

PRODUCT STANDARD
ELECTRICAL C & I
BAP/BHEL/RANIPET – 632 406

TEP:NTPC:JB:006:REV.02
PAGE 01 OF 04
EFFECTIVE DATE 22.10.2007

TITLE : TECHNICAL SPECIFICATION FOR BOUGHT ITEMS FOR ESP
ITEM : JUNCTION BOX
CUSTOMER : NATIONAL THERMAL POWER CORPORATION LTD (NTPC).

	NAME	DESIGNATION	SIGNATURE	DATE
PREPARED	G.M.KUMAR	SEF	<i>G.M. Kumar</i>	22.10.2007
CHECKED	T.VENUGOPAL	DM	<i>T.V.</i>	22.10.2007
APPROVED	C.R.JAYACHANDRAN	SR.MGR.	<i>C.R.</i>	22.10.2007

ISSUED BY

EDC – AQCS

REVISION NO :00
REVISION NO :01
REVISION NO :02

INITIAL RELEASE : 24.01.2004
: 09.05.2006
: 22.10.2007

1.0.0 **SCOPE OF SUPPLY:**

The scope of supply of Junction box includes, manufacturing, Inspection, testing, packing and delivery.

2.0.0 **CONSTRUCTION:**

The Junction boxes shall be provided with hinged door with captive screws. Top of the box shall be arranged to slope towards the rear of the box. The box shall be hot dip galvanised and shall be provided with suitable Neoprene gaskets to achieve specified degree of protection. Adequate spacing shall be provided to terminate the external cables. The boxes shall be suitable for mounting on rail/column/steel structure etc.,

3.0.0 **APPLICATION:**

The Junction boxes are used in Electrostatic precipitators to interconnect various field mounted equipments.

4.0.0 **APPLICABLE STANDARDS:**


The Junction boxes shall be manufactured and tested as per the following standards.

- 4.1.1 IS 13947 - Low voltage Switch gear and Control gear.
- 4.1.2 IS 2633 - Method of testing of uniformity of coating of zinc coated articles.
- 4.1.3 IS 2629 - Recommended practice for hot dip galvanising on iron and steel
- 4.1.4 IS 4759 - Specification for hot dip zinc coatings on structural steel and other allied products.
- 4.1.5 IS 694 - PVC insulated wires.

5.0.0 **SITE CONDITIONS:**

- 5.1.1 Ambient temperature : 5 Deg.C to 50 Deg.C
- 5.1.2 Relative humidity : 100% RH
- 5.1.3 Atmospheric : Heavy dusty, abrasive, and polluted, conductive to fungus growth, climate is tropical.
- 5.1.4 Design temperature : 50 Deg.C
- 5.1.5 Location : Out door

6.0.0 GENERAL REQUIREMENTS:

- 6.1.1 Gland plate material : Hot rolled sheet steel
- 6.1.2 Casing, Base plate material : Cold rolled sheet steel
- 6.1.3 Gland plate thickness : 3 mm
- 6.1.4 Casing, base plate thickness : 2 mm
- 6.1.5 Galvanising of all sheet steel, fasteners : As per IS 2629 & IS 4759
- 6.1.6 Amount of zinc coating : (i) 610 gm/sq.m.
(ii) Min. coating thickness on junction box shall not be less than 86 microns. 
- 6.1.7 Door opening angle : 180 Degree.
- 6.1.8 Door locking arrangement : Rider clamps at two points
- 6.1.9 Enclosure protection type : IP 55 as per IS 13947
- 6.1.10 Thickness of Neoprene gasket : Min. 3 mm on compression
- 6.1.11 Terminal block type : As per BHEL drawing
- 6.1.12 Terminal block insulating material : Melamine confirming to ESI standard 12.1
- 6.1.13 Terminal block voltage grade : 750/1000 V
- 6.1.14 Terminal block current rating : As per drawing .
- 6.1.15 Wiring (for power JB only) : 1100V grade, PVC insulated single core, multistranded copper wires of cross section as per drawing.
- 6.1.16 Lug type (as per IS 8309) : Annealed tinned solder less crimping type copper lugs (lugs shall be provided for internal & external wiring).
- 6.1.17 Lug size : To suit cable sizes indicated in the drawing
- 6.1.18 Number of earthing terminals : Two
- 6.1.19 Size of earthing terminals : M8x10 Screw with star / Belleville washer.

- 6.1.20 Location of earthing terminals : As per drawing.
- 6.1.21 Location of earthing symbol : Just above the earthing terminal.
- 6.1.22 Rated voltage grade of junction box : 415V.

7.0.0 MAKE OF COMPONENTS

- 7.1.1 Terminal block : ELMEX
- 7.1.2 Crimping type lug : DOWELL
- 7.1.3 PVC Wires : ISI (BIS) APPROVED / CERTIFIED makes

8.0.0 PACKING

Each JB shall be fully wrapped in plastic cover to avoid water entry and each unit shall be packed separately in cardboard unit. Finally all such packing shall be packed in a completely closed wooden crate. Along with the packing slip two copies of supplier's drawing shall be sent.

9.0.0 DRAWING PREPARATION

- 9.1.1 Manufacturing and packing drawings prepared in AUTO CAD shall be submitted in SOFT MEDIA in addition to hard copies for approval by BHEL, (prior to start of manufacture) within 10 days from the date of purchase order.
- 9.1.2 After final approval, one CD containing the approved drawing shall be supplied. Apart from CD, 6 hard copies of approved drawings shall be submitted on delivery.

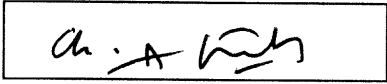
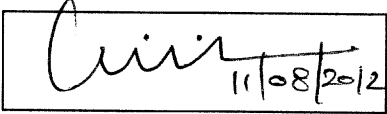
10.0.0 NAME PLATE:

The nameplate shall be made of non-corrosive material indicating manufacturers name, Serial number, type (variant number), etc. shall be provided.

11.0.0 INSPECTION:

The inspection and testing shall be carried out based on the following documents:

- 11.1.1 BHEL purchase order
- 11.1.2 BHEL technical specification
- 11.1.3 BHEL quality checklist
- 11.1.4 BHEL / NTPC approved sub vendor drawing.
- 12.0.0 This specification is prepared in line with NTPC specification, hence no deviation shall be taken.

BHEL RANIPET	STANDARD CHECK LIST FOR JUNCTION BOXES (GALVANIZED/PAINTED/FRP) MEANT FOR ESP APPLICATION.	
REF.NO.	REVISION NO.	EFFECTIVE DATE
CKL:E:816	00	11 08 2012
TITLE : JUNCTION BOXES (GALVANIZED/PAINTED/FRP) MEANT FOR ESP APPLICATION.		
		SIGNATURE
PREPARED BY	: CH.ANILSINGH ASST.ENGINEER/QA	
REVIEWED & APPROVED BY	: C.SRINIVASAN SR.MANAGER/QA	
ISSUED & CONTROLLED BY	:: QUALITY ASSURANCE BHEL, RANIPET – 632 406	
DOCUMENT STATUS	<input type="checkbox"/>	INFORMATION COPY
	<input type="checkbox"/>	CONTROL COPY
	* It is a control of copy only if the mark against the control copy is in other than black color. Otherwise it will be an uncontrolled copy. Check for current revision.	
ISSUED TO :	CONTROL COPY NO.	
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Note:

1. This is a standard check list for JUNCTION BOXES (Galvanized/Painted/FRP). Any additional project specific requirements highlighted in PO or relevant TEP shall be complied with. Any contradiction noticed in this check list with respect to enquiry requirements/TEP shall be highlighted in the offer.
2. If the acceptance criteria given in PO or TEP or approved data sheet is stringent than the one specified in this above, the requirement as per PO/TEP/data sheet will supersede the one given in the check list.

BHEL RANIPET	STANDARD CHECK LIST FOR JUNCTION BOXES (GALVANIZED/PAINTED/FRP) MEANT FOR ESP APPLICATION.							
REF.NO.	REVISION NO.	EFFECTIVE DATE						
CKL:E:816	00	11 08 2012						
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REV.NO	Effective Date	Remarks						
00	11 08 2012	Original Issue						
		PAGE 02 OF 04						

BHEL RANIPET	STANDARD CHECK LIST FOR JUNCTION BOXES (GALVANIZED/PAINTED/FRP) MEANT FOR ESP APPLICATION	Ref no: CKL:E: 816 Rev No: 00 Date : 11 08 2012 Page: 03 OF 04
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FOLLOWING TESTS / CHECKS ARE TO BE DONE

1.) Routine Tests (Sample Size: IS 2500(Part I), ISO 2859 (Part-1) AQL 4%)
by vendor.

- a) Visual Inspection
- b) Dimensional Checks on random selected samples.
- c) Checks on mounting whole dimension, overall dimension, thickness, verification of verticality and squareness.
- d) Provision of gaskets at door and gland plate
- e) Operation of door and door locking arrangement.
- f) Matching of door with box.
- g) IR(IR > 1M ohm When Checked with 500V meggar) HV Test(2KV for 1 Minute)
- h) Verification on wiring, terminal blocks and provision of suitable cable glands and Lugs as per specification/drawing / PO condition.
- i) Provision of dummy covers for cable glands.
- j) Check degree of protection as per specification by inserting thin paper.
- k) Review of raw material test certificate
- l) Provision of label with inscription and earthing bolt and star washers and symbol for earthing.(Applicable only Painted and Galvanized Junction boxes)

2.) Type Tests Requirements

Review of type test certificate for enclosure protection test conducted on identical designs as per TEP / drawing.

3.) For Painted Junction Boxes

- a. Test /check for verifying the coating thickness, adhesion test including paint shade and the same shall be as per BHEL Drawing (or) supplier drawing approved by BHEL/Engg/BHEL Specification/Po Condition.
- b. Ensure Surface preparation(7 tank Process as per IS 6005 or Equivalent practices)
- c. Ensure Primer is two coat of Anti corrosive Red Oxide Epoxy Primer and finish paint is Two coat of anti corrosive ref oxide Epoxy Primer
- d. Ensure junction boxes shall be stove Enameled (or) powder coating.

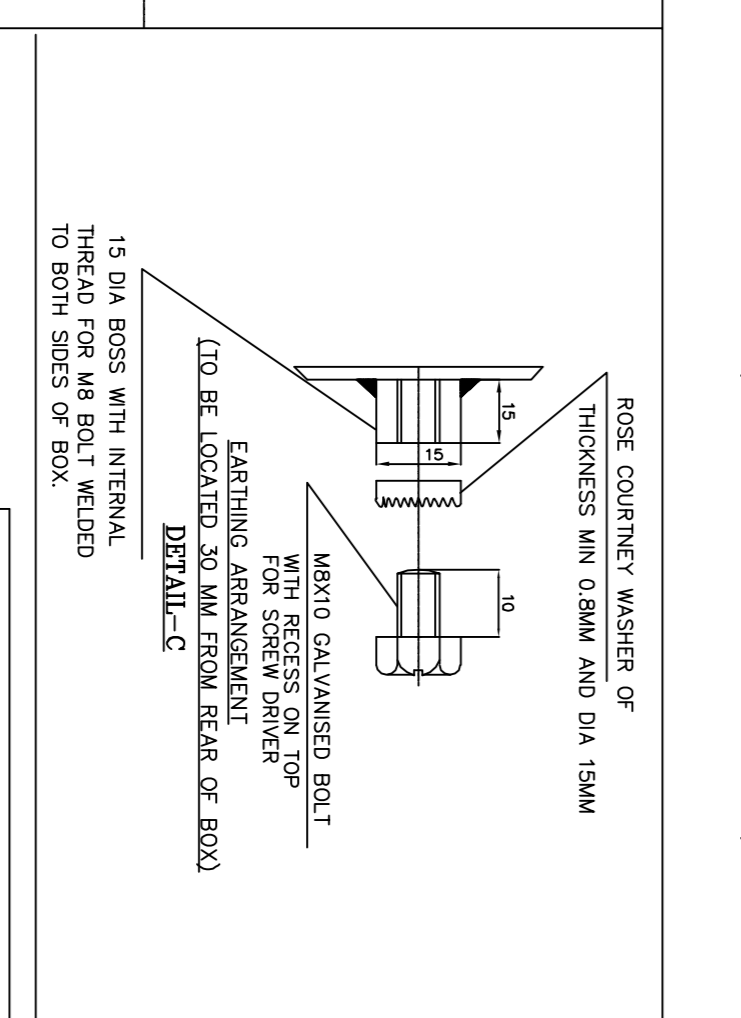
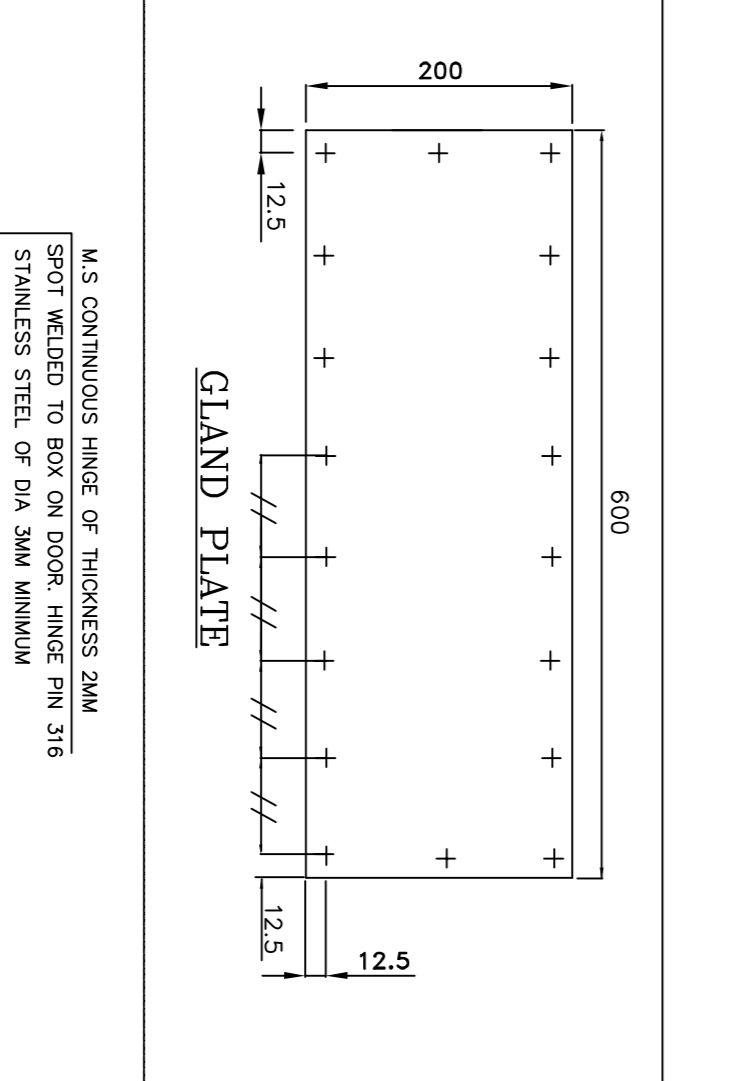
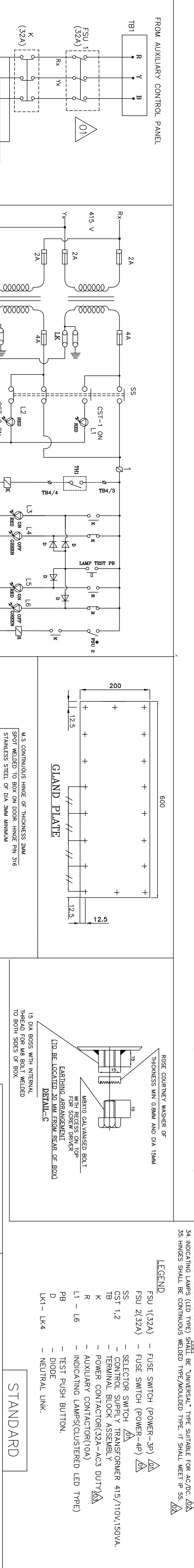
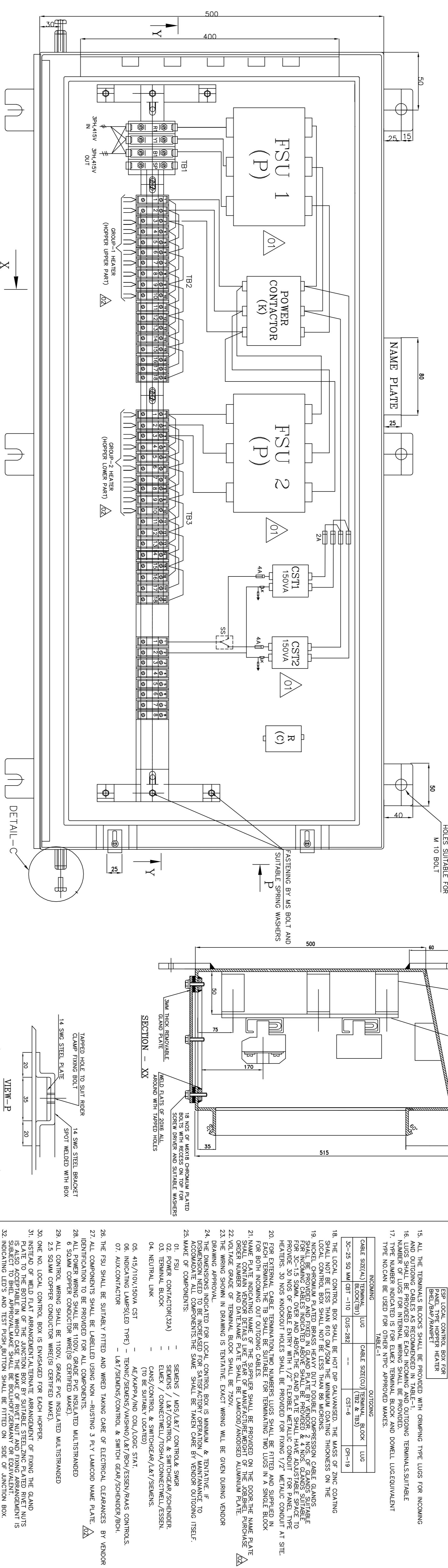
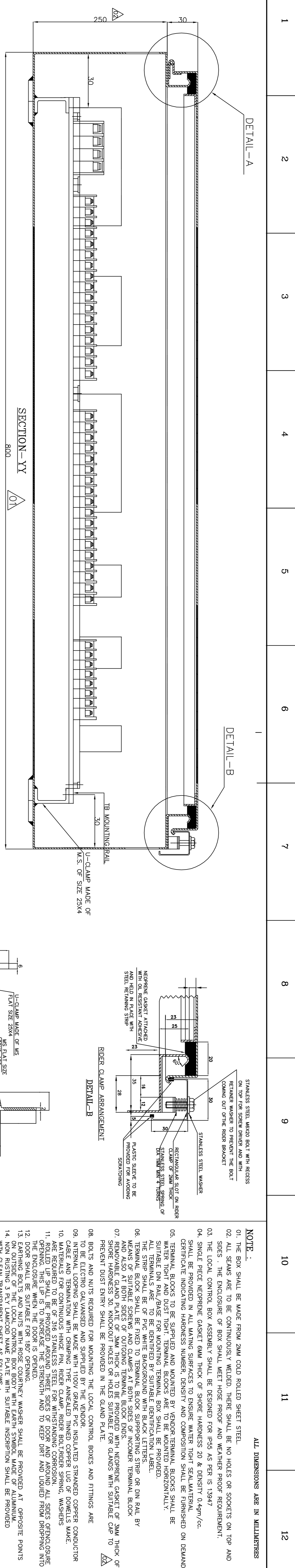
BHEL RANIPET	STANDARD CHECK LIST FOR JUNCTION BOXES (GALVANIZED/PAINTED/FRP) MEANT FOR ESP APPLICATION	Ref no: CKL:E: 816 Rev No: 00 Date : 11 08 2012 Page: 04 OF 04
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4.) For Galvanised Junction Boxes

- a) Test /check for verifying quality of galvanizing including uniformity of zinc coating as per IS 4759/IS 2633 and dichromatization and the same shall be as per drawing/specification/PO Condition.
- b) Hot Dip Galvanizing Source for NON NTPC Projects is to be done in any one of the BHEL approved sources for which vendor shall obtain galvanizing sources from Purchase Department, BAP BHEL/Ranipet before proceeding for the same.
- c) Hot Dip Galvanizing Source for NTPC Projects is to be done in any one of the *** NTPC approved Sources as indicated below w.r.t NTPC projects.

- M/s Kanade Anand Udyog, Mumbai
- m/s MJ Engg., New Delhi/Bhiwadi
- M/s Vishaka Steel Allaid, Anakapally
- M/s Karamtara., Thane
- M/s Industrial Perfortion., Kolkata
- M/s BG Shirke., Pune
- M/s Jamuna Metals, New Delhi/Sonpet
- M/s Gurupreet., Hyderabad
- M/s Sigma Glavanisers., Mumbai
- M/s T.M Radha Krishna Galvanisers, Chennai.
- M/s Poona Galvanisers, Pune
- Other NTPC approved Sources.

- 5.) All other requirements if any shall be ensured as per BHEL PO and BHEL specification / drawings.



LEGEND

- FSU 1 (32A) - FUSE SWITCH (POWER-3P)
- FSU 2 (32A) - FUSE SWITCH (POWER-4P)
- SS - SELECTOR SWITCH
- CST 1,2 - CONTROL SUPPLY TRANSFORMER 415/110V/150VA
- TB - TERMINAL BLOCK ASSEMBLY
- K - POWER CONTACTOR (32A-AC3 DUTY)
- R - AUXILIARY CONTACTOR (10A)
- L1 - L6 - INDICATING LAMP (CLUSTERED LED TYPE)
- PB - TEST PUSH BUTTON
- D - DIODE
- LK1 - LK4 - NEUTRAL LINK

STANDARD

REVISIONS

NO.	DATE	BY	CHKD	APPD	REASON
01	23/01/09	THANU, B		APD	REVISED AS PER NTPC COMMENTS DATED 12/11/2008
02	20/11/10	REMYA	REMYA	S R RAJAN	REVISED TO INCLUDE FEEDBACK FROM EARLIER PRODUCTS
03					CONTRACTOR SHALL BE AC3 DUTY

JOB NO. NTPC DRG NO.- 2250-101-01-RN-PVE-B-047A
CONTRACT NATIONAL THERMAL POWER CORPORATION LTD.
STATUS CONTRACT
DISTRIBUTION

TO	NO. OF	DATE	ALTD	CHKD	APPD	SRN	DATE

TITLE: GA DRAWING OF LOCAL CONTROL BOX (POWER)
SCALE: N.T.S
REV: 03
SHEET: 01 OF 01

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01	23/01/09	THANU, B		APD	REVISED AS PER NTPC COMMENTS DATED 12/11/2008
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ALL DIMENSIONS ARE IN MILLIMETERS

NOTE:

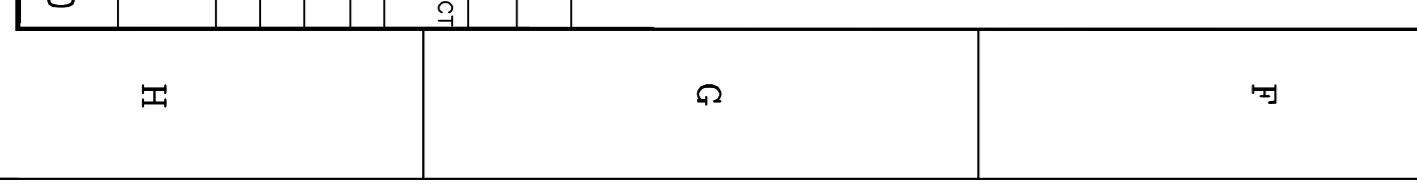
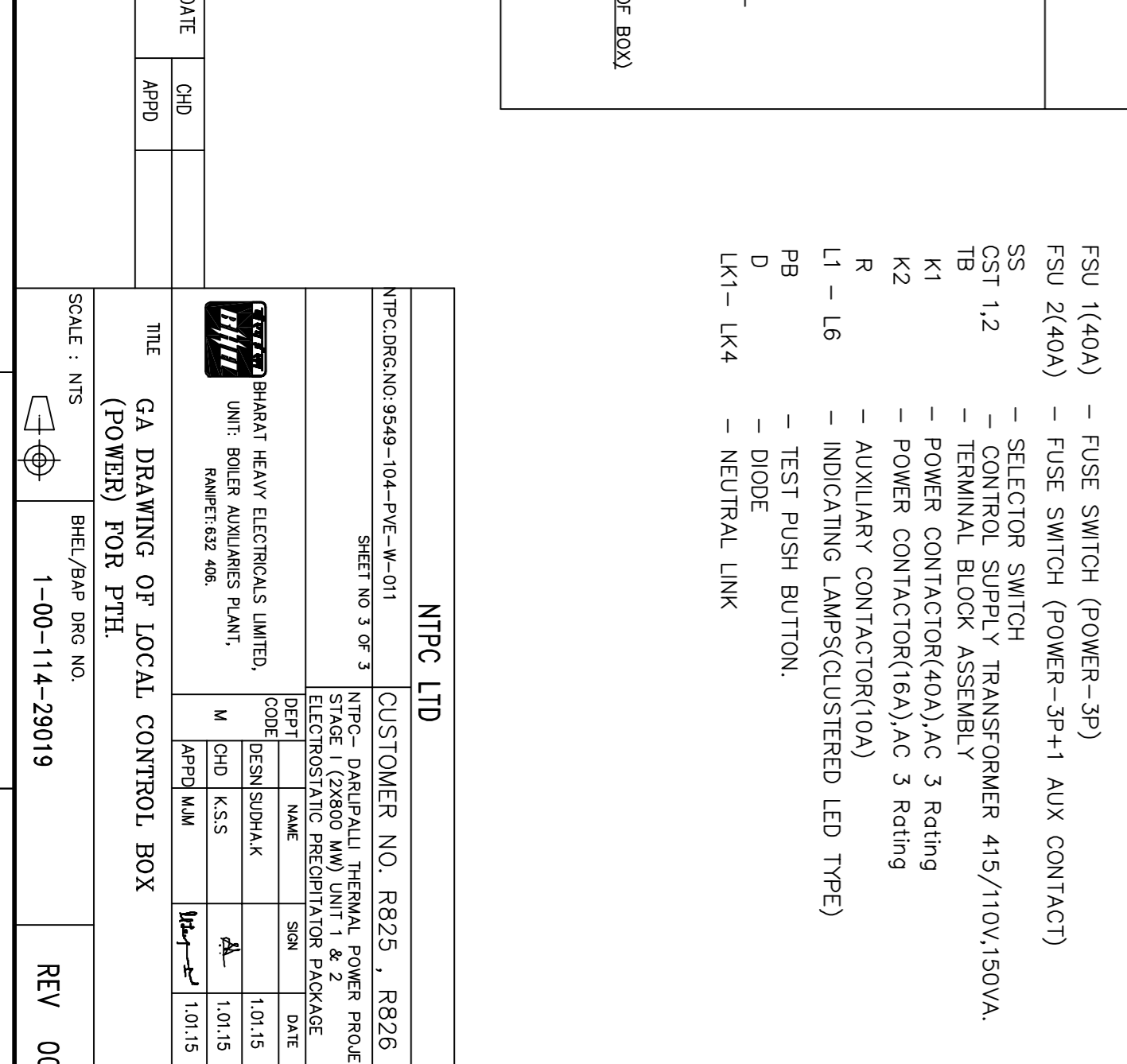
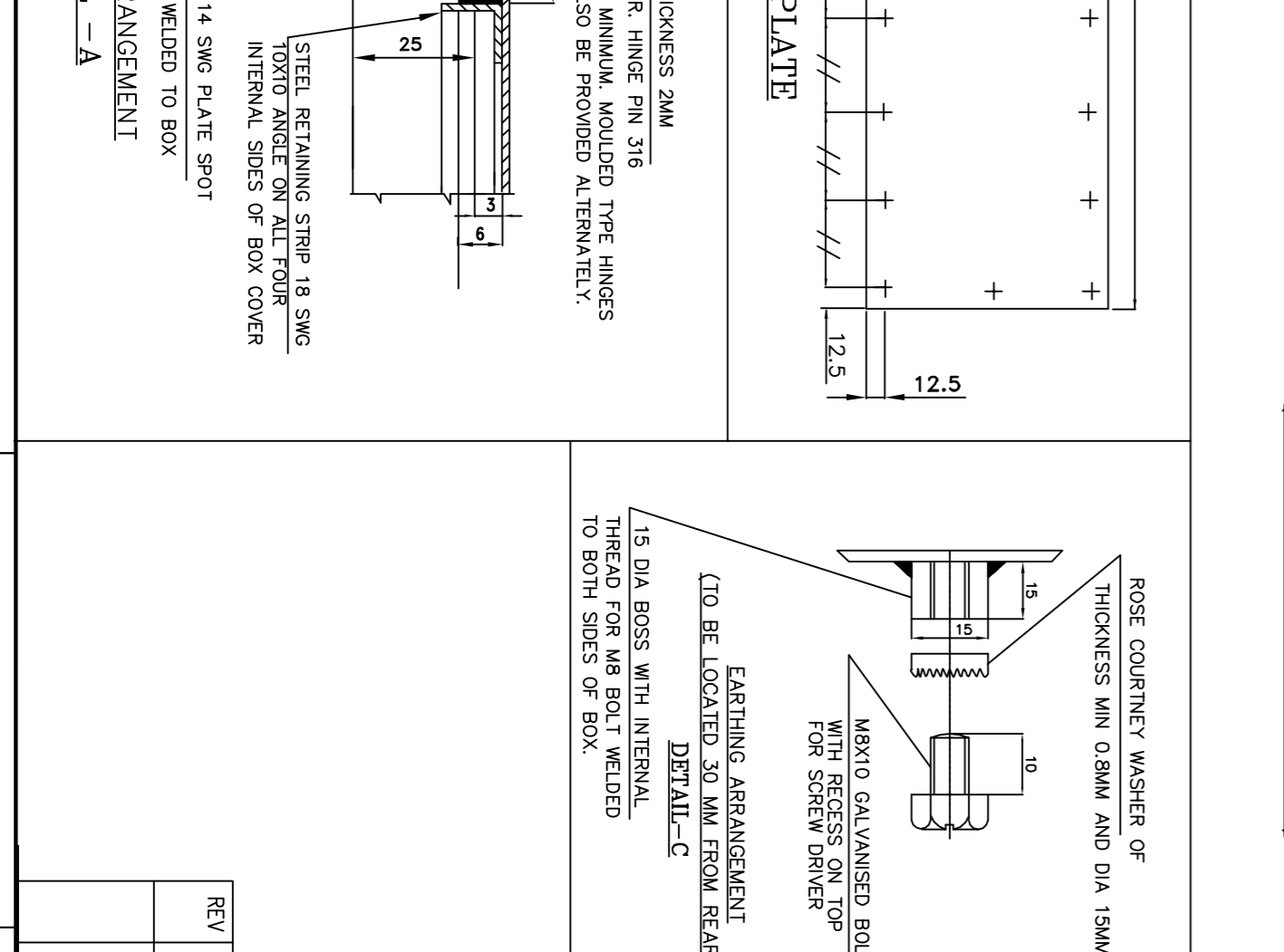
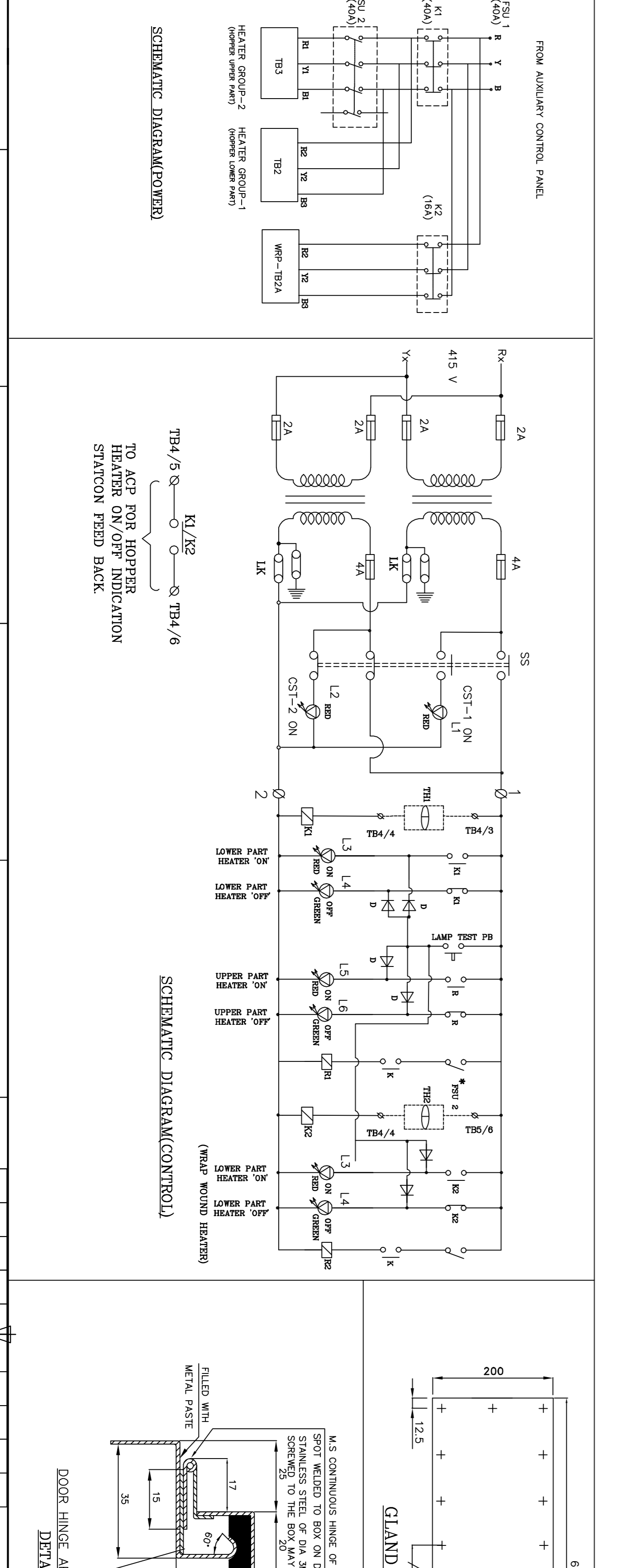
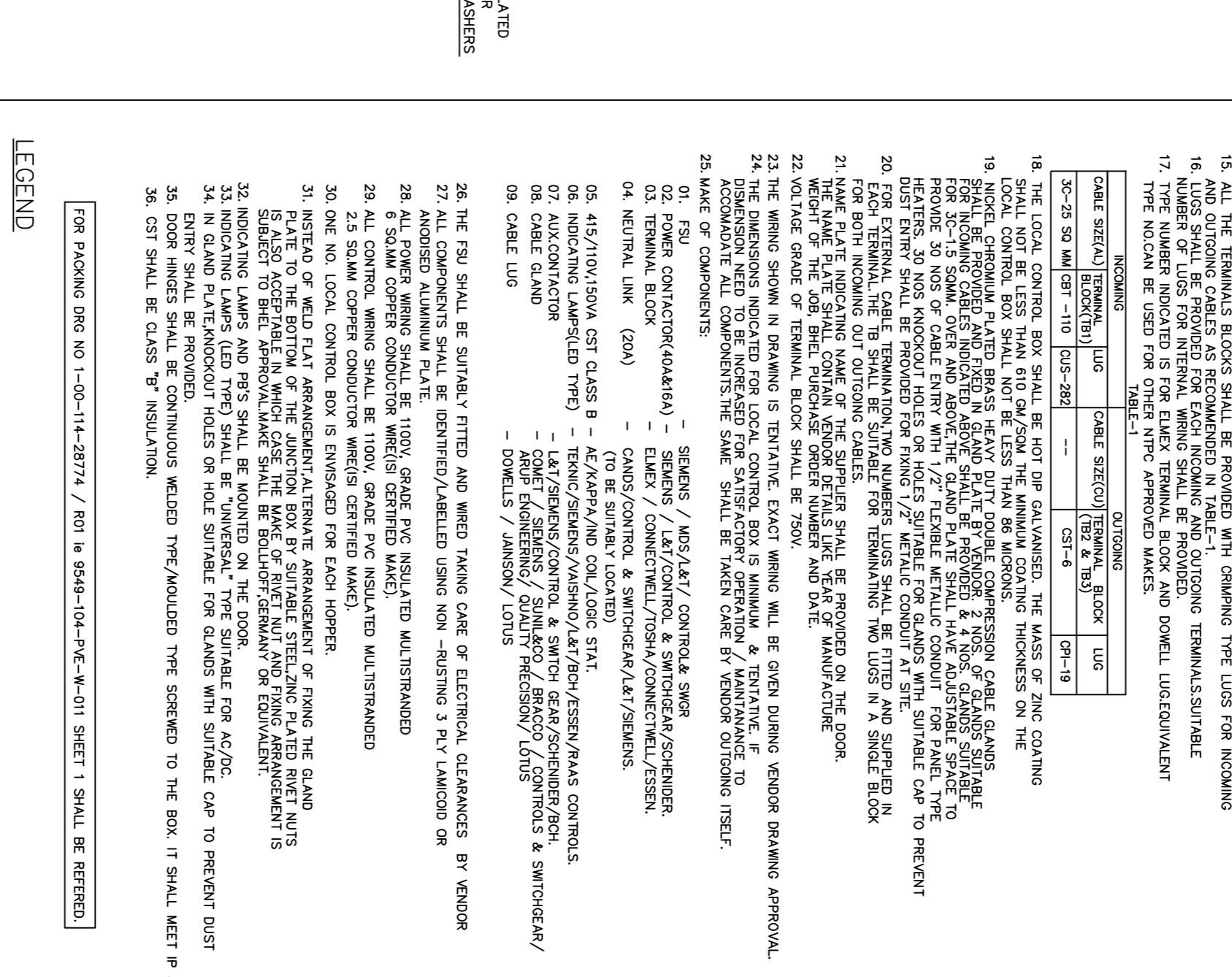
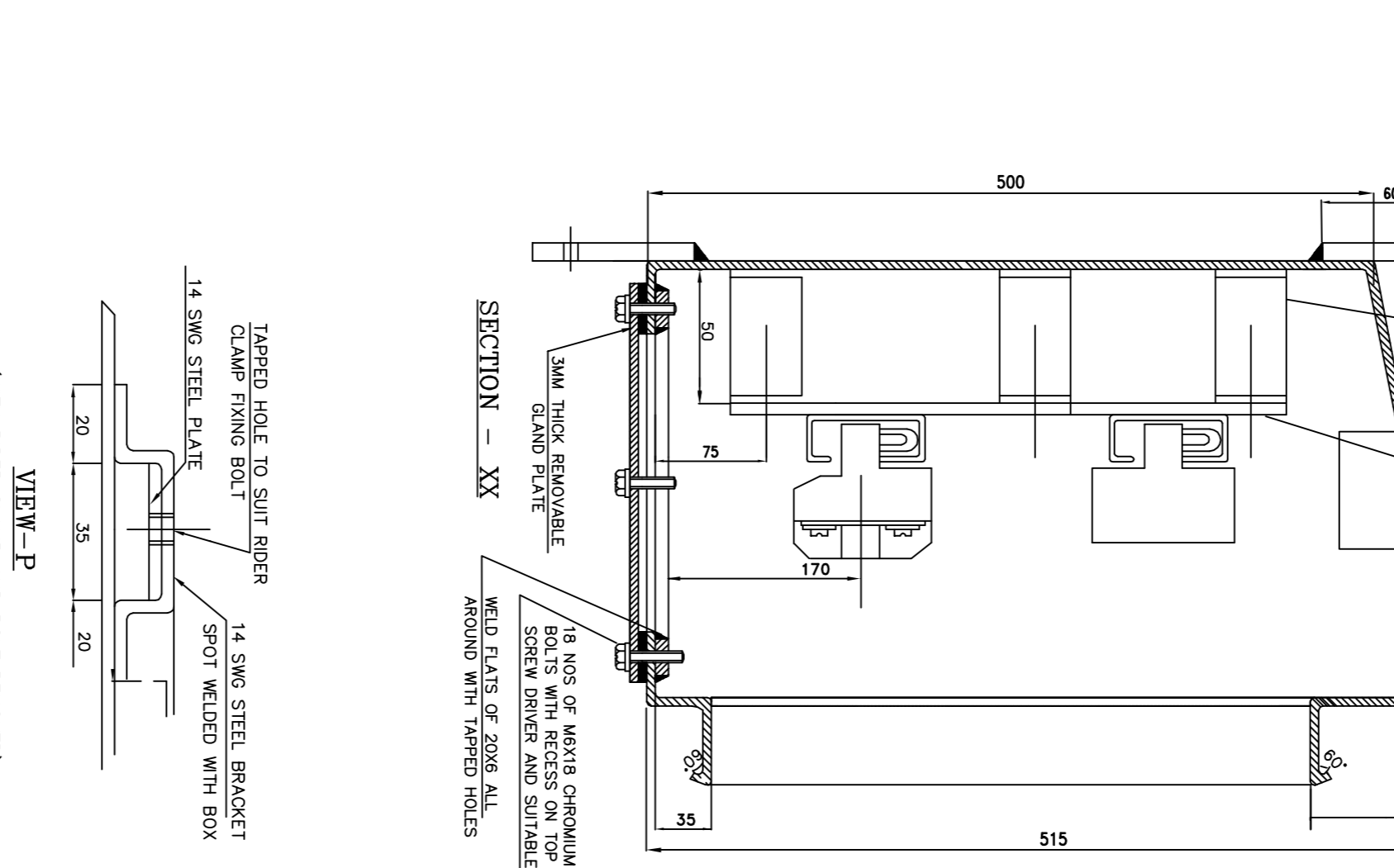
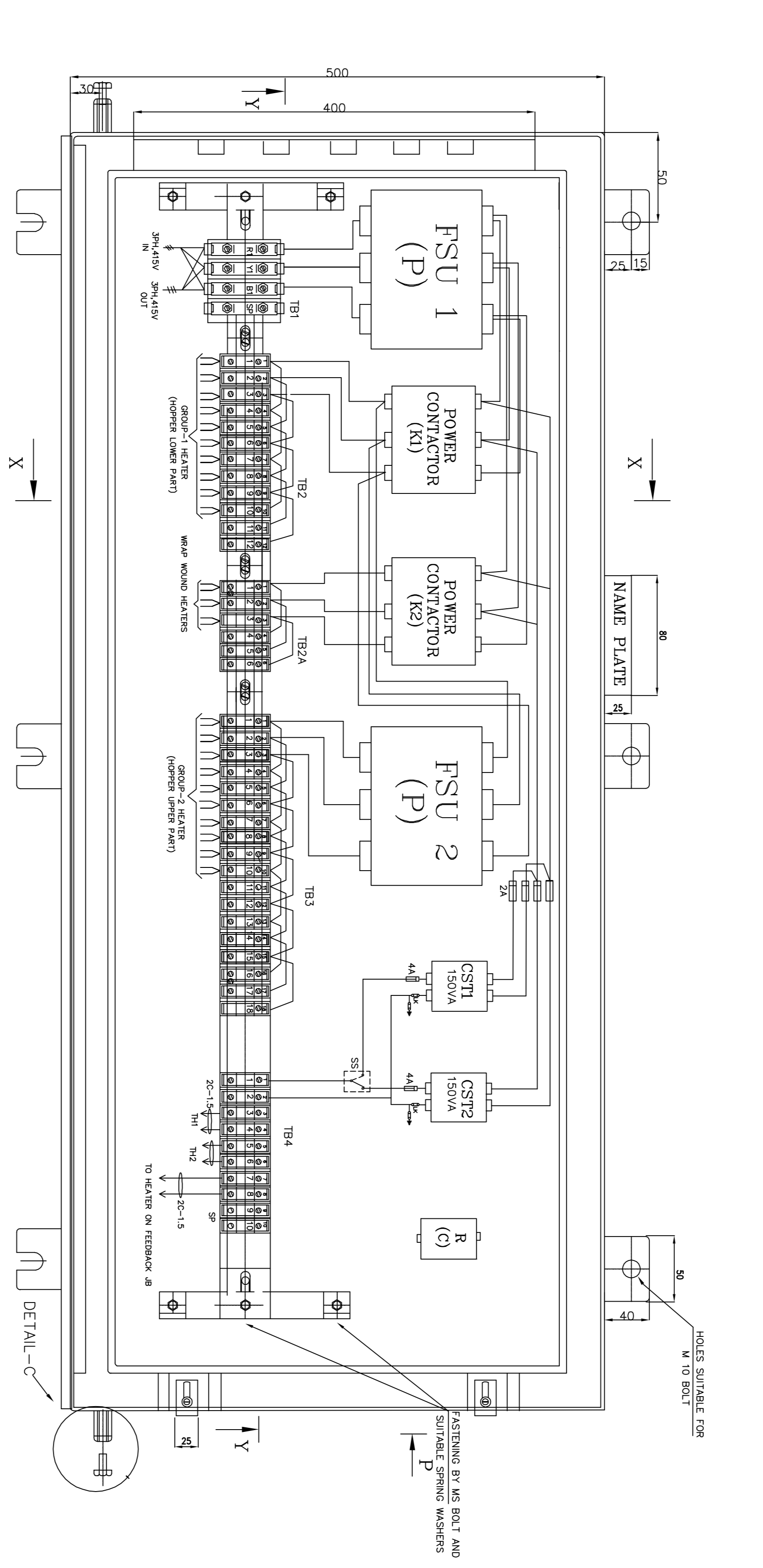
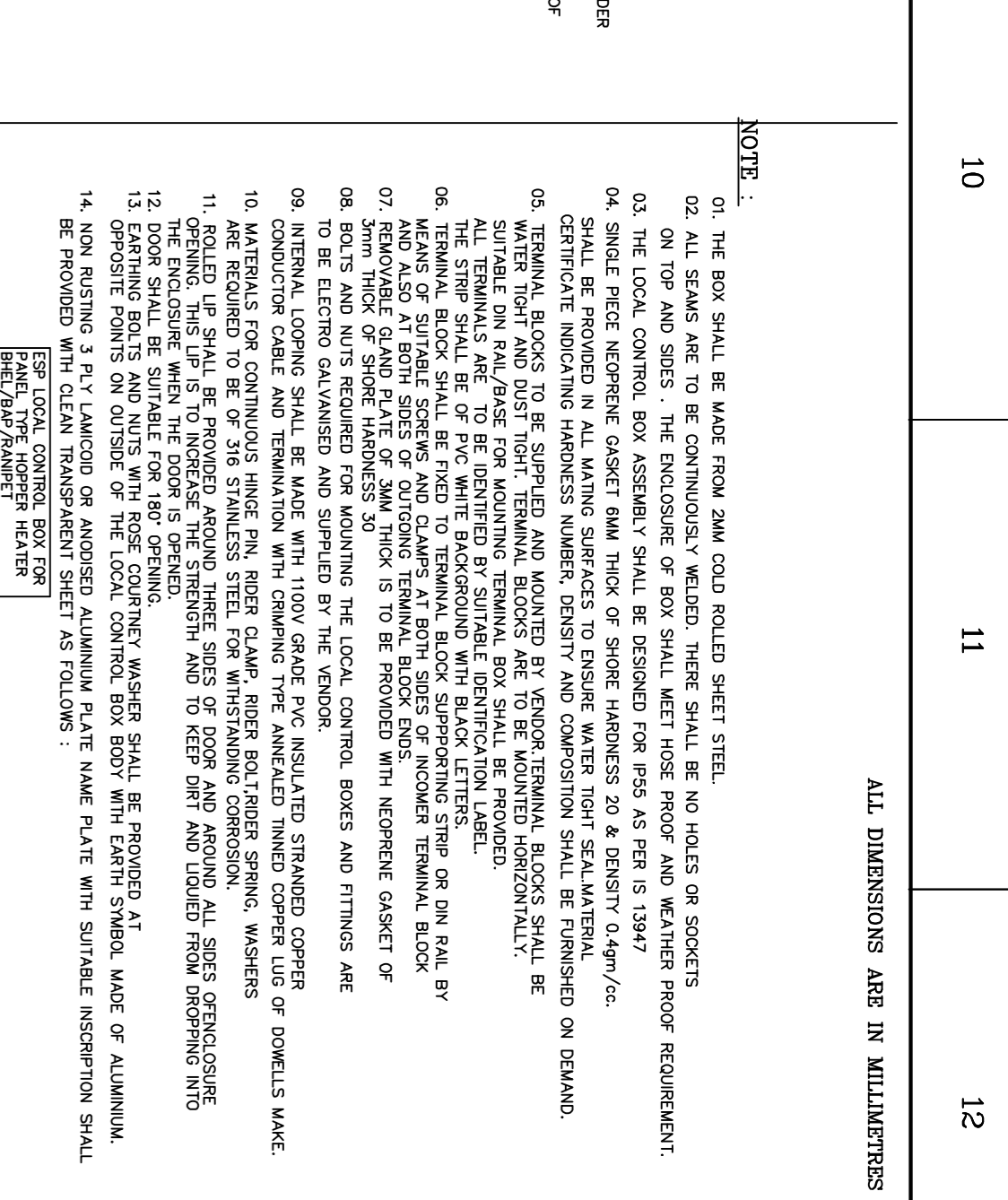
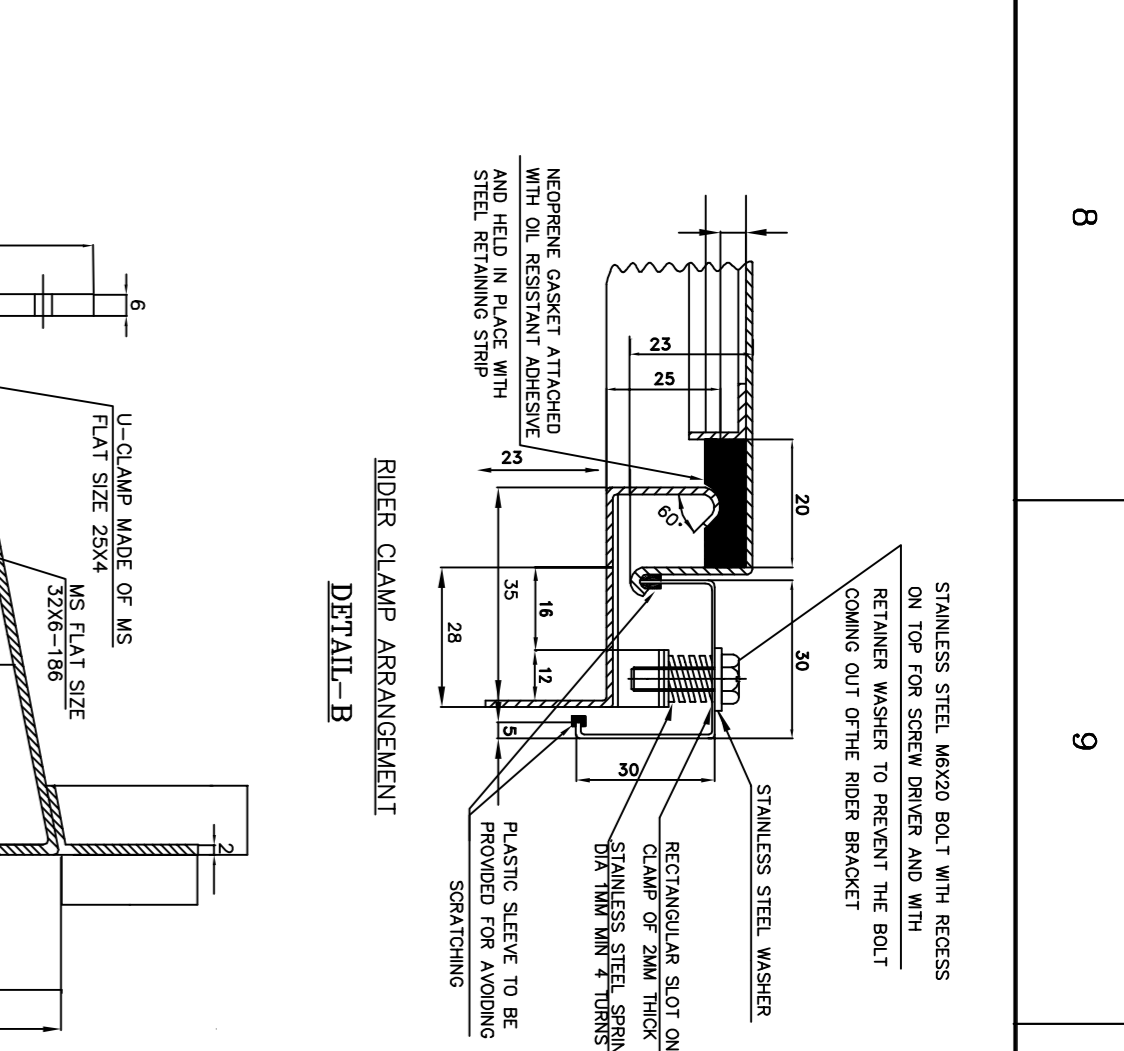
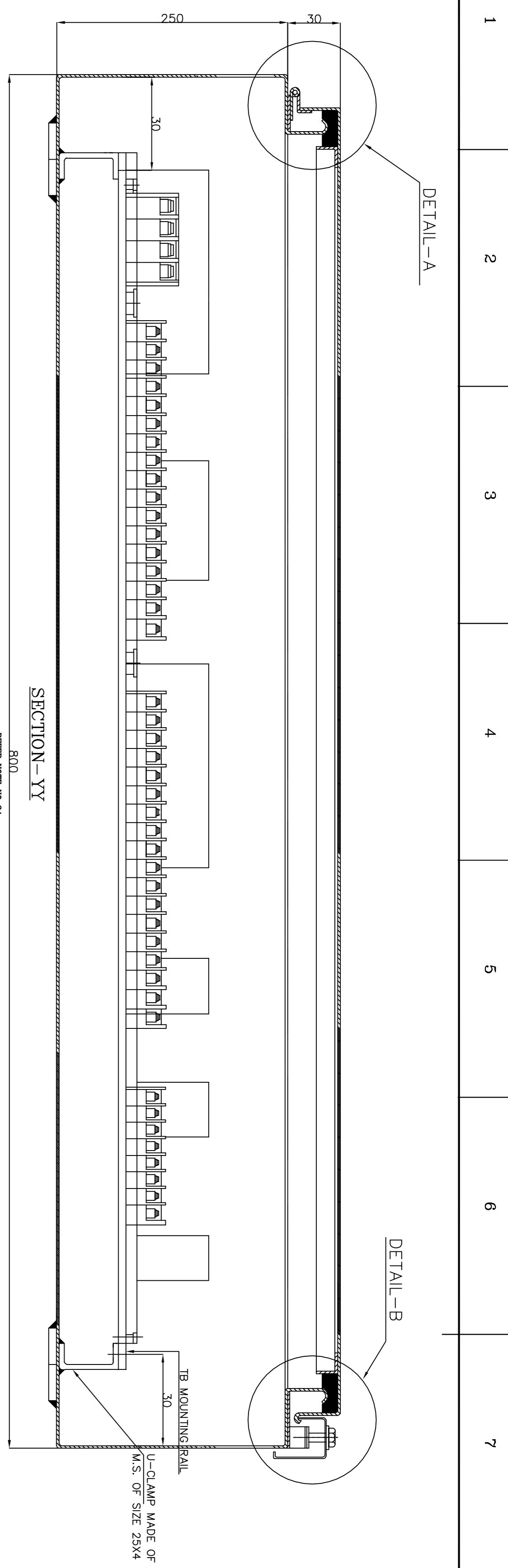
- THE BOX SHALL BE MADE FROM 2MM COLD ROLLED SHEET STEEL.
- ALL SEAMS ARE TO BE CONTINUOUSLY WELDED. THERE SHALL BE NO HOLES OR SOCKETS ON TOP AND SIDES. THE ENCLOSURE OF BOX SHALL WEAT PROOF AND WEATHER PROOF REQUIREMENT.
- THE LOCAL CONTROL BOX ASSEMBLY SHALL BE DESIGNED FOR IP54 AS PER IS 13947
- SINGLE PIECE NEOPRENE CASKETS 6MM THICK OF SHORE HARDNESS 20 & DENSITY 0.94M/CC SHALL BE PROVIDED IN ALL MATING SURFACES TO ENSURE WATER TIGHT SEAL. MATERIAL CERTIFICATE INDICATING HARDNESS NUMBER, DENSITY AND COMPOSITION SHALL BE FURNISHED ON DEMAND
- TERMINAL BLOCKS TO BE SUPPLIED AND MOUNTED BY VENDOR. TERMINAL BLOCKS SHALL BE WATER TIGHT AND DUST TIGHT. TERMINAL BLOCKS ARE TO BE MOUNTED HORIZONTALLY.
- SUITABLE DIN RAIL/BASE FOR MOUNTING TERMINAL BLOCK SHALL BE PROVIDED.
- TERMINAL BLOCK SHALL BE FIXED TO TERMINAL BLOCK SUPPORTING STRIP OR DIN RAIL BY MEANS OF SUITABLE SCREWS AND CLAMPS AT BOTH SIDES OF INCOMER TERMINAL BLOCK.
- TERMINAL BLOCK SHALL BE OF PVC WHITE BLACK GROUND WITH BLACK LETTERS.
- THE STRIP SHALL BE OF PVC WHITE BLACK GROUND WITH BLACK LETTERS.
- TERMINAL BLOCK SHALL BE PROVIDED WITH BLACK LETTERS.
- ROLL UP SHALL BE PROVIDED AROUND THREE SIDES OF DOOR AND AROUND ALL SIDES OPENING. THIS UP IS TO INCREASE THE STRENGTH AND TO KEEP DIRT AND LIQUID FROM DROPPING INTO THE ENCLOSURE WHEN THE DOOR IS OPENED.
- THE ENCLOSURE SHALL BE PROVIDED WITH 1/2" FLEXIBLE METALLIC CONDUIT AT SITE.
- EARTHING BOLTS AND NUTS WITH ROSE COURTESY WASHER SHALL BE PROVIDED AT OPPOSITE POINTS ON OUTSIDE OF THE LOCAL CONTROL BOX BODY WITH EARTH SYMBOL. MADE OF ALUMINIUM.
- NON RUSTING 3 PLY LAMINCOID NAME PLATE WITH SUITABLE INSCRIPTION SHALL BE PROVIDED WITH CLEAN TRANSPARENT SHEET AS FOLLOWS:

15. ALL THE TERMINALS BLOCKS SHALL BE PROVIDED WITH CLAMPING THE LUGS FOR INCOMING AND OUTGOING CABLES AS RECOMMENDED IN TABLE-1.

16. LUGS SHALL BE PROVIDED FOR EACH INCOMING AND OUTGOING TERMINALS/SUITABLE TYPE NUMBER INDICATED IS FOR ELKX TERMINAL BLOCK AND DOWELL LUG-EQUIVALENT TYPE. NONE CAN BE USED FOR OTHER NTPC APPROVED MAKES.

TABLE-1

CABLE SIZE (sq mm)	TERMINAL BLOCK	CABLE SIZE (sq mm)	TERMINAL BLOCK
35-25 SQ MM	BT-110	35-25 SQ MM	BT-110
10-6	CST-6	10-6	CST-6
19-18	CP-18	19-18	CP-18



NOTE: 01. THE BOX SHALL BE MADE FROM 2MM COLD ROLLED SHEET STEEL.
02. ALL SEAMS ARE TO BE CONTINUOUSLY WELDED. THERE SHALL BE NO HOLES OR SOCKETS
ON TOP AND SIDES. THE ENCLOSURE BOX SHALL WEAR HOSE PROOF REQUIREMENT.
03. THE LOCAL CONTROL BOX ASSEMBLY SHALL BE DESIGNED FOR 95 AS PER IS 1349
04. THE LOCAL CONTROL BOX SHALL BE PROVIDED WITH A LOCK AND KEYS. THE KEYS
SHALL BE PROVIDED IN ALL MAINS SURFACES TO ENSURE WATER TIGHT SEALING.
05. CERTIFICATE INDICATING HARDNESS NUMBER, DENSITY AND COMPOSITION SHALL BE PROVIDED ON DEMAND.
06. TERMINAL BLOCKS TO BE SUPPLIED AND MOUNTED BY VENDOR. TERMINAL BLOCKS SHALL BE
SURFACE MOUNTED ON RAIL/RAILER FOR MOUNTING. TERMINAL BOX SHALL BE PROVIDED.
07. ALL TERMINALS ARE TO BE IDENTIFIED BY SUITABLE IDENTIFICATION LABEL.
08. TERMINAL BLOCK SHALL BE FIXED TO TERMINAL BLOCK SUPPORTING STRIP OR ON RAIL BY
MOUNTING SCREW AND NUTS. TERMINAL BLOCK SHALL BE PROVIDED WITH NEOPRENE GASKET OF
MATERIAL FOR CONTINUOUS SINCE PIN, ROGER CLAMP, ROGER INSULATOR, SPACING WASHERS
AND BOLTS AND NUTS REQUIRED FOR MOUNTING THE LOCAL CONTROL BOXES AND FITTINGS ARE
TO BE ELECTRO GALVANIZED AND SUPPLIED BY THE VENDOR.
09. INTERNAL LOGGING SHALL BE MADE WITH 100V GRADE PVC INSULATED STRAPPED COPPER
10. MATERIALS FOR CONTINUOUS SINCE PIN, ROGER CLAMP, ROGER INSULATOR, SPACING WASHERS
AND BOLTS TO BE OF 316 STAINLESS STEEL FOR WITHSTANDING CORROSION.
11. GROUNDING SHALL BE PROVIDED FOR ALL ELECTRICAL COMPONENTS. THE GROUNDING
CONNECTION SHALL BE PROVIDED THROUGH THE TERMINAL BLOCK AND PROVIDED FROM DEPENDENT INTO
THE ENCLOSURE WHEN THE DOOR IS OPENED.
12. EARTHING BOLTS AND NUTS WITH ROSE CORNETRY WASHER SHALL BE PROVIDED AT
APPROPRIATE POINTS ON OUTSIDE OF THE LOCAL CONTROL BOX BODY WITH EARTH SYMBOL MADE OF ALUMINIUM.
13. NON ROTATING 2 P.W. LAMPOON OR APPROVED ALUMINIUM PLATE NAME PLATE WITH SUITABLE INSCRIPTION SHALL
BE PROVIDED.
14. LOCAL CONTROL BOX FOR
HEATER HEATER HEATER

ALL DIMENSIONS ARE IN MILLIMETERS

LEGEND

FSU (40A)	- FUSE SWITCH (POWER-3P)
FSU 2(40A)	- FUSE SWITCH (POWER-3P+1 AUX CONTACT)
SS	- SELECTOR SWITCH
CST 1,2	- CONTROL SUPPLY TRANSFORMER 415/110V,150VA.
TB	- TERMINAL BLOCK ASSEMBLY
K1	- POWER CONTACTOR(40A) AC 3 Rating
K2	- POWER CONTACTOR(6A) AC 3 Rating
R	- AUXILIARY CONTACTOR(10A)
L1 - L6	- INDICATING LAMP(S/CLUSTERED LED TYPE)
PB	- TEST PUSH BUTTON.
D	- DIODE
LK1 - LK4	- NEUTRAL LINK

REV	DATE	CHD	APPD

TITLE: GA DRAWING OF LOCAL CONTROL BOX (POWER) FOR PTH

SCALE: NTS

DATE: 1-00-14-2019

REV: 00

Size: A1