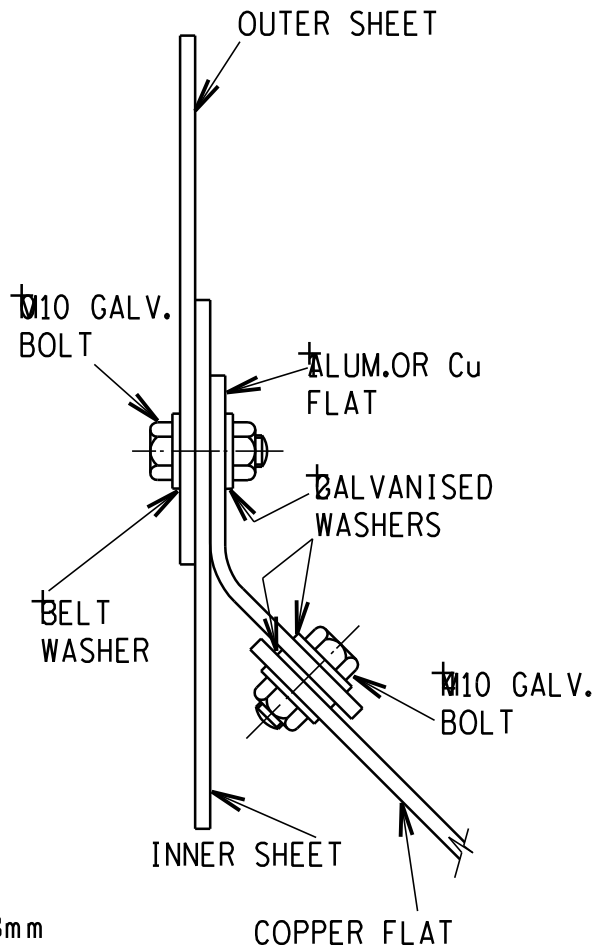
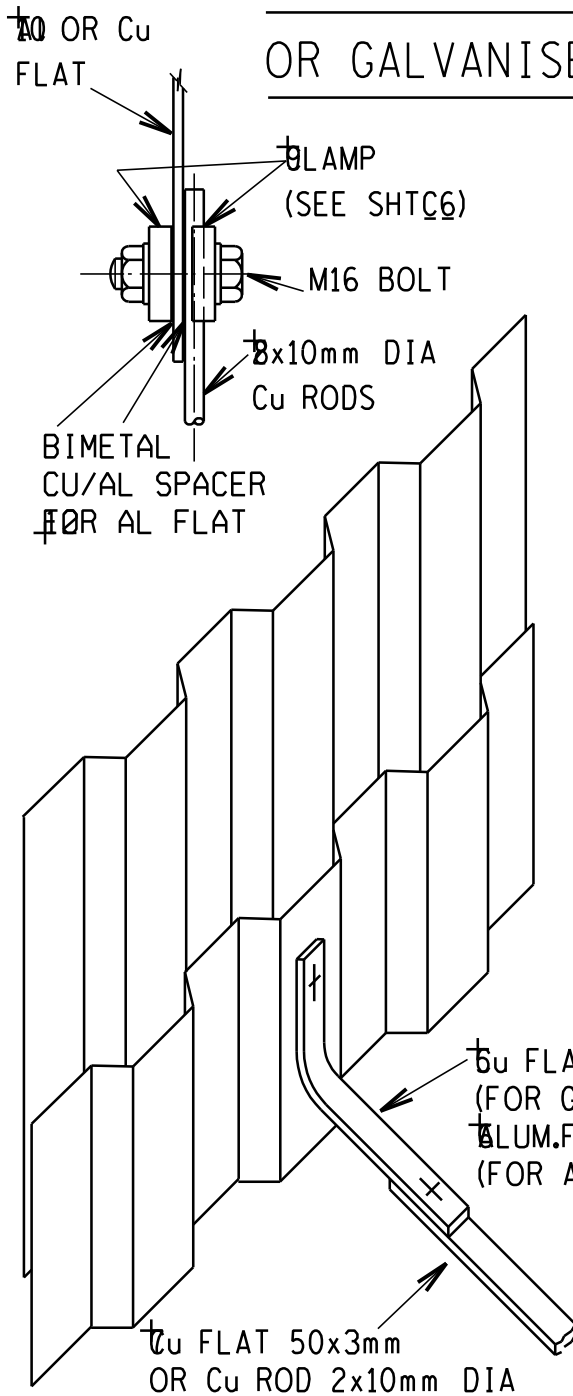
0.54/393

SHEET C11

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# METHOD OF EARTHING ALUMINIUM OR GALVANISED STEEL CLADDING



EARTH CONNECTIONS TO BE MADE NEAR TOP OF LOWEST SHEET OF CLADDING AT 10000mm INTERVALS

THE ALUMINIUM TO ALUMINIUM JOINT SHALL BE MADE WITH USE OF JOINTING COMPOUND AS USED IN HIGH VOLTAGE YARD JOINTS

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC12.R00



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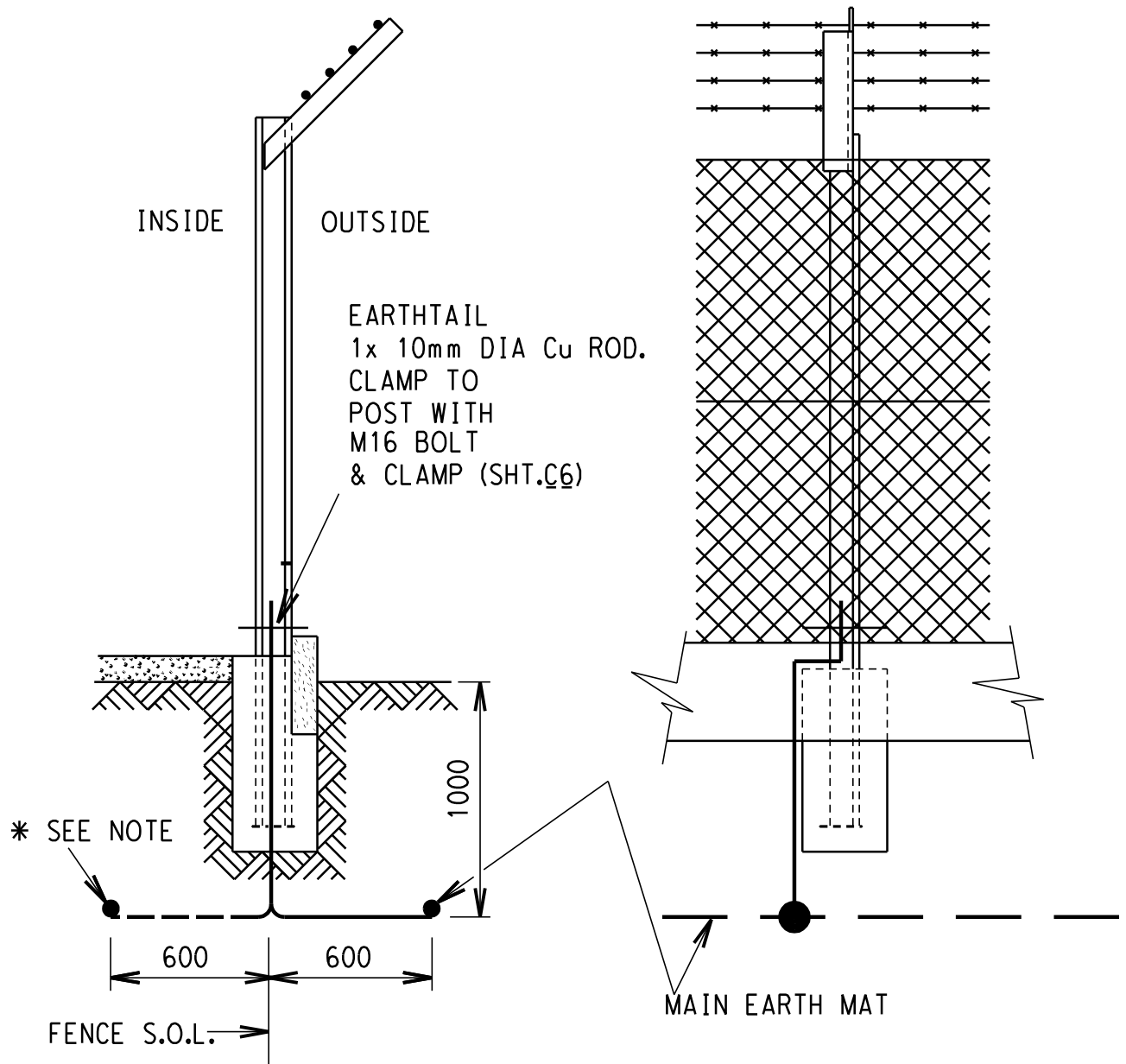
SHEET C12

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REGISTR

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# SAFETY FENCE EARTHING



## STEEL POSTS

FENCE TO BE EARTHED ON BOTH SIDES OF ANY GATE OR REMOVABLE PANEL AND AT INTERVALS NOT EXCEEDING 20000mm

\* NOTE:- WHEN THE BARRIER SECURITY FENCE IS SITUATED ON THE SUBSTATION TERRACE THE MAIN EARTHMAT FINISHES 600mm ON THE INSIDE OF THE FENCE. REFER TO SHEET C3B.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC13.R02



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16.4.  
1997

EARTHING STANDARDS

0.54/393

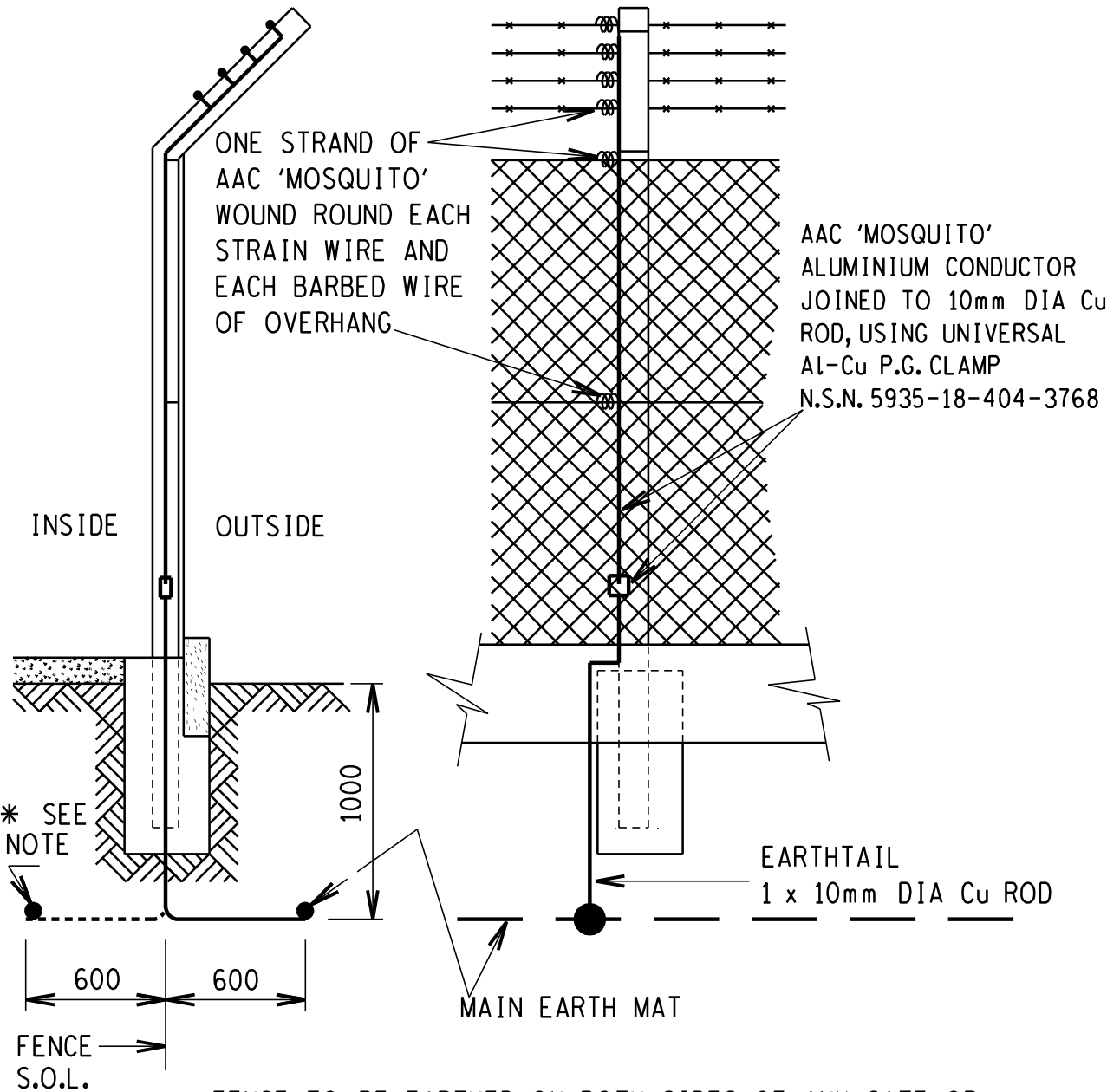
SHEET C13

DRG. TEK  
REGISTR

393C13.DGN

# SAFETY FENCE EARTHING

## CONCRETE POSTS WITH ALUMINIUM WIRE FENCE



FENCE TO BE EARTHED ON BOTH SIDES OF ANY GATE OR REMOVABLE PANEL AND AT INTERVALS NOT EXCEEDING 20000mm

\* NOTE:- WHEN THE BARRIER SECURITY FENCE IS SITUATED ON THE SUBSTATION TERRACE THE MAIN EARTHMAT FINISHES 600mm ON THE INSIDE OF THE FENCE. REFER TO SHEET C3B.

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC14.R02



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DATUM

16.4.  
1997

EARTHING STANDARDS

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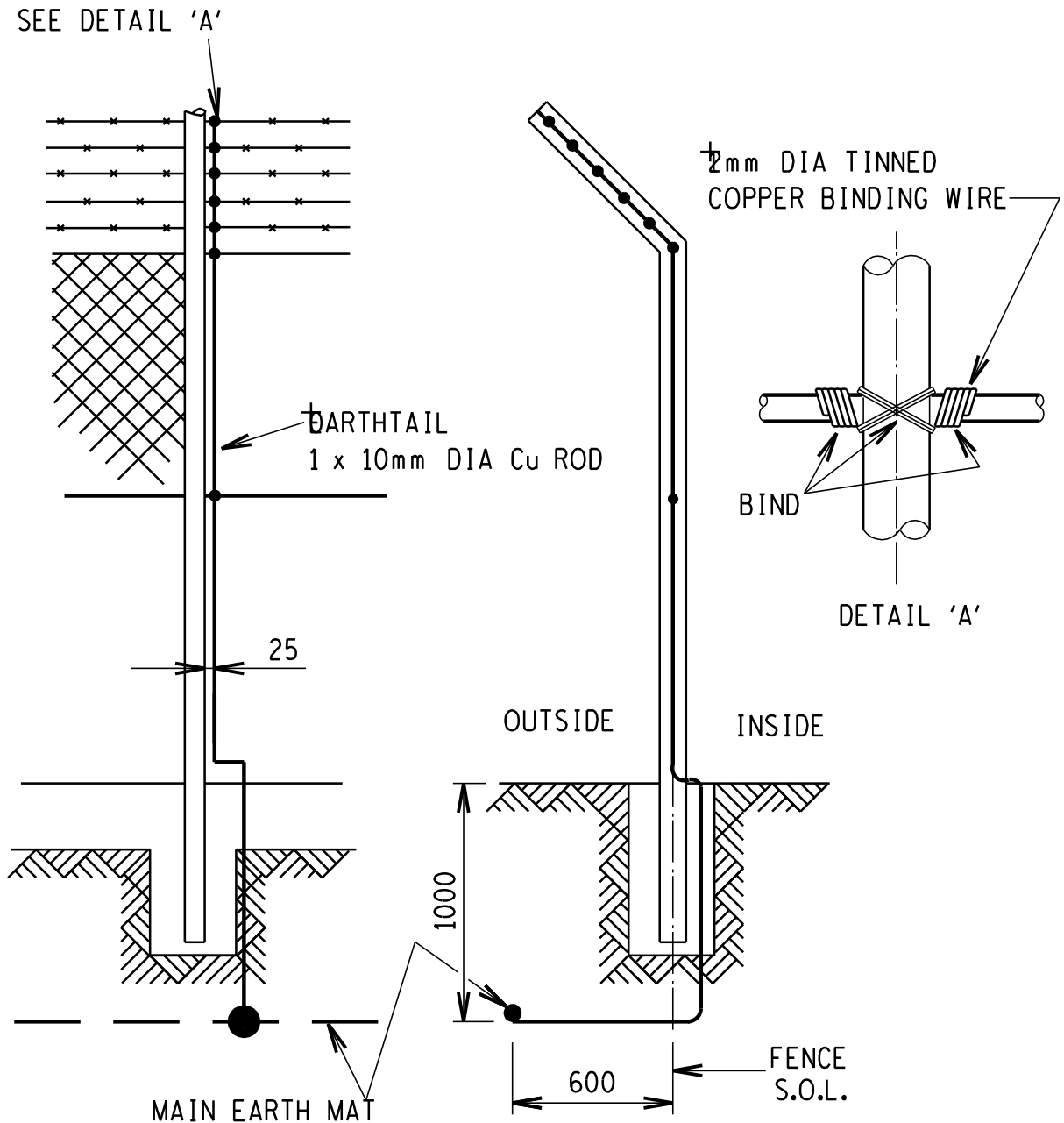
SHEET C14

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REGISTR

393C14.DGN

# FENCE EARTHING

## WOODPOLE WITH GALVANISED WIRE FENCE



FENCE TO BE EARTHED ON BOTH SIDES OF ANY GATE OR REMOVABLE PANEL AND AT INTERVALS NOT EXCEEDING 20000mm

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC15.R00



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EARTHING STANDARDS

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SHEET C15

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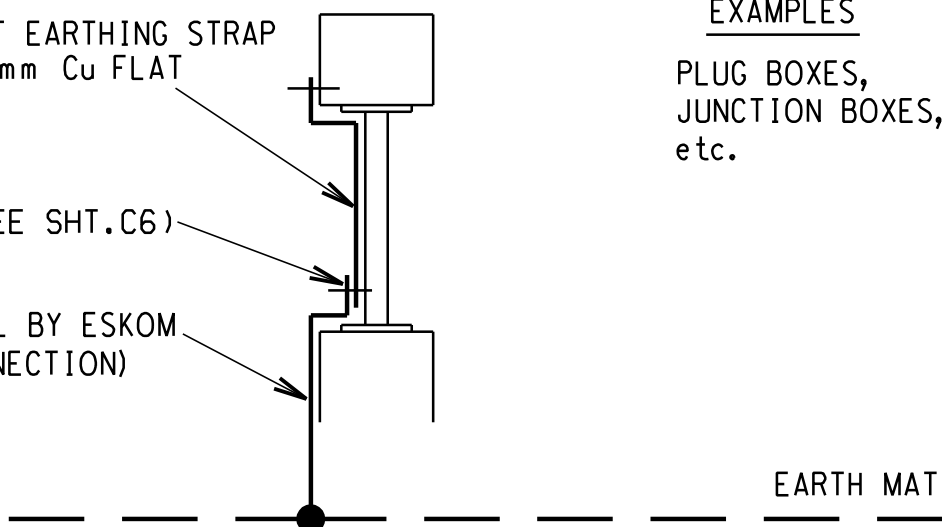
393C15.DGN

# TANKS, BASES, etc. & NEUTRALS OF ALL EQUIPMENT MOUNTED ON UNEARTHED MATERIAL

EQUIPMENT EARTHING STRAP  
 50x3mm Cu FLAT

CLAMP (SEE SHT.C6)

EARTHTAIL BY ESKOM  
 (ONE CONNECTION)



## EXAMPLES

PLUG BOXES,  
 JUNCTION BOXES,  
 etc.

EARTH MAT

THE C.A.D. REFERENCE NUMBER IS:  
 [100.164100393EC16.R01]



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EARTHING STANDARDS

0.54/393

SHEET C16

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393C16.DGN

# PAINTED TANKS, BASES etc OF EQUIPMENT MOUNTED ON EARTHED STEELWORK

EQUIPMENT EARTHING STRAP  
50x3mm Cu FLAT

CLAMP (SEE SHT.C6)

SUPPORT STEELWORK  
EARTHTAIL BY ESKOM  
(SEE NOTE)

## EXAMPLES

CURRENT TRANSFORMERS,  
AUXILIARY TRANSFORMERS,  
CIRCUIT BREAKERS, etc.

EARTH MAT

NOTE:

SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS  
TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION  
FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC17,R01



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EARTHING STANDARDS

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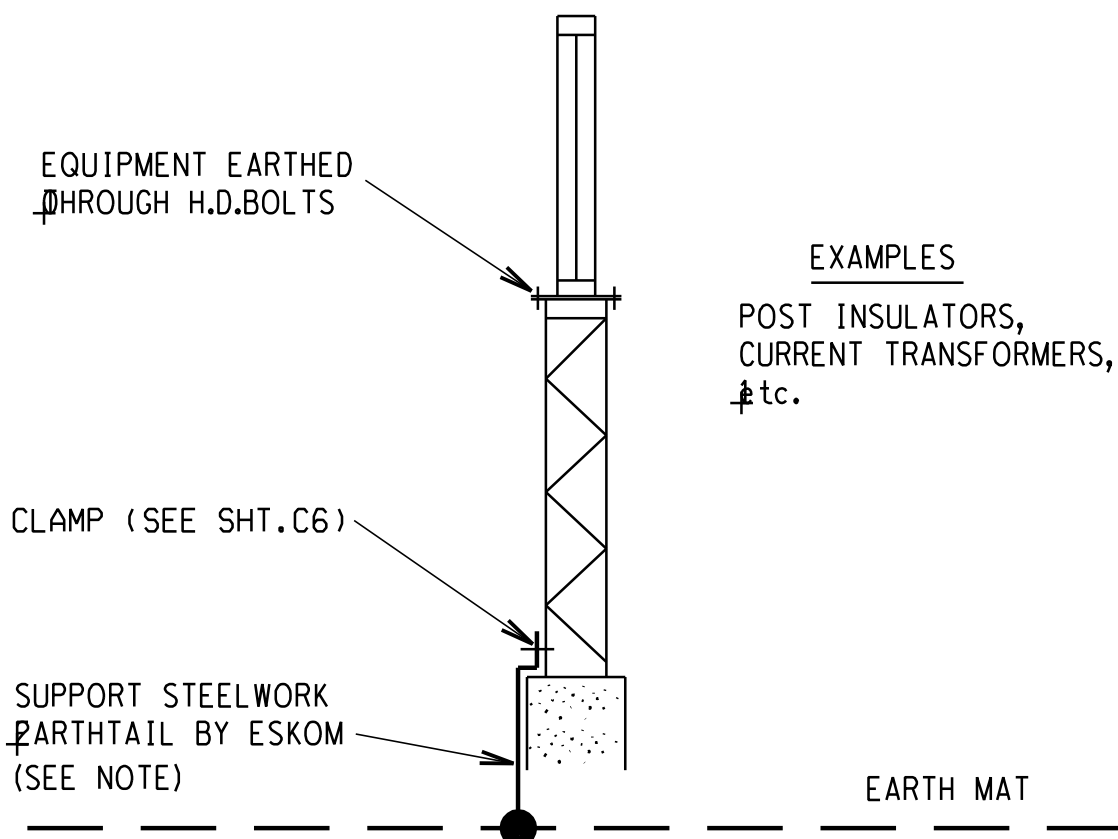
SHEET C17

DRG.TEK  
REGISTR

393C17.DGN

# GALVANISED TANKS, BASES etc OF EQUIPMENT

## MOUNTED ON EARTHED STEELWORK



**NOTE:**

SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
[101,164]00393EC18.R000



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# EARTHING STANDARDS

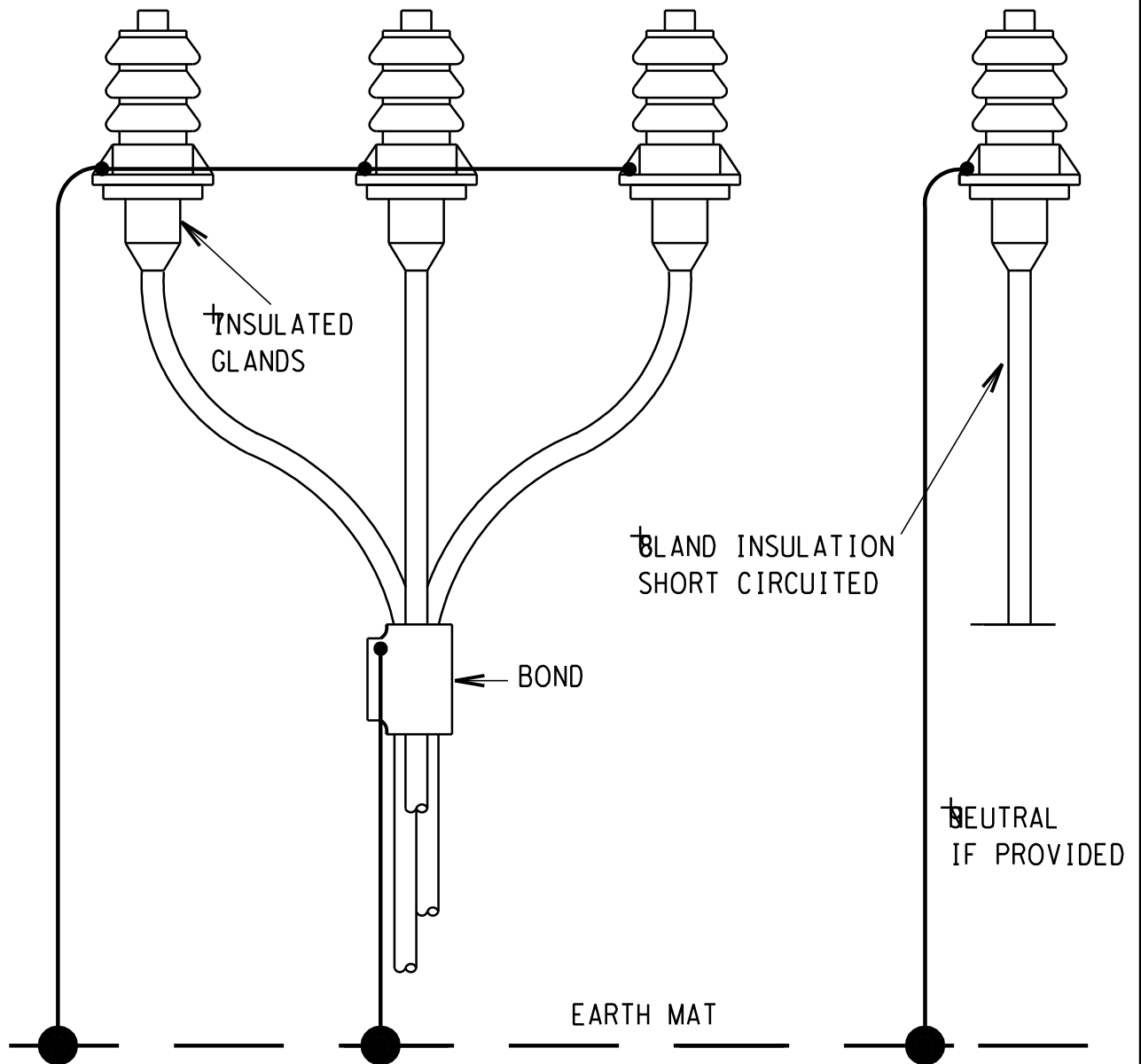
0.54/393

SHEET C18

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# ALL SINGLE CORE CABLE SEALING ENDS



THE C.A.D. REFERENCE NUMBER IS:  
[100,164100393EC19.R000



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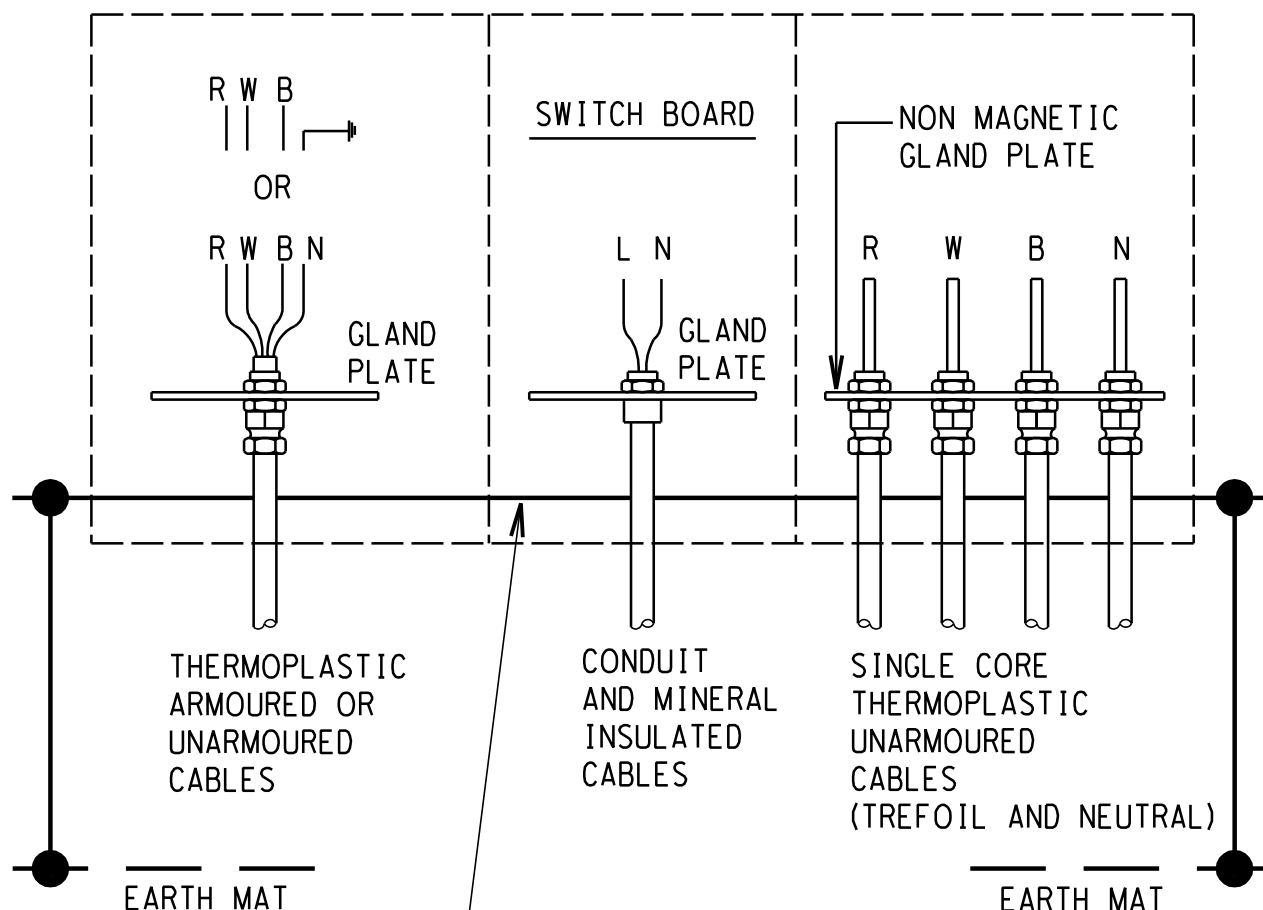
0.54/393

SHEET C19

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# SWITCHBOARDS (WITH THERMOPLASTIC INSULATED CABLES)



## NOTE:

EARTHING BAR  
(SEE NOTE 1)

1. EARTHING BAR. NUMBER OF EQUIPMENT EARTHING STRAPS AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.
2. ARMOURING OF SINGLE CORE CABLES AND SCREENS OF TELEPHONE AND CONTROL CABLES TO BE EARTHED ON ONE END ONLY.

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC20.R01]



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1988

EARTHING STANDARDS

0.54/393

SHEET C20

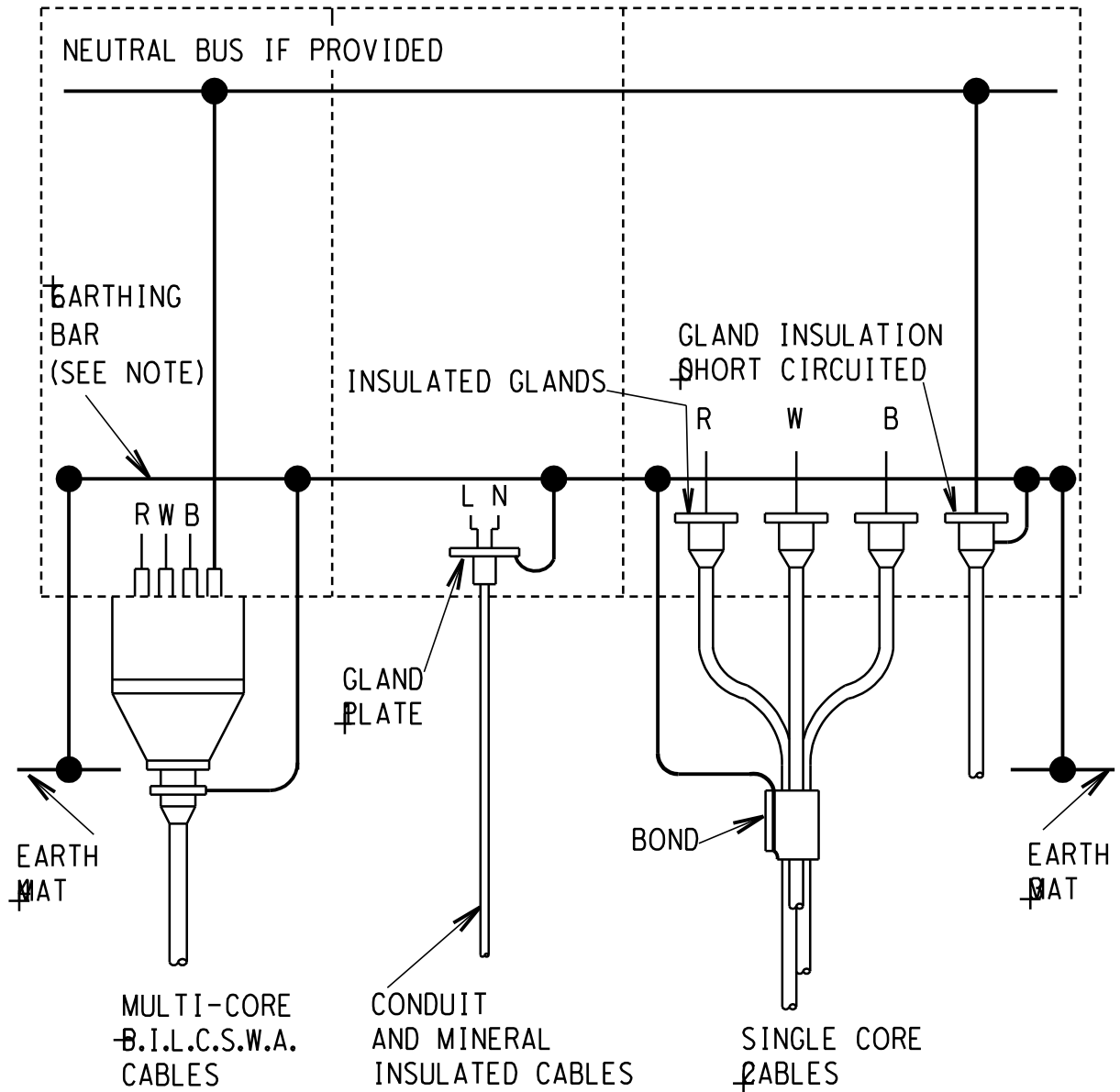
DRG.TEK  
REGISTR

393C20.DGN



# SWITCHBOARDS

## (WITH PAPER INSULATED CABLES)



NOTE:

EARTHING BAR. NUMBER OF EQUIPMENT EARTHING STRAPS AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC21.R00



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EARTHING STANDARDS

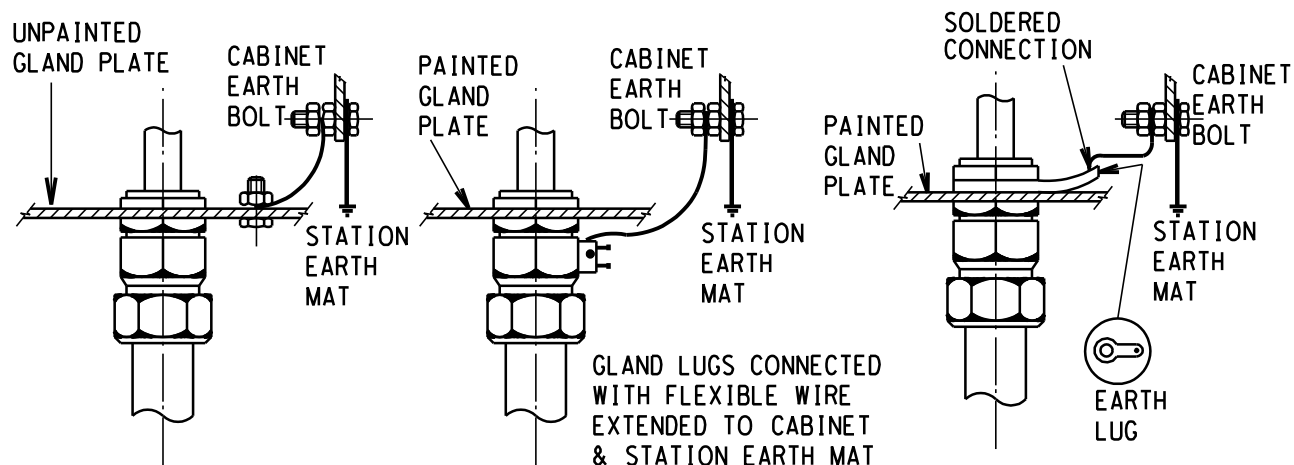
0.54/393

SHEET C21

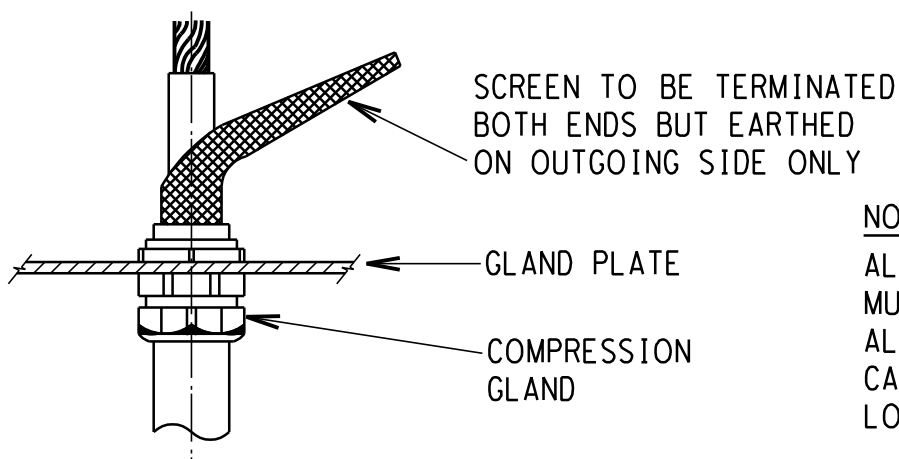
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393C21.DGN

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ALUMINIUM GLANDS MUST BE USED ON ALUMINIUM ARMoured CABLES (DOUBLE LOCK TYPE)

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC22.R01



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EARTHING STANDARDS

0.54/393

SHEET C22

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THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EC23.R01



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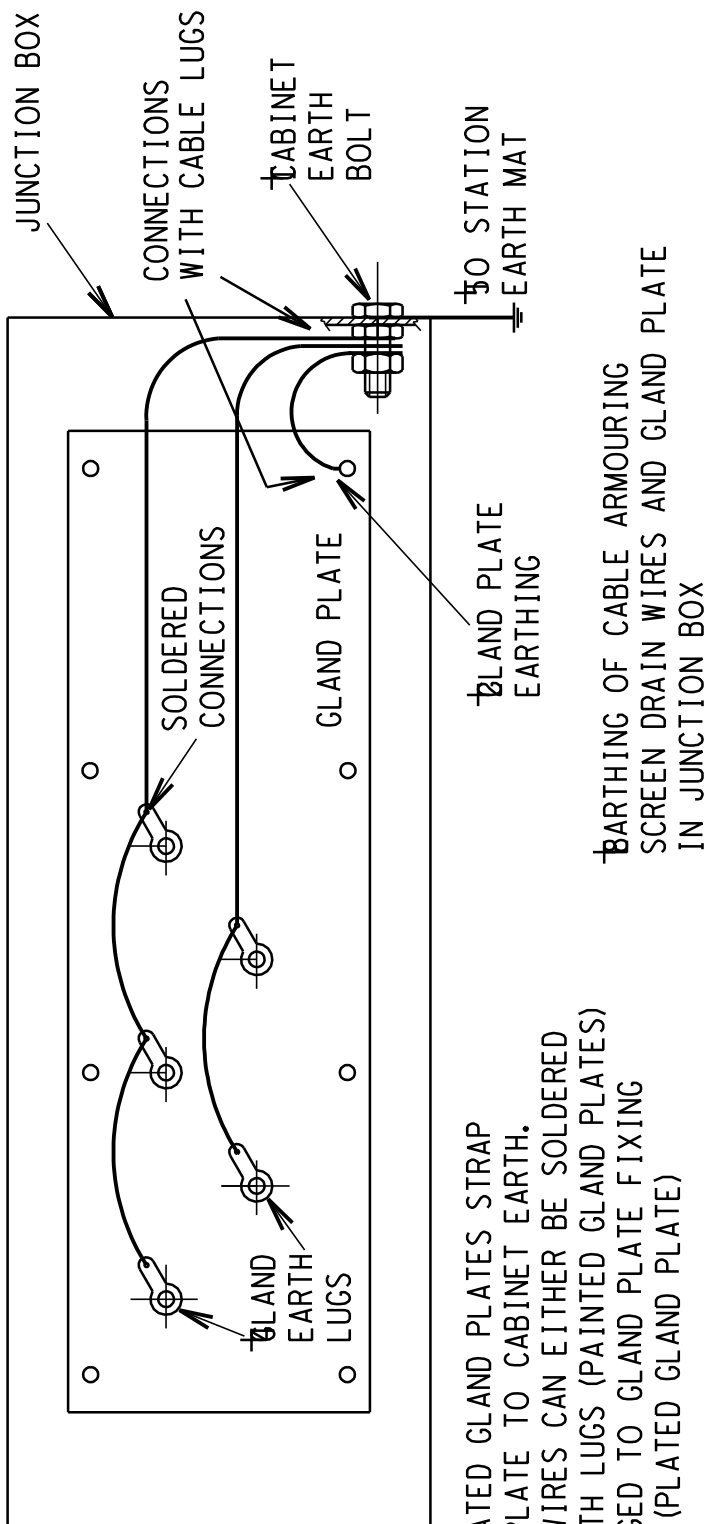
# EARTHING STANDARDS

0.54/393

SHEET C23

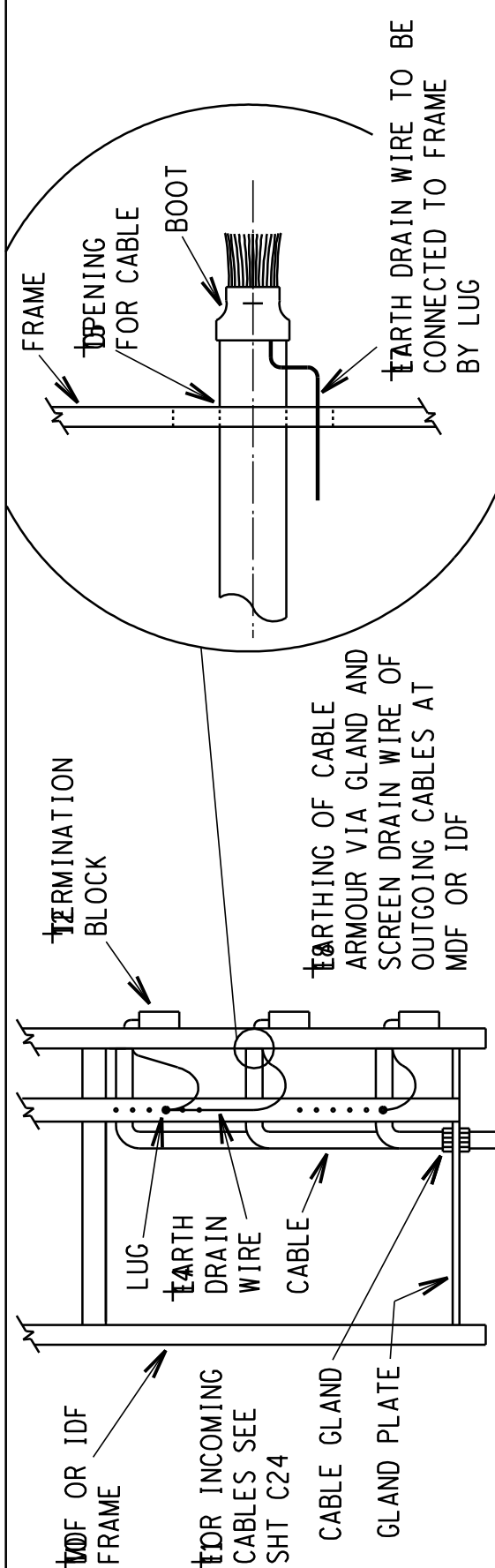
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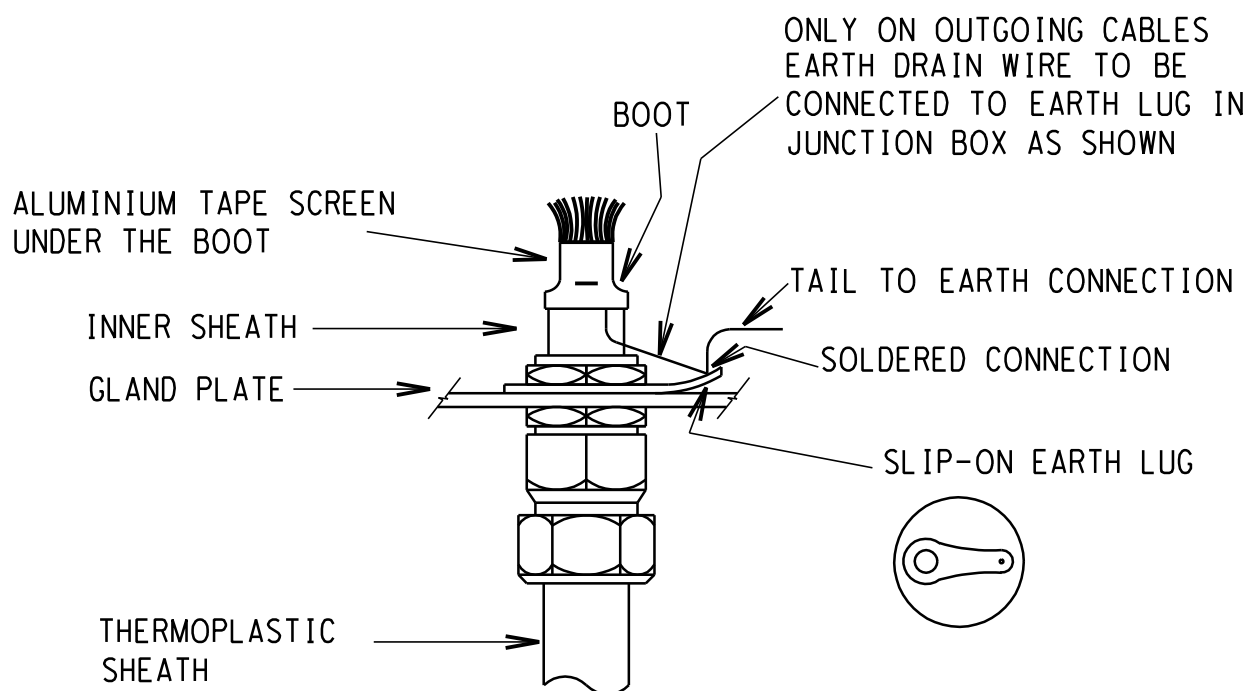
## NOTE:

1. FOR PLATED GLAND PLATES STRAP GLAND PLATE TO CABINET EARTH.
2. EARTH WIRES CAN EITHER BE SOLDERED TO EARTH LUGS (PAINTED GLAND PLATES) OR LUGGED TO GLAND PLATE FIXING SCREWS (PLATED GLAND PLATE)

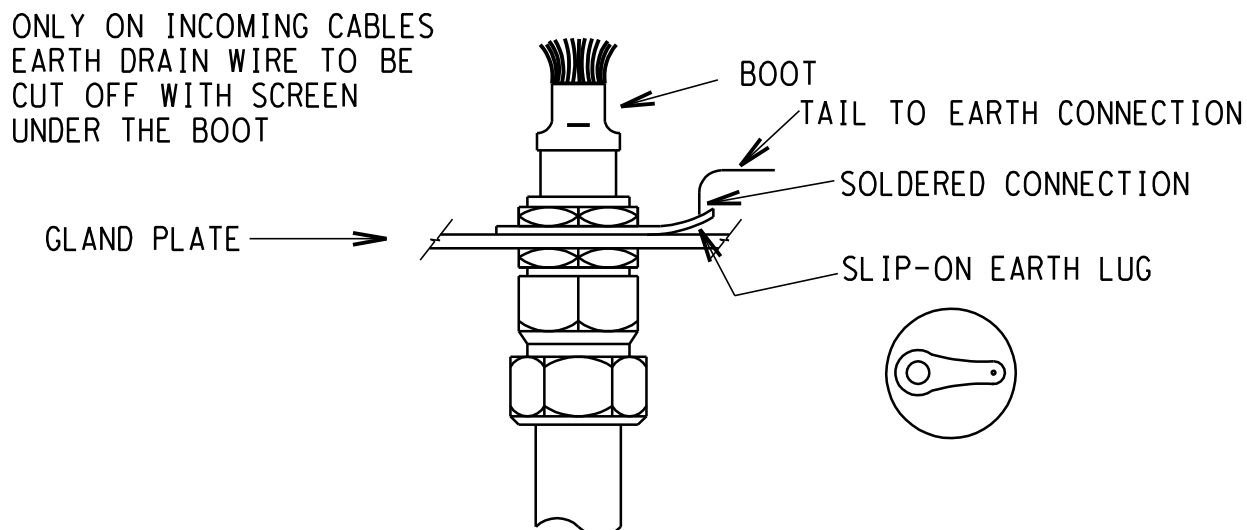


# ARMoured TELEPHONE AND SCREENED CONTROL CABLES AT JUNCTION BOX

## OUTGOING CABLES



## INCOMING CABLES



THE C.A.D. REFERENCE NUMBER IS:  
[100,164100393EC24,R01



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EARTHING STANDARDS

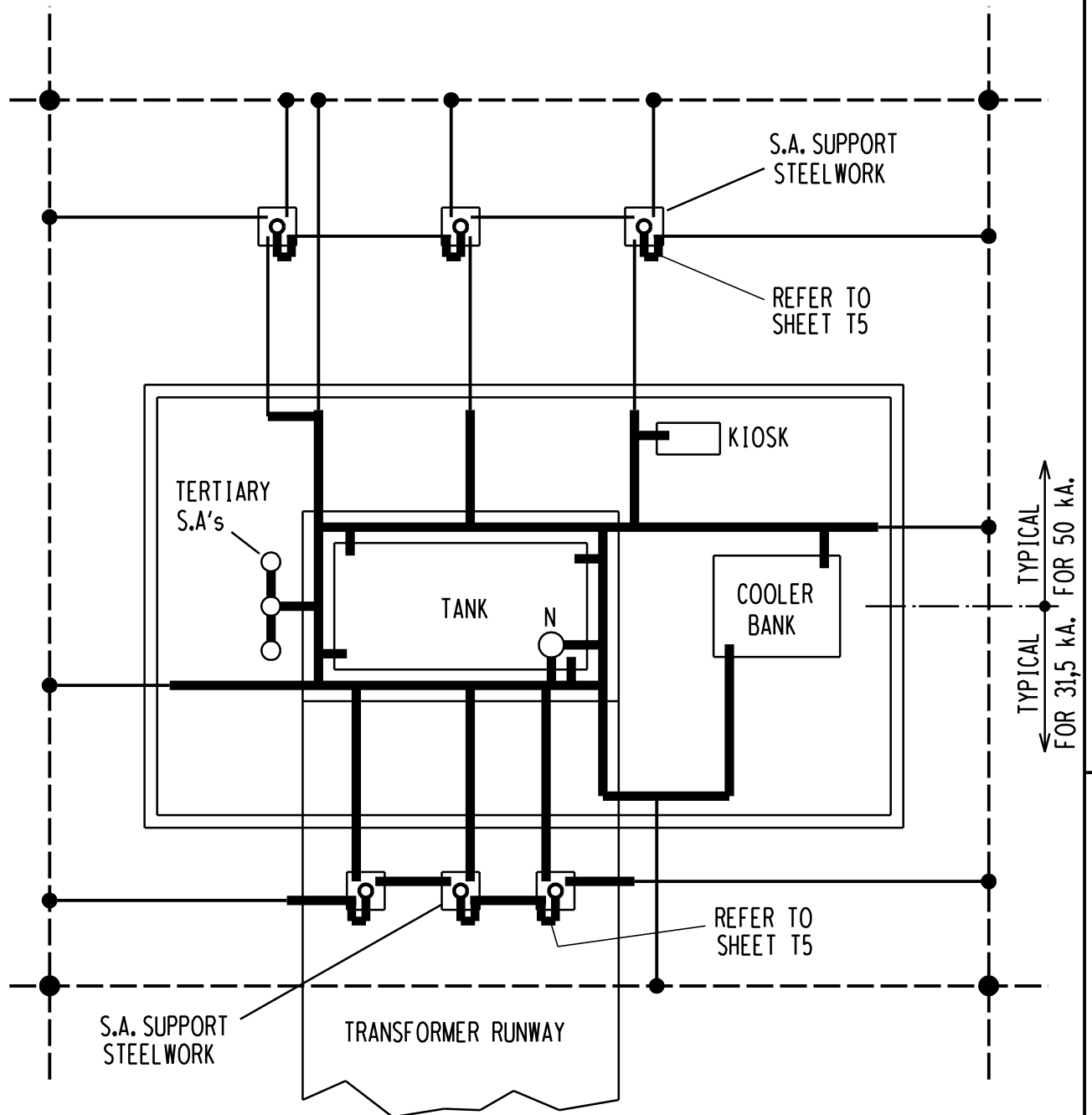
0.54/393

SHEET C24

DRG.TEK  
REGISTR

393C24.DGN

# TYPICAL TRANSFORMER AND S.A. EARTHING



- INDICATES 50 x 3mm Cu STRAP
- INDICATES MAIN EARTH MAT
- INDICATES 2 x 10mm DIA Cu RODS
- INDICATES CONNECTION BETWEEN 50 x 3mm STRAP AND 2 x 10mm DIA RODS (SEE SHEET C26)

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC25.R01



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7.6.  
1995

EARTHING STANDARDS

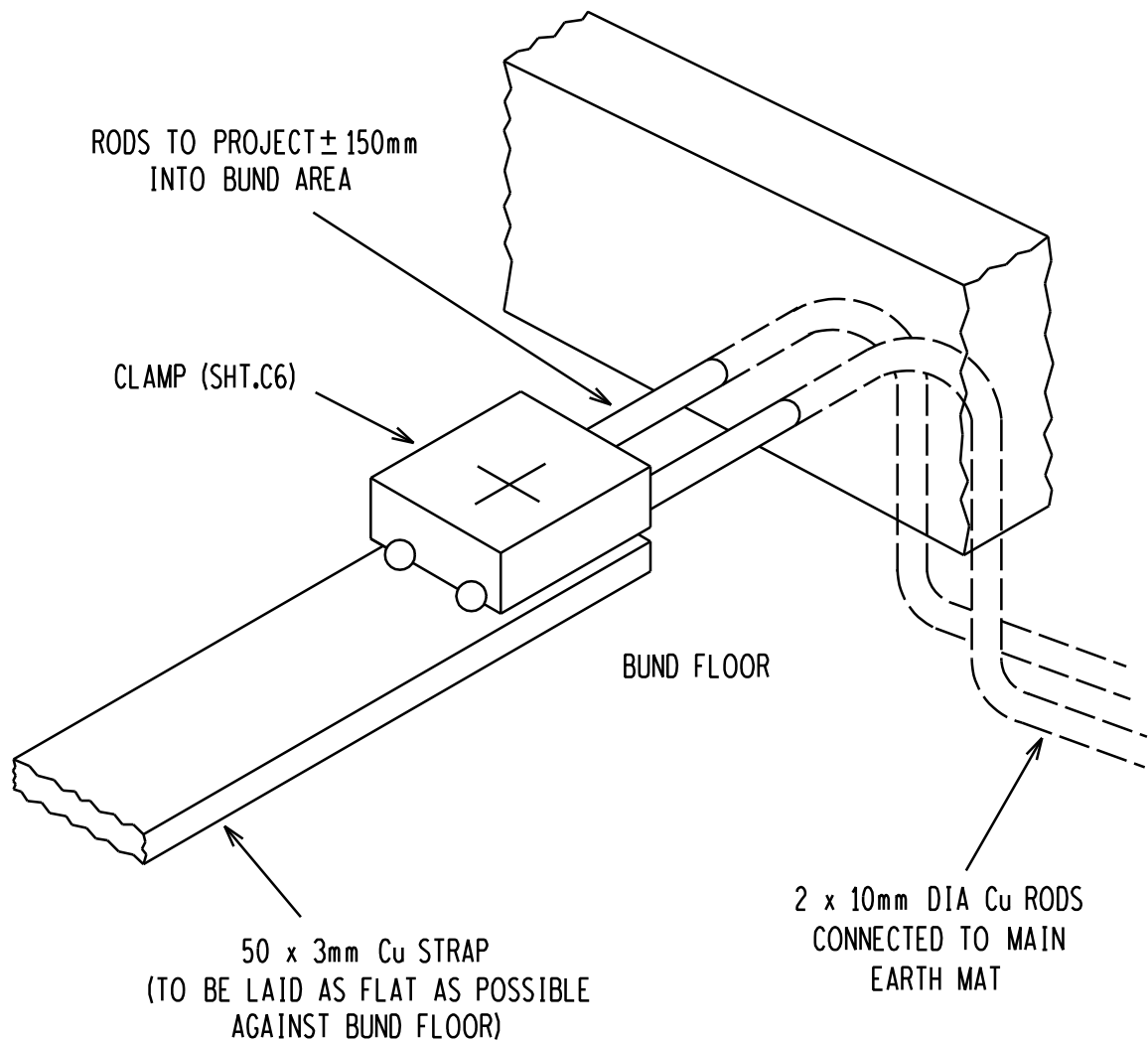
0.54/393

SHEET C25

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# BOLTED CONNECTION BETWEEN 50 x 3mm Cu STRAP AND 2 x 10mm DIA Cu RODS



THE C.A.D. REFERENCE NUMBER IS:  
 C100,164 100393EC26.R00



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EARTHING STANDARDS

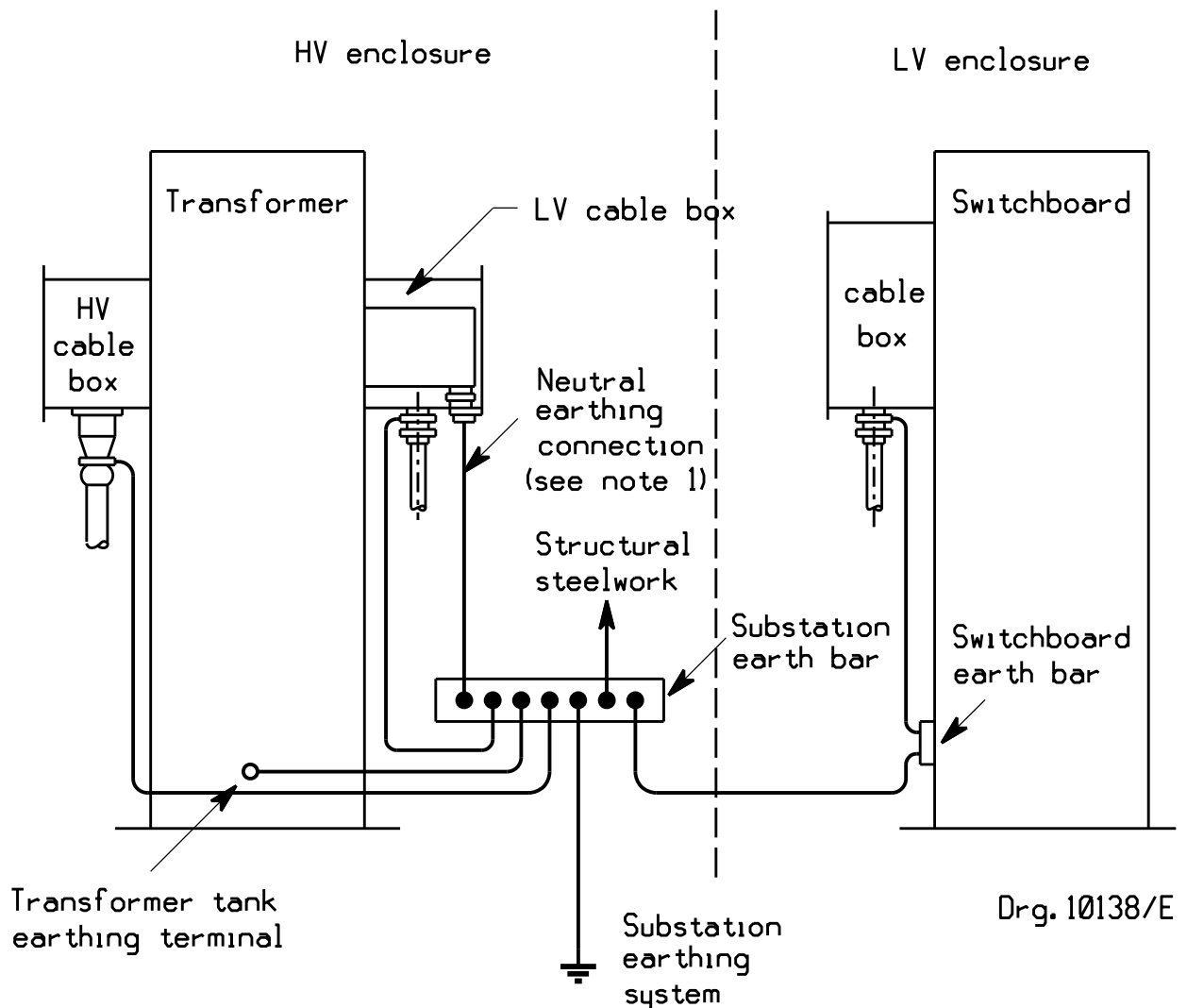
0.54/393

SHEET C26

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393C26.DGN

# TYPICAL LAYOUT OF SUBSTATION SHOWING REQUIRED EARTHING CONNECTIONS



Drg. 10138/E

## NOTES :

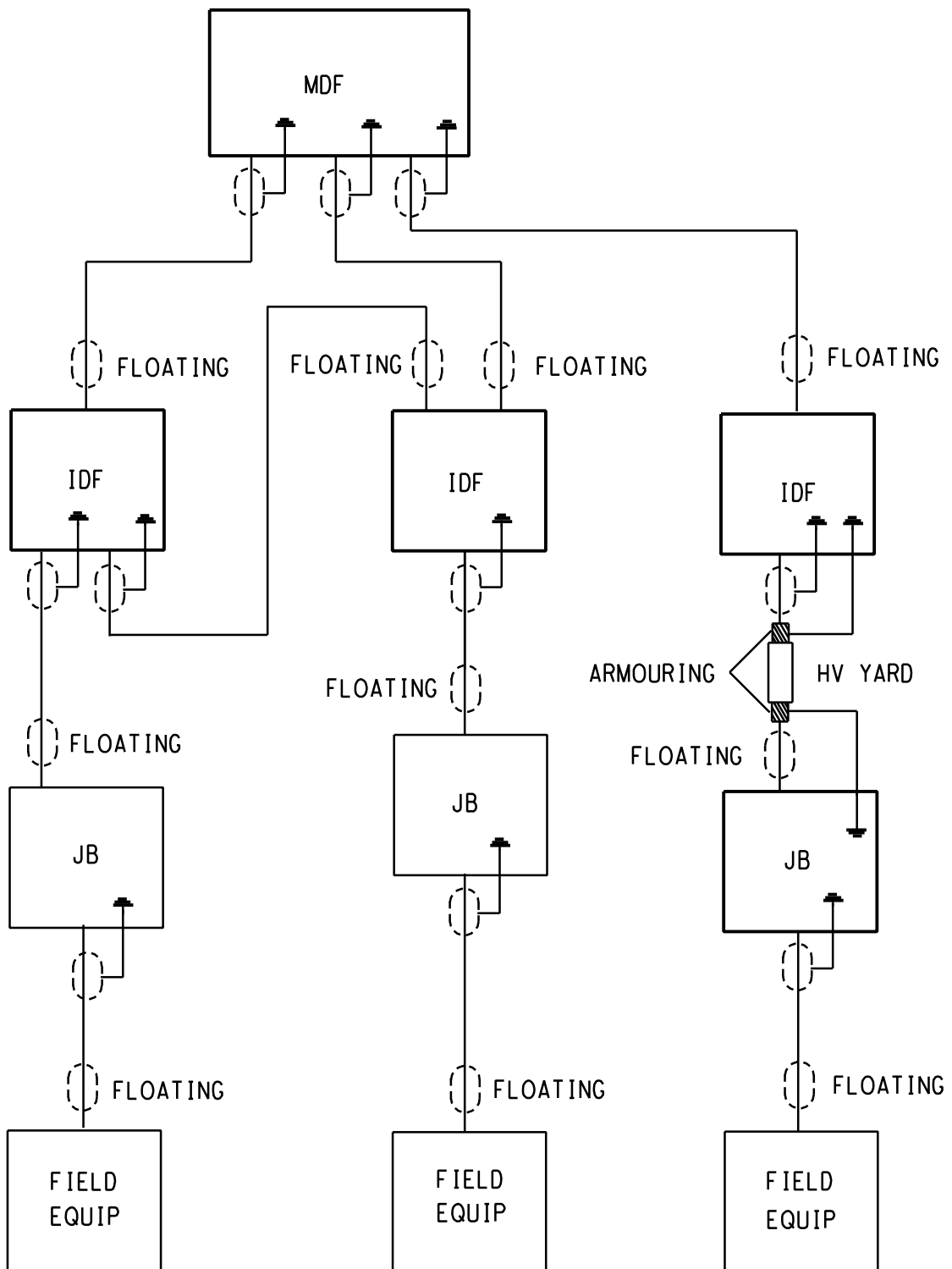
GENERAL: make earth connections to structures and equipment at points specifically provided for this purpose. Do not make earth connections to bolts or clamps designed for mechanical support because these may be removed temporarily or permanently (e.g. during maintenance work or alterations to the structure).

NOTE 1: Normal Eskom practice is to earth the neutral at the incomer in the switchboard.

 THE C.A.D. REFERENCE NUMBER IS:  
[100.164]00393EC27.R00


DRAWN GETEKEN	H.G.	04/04 89	CHKD NAGES		AUTH MAS	DvB AUG 89	BS AUG 89	REV	0	DATE DATUM	
EARTHING STANDARDS										0.54/393	
										SHEET C27	
DRG. TEK REGISTR										393C27.DGN	

# EARTHING OF TELEPHONE OR PROCESS CONTROL CABLES



THE C.A.D. REFERENCE NUMBER IS:  
[100.164]00393EC28.R00



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H.G.

31/03  
89

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NAGES

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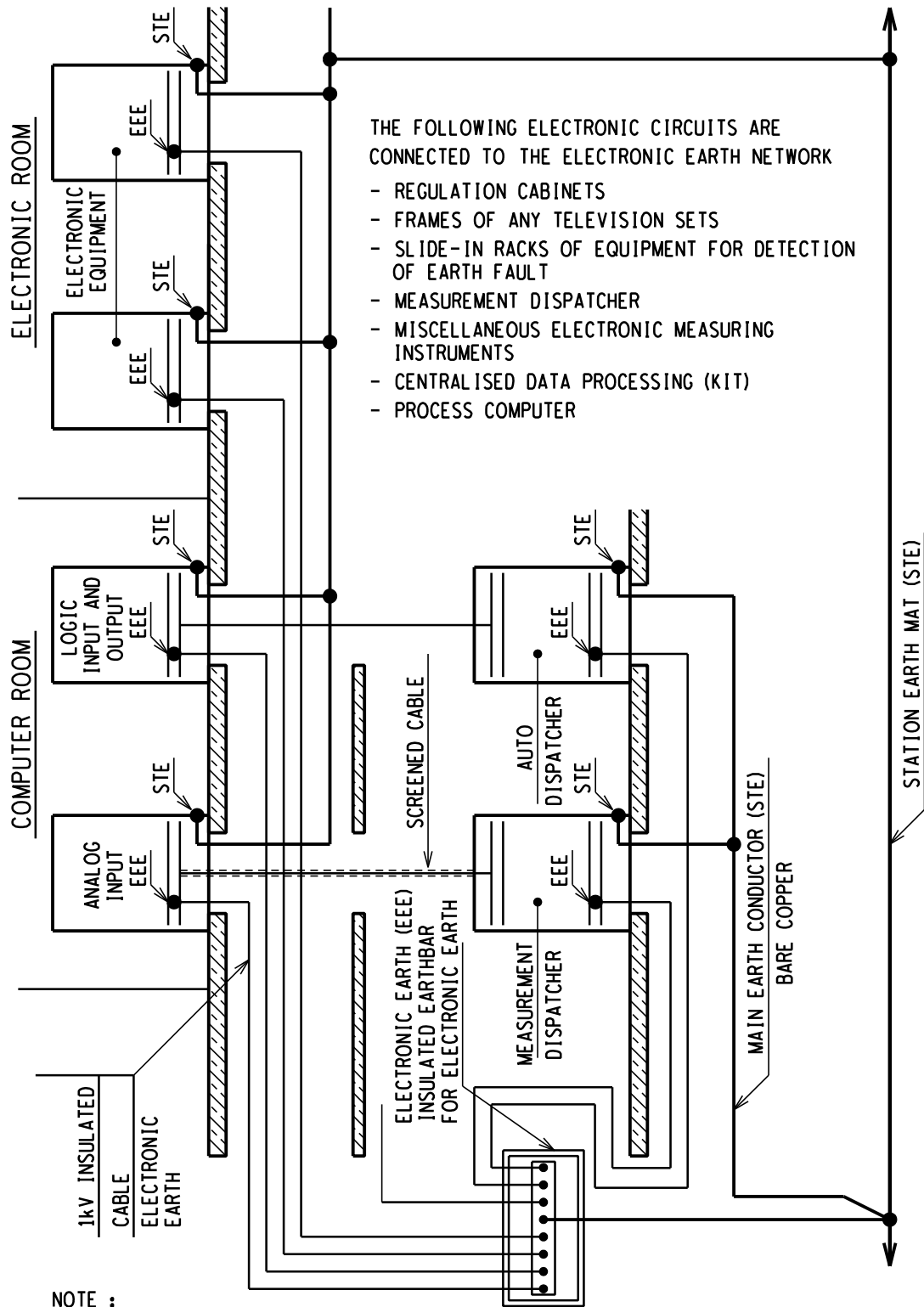
SHEET C28

DRG.TEK  
REGISTER

393C28.DGN



# EARTHING OF PROCESS CONTROL COMPUTERS



THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC29,R00



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EARTHING STANDARDS

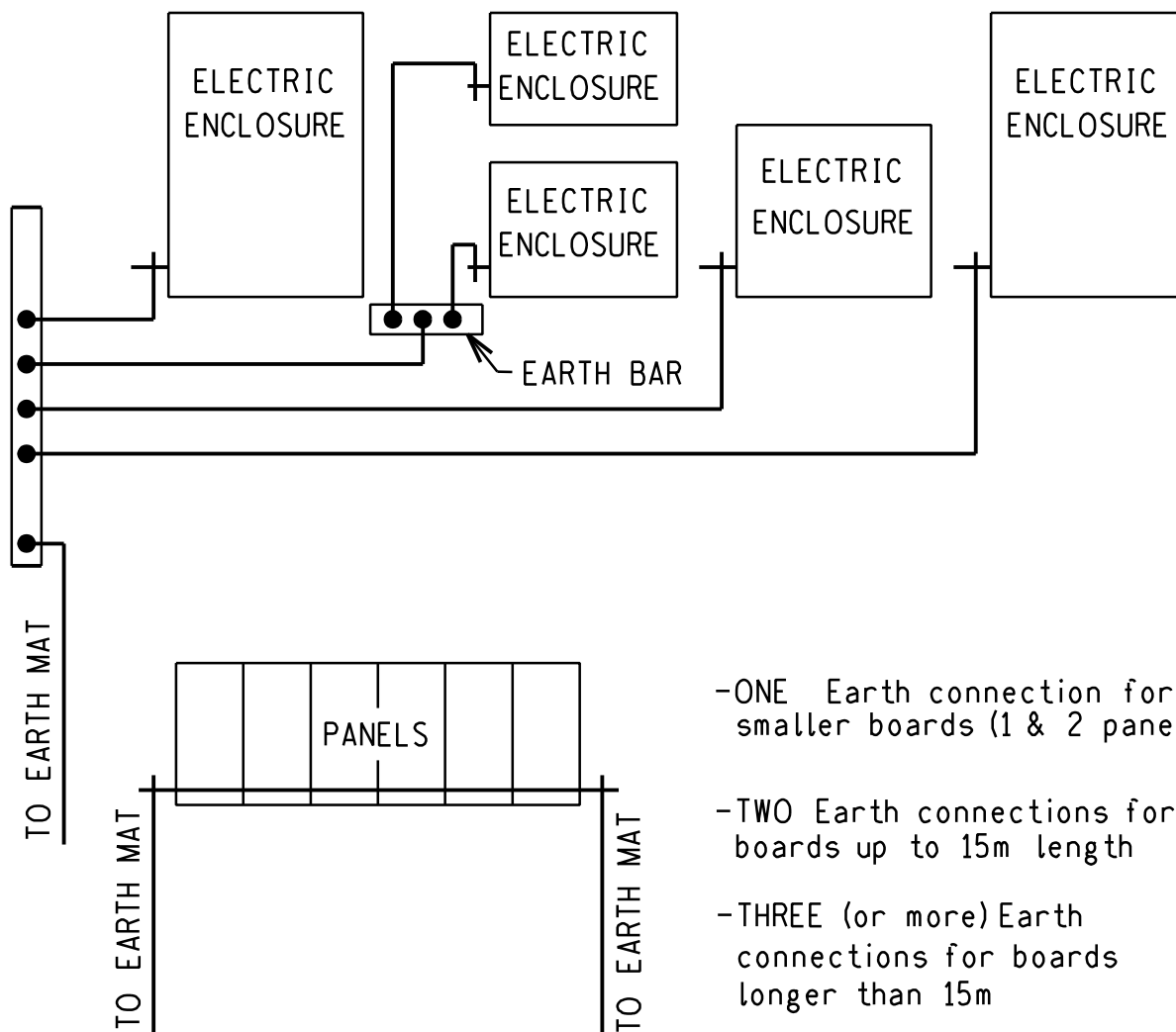
0.54/393

SHEET C29

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393C29.DGN

# EARTHING OF ELECTRIC ENCLOSURES



THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC30,R00



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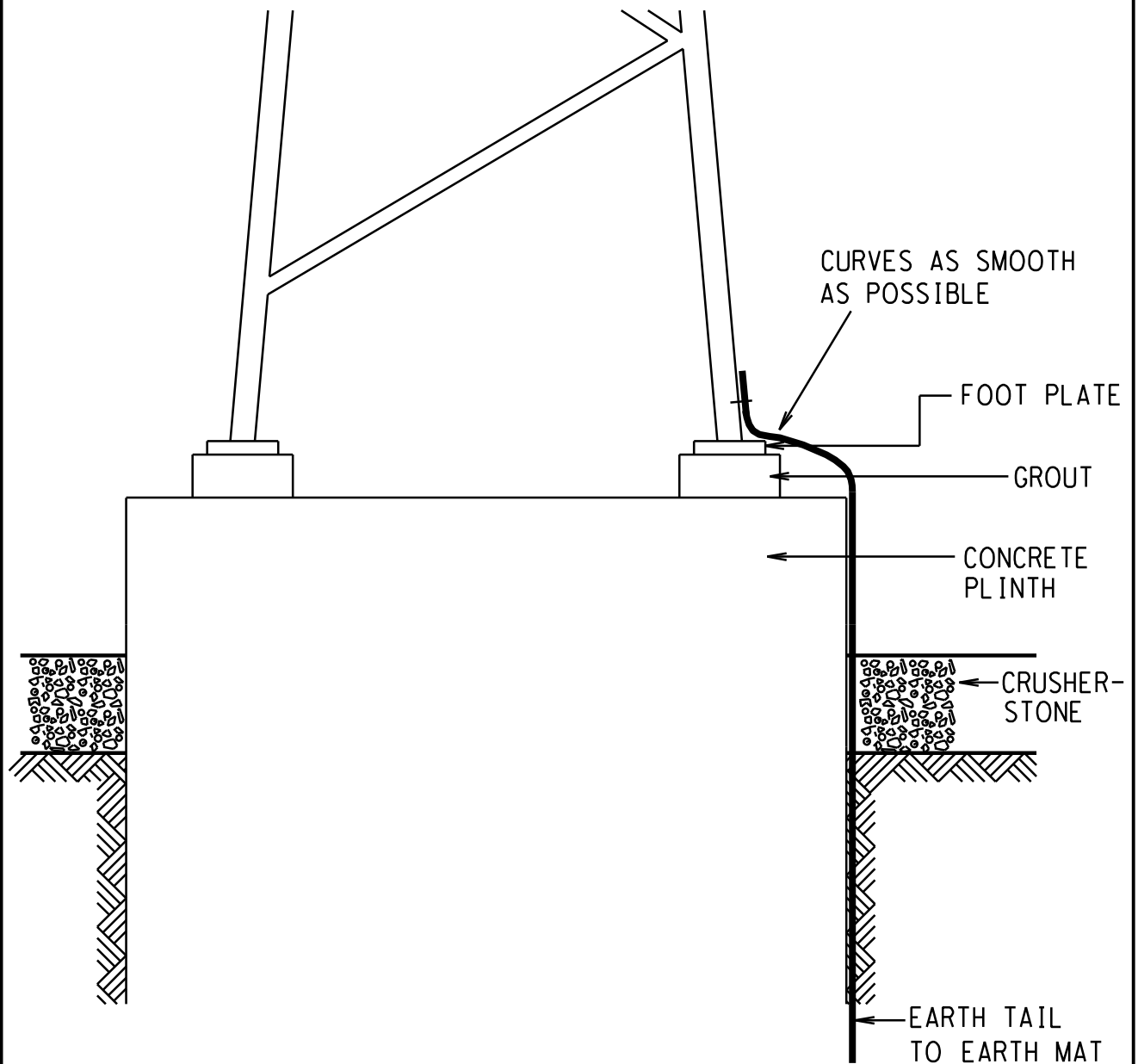
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SHEET C30

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REGISTR

393C30.DGN

# EARTHING OF STEEL STRUCTURES



THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EC31.R00



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EARTHING STANDARDS

0.54/393

SHEET C31

DRG.TEK  
REGISTR

393C31.DGN

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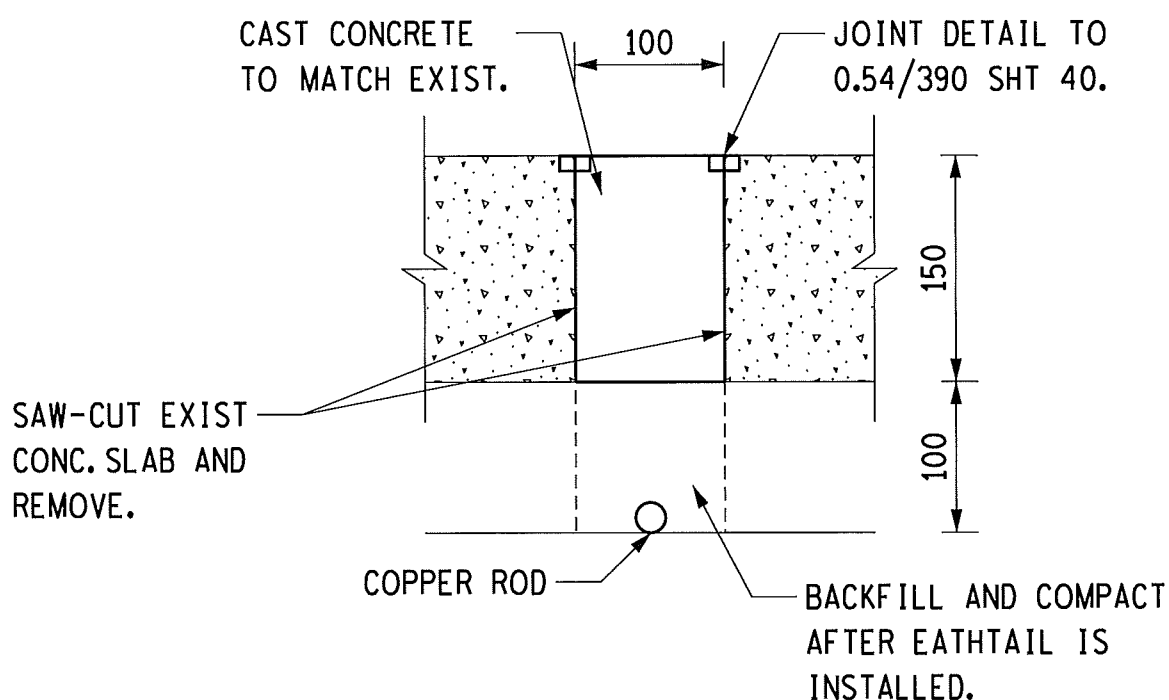
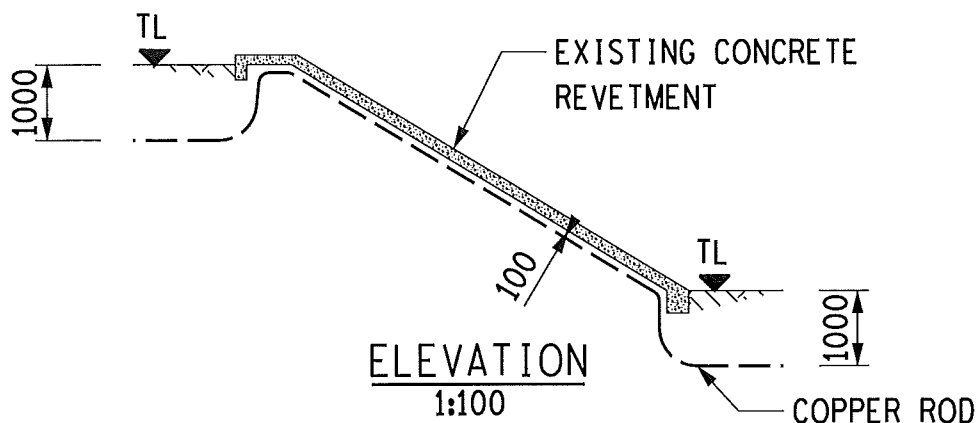
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SECTION THROUGH SAW-CUT REVETMENT

1:10

EARTHMAT RUNNING BEHIND EXISTING  
REVETMENT



ESKOM HOLDINGS LIMITED  
REG No  
2002/015527/06

0 FIRST ISSUE PM DN DS 30/07/15

REV REVISION DESCRIPTION BY CHKD AUTH DATE

EARTHING  
STANDARD

0.54/393

SHEET NUMBER REVISION

C32

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1

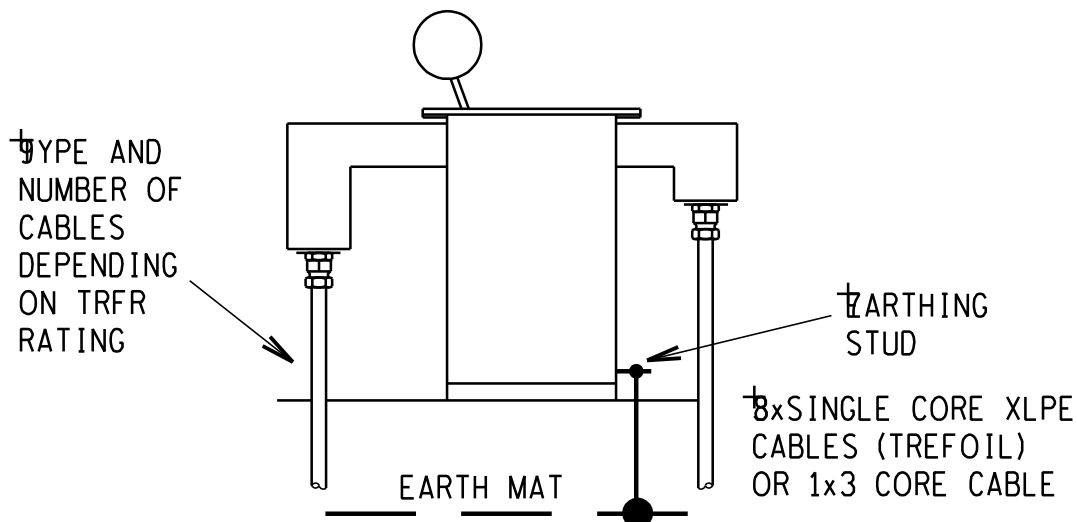
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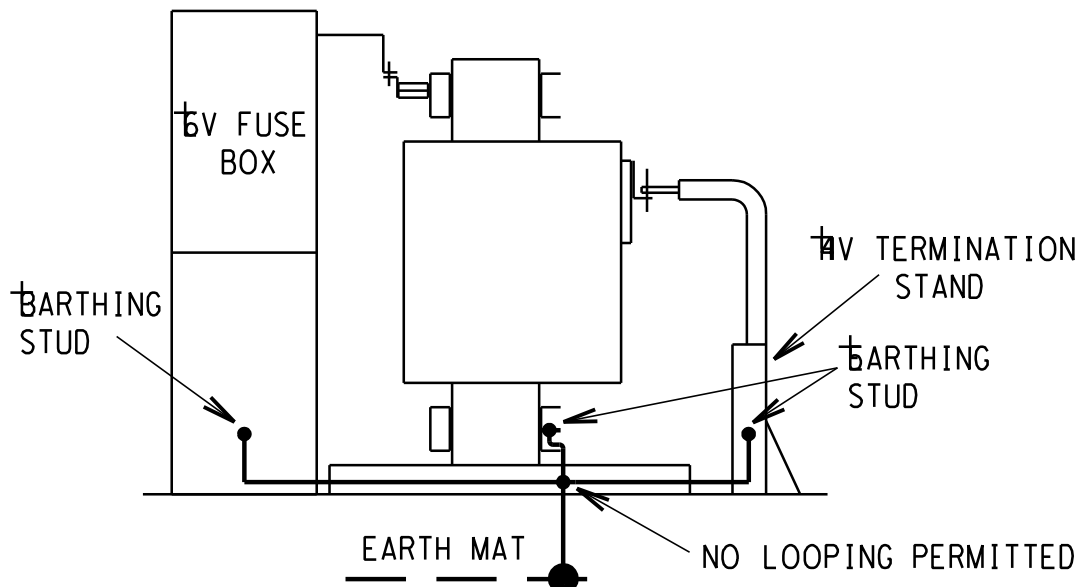
## OIL TYPE AUXILIARY TRANSFORMERS IN POWER STATION



### NOTES:

1. GLAND PLATES FOR HV AND LV TERMINATION BOXES TO BE NON MAGNETIC IF CONNECTIONS ARE TO BE SINGLE CORE CABLES.
2. MV + LV SINGLE CORE CABLES TO BE EARTHED AT SWITCH BOARDS ONLY.
3. FOR EARTHING OF LARGER TRANSFORMERS REFER TO SPECIFIC EARTHMAT LAYOUT DRAWINGS.

## DRY TYPE AUXILIARY TRANSFORMERS IN POWER STATION



THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EP01.R02



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GETEKEN

CHKD  
NAGES

AUTH  
MAS

DvB  
FEB 88

BS  
FEB 88

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DATE  
DATUM

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1988

# EARTHING STANDARDS

0.54/393

SHEET P1

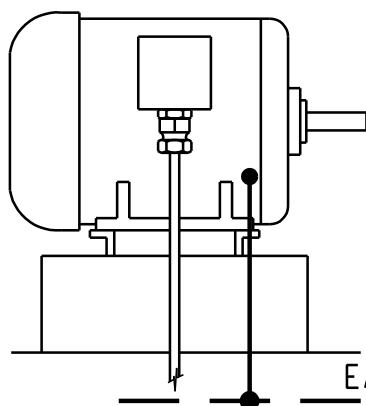
DRG.TEK  
REGISTR

393P01.DGN

# MOTORS FED BY XLPE OR THERMOPLASTIC INSULATED CABLES

MOTORS MOUNTED ON  
UNEARTHED MATERIAL

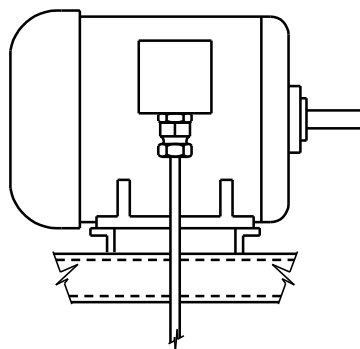
UP TO 660V



EARTH MAT

MOTORS MOUNTED ON  
EARTHED MATERIAL

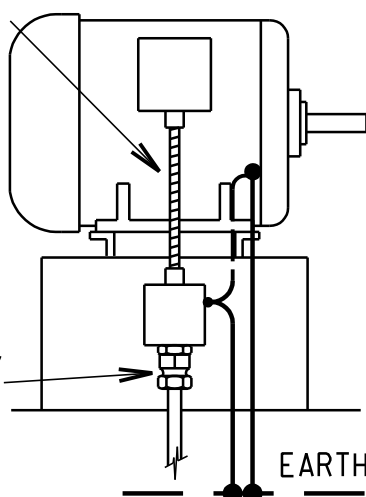
UP TO 660V



SEE NOTES

FLEXIBLE  
CONDUIT OR  
CABLE OF  
SMALLER  
RATED  
AREA

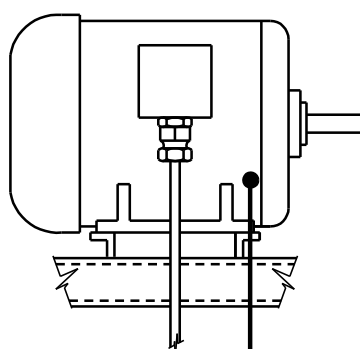
UP TO 660V



EARTH MAT

FUNCTION/  
REDUCTION  
BOX

ABOVE 660V



EARTH MAT

SEE NOTES

FLEX EARTHTAIL <1000 mm  
THEN ONTO COPPER

## NOTES:

1. MOTORS MOUNTED ON EARTHED STEELWORK AND CONNECTED WITH UNARMoured CABLES SHALL BE EARTHED TO EARTHMAT. WHERE A DEDICATED CORE IS PROVIDED FOR EARTHING PURPOSES, THIS CORE IS TO BE CONNECTED TO AN INTERNAL EARTHING POINT.
2. FOR EARTHING OF LARGE MOTORS REFER TO SPECIFIC EARTHMAT LAYOUT DRAWINGS.
3. FOR MOTORS FED BY CABLES UP TO 16 mm<sup>2</sup> A FOURTH CABLE CAN BE USED AS EARTH CONTINUITY CONDUCTOR. FOR MOTORS FED BY CABLES >25 mm<sup>2</sup> A SEPARATE LOCAL EARTH CONNECTION IS REQUIRED.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164100393EP02.R01



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

DvB  
FEB 88

BS  
FEB 88

REV

1

DATE  
DATUM

10.11.  
1988

EARTHING STANDARDS

0.54/393

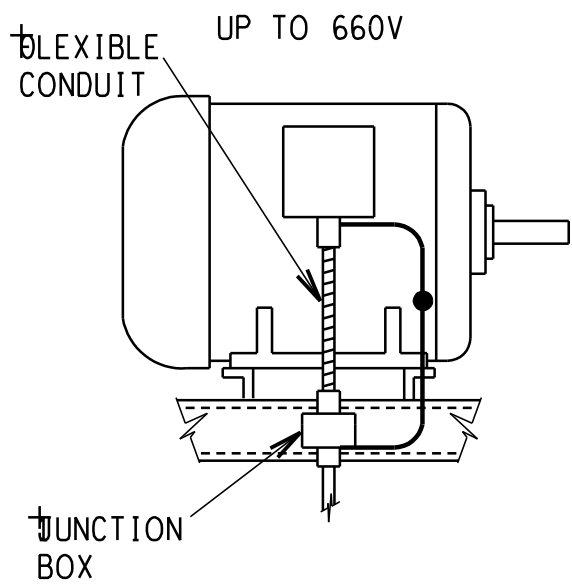
SHEET P2

DRG.TEK  
REGISTR

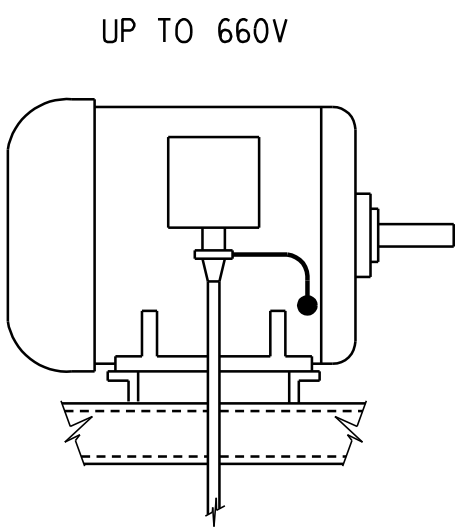
393P02.DGN

MOTORS FED BY MICC, CONDUIT OR PILCSWA CABLES

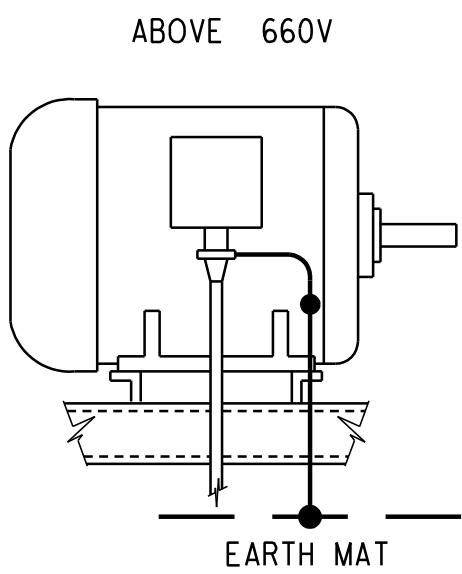
MOUNTED ON EARTHED MATERIAL



MINERAL INSULATED CABLES  
OR CABLES IN CONDUIT



P.I.L.C.S.W.A. CABLES



EARTH MAT

P.I.L.C.S.W.A. CABLES

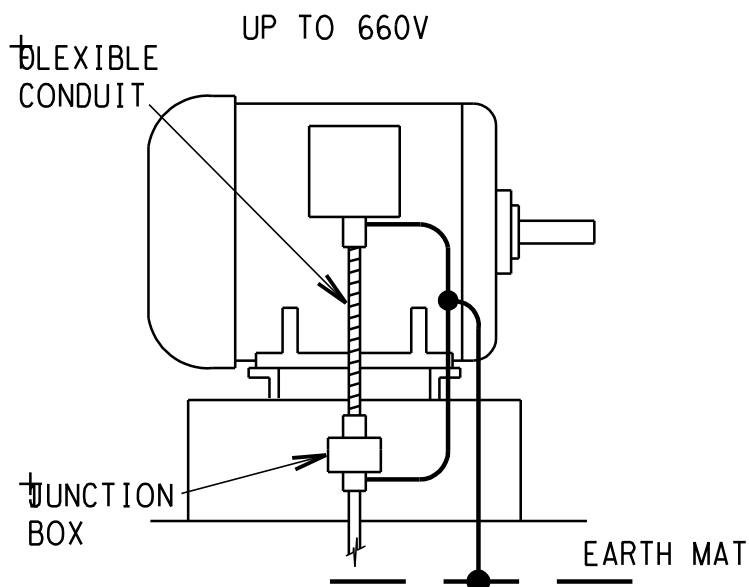
THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EP03.R00



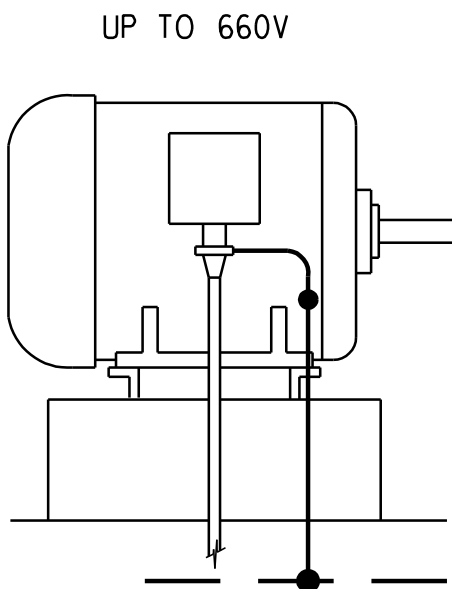
DRAWN GETEKEN		CHKD NAGES		AUTH MAS	DvB FEB 88	BS FEB 88	REV	0	DATE DATUM	
EARTHING STANDARDS							0.54/393			
							SHEET P3			
DRG.TEK REGISTR							393P03.DGN			

# MOTORS FED BY MICC, CONDUIT OR PILCSWA CABLES

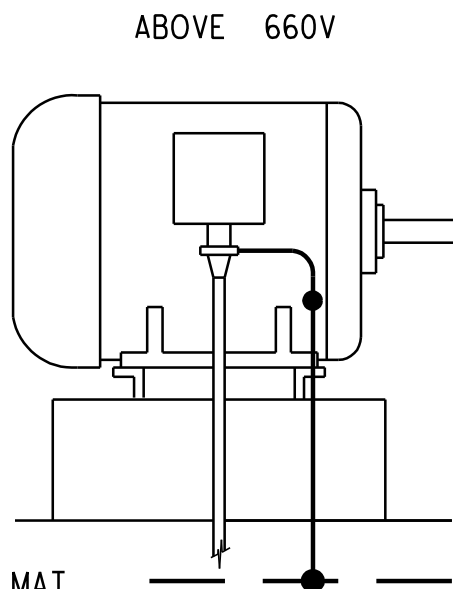
## MOUNTED ON UNEARTHED MATERIAL



MINERAL INSULATED CABLES  
OR CABLES IN CONDUIT



P.I.L.C.S.W.A. CABLES



P.I.L.C.S.W.A. CABLES

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EP04.R00



ESKOM

DRAWN  
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CHKD  
NAGES

AUTH  
MAS

DvB  
FEB 88

BS  
FEB 88

REV

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DATE  
DATUM

EARTHING STANDARDS

0.54/393

SHEET P4

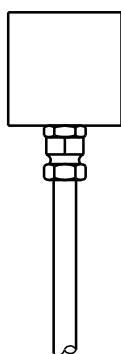
DRG.TEK  
REGISTR

393P04.DGN



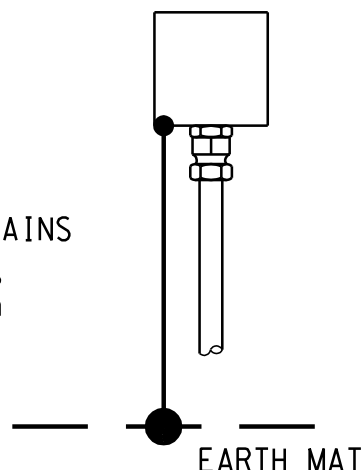
# CONTROL EQUIPMENT & MOTOR STARTERS (CONNECTED BY ARMOURED OR UNARMOURED THERMOPLASTIC INSULATED CABLES)

CONTROL EQUIPMENT MOUNTED  
ON EARTHED MATERIAL



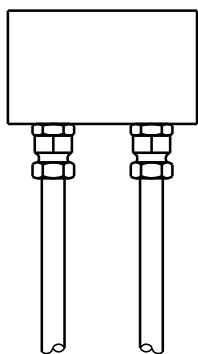
SEE NOTE

CONTROL EQUIPMENT MOUNTED  
ON UNEARTHED MATERIAL



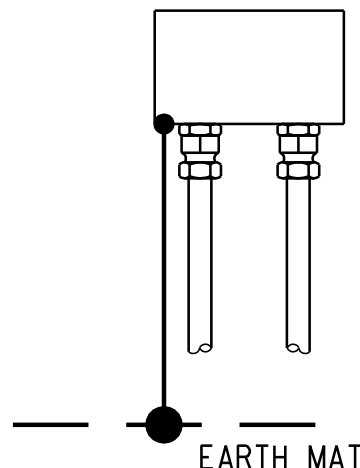
CONDUCTOR TO BE AT  
LEAST ONE HALF OF MAINS  
CONDUCTOR WITH  
MAXIMUM OF 70(75) mm<sup>2</sup>

MOTOR STARTERS MOUNTED  
ON EARTHED MATERIAL



SEE NOTE

MOTOR STARTERS MOUNTED  
ON UNEARTHED MATERIAL



## NOTE:

STEEL ENCLOSURES MOUNTED ON EARTHED MATERIAL AND CONNECTED  
WITH UNARMOURED CABLES SHALL BE EARTHED TO EARTH MAT.  
WHERE A DEDICATED CORE IS PROVIDED FOR EARTHING PURPOSES,  
THIS CORE IS TO BE CONNECTED TO AN INTERNAL EARTHING POINT.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164100393EP05.R01



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

DvB  
FEB 88

BS  
FEB 88

REV

1

DATE  
DATUM

10.11.  
1988

EARTHING STANDARDS

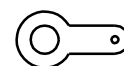
0.54/393

SHEET P5

DRG.TEK  
REGISTR

393P05.DGN

EARTH LUG

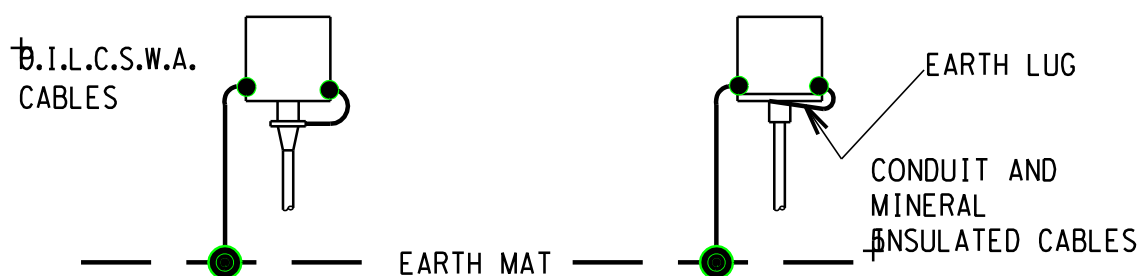


## CONTROL EQUIPMENT AND MOTOR STARTERS (CONNECTED BY MICC, CONDUIT OR PILCSWA CABLES)

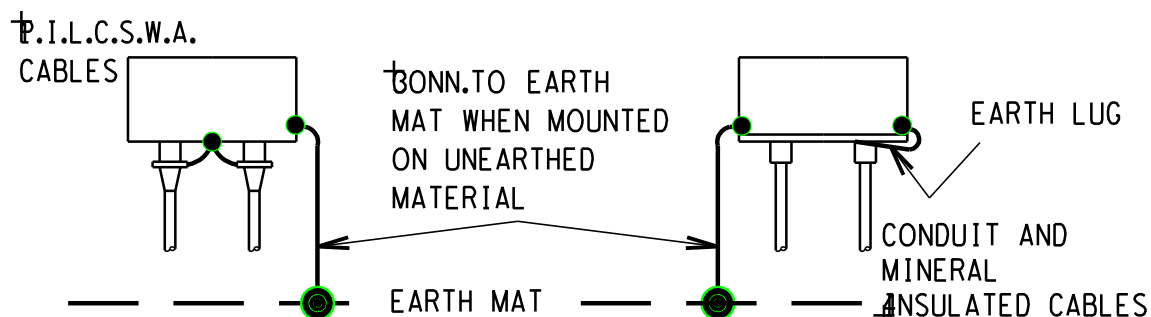
### MOUNTED ON EARTHED MATERIAL



### MOUNTED ON UNEARTHED MATERIAL



## MOTOR STARTERS IRRESPECTIVE OF MOUNTING



THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EP06.R00



ESKOM

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GETEKEN

CHKD  
NAGES

AUTH  
MAS

DvB  
FEB 88

BS  
FEB 88

REV

0

DATE  
DATUM

EARTHING STANDARDS

0.54/393

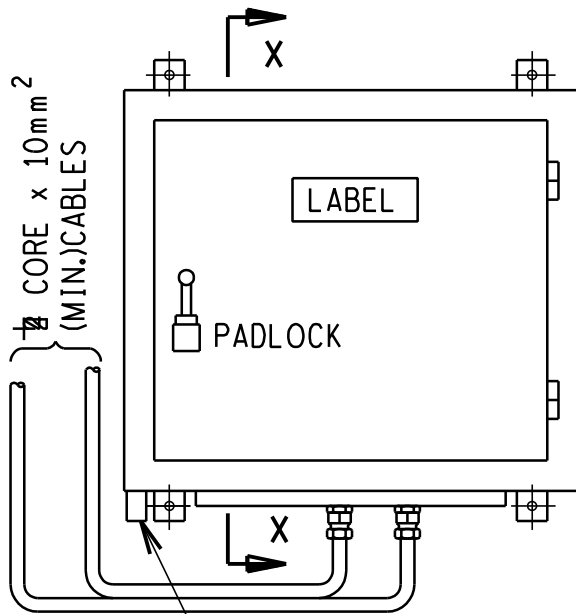
SHEET P6

DRG.TEK  
REGISTR

393P06.DGN

# POWER STATION AUXILIARY BAY

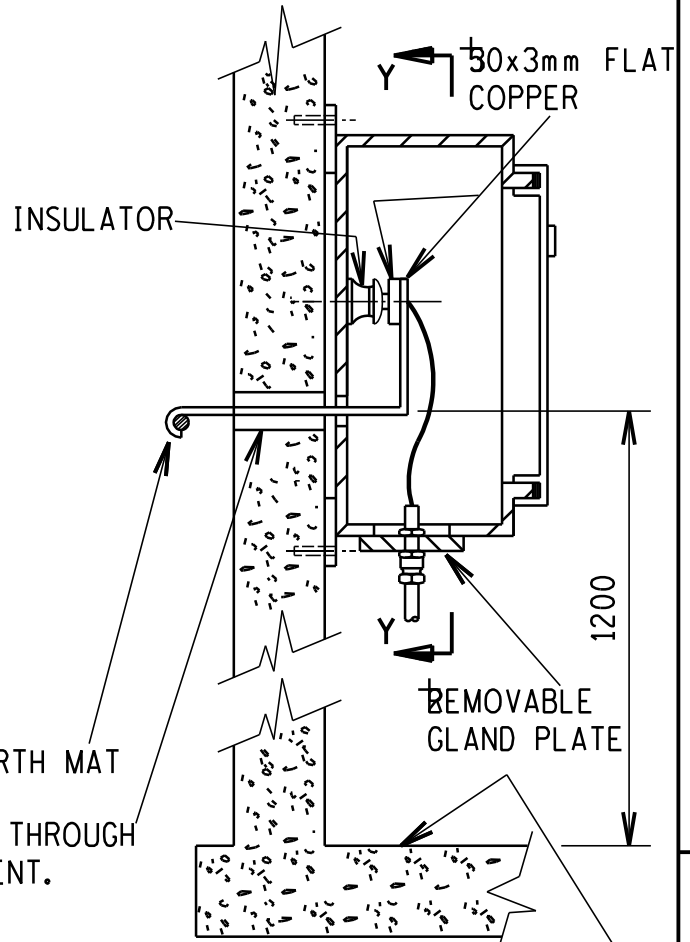
## SIGNAL EARTH TERMINATION BOX



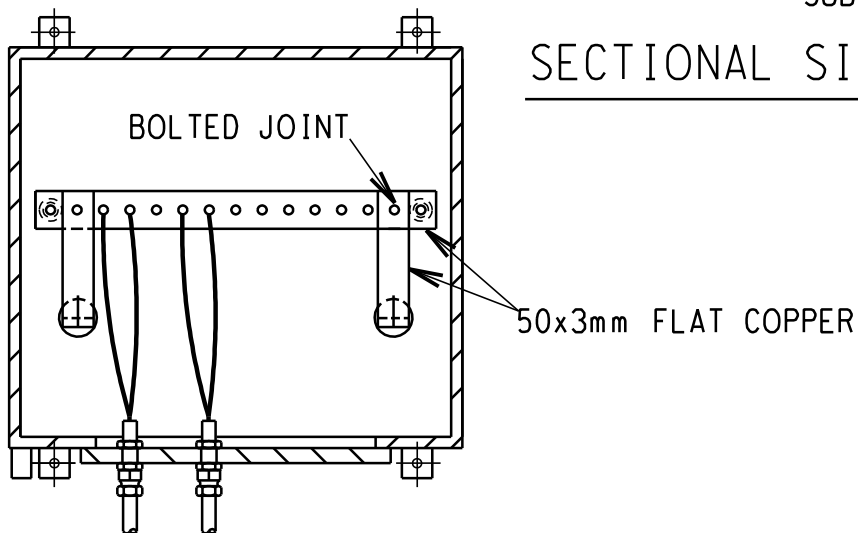
FRONT VIEW

CONNECTION TO MAIN EARTH MAT

50mm DIA PLASTIC PIPE THROUGH  
CONCRETE OF SUB BASEMENT.  
(TO BE SEALED OFF WITH  
WATERTIGHT SEALANT)



SECTIONAL SIDE VIEW X-X



SECTIONAL FRONT VIEW Y-Y

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EP07.R00



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GETEKEN

CHKD  
NAGES

AUTH  
MAS

DvB  
FEB 88

BS  
FEB 88

REV

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DATE  
DATUM

EARTHING STANDARDS

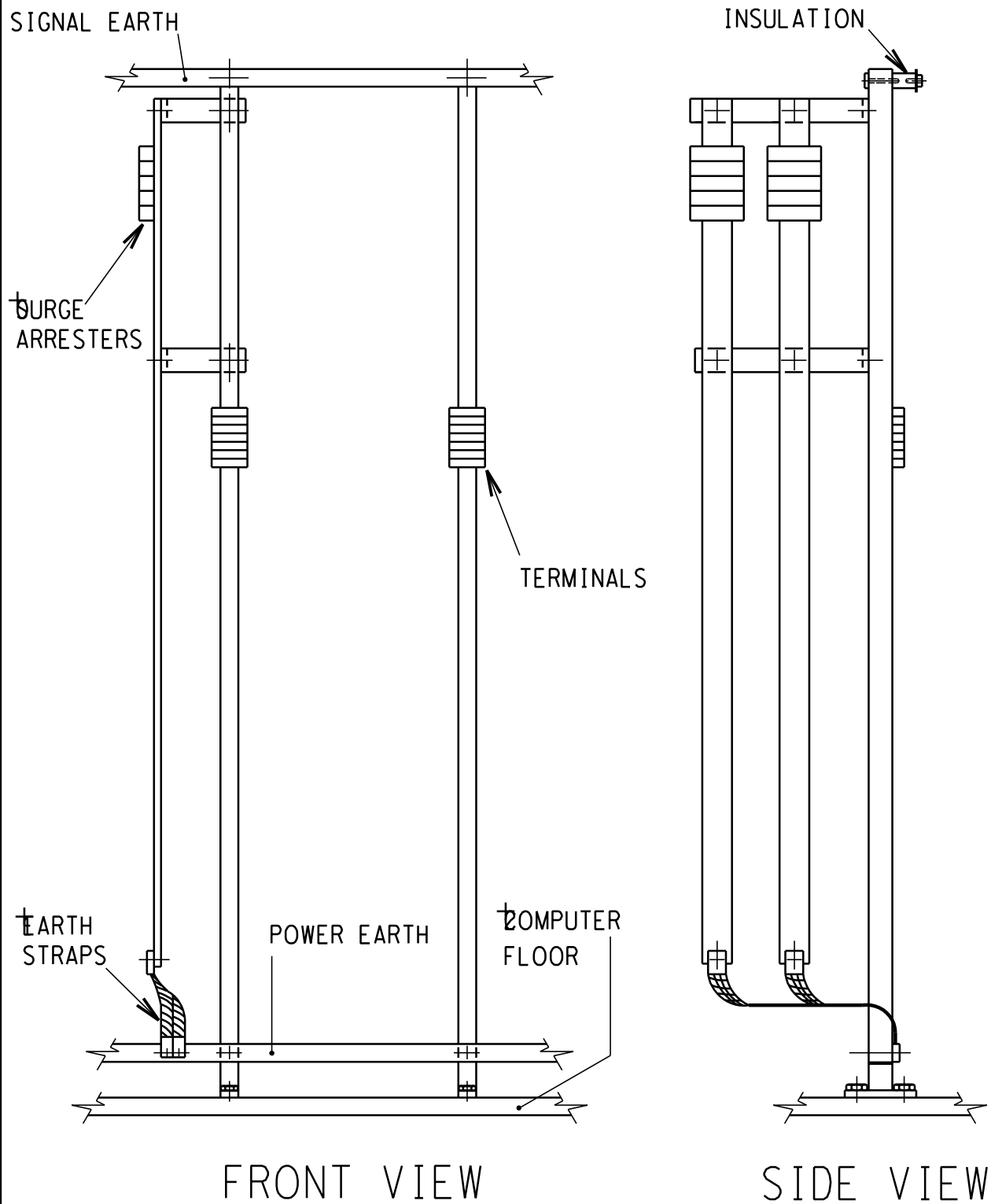
0.54/393

SHEET P7

DRG.TEK  
REGISTR

393P07.DGN

# EARTHING OF SIGNAL DISTRIBUTION FRAMES



THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EP08.R00



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

DvB  
FEB 88

BS  
FEB 88

REV

0

DATE  
DATUM

EARTHING STANDARDS

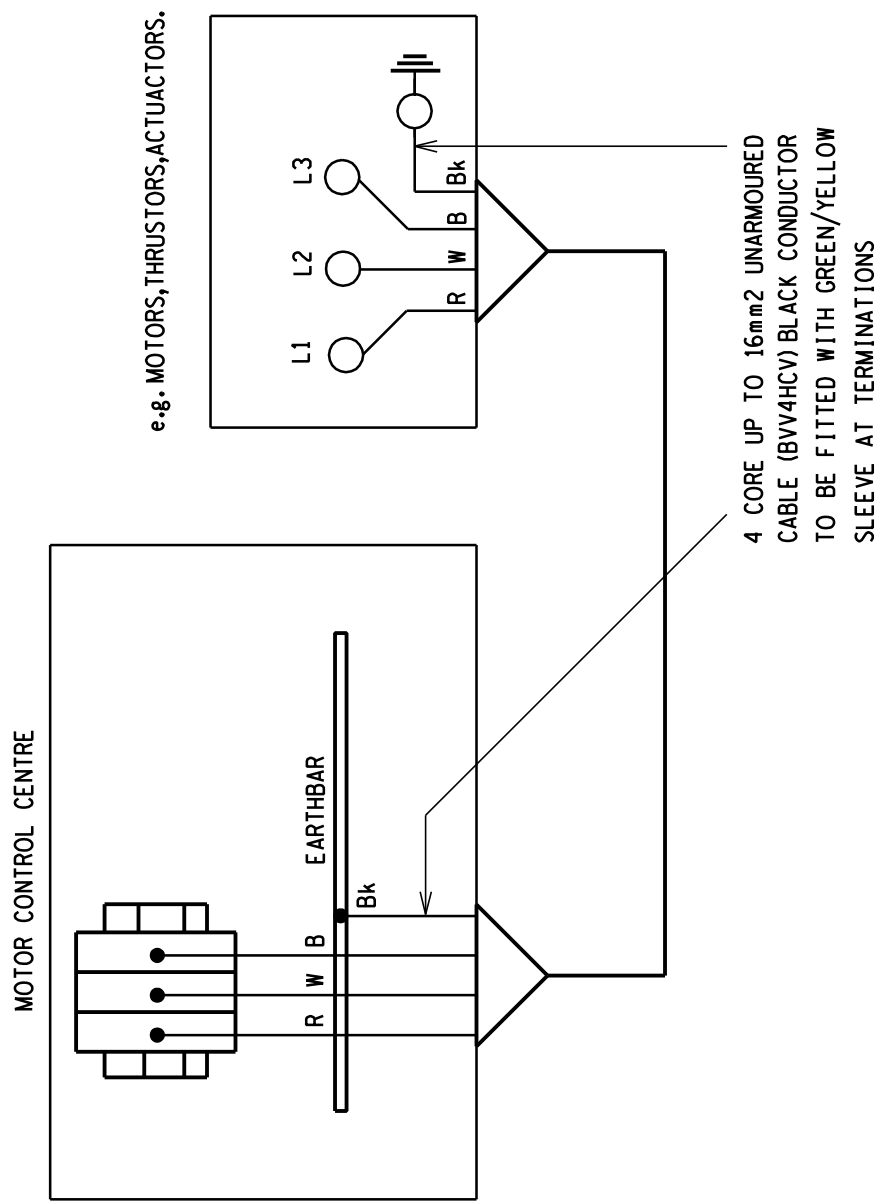
0.54/393

SHEET P8

DRG.TEK  
REGISTR

393P08.DGN

# EARTHING OF SMALLER 3 PHASE CONSUMERS WITHOUT NEUTRAL WITH 4 CORE UNARMoured CABLE

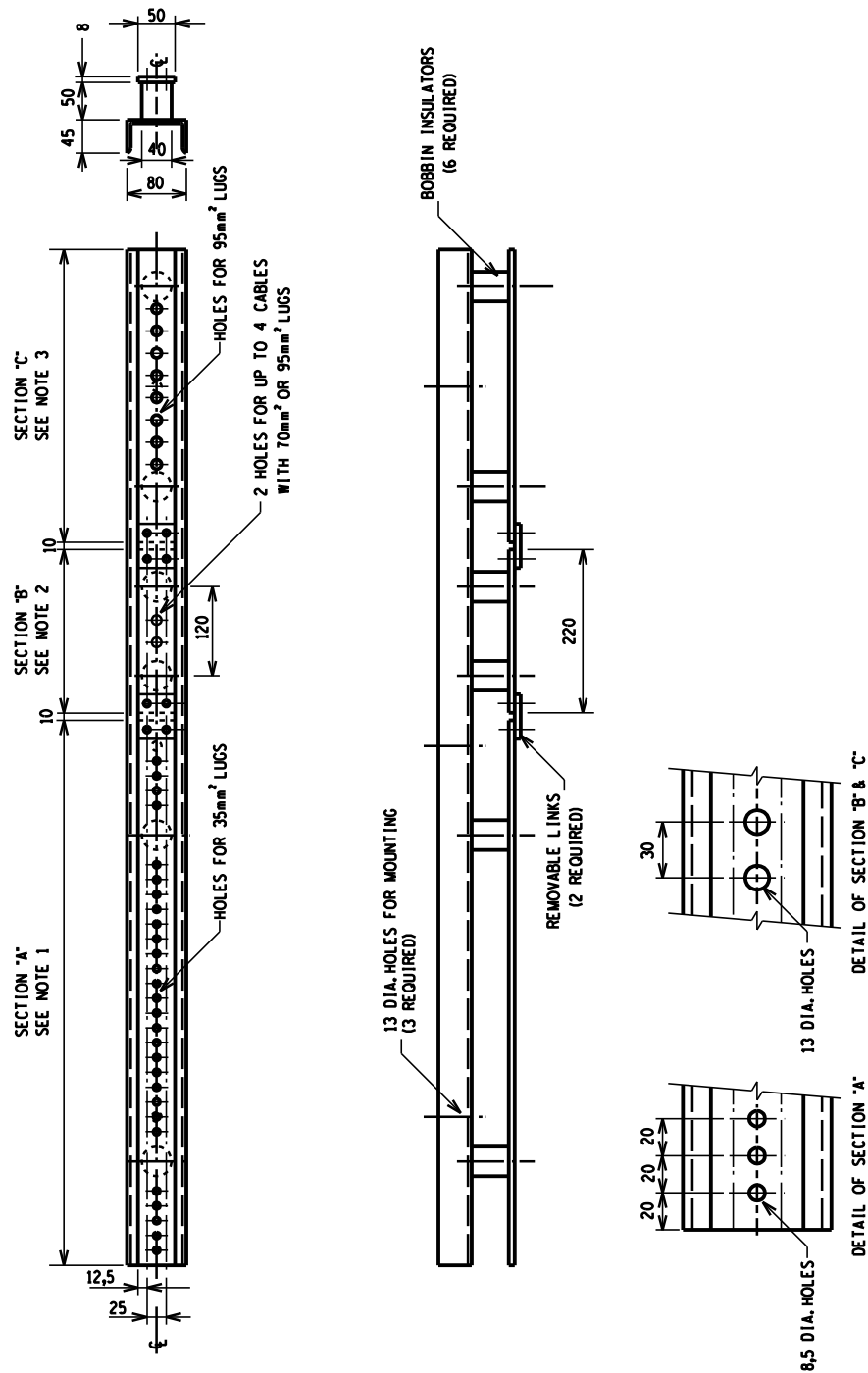


THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393EP09.R00



DRAWN GETEKEN	H.G.	31/03 89	CHKD NAGES		AUTH MAS	DvB AUG 89	BS AUG 89	REV	0	DATE DATUM
EARTHING STANDARDS								0.54/393		
								SHEET P9		
DRG.TEK REGISTR								393P09.DGN		

# INSULATED MAIN SCREEN EARTH BAR TYPICAL ARRANGEMENT



- NOTES:
1. SECTION 'A' - FOR EARTHING OF ELECTRONIC SYSTEMS LENGTH TO SUIT
  2. SECTION 'B' - FOR CONNECTION TO EARTH MAT
  3. SECTION 'C' - FOR EARTHING OF EQUIPMENT CUBICLES LENGTH TO SUIT

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393EP10.R00



DRAWN  
GETEKEN

DHL

CHKD  
NAGES

IH

AUTH  
MAS

DvB  
AUG 89

BS  
AUG 89

REV

0

DATE  
DATUM

EARTHING STANDARDS

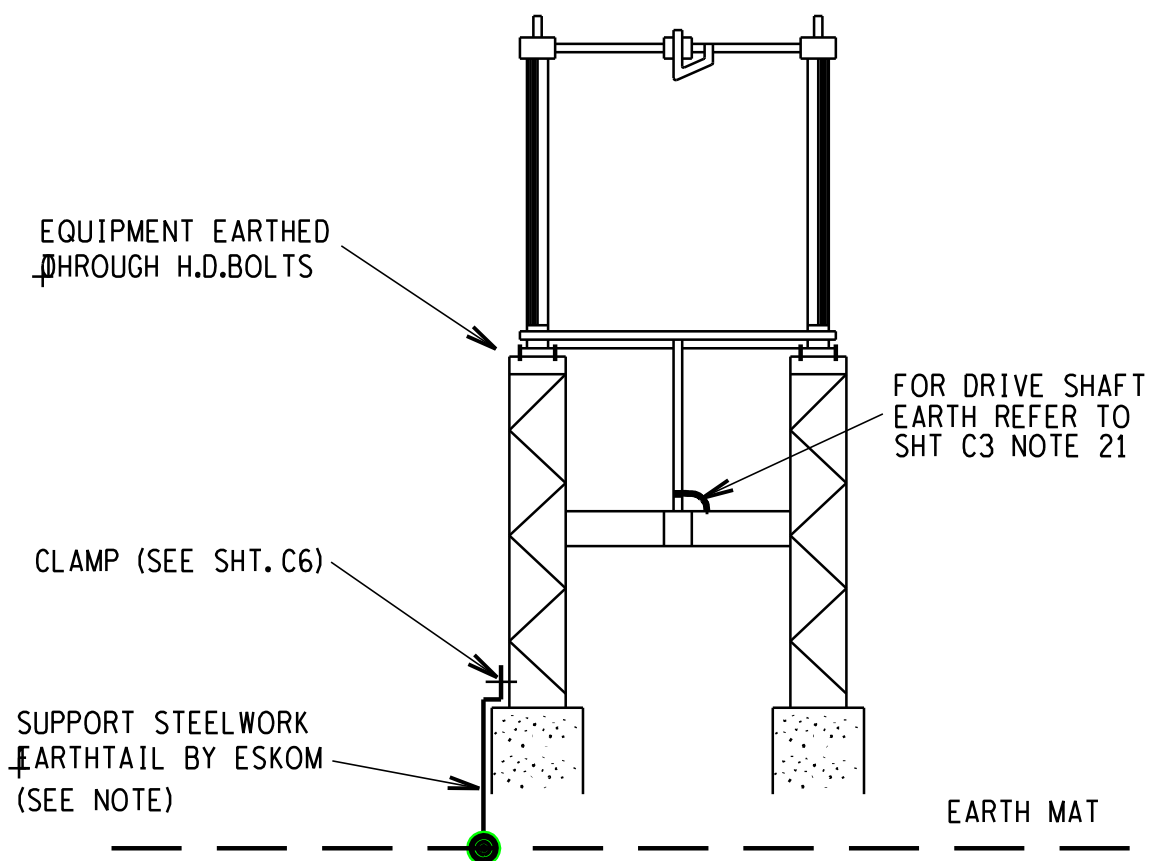
0.54/393

SHEET P10

DRG.TEK  
REGISTR

393P10.DGN

# ISOLATOR WITHOUT EARTHING BLADES



## NOTE:

SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393ET01.R02



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

LER  
FEB 88

REV

2

DATE  
DATUM

7.6.  
1995

EARTHING STANDARDS

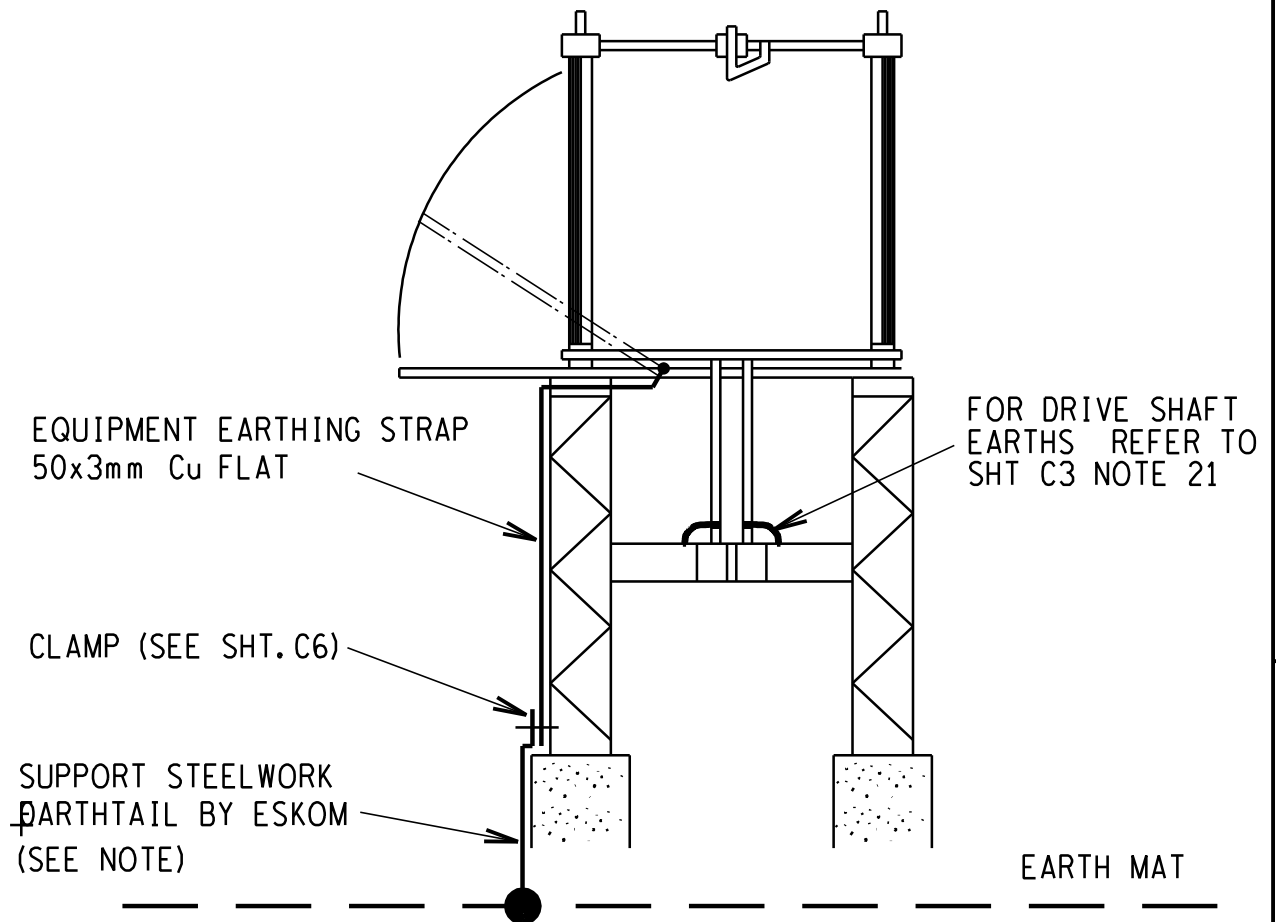
0.54/393

SHEET I1

DRG.TEK  
REGISTR

393TQ1.DGN

## ISOLATOR WITH ONE EARTHING BLADE



NOTE:

SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
[[100,164]00393ET02.R02



ESKOM

DRAWN  
GETEKENCHKD  
NAGES

AUTH  
MAS

LER  
FEB 88

REV

2

DATE  
DATUM7.6.  
1995

# EARTHING STANDARDS

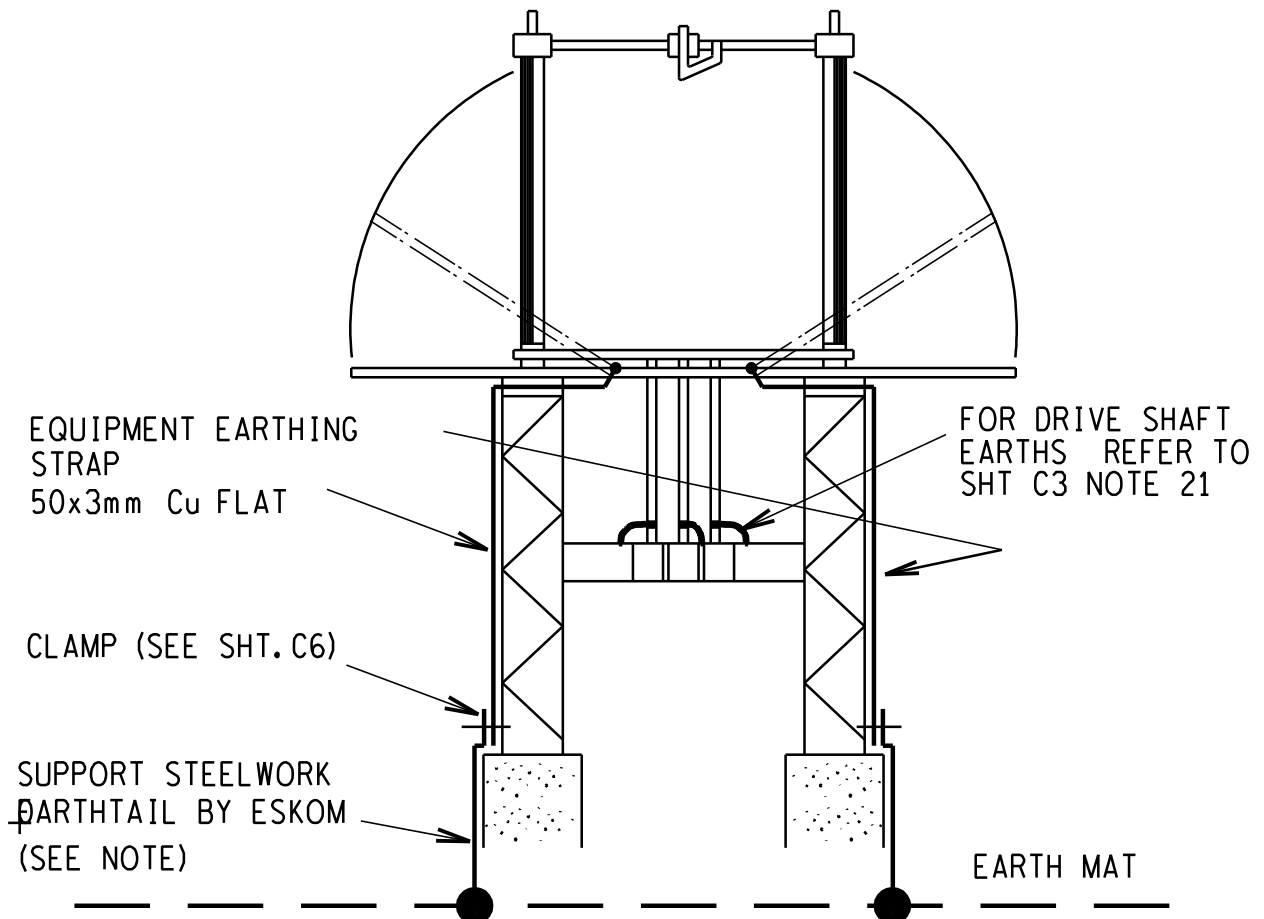
0.54/393

SHEET 12DRG.TEK  
REGISTR

393T02.DGN



# ISOLATOR WITH TWO EARTHING BLADES



## NOTE:

SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
[100.164100393ET03.R02



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

LER  
FEB 88

REV

2

DATE  
DATUM

7.6.  
1995

EARTHING STANDARDS

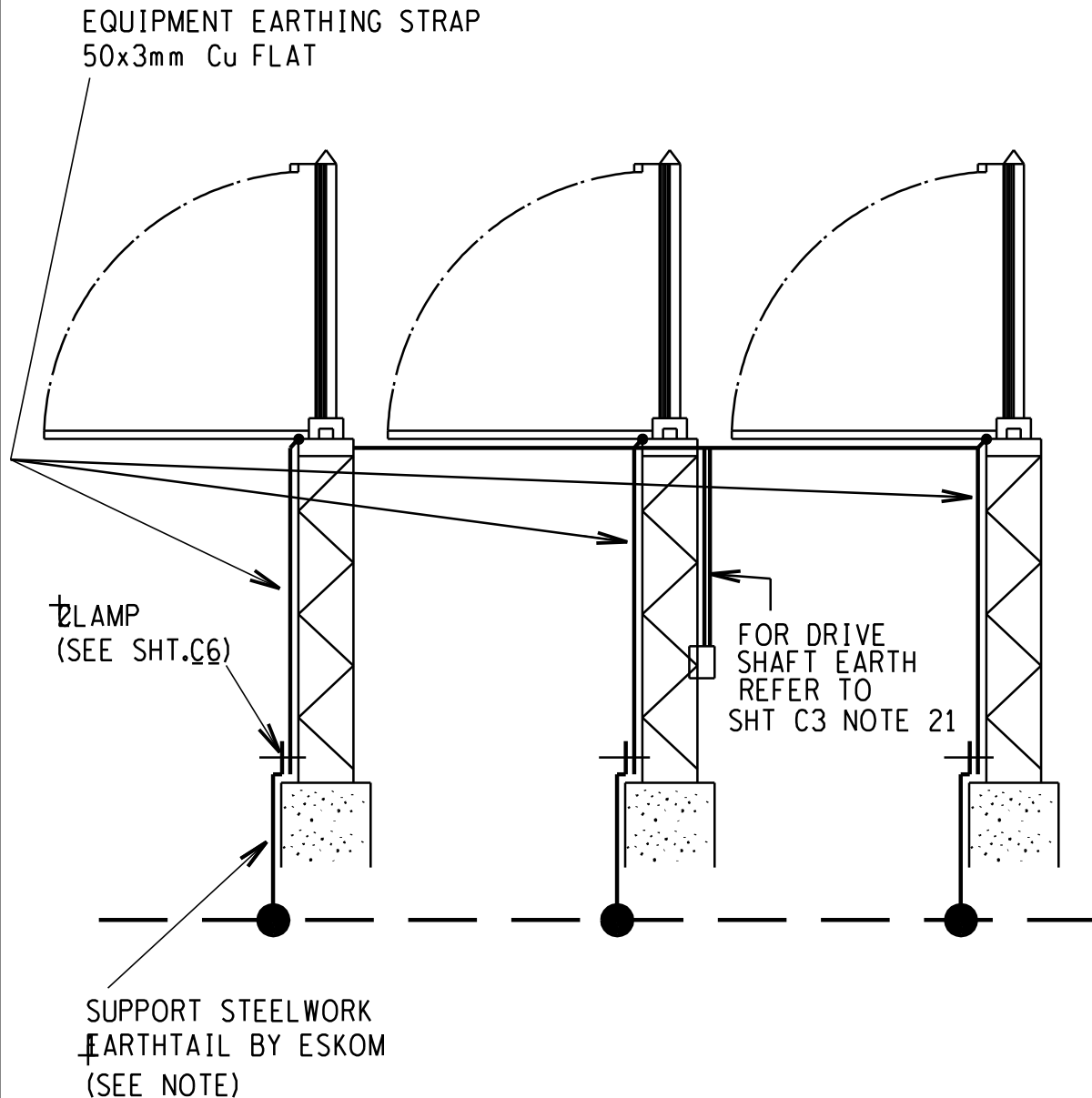
0.54/393

SHEET 13

DRG. TEK  
REGISTR

393T03.DGN

# EARTHING SWITCHES



## NOTE:

SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS  
TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION  
FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164100393T04,R02



ESKOM

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GETEKEN

CHKD  
NAGES

AUTH  
MAS

LER  
FEB 88

REV

2

DATE  
DATUM

7.6.  
1995

EARTHING STANDARDS

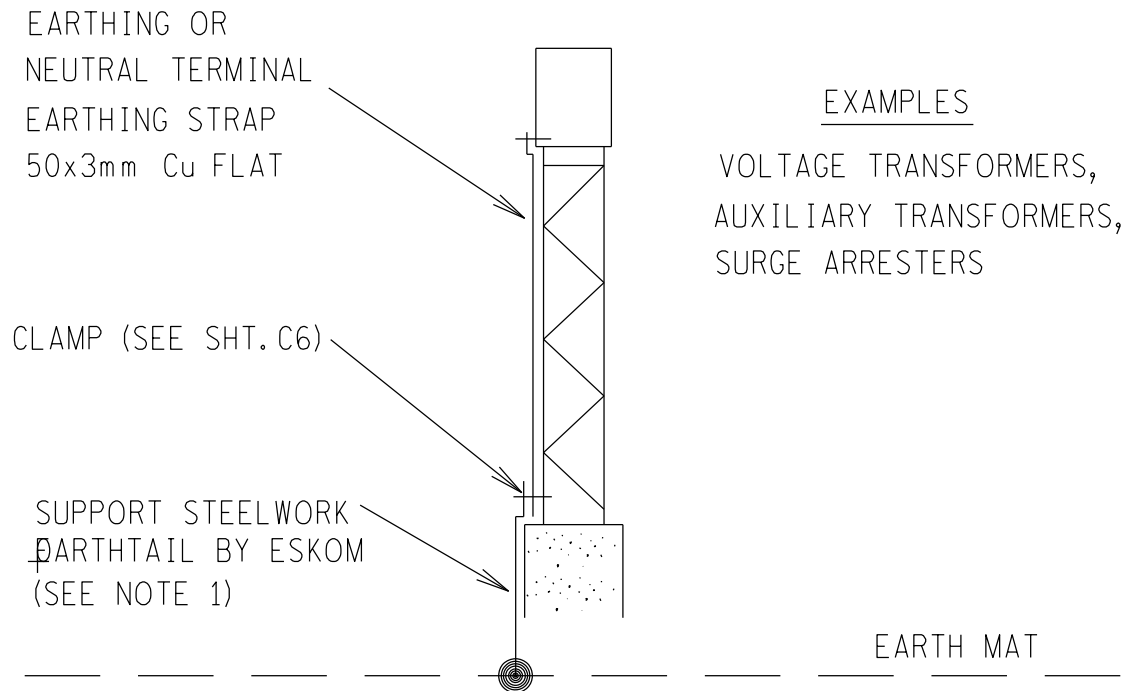
0.54/393

SHEET I4

DRG.TEK  
REGISTER


393T04.DGN

# NEUTRALS OF EQUIPMENT MOUNTED ON EARTHED STEELWORK

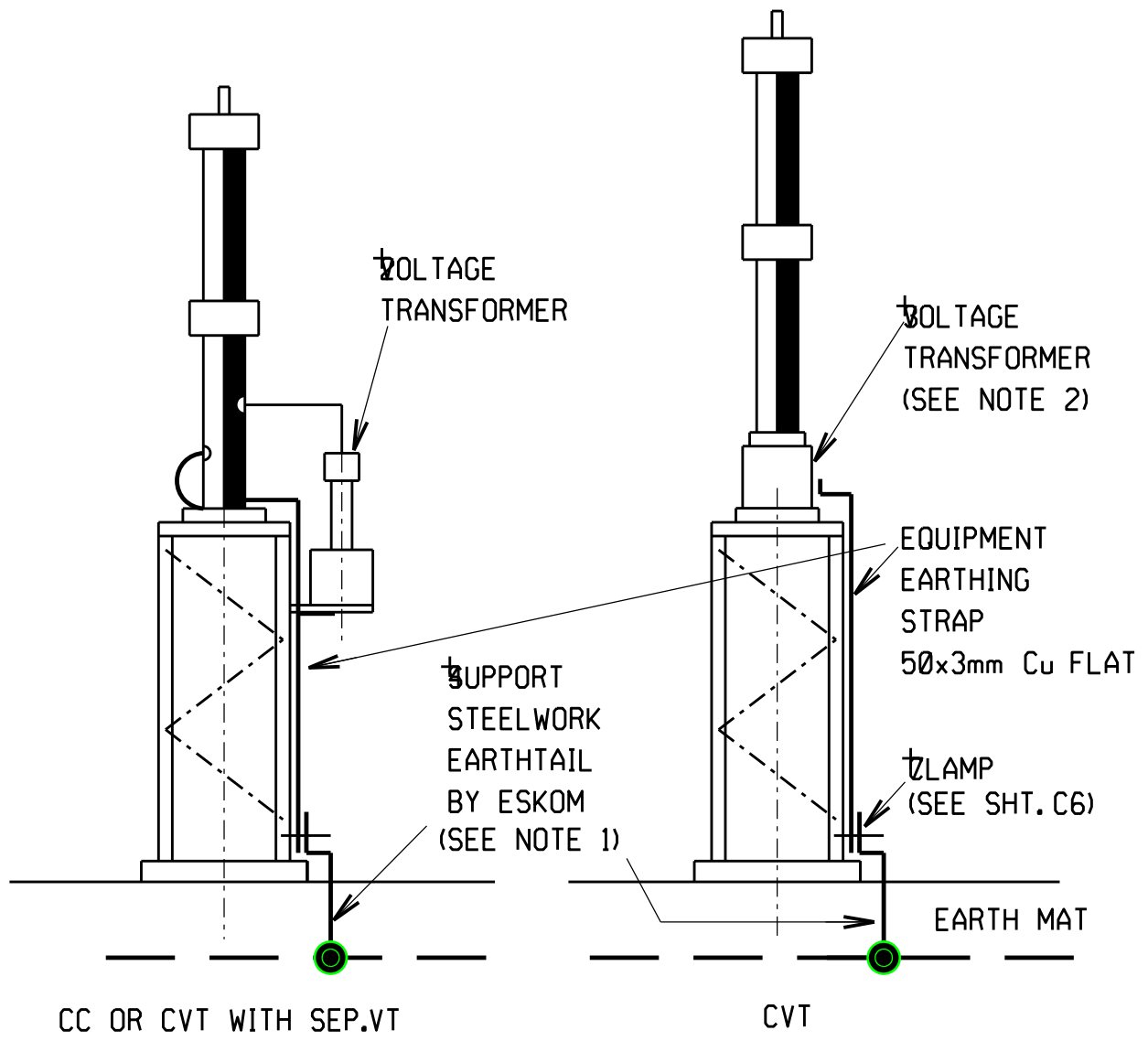


## NOTE:

1. SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.
2. FOR SURGE ARRESTERS FITTED WITH DISCHARGE COUNTERS SEE SHEETS I8 & I9.
3. FOR SURGE ARRESTERS EARTH STRAP TO BE RUN AS STRAIGHT AS POSSIBLE.
4. SEE SHEET 14, 14A, 14B FOR EARTHING OF SURGE ARRESTERS WITH PROVISION FOR CONDITION MONITORING DEVICE.

2	NOTE 4 ADDED.	E.G.	P.C.B.	I.HILL	25.05.07	
1					17.3.1989	
REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	REFERENCE DRAWINGS
APPROVED BY L.RYAN		<div></div>			ESKOM HOLDINGS LIMITED REG NO. 2002/015527/06	
DATE FEB 1988						
CHECKED BY		<div>EARTHING STANDARDS</div>				
DATE						
DRAWN BY						
DATE						
SCALE: N.T.S.		<div>0.54/393</div>			SHEET NUMBER	REVISION
					T5	2

CVT (GALVANISED & PAINTED TANKS)  
MOUNTED ON EARTHED STEELWORK  
WITHOUT CARRIER COUPLING EQUIPMENT (LME)



NOTE:

1. SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.
2. LOW VOLTAGE (LME) TERMINAL TO BE EARTHED IN VOLTAGE TRANSFORMER CONNECTION BOX

THE C.A.D. REFERENCE NUMBER IS:  
 [100,164]00393ET06.R01



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NAGES

AUTH  
MAS

LER  
FEB 88

REV

1

DATE  
DATUM

17.3.  
1989

EARTHING STANDARDS

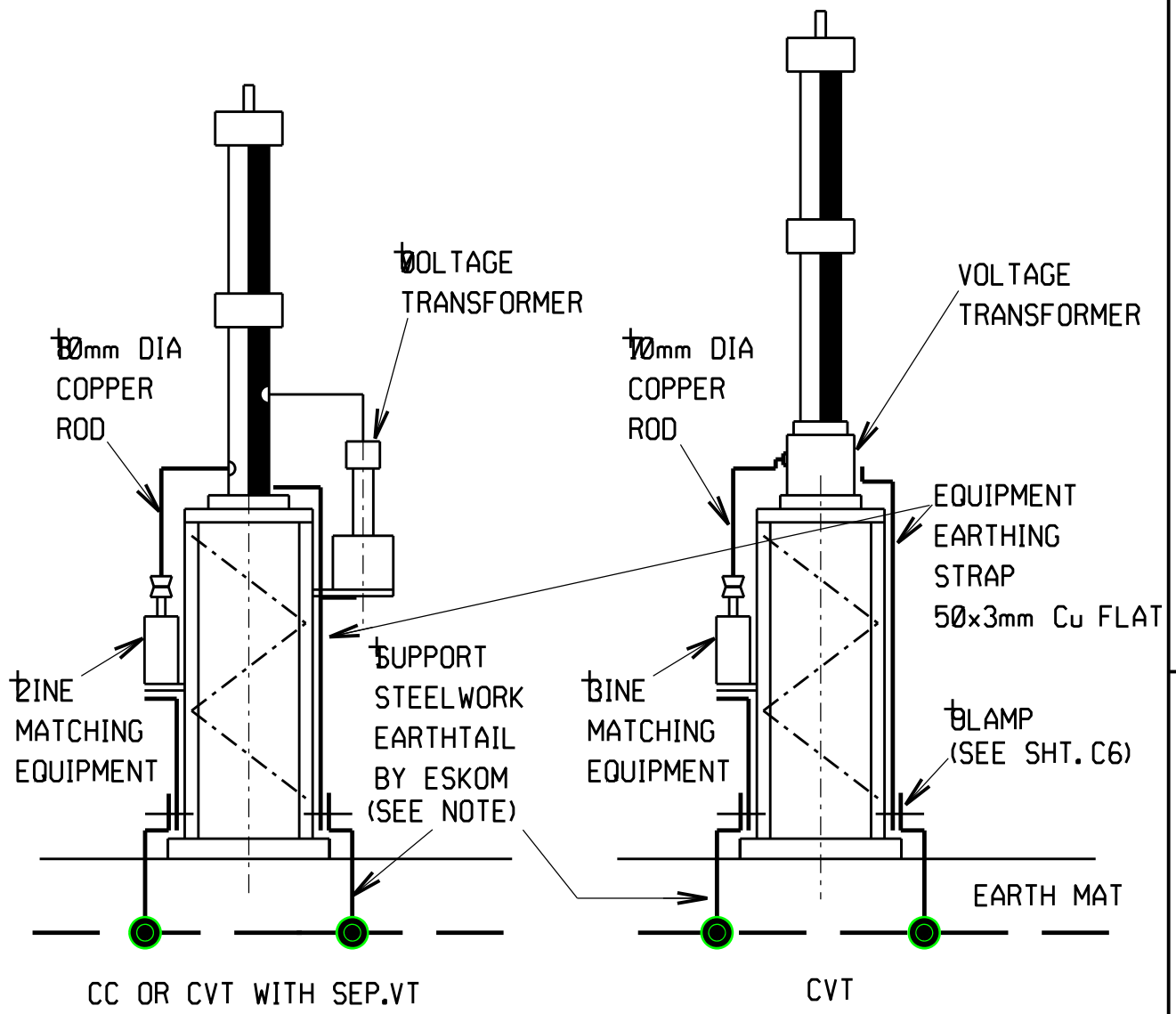
0.54/393

SHEET T6

DRG.TEK  
REGISTR

393T06.DGN

CVT (GALVANISED & PAINTED TANKS)  
MOUNTED ON EARTHED STEELWORK  
WITH CARRIER COUPLING EQUIPMENT (LME)



**NOTE:**

SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
 [100,164100393ET07.R01]



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

LER  
FEB 88

REV

1

DATE  
DATUM

17.3.  
1989

EARTHING STANDARDS

0.54/393

SHEET 12

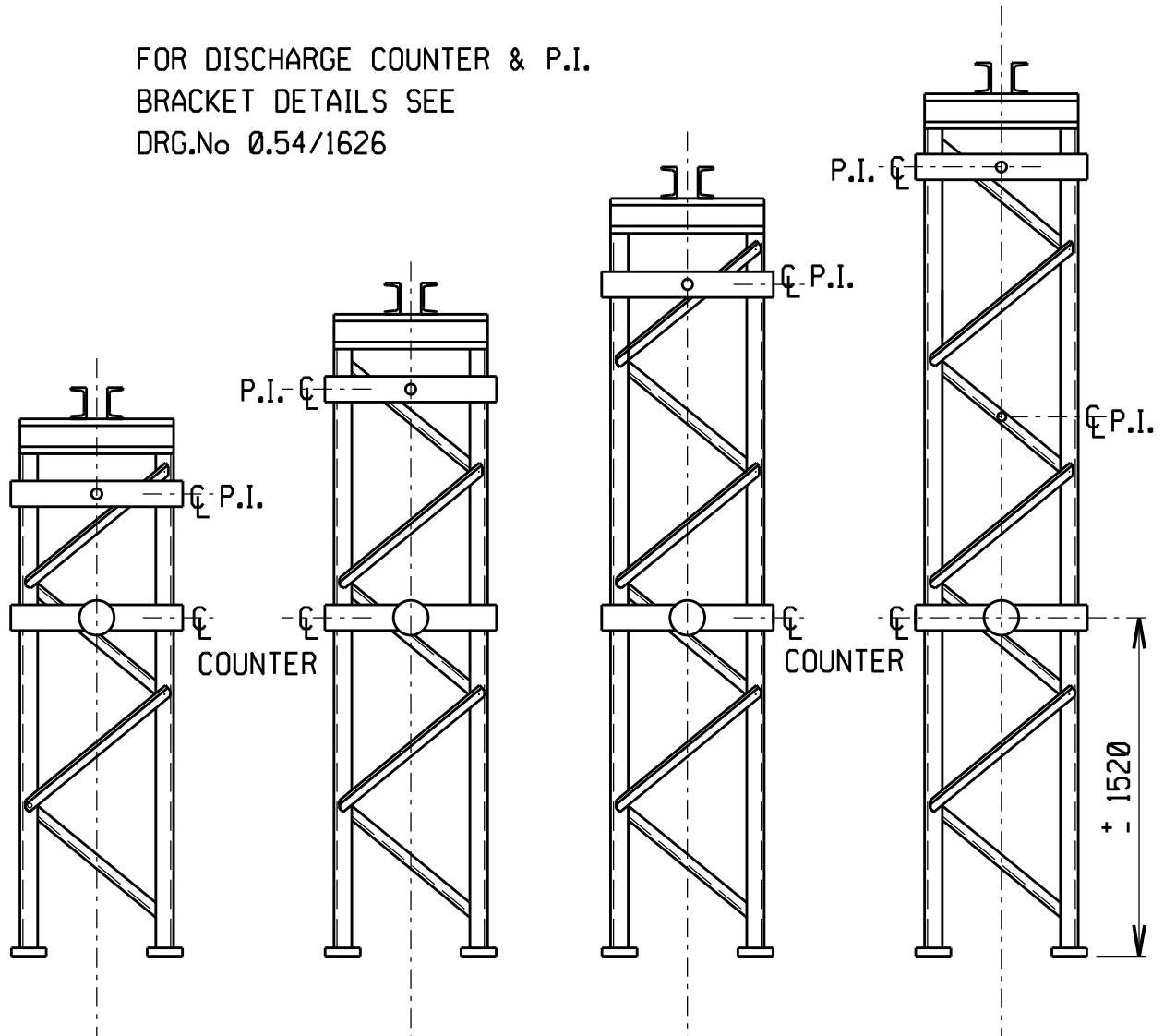
DRG.TEK  
REGISTR

393T07.DGN

# EARTHING OF SURGE ARRESTERS FITTED WITH DISCHARGE COUNTERS

(CONTINUED ON SHT. I9)

FOR DISCHARGE COUNTER & P.I.  
BRACKET DETAILS SEE  
DRG.No 0.54/1626



2500 HIGH  
MED. SUPPORT

3000 HIGH  
MED. SUPPORT

3500 HIGH  
MED. SUPPORT

4000 HIGH  
MED. SUPPORT

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393ET08.R01



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

LER  
FEB 88

REV

1

DATE  
DATUM

20.12.  
1990

EARTHING STANDARDS

0.54/393

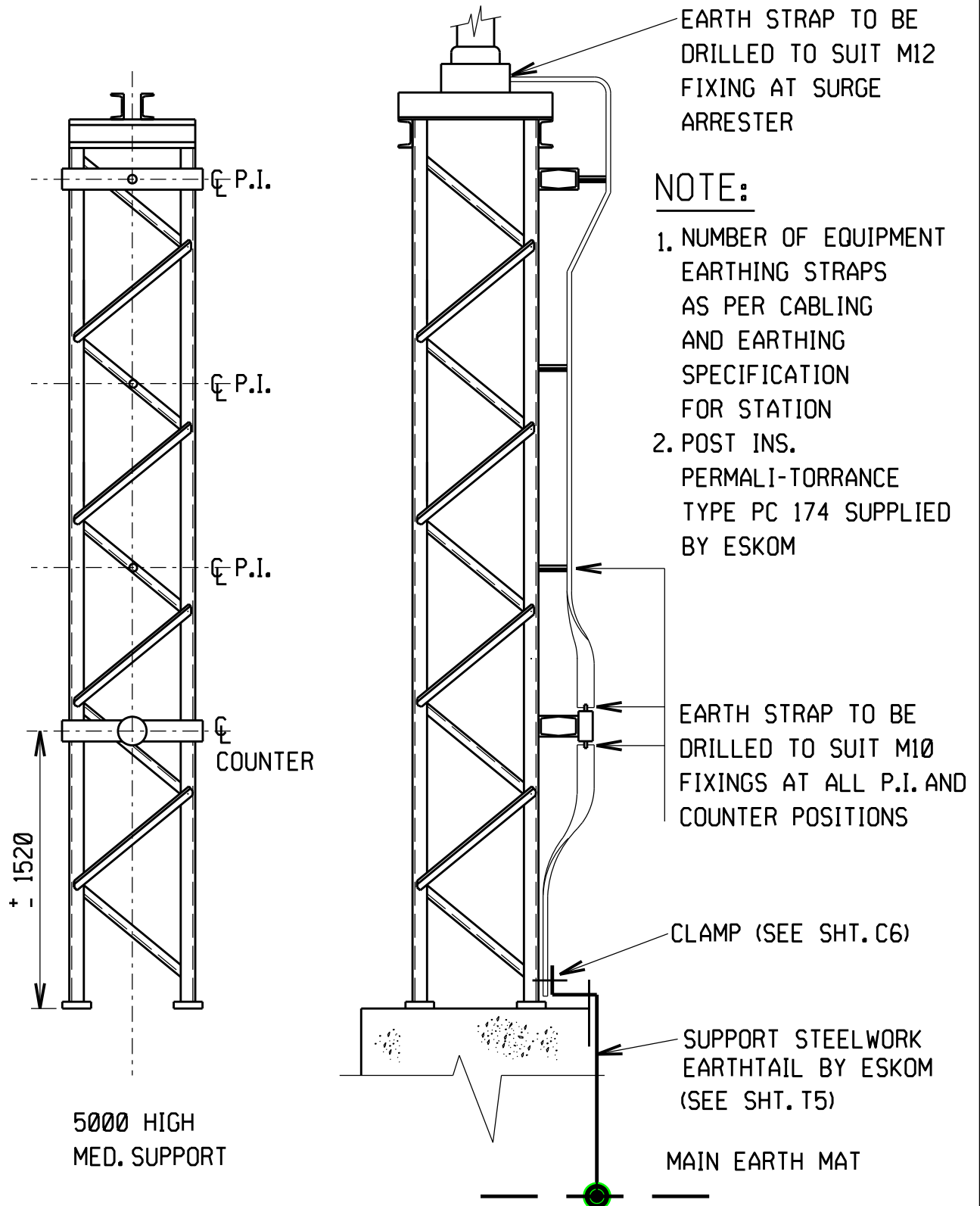
SHEET I8

DRG.TEK  
REGISTR

393T08.DGN

# EARTHING OF SURGE ARRESTERS FITTED WITH DISCHARGE COUNTER

(CONTINUED FROM SHT. I8)



THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393ET09,R02



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

LER  
FEB 88

REV

2

DATE  
DATUM

20.12.  
1990

EARTHING STANDARDS

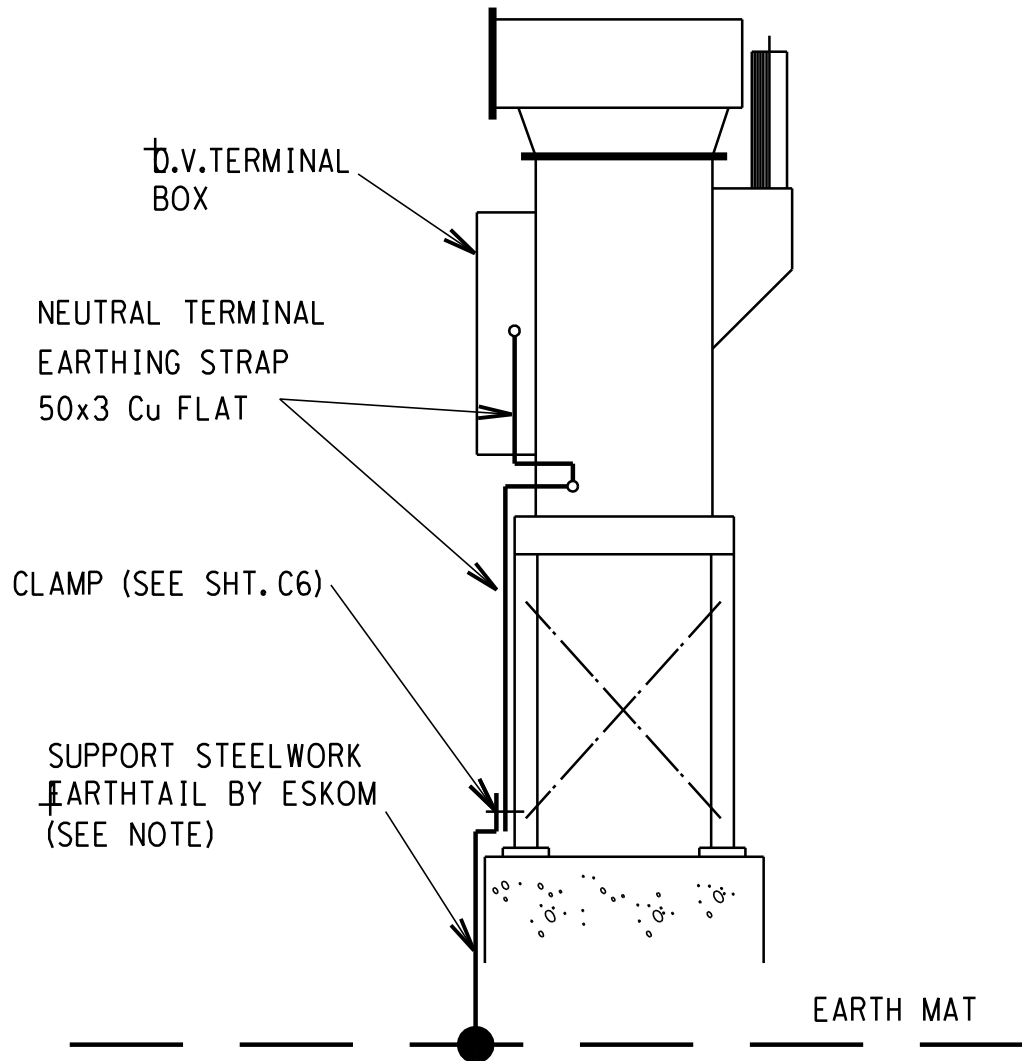
0.54/393

SHEET T9

DRG. TEK  
REGISTR

393T09.DGN

# H.V.YARD AUXILIARY TRANSFORMER



## NOTE:

SUPPORT STEEL EARTHING. NUMBER OF EARTHING CONNECTIONS TO EARTH MAT AS PER CABLING AND EARTHING SPECIFICATION FOR STATION.

THE C.A.D. REFERENCE NUMBER IS:  
[100,164]00393ET10.R01



ESKOM

DRAWN  
GETEKEN

CHKD  
NAGES

AUTH  
MAS

LER  
FEB 88

REV

1

DATE  
DATUM

17.3.  
1989

EARTHING STANDARDS

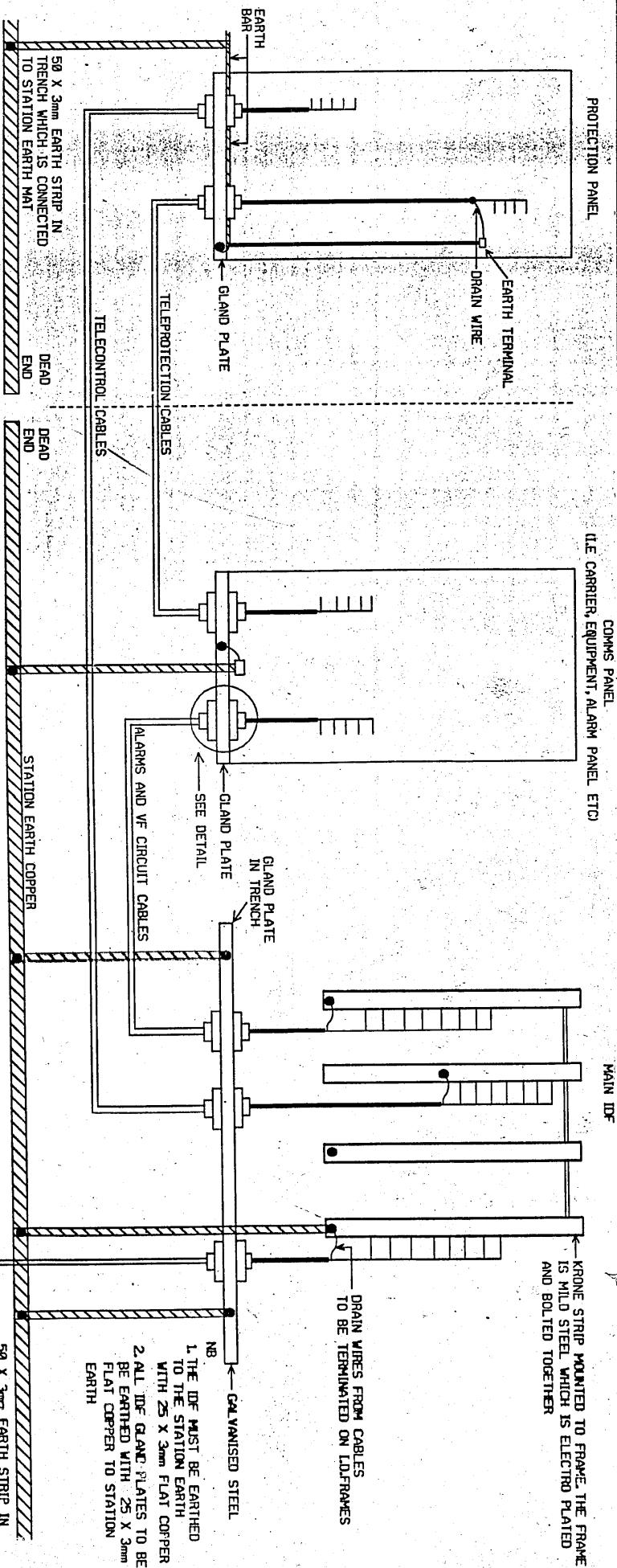
0.54/393

SHEET T10

DRG. TEK  
REGISTR

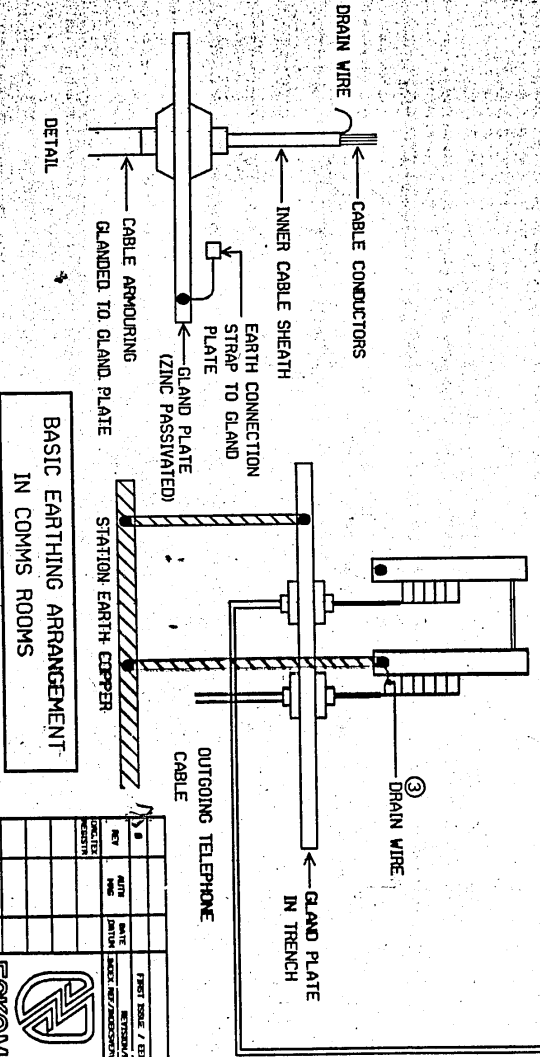
393T10.DGN





NOTE  
CABLE ARMOURING EARTHED AT BOTH ENDS  
DRAIN WIRE EARTHED AT ONE END ONLY, EITHER  
1. AT IDF  
OR  
2. AT PROTECTION PNL  
OR  
3. AT NEAREST POINT TO MAIN IDF  
DRAIN WIRE AT OTHER END OF  
CABLE TO BE CUT BACK AND INSULATED

TYPE OF CABLE ARMOURING	GLAND TYPE	MAKE
ALUMINIUM	ALUMINIUM GLAND	FALKADE
STEEL WIRE	CHROME PLATED GLAND	CHP OR PRATLEY
UNARMoured	COMPRESSION GLAND	CHP



BASIC EARTHING ARRANGEMENT  
IN COMMS ROOMS

FILE NO. 1000000000		THE C.A.B. REFERENCE NUMBER IS 153	
LIBRARY/REFERENCE NUMBER		1000000000	
NO.	DATE	NO.	DATE
1	1970	2	1970
3	1970	4	1970
5	1970	6	1970
7	1970	8	1970
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0.54/393

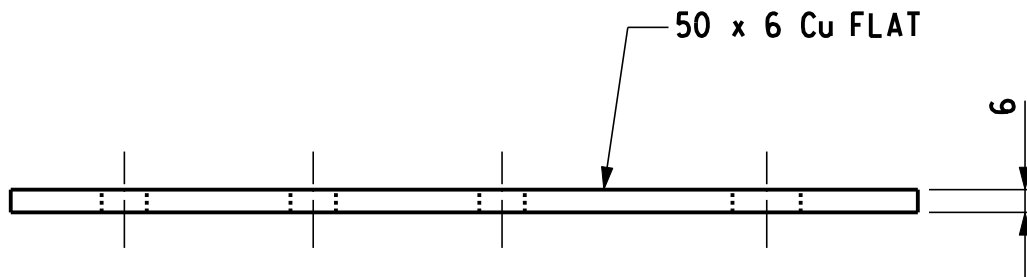
SHEET 111

EARTHING STANDARDS



ESKOM

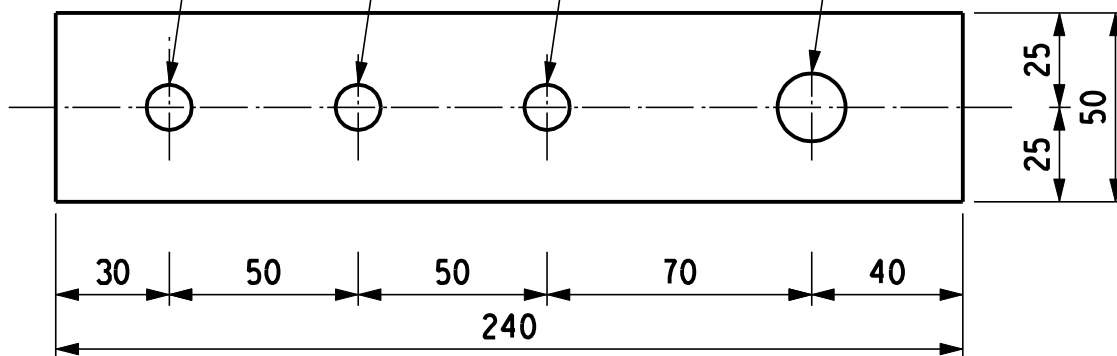




ELEVATION

DRILL 3 HOLES  
12mm DIA

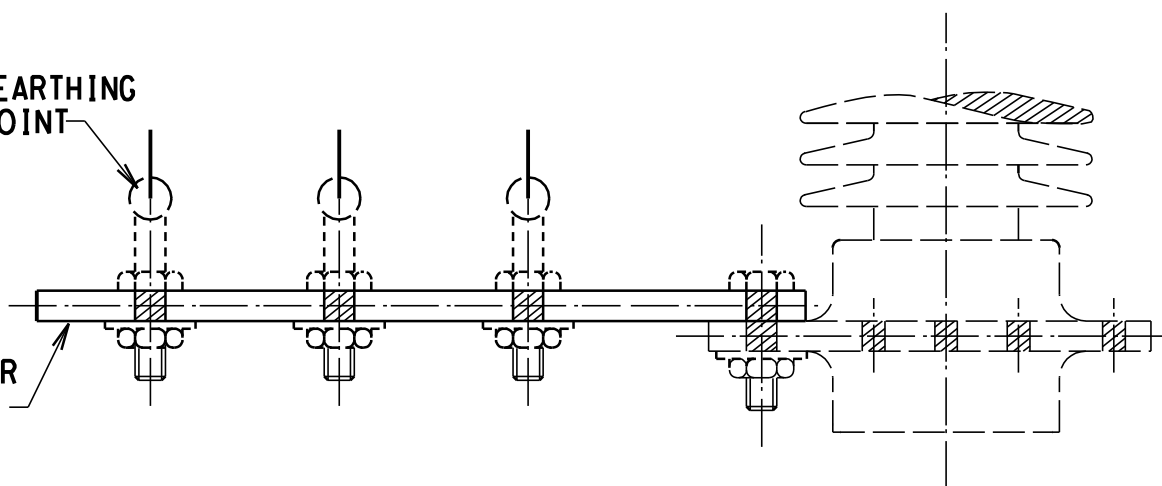
DRILL 1 HOLE  
18mm DIA



PLAN

FIXED EARTHING  
BALL JOINT

ADAPTOR  
PLATE



TYPICAL APPLICATION

TRANSMISSION  
SUBSTATION  
TECHNOLOGY  
DEPARTMENT



ESKOM

DRAWN  
GETEKEN

O.J.

20.11.00

CHKD  
NAGES

C.G.A.

AUTH  
MAS

REV

0

DATE  
DATUM

SKETCH No

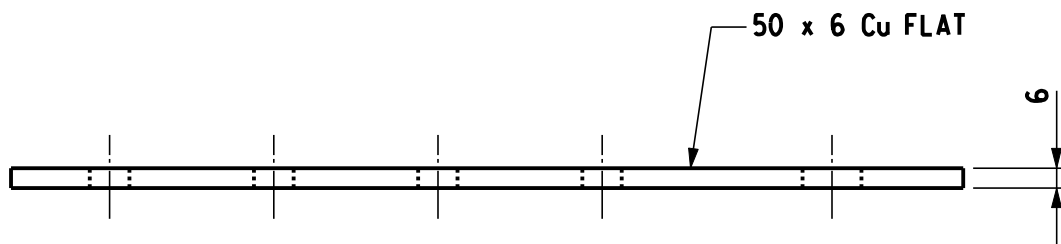
CAPACITOR BANK  
EARTH STUD ADAPTOR PLATE

0.54/393

SHEET T13

DRG.TEK  
REGISTR

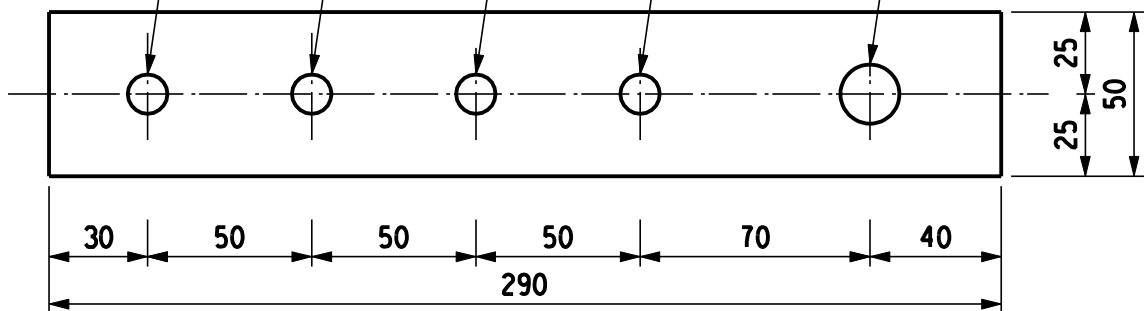
A4L



**ELEVATION**

DRILL 4 HOLES  
12mm DIA

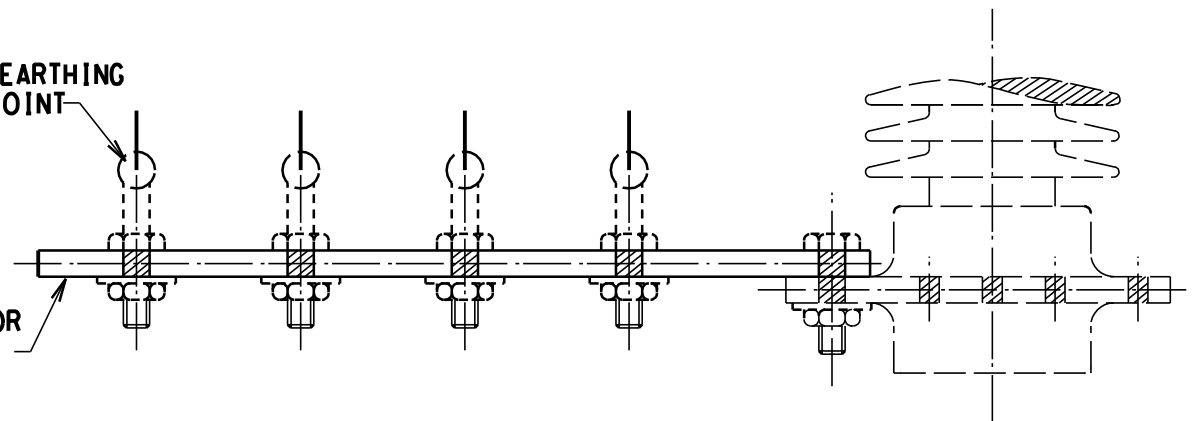
DRILL 1 HOLE  
18mm DIA



**PLAN**

FIXED EARTHING  
BALL JOINT

ADAPTOR  
PLATE



**TYPICAL APPLICATION**

NOTE: MAX. 20kA STUDS  
TO BE USED IN  
THIS ARRANGEMENT.

**SUBSTATION  
ENGINEERING**



DRAWN  
GETEKEN

S.M

17.02.10

CHKD  
NAGES

C.T

23.02.10

AUTH  
MAS

A.A

23.02.10

REV

0

DATE  
DATUM

SKETCH No

**CAPACITOR BANK  
EARTH STUD ADAPTOR PLATE**

**0.54/393**

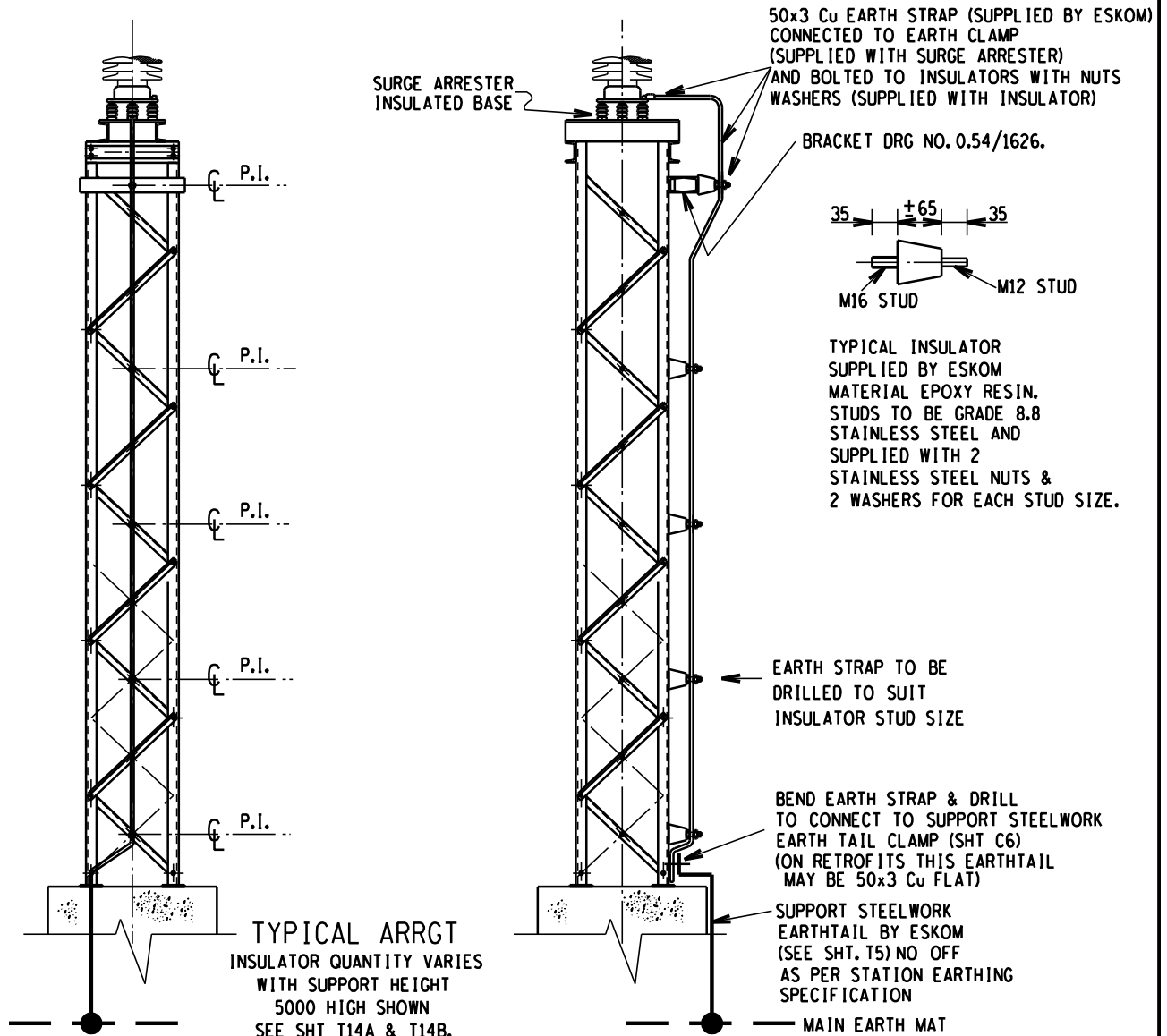
**SHEET T13A**


DRG.TEK  
REGISTR

A4L

**EARTHING OF SURGE ARRESTER  
MOUNTED ON INSULATED BASE  
WITH PROVISION FOR  
CONDITION MONITORING DEVICE**

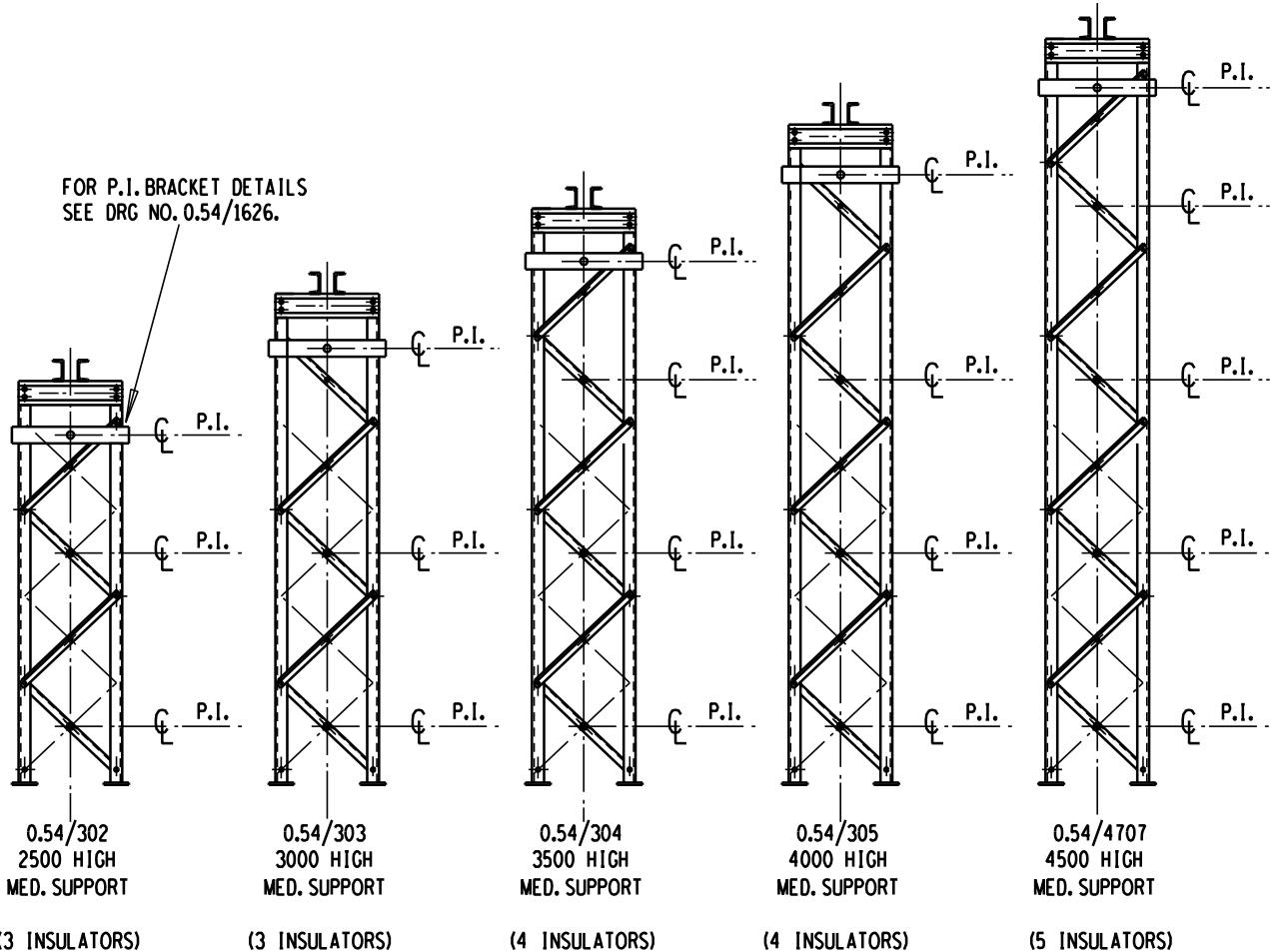
(SEE ALSO SHT T14A & T14B)




0		E.C.	P.C.B.		25/05/07	
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APPROVED BY  I.HILL		<div></div>			ESKOM HOLDINGS LIMITED REG NO. 2002/015527/06	
DATE 01/06/07						
CHECKED BY  P.C.B.		EARTHING STANDARDS				
DATE 25/05/07						
DRAWN BY  E.C.						
DATE MARCH 2007		©  0.54/393			SHEET NUMBER	REVISION
SCALE: N.T.S.					T14	0

EARTHING OF SURGE ARRESTER  
MOUNTED ON INSULATED BASE  
WITH PROVISION FOR CONDITION  
MONITORING DEVICE.

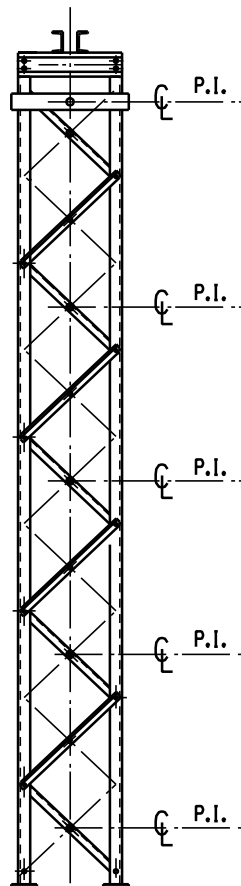
(SEE ALSO SHT T14 & 14B)



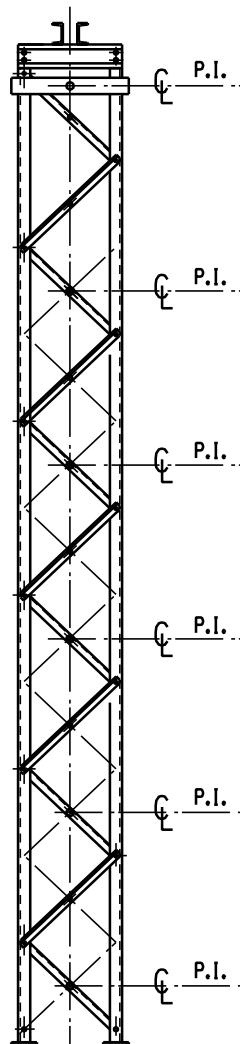
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APPROVED BY I.HILL				ESKOM HOLDINGS LIMITED REG NO. 2002/015527/06			
DATE 25/05/07							
CHECKED BY P.C.B.	EARTHING STANDARDS						
DATE 25/05/07							
DRAWN BY E.G.							
DATE MARCH 2007	0.54/393			SHEET NUMBER	REVISION		
SCALE: N.T.S.				T14A	0		

**EARTHING OF SURGE ARRESTER  
MOUNTED ON INSULATED BASE  
WITH PROVISION FOR CONDITION  
MONITORING DEVICE.**

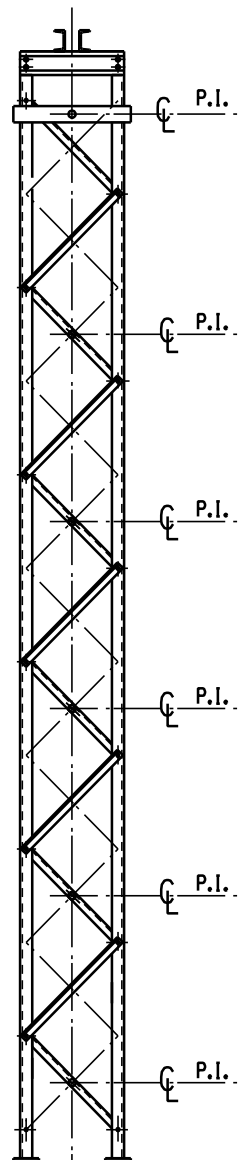
(SEE ALSO SHT T14 & 14A)



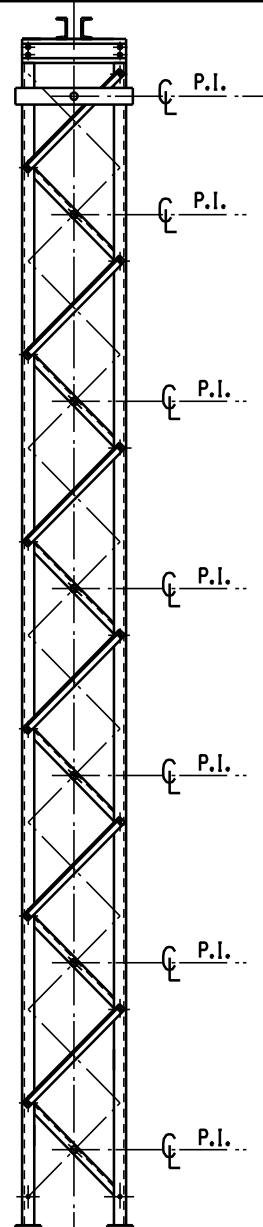
0.54/1596  
5000 HIGH  
MED. SUPPORT  
(5 INSULATORS)




0.54/4160  
6000 HIGH SUPPORT  
(SA MTD ON FIRE  
BARRIER SUPPORT)  
(6 INSULATORS)



0.54/4586  
6500 HIGH SUPPORT  
(6 INSULATORS)



0.54/4318  
7000 HIGH SUPPORT  
(7 INSULATORS)

0		E.G.	P.C.B.	I.HILL	25/05/07	
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DATE 25/05/07						
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DATE 25/05/07						
DRAWN BY E.G.						
DATE MARCH 2007		©  0.54/393			SHEET NUMBER	REVISION
SCALE: N.T.S.					T14B	0

A

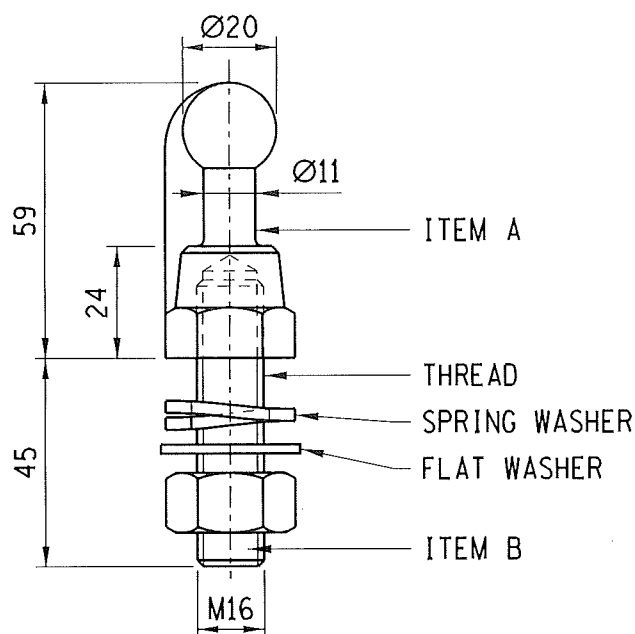
A

B

B

C

C



NOT TO SCALE

NOTE :  
DRAWING NOT FOR MANUFACTURING PURPOSE.

D

D

SHORT DESCRIPTION JOINT, BALL PORTABLE EARTH 20kA T/C  
TECH. DESCRIPTION

BALL JOINT (SINGLE) FOR USE ON PORTABLE EARTH ASSEMBLY.  
FAULT LEVEL : 0-20kA; BALL DIAMETER: 20mm.  
ITEM A - MATERIAL: TINNED COPPER.  
ITEM B - THREADED ROD: M16 - MATERIAL: STAINLESS STEEL.  
M16 HEX. NUT - MATERIAL: STAINLESS STEEL.  
ITEM B TO BE TIGHTENED BY SCREWING INTO ITEM A.  
SUPPLIED WITH HEX. NUT, WASHER AND SPING WASHER.

E

E



0 FIRST ISSUE

*[Signature]* 20/10/2015

REV

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BY

CHKD

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DATE

EARTHING STANDARDS

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©

SHEET NUMBER

REVISION

T15

0

1

2

3

4 SIZE  
GROOTTE A4L

F



A

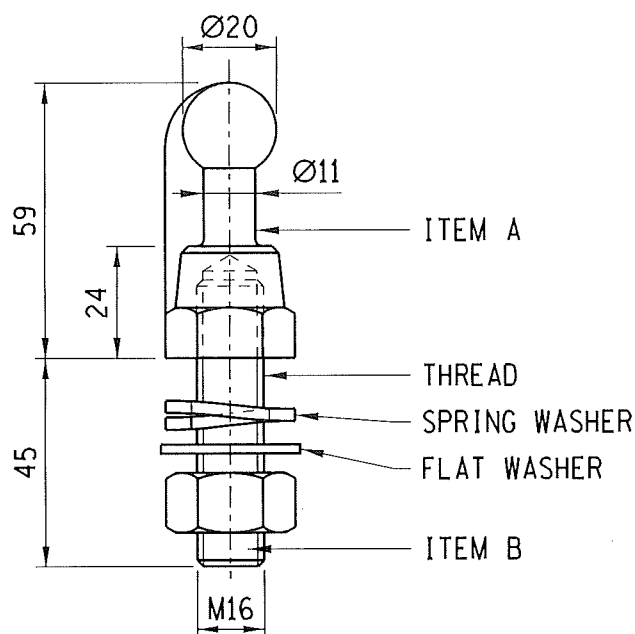
A

B

B

C

C



NOT TO SCALE

NOTE :  
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D

D

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M16 HEX. NUT - MATERIAL: STAINLESS STEEL.  
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SUPPLIED WITH HEX. NUT, WASHER AND SPING WASHER.

E

E



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1

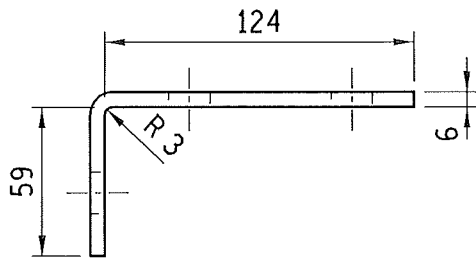
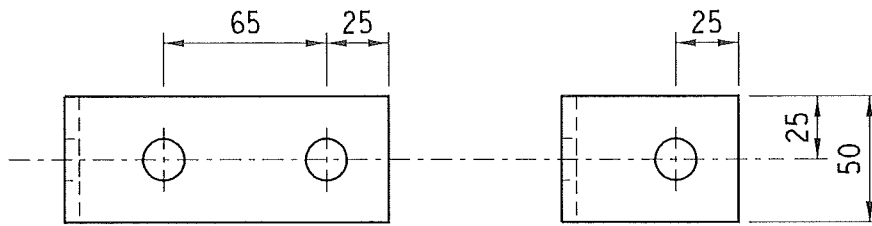
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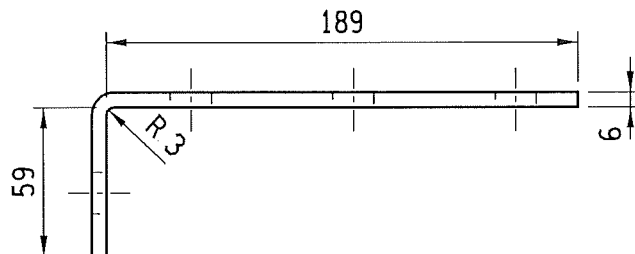
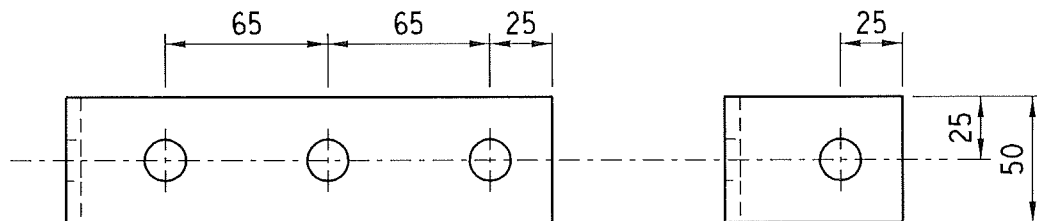
SIZE  
GROOTTE A4L

# TYPE 'A'



FLAT LENGTH: 198mm  
MATERIAL: COPPER  
3 HOLES: 17 DIA

# TYPE 'B'



FLAT LENGTH: 263mm  
MATERIAL: COPPER  
4 HOLES: 17 DIA

## NOTE:

- 1.) MATERIAL TO BE 50x6 COPPER.
- 2.) ALL SHARP EDGES TO BE BLUNT OFF.



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T16

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1

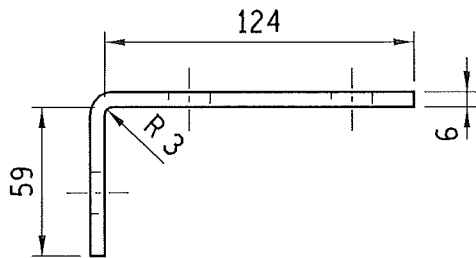
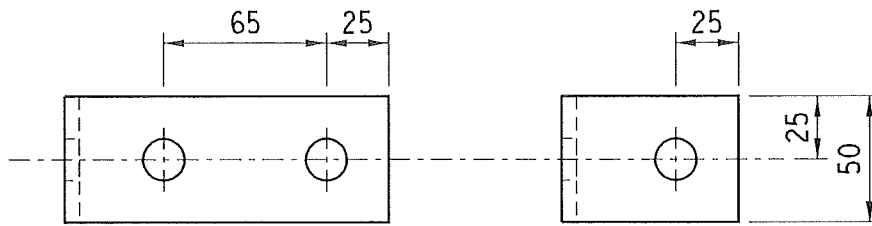
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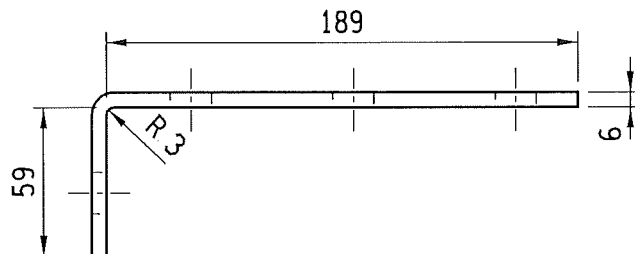
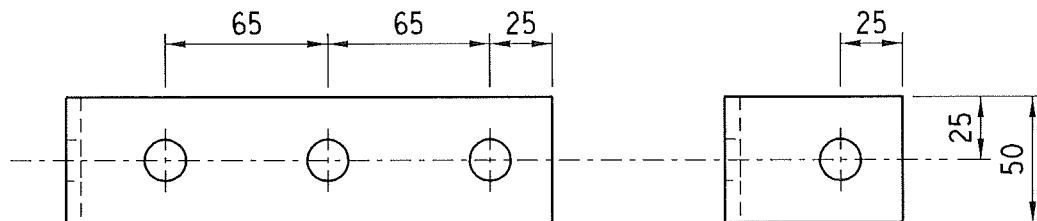
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1

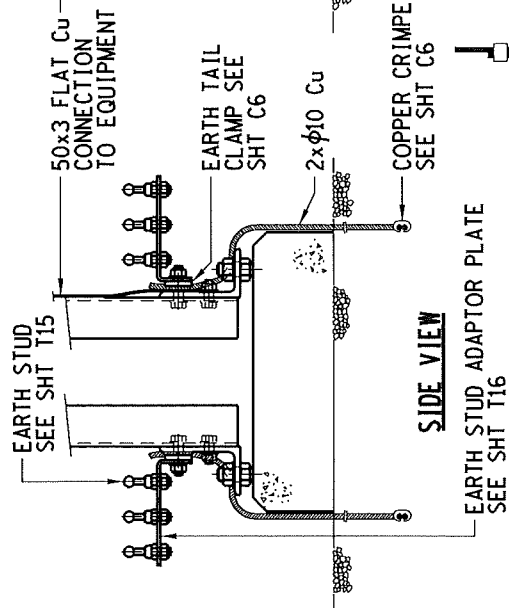
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3

4

SIZE  
GROOTTE A4L

TYPICAL LAYOUT OF OPERATING EARTHING SHOWING REQUIRED CONNECTIONS



FRONT VIEW

SIDE VIEW

NOT TO SCALE

QUANTITIES FOR ISOLATOR WITH TWO EARTH SWITCHES			
FAULT LEVEL kA	'L' SHAPED EARTH STUD ADAPTOR PLATE	EARTH STUDS	
20	4x TYPE 'A' (2 HOLES)	6	
20-40	4x TYPE 'B' (3 HOLES)	12	

PLAN



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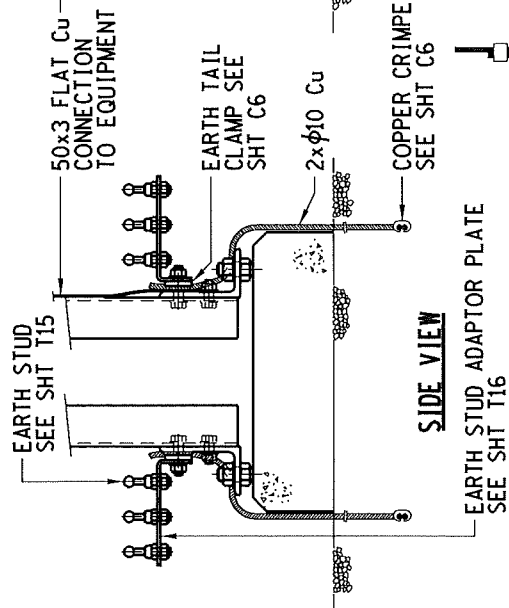
REVISION

T17

0

4 SIZE GROOTE A4L

TYPICAL LAYOUT OF OPERATING EARTHING SHOWING REQUIRED CONNECTIONS



NOT TO SCALE

QUANTITIES FOR ISOLATOR WITH TWO EARTH SWITCHES			
FAULT LEVEL kA	'L' SHAPED EARTH STUD ADAPTOR PLATE	EARTH STUDS	
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4 SIZE GROOTEE A4L