



CORRIGENDUM TO OPEN TENDER (RATE CONTRACT) 4251506E

Open tender (Rate contract) for Procurement of “Tubular Type of Heating Element as per Specification, Standards and Quantities as listed below.

NOTICE INVITING RATE CONTRACT TENDER :

In addition to earlier requirement e-Rate contract tenders are invited for the supply of Tubular Type of Heating Element as per the Specification, standards and Quantities as listed below.

The Scope includes Tubular Type of Heating Element.

SI No	Material code	Description	Quality Plan Requirement	Present requirement		Tentative Delivery Schedule
				Unit	Qty	
04	R79537160000	Heating Element for support insulator (with stainless steel sheath) as per BHEL DRG No 1-00-114-27794 Rev:02 and technical specification TEP:NTPC:HE 011 Rev:01 and as per packing DRG No:3-00-114-37123 Rev:02	QP:E:837:G REV 00	No	1824	Financial year 2016-17 Exact delivery schedule will be Intimated later
05	R79537170000	Heating Element for shaft insulators (with stainless steel sheath) as per BHEL DRG No 1-00-114-27795 Rev:02 and technical specification TEP:NTPC:HE 011 Rev:01 and as per packing DRG No:3-00-114-37122 Rev:02		No	456	

Table -1

**PRODUCT STANDARD
AIR QUALITY CONTROL SYSTEMS
BAP / BHEL RANIPET**

**TEP: NTPC: HE: 011: REV 01
PAGE 01 OF 05
EFFECTIVE DATE: 01.09.2012**

**TITLE : TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS OF
ELECTROSTATIC PRECIPITATOR**

ITEM : HEATING ELEMENT FOR SHAFT / SUPPORT INSULATOR

CUSTOMER : M/S. NATIONAL THERMAL POWER CORPORATION (M/S. NTPC)

	NAME	DESIGNATION	SIGNATURE	DATE
PREPARED	P.SRITHARUN	AE		01.09.2012
CHECKED	G.M.KUMAR	SAE		01.09.2012
APPROVED	M.JEYAMURUGANAND	DGM		01.09.2012

ISSUED BY

EDC / AQCS

**REVISION NUMBER: 01 In Cl.No 6.1.7 material changed REVISION DATE 01.09.2012
from Incolloy to SS & packing altered**

REVISION NUMBER: 00

INITIAL RELEASE 24.01.2004

1.0.0 SCOPE OF SUPPLY:

The scope of supply of Heating elements for shaft insulator and support insulator includes design, manufacture, testing, inspection, packing and delivery.

2.0.0 APPLICATION:

These HEATING ELEMENTS are used in Electrostatic precipitator, to keep the shaft and support insulator in warm condition in order to avoid any moisture condensation and dust deposit, which will result in failure of the insulator.

3.0.0 SITE CONDITIONS:

The HEATING ELEMENTS shall be designed taking care of the following site conditions.

- 3.1.1 Ambient temperature : 5 deg C to 50 deg C
- 3.1.2 Design ambient temperature : 50 deg C
- 3.1.3 Relative humidity (max) : 100% RH
- 3.1.4 Environment : Highly polluted, abrasive dust. Climate is tropical and conducive to fungus growth.
- 3.1.5 Location : The HEATING ELEMENT portion is kept inside the chamber to be heated. The terminal box is kept at ambient temp.

4.0.0 APPLICABLE STANDARD:

The HEATING ELEMENT shall be designed, manufactured and tested as per the following standards. If there is any conflict between these standards, and their amendments, if any, then the most stringent condition shall apply.

- 4.1.1 IS 302 : General & safety requirements for light electrical appliances.
- 4.1.2 IS 4159 : Specification for mineral filled sheathed heating elements.

5.0.0 TERMINAL CONDITIONS:

- 5.1.1 Input power supply : 415V, 2 Wire, 50 Hz.

5.1.2 Power supply variation:

Voltage : +/- 10%

Frequency : +/- 5%

Combined voltage and frequency : 10% (Absolute sum)

6.0.0 CONSTRUCTIONAL FEATURES:

- 6.1.1 The heating elements shall be of mineral filled sheathed type as per IS 4159 and manufactured as per the drawing indicated in the Purchase enquiry / purchase order.
- 6.1.2 The design of heating elements, shall take into account necessary safety factor.
- 6.1.3 The heaters shall have minimum design life of 25 years, and shall be able to withstand the thermal cycling as well as dynamic forces such as vibrating etc.
- 6.1.4 All ferrous parts shall be adequately rust protected.
- 6.1.5 All bolts, nuts, washers and other terminals shall be nickel plated to avoid rusting.
- 6.1.6 The external finish on metal components shall be heat and moisture resisting nature and shall not be affected adversely by variation in temperature under normal operating temperature.
- 6.1.7 The sheath material shall be heat resisting, Stainless Steel SS321.
- 6.1.8 The resistance wires forming the heating coil shall be of “KANTHAL – D”. The wire shall be free from twist, bends, kinks and other flaws and shall be clean and smooth.
- 6.1.9 The resistance wire heating coil shall be of uniform hardness and shall be capable of being closely wrapped without twisting.
- 6.1.10 The mineral shall be adequately filled to withstand thermal shock and shall not deteriorate by heating and cooling in service. The filling material shall be magnesium oxide granules.
- 6.1.11 The terminal box shall house with terminal block of ceramic material. The terminal connectors shall be of brass.
- 6.1.12 The terminal block shall be suitable to receive 2 Nos 2C – 2.5 sq.mm stranded copper, PVC insulated FRLS, unarmoured cables.
- 6.1.13 The terminals of heating elements shall be connected to the terminal block using 2.5 sq .mm copper conductors having heat resistant insulation with crimping type ATC lugs. The heat resistant insulation shall withstand the temperature inside the terminal box.
- 6.1.14 The terminal box shall be provided with 2 Nos. nickel chromium plated double compression type heavy duty BRASS cable gland as per BS6121 each suitable to receive 2C – 2.5 sq.mm copper, PVC insulated FRLS, unarmoured cable.

- 6.1.15 The terminal box shall be provided with 4 Nos. annealed tinned copper crimping type lugs to receive 2.5 sq.mm insulated copper conductor.
- 6.1.16 Two sets of M6 earthing screws with rose Courtney washer, nuts shall be provided at the outside of terminal box, to receive, 8 SWG GI earth wire.
- 6.1.17 The rating of shaft insulator heater and support insulator heater shall be 1 KW each.
- 6.1.18 At the steady state temperature, leakage current, which may flow from the live parts to the accessible parts and metal foil on external insulating material connected together shall not exceed 210 microamperes (rms) or 300 microamperes (peak) when measured as per IS 302.
- 6.1.19 At steady state and at rated voltage the power consumption shall not differ from the rated power consumption by more than 10%.
- 6.1.20 The heating elements shall be capable of withstanding 1KV AC high voltage test at 50 Hz without flashover or break down for one minute.
- 6.1.21 The Insulation resistance of the heater, immediately after conducting High voltage test, shall be more than 1 mega ohms, when measured at 500 V DC.
- 6.1.22 The Heating elements shall be capable of withstanding the following endurance and thermal shock tests. Heating elements shall be operated in air at 1.1 times the rated input for 1000 operating hours on cycles consisting of 30 minutes switching ON followed by 30 minutes switching OFF. Heat discharge shall not exceed the quoted value of manufacture after every 100 hours. Water at a temperature between 15 deg C and 40 deg C shall be poured on the element immediately, after the element has been switched OFF. At the end of the test, high voltage and insulating resistance test shall be conducted.
- 6.1.23 Asbestos should not be used. Instead an equivalent material shall be used.
- 6.1.24 The NON- ASBESTORS thermal & electrical insulating material provided in the terminal box shall be suitable for the temperature encountered.
- 6.1.25 **MAKE OF COMPONENTS:**
- i) Cable glands: COMET / SUNIL & CO / BRACCO / QUALITY PRECISION/CMI
 - ii) Cable lugs : DOWELLS/3D

6.1.26 PAINTING: As per purchase order / purchase enquiry.

6.1.27 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.

6.1.28 Name plate (engraved chromium plated) shall be provided on the terminal box indicating manufacture's name, KW rating, Voltage grade, serial number, name of the equipment.

7.0.0 INSPECTION AND TESTING:

The heating element shall be inspected and tested based on the following documents.

1. BHEL Purchase order.
2. BHEL Technical specification.
3. BHEL Quality CHECKLIST.
4. BHEL Approved supplier drawings for heaters and packing.

8.0 PACKING:

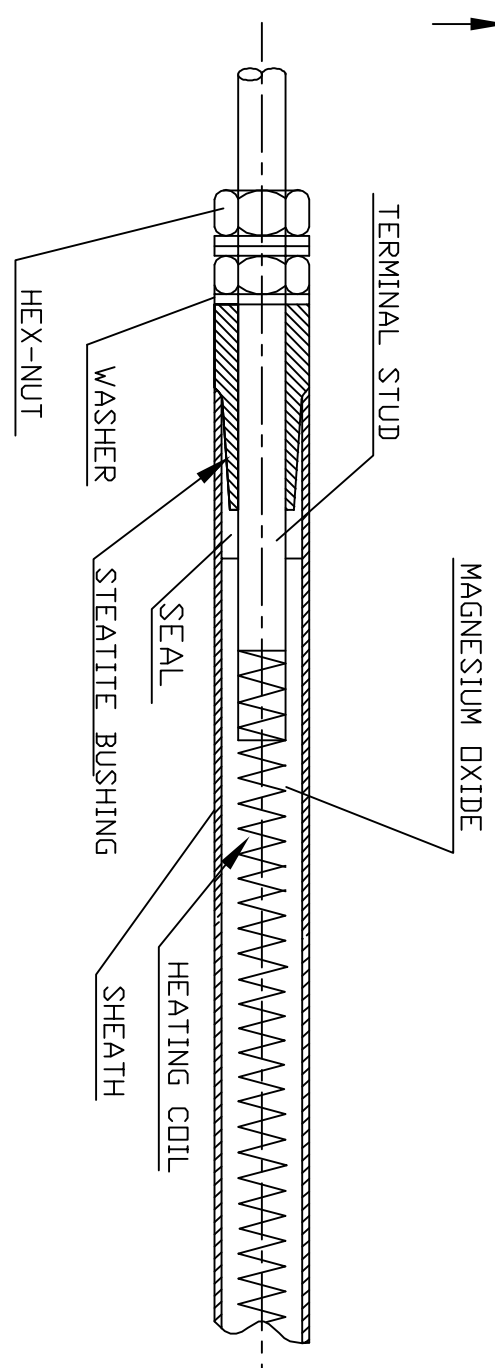
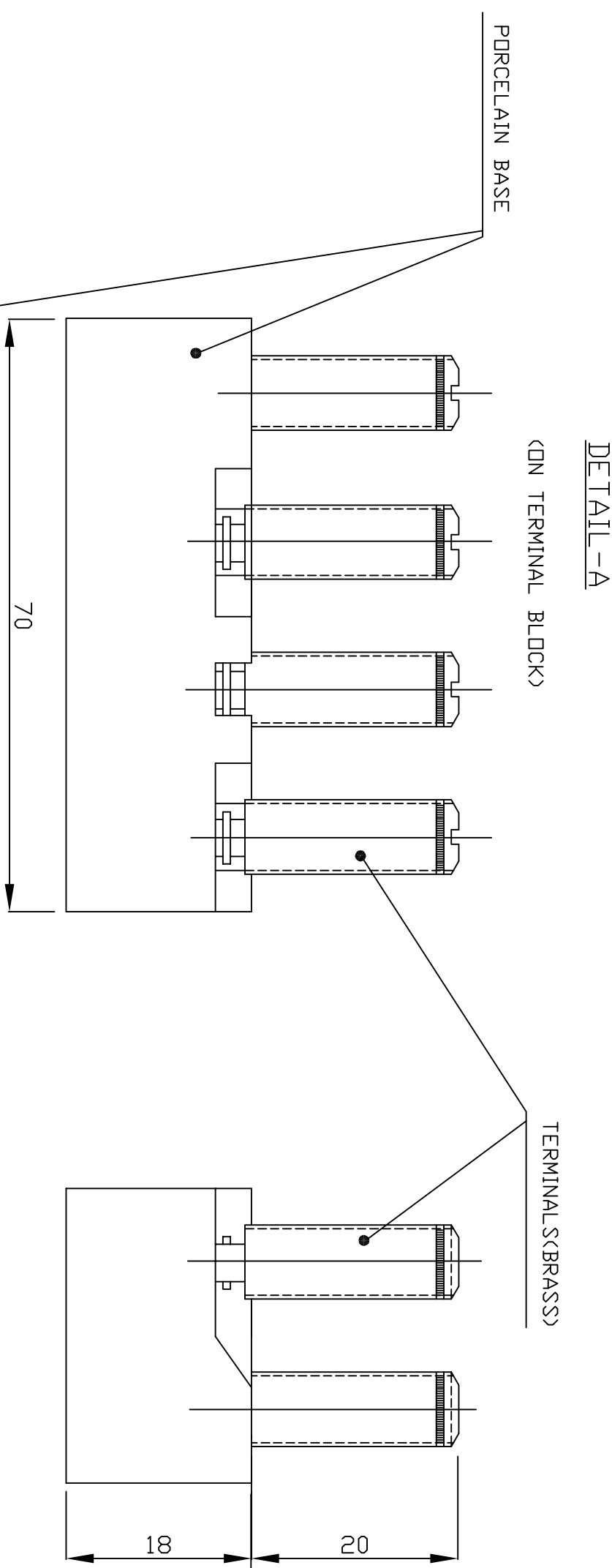
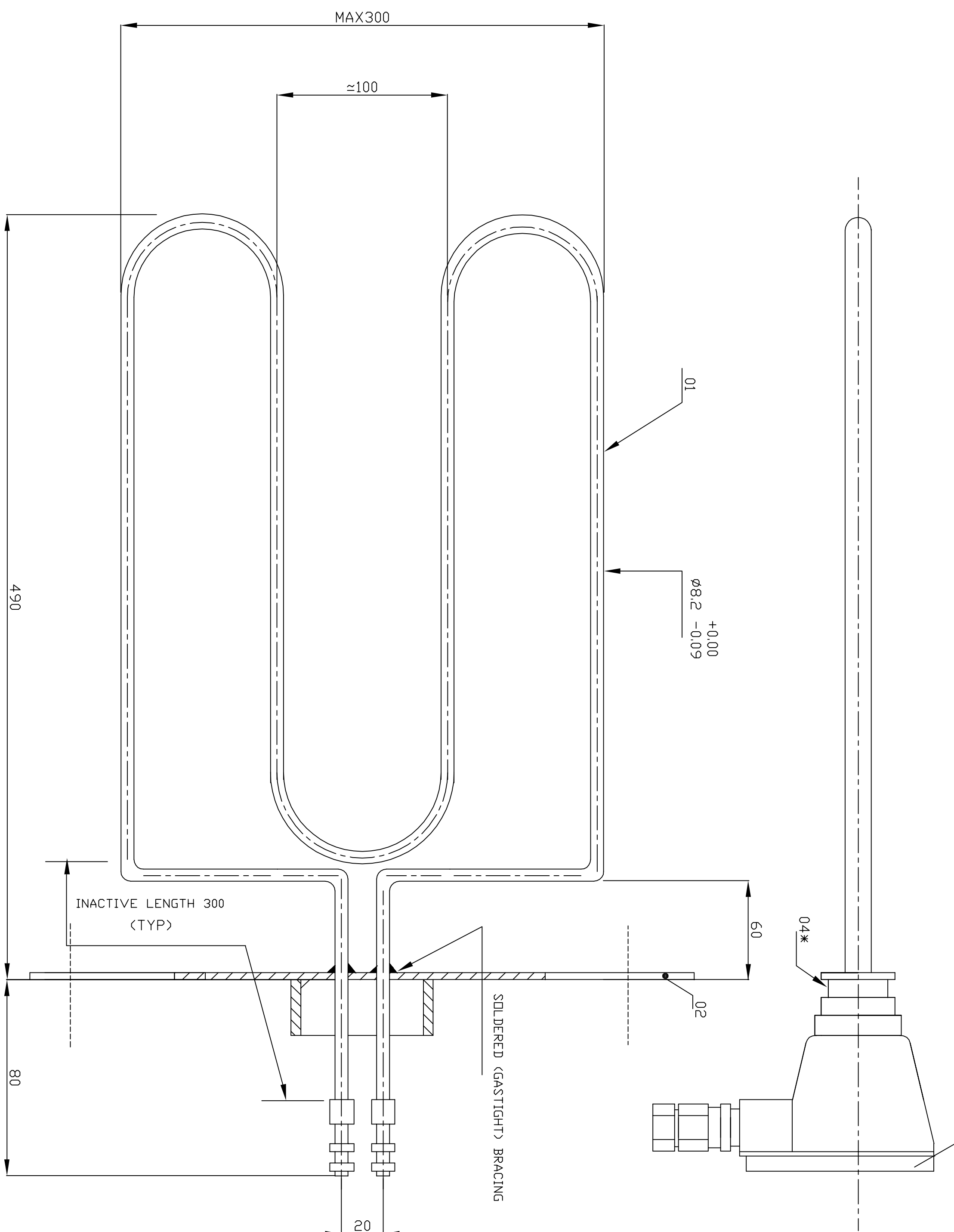
8.1.1 Each Heating element shall be packed individually with cardboard packing material. Lining with plastic sheet shall be provided inside the cardboard packing to avoid water entry during transit / storage.

8.1.2 The shaft insulator heating elements shall be packed with 6 Nos in each final packing and balance quantity in a separate packing for each material code.

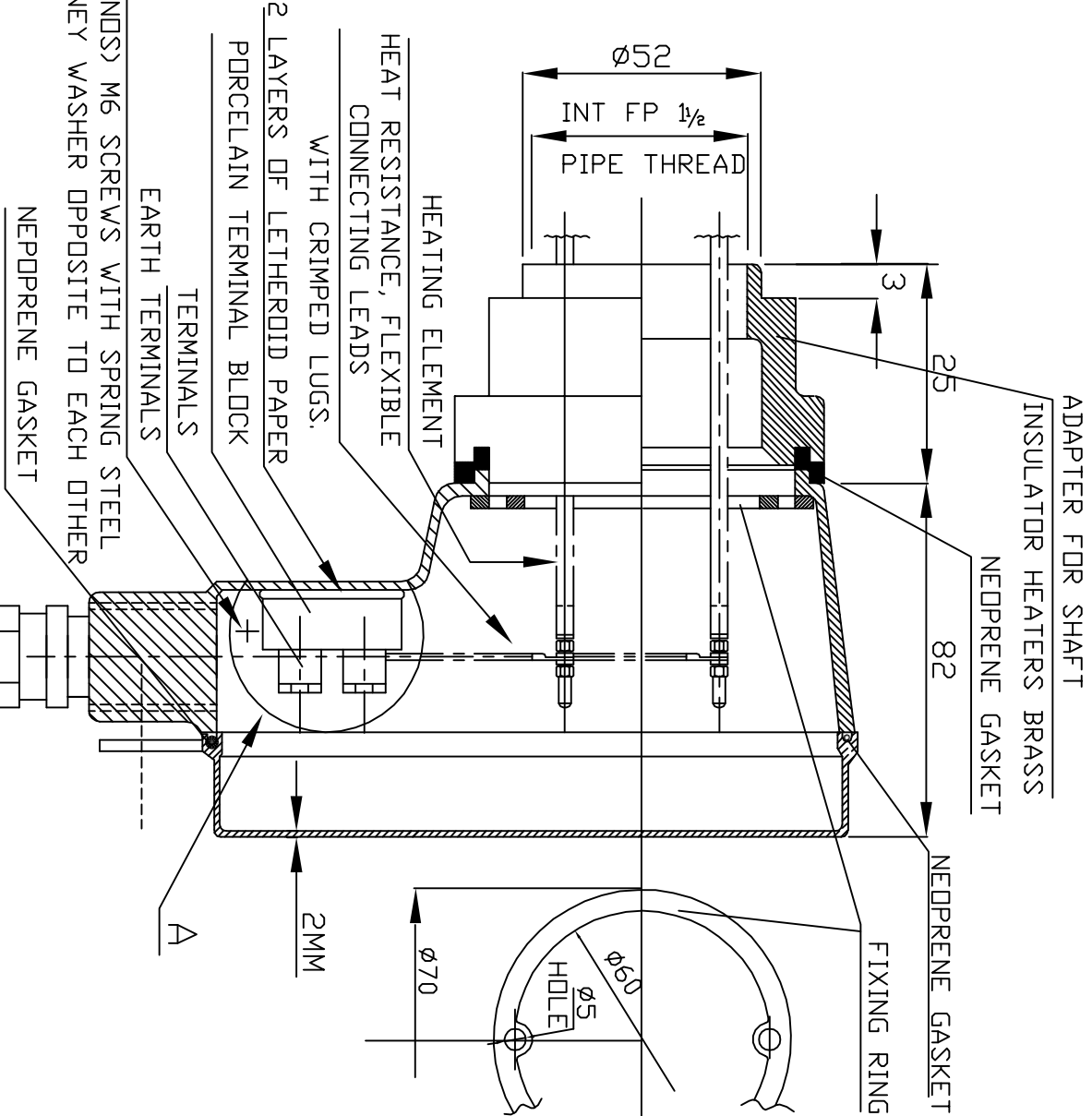
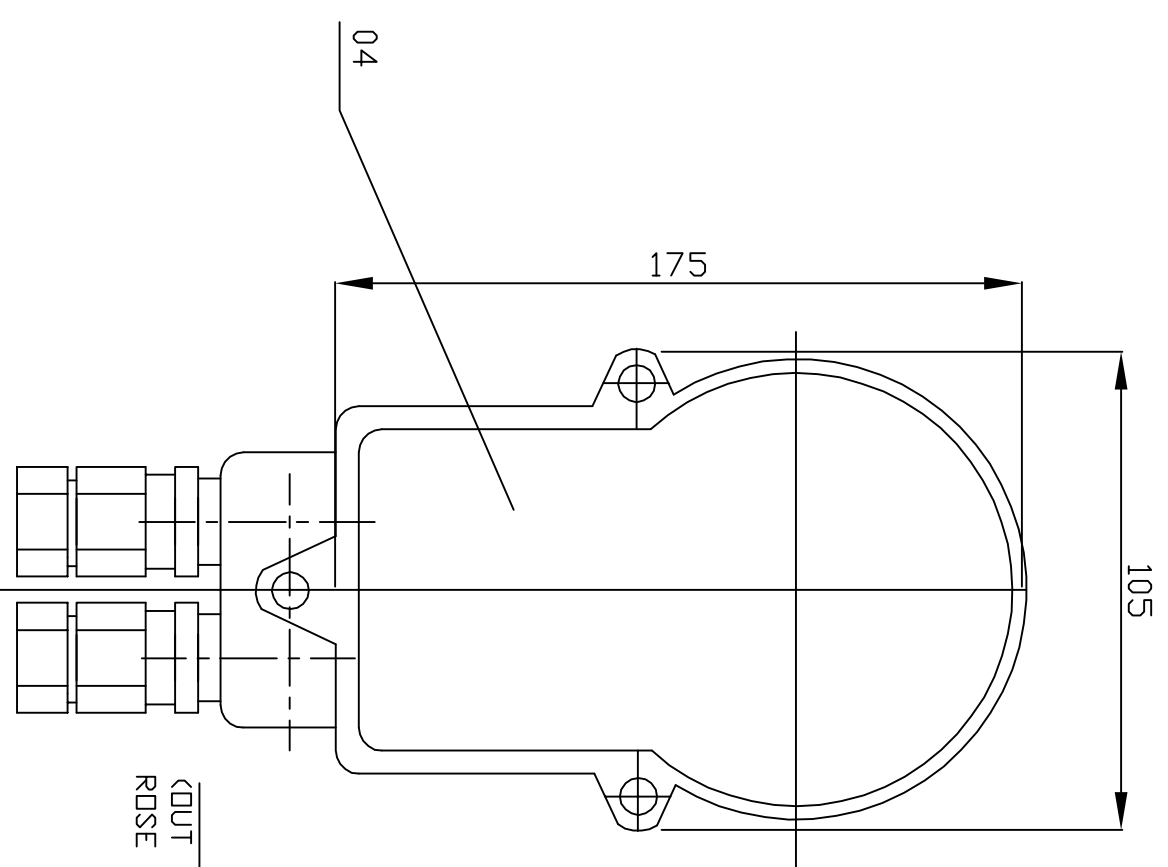
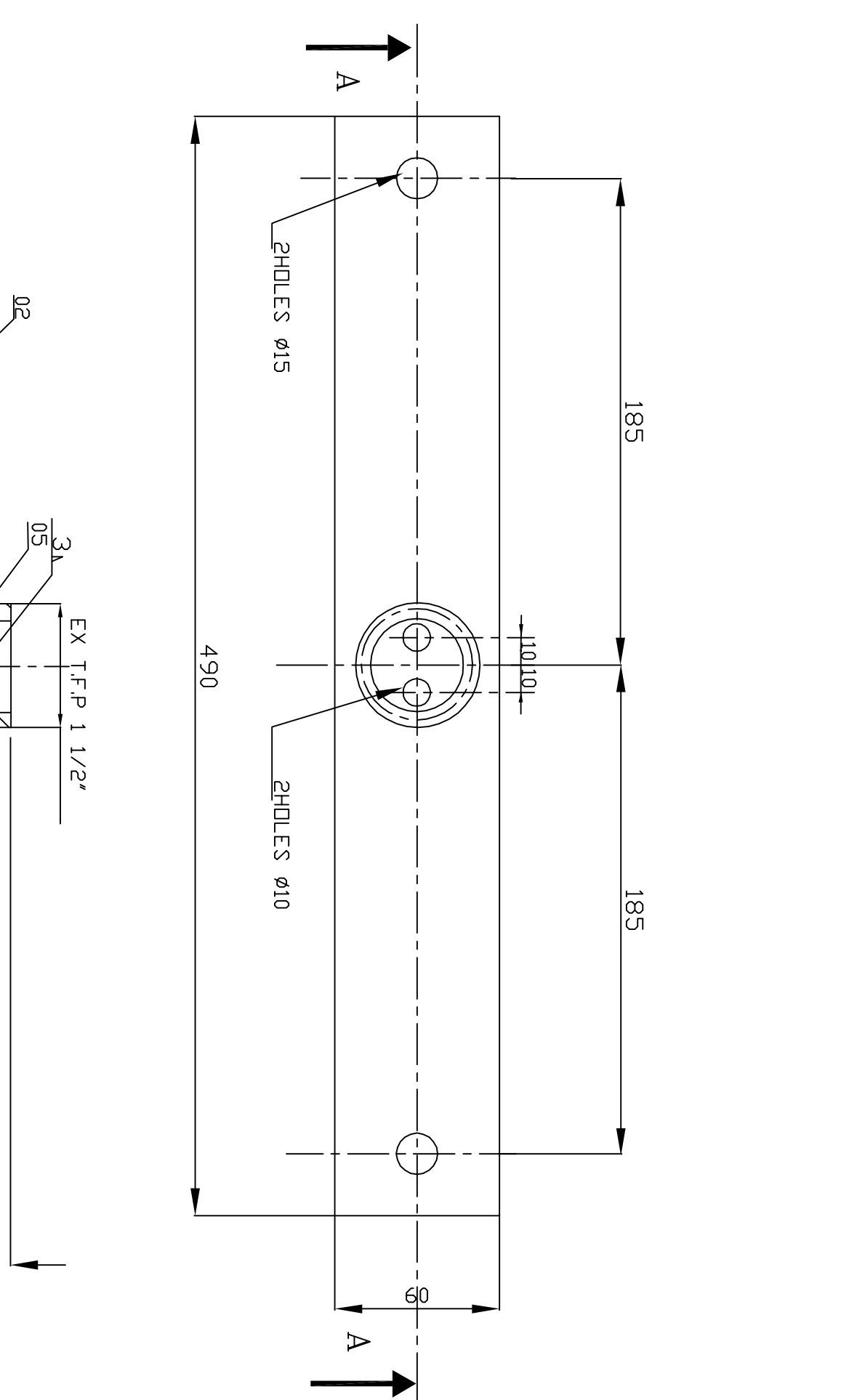
8.1.3 The support insulator heating elements shall be packed with 8 Nos in each final packing.

8.1.4 In the event of order, manufacturing and packing drawing shall be submitted for BHEL approval within 10 days from the date of purchase order.

9.0.0 This specification meets NTPC requirements. Hence no deviation shall be taken by bidder / supplier.



CROSS SECTION OF HEATING ELEMENT(TYP)



REV	DATE	ALTERED	G.M.K
02	28.01.14	CHECKED	M.J.M

2 CORE 2.5 SQ MM COPPER CONDUCTOR UNARMORED PVC CABLE

NOTE NO : 12 ADDED				
REV 01	DATE 14.08.10	ALTERED CHECKED	R V S R	R. Lakh S. R.

1. SHEATH MATERIAL : STAINLESS STEEL SS321 
2. HEATING COIL MATERIAL:KANITANHAL D WIRE
3. CABLE GLANDS SHALL BE FIXED WITH DUMMY PLUGS.
4. ALL FERROUS PARTS TO BE GALVANISHED AND BRASS PARTS TO BE NICKEL PLATED.
5. TERMINAL BOX MATERIAL: CAST ALUMINUM ULTRAPRESSURE DIE CAST.
6. MINIMUM CLEARANCE FROM THE TERMINAL STUD TOP AND HEATING ELEMENT STUD TO THE TERMINAL END LID SHOULD BE 19 MM(OTHER CLEARANCE)/ CREPEPAGES SHALL BE AS PER THE RELEVANT STANDARDS
7. THE TERMINAL BOX SHALL BE DESIGNED FOR IP55 DEGREE OF PROTECTION AS PER IS/IEC-60947.
8. CRIMPING TYPE CABLE LUGS ATOYSHALL BE PROVIDED TO RECEIVE
9. RUNS OF 20-2550 MM COPPER CABLE
9. MANUFACTURING DRAWINGS SHALL BE SUBMITTED FOR APPROVAL.
10. PIPE THREAD SHALL BE AS PER IS 2643.
11. NON ASBESTOS THERMAL/ELECTRICAL INSULATING CUSHION MATERIAL SUITABLE FOR THE TEMPERATURE EXPERIENCED,SHALL BE PROVIDED BELOW THE PORCELAIN TERMINAL BLOCK.
12. PAINT SHADE FOR TERMINAL BOX SHALL BE:RAL-5012 (BLUE).

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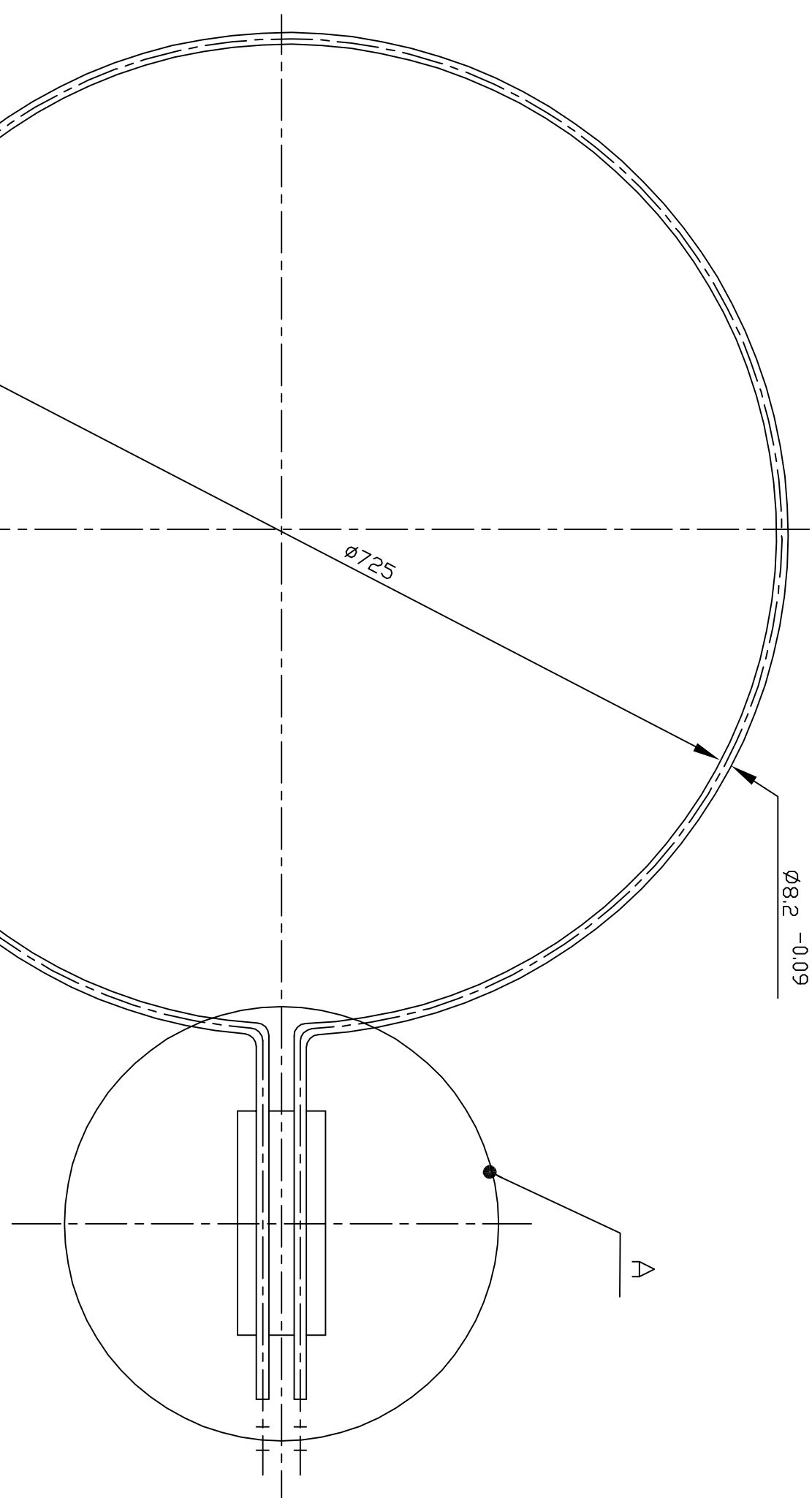
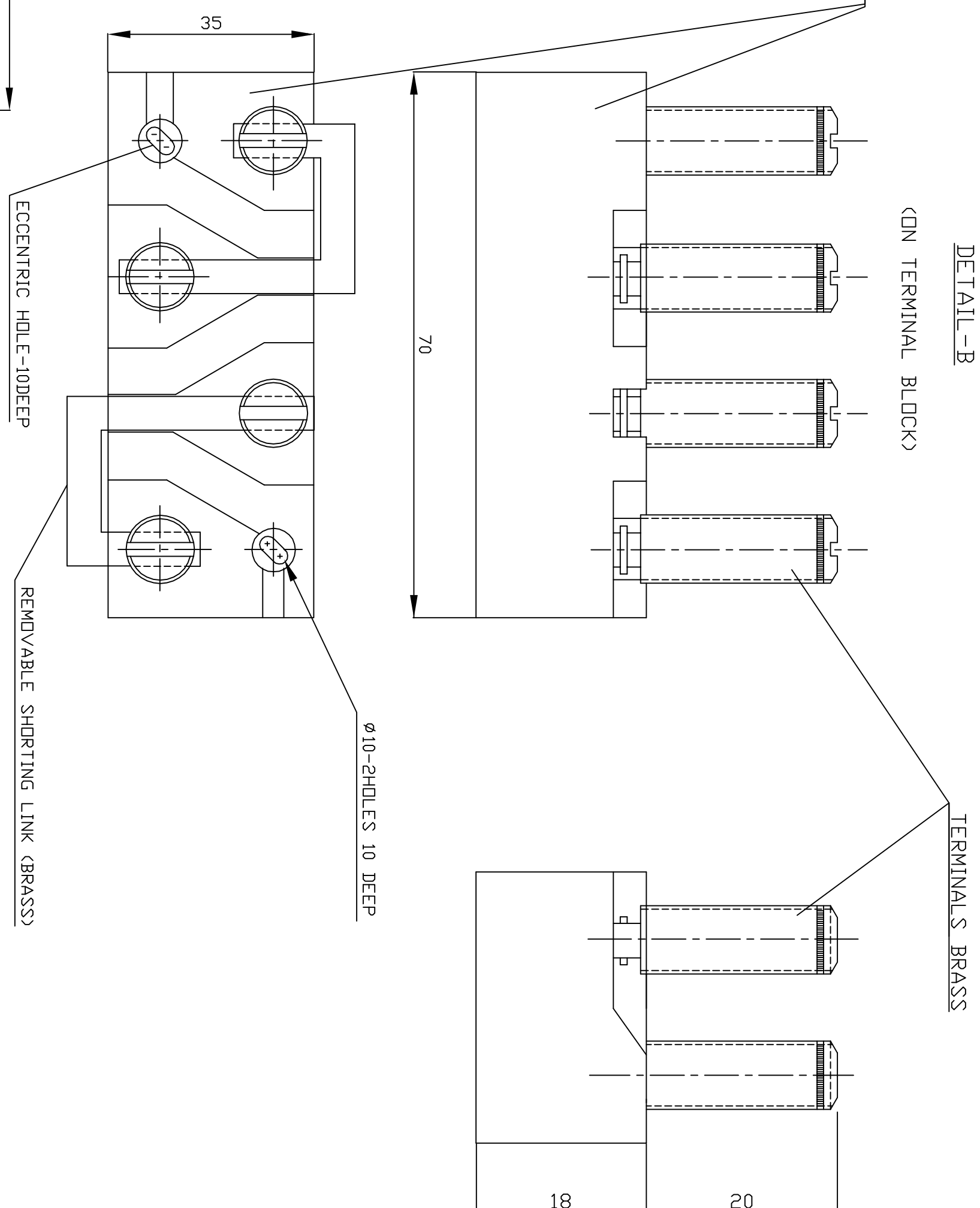
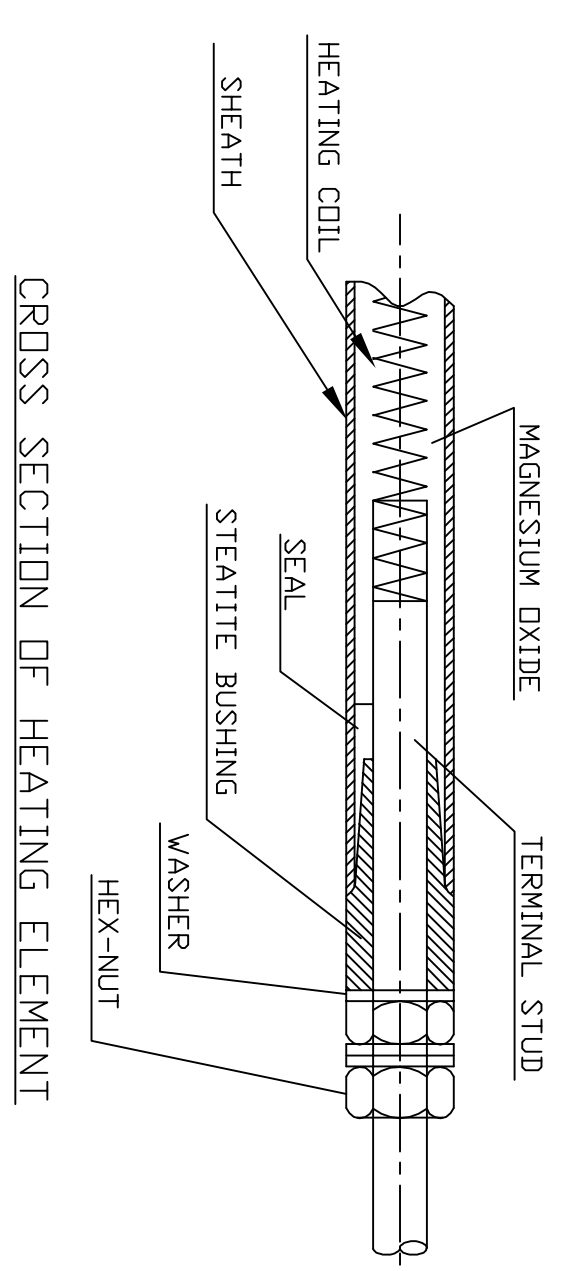
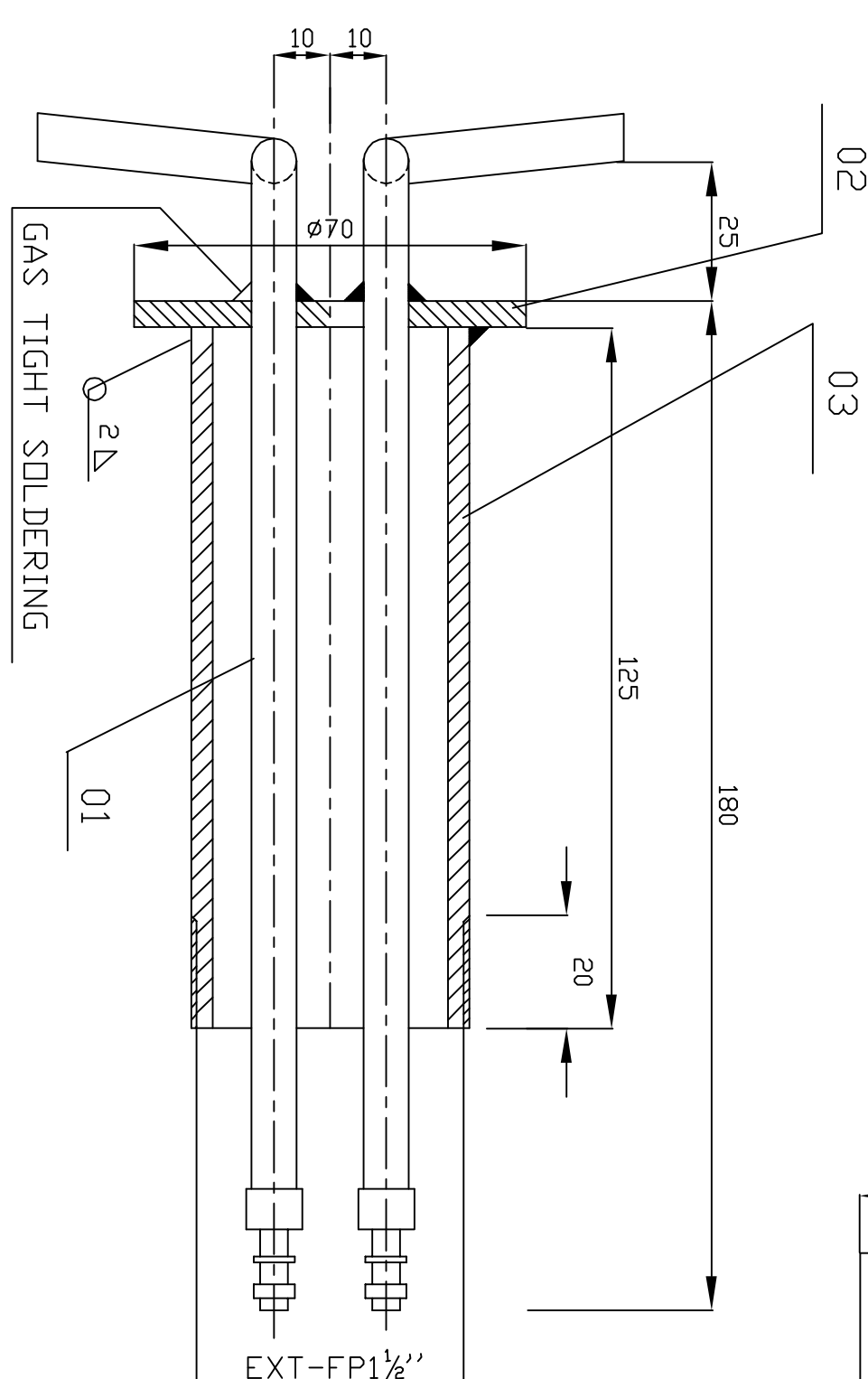
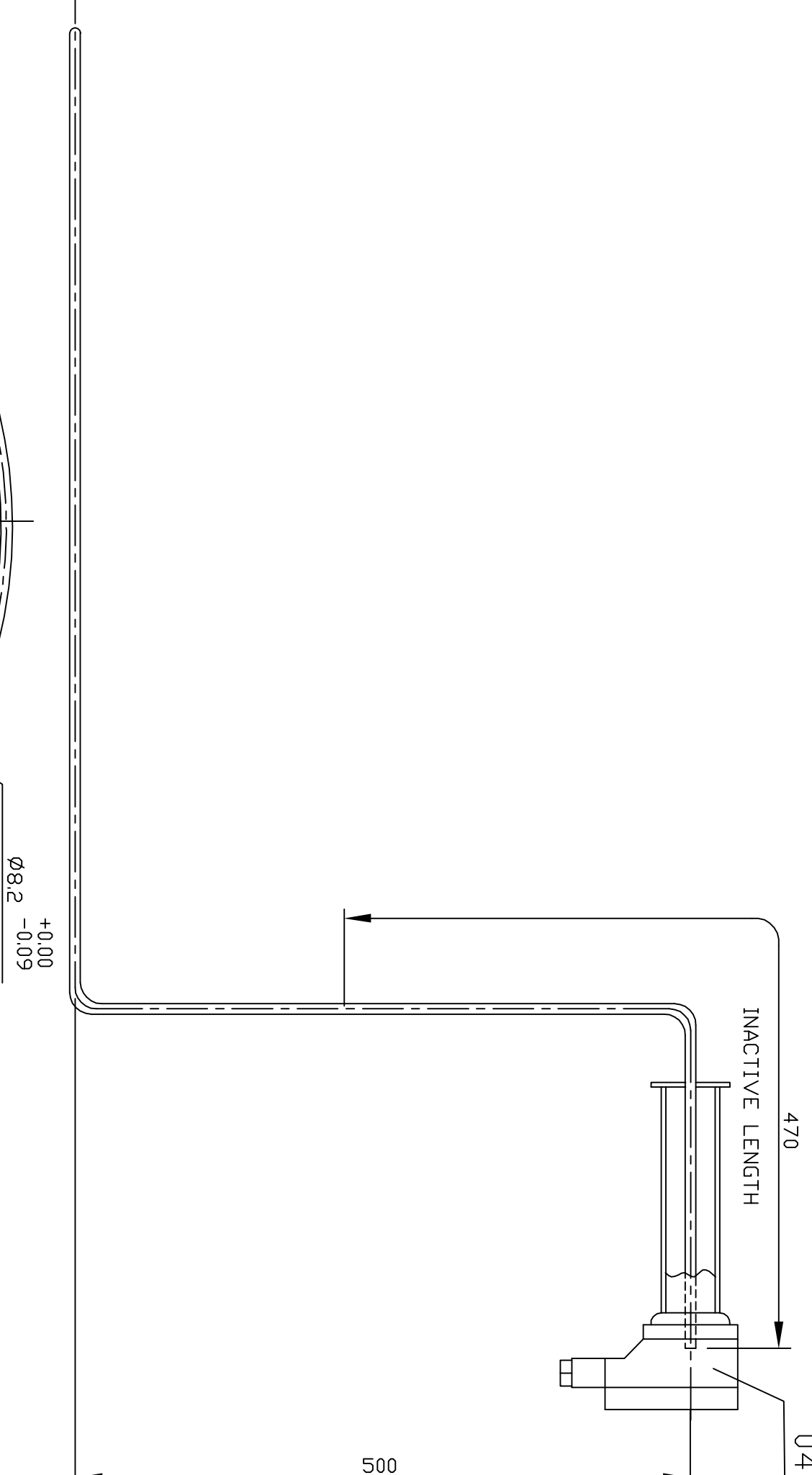
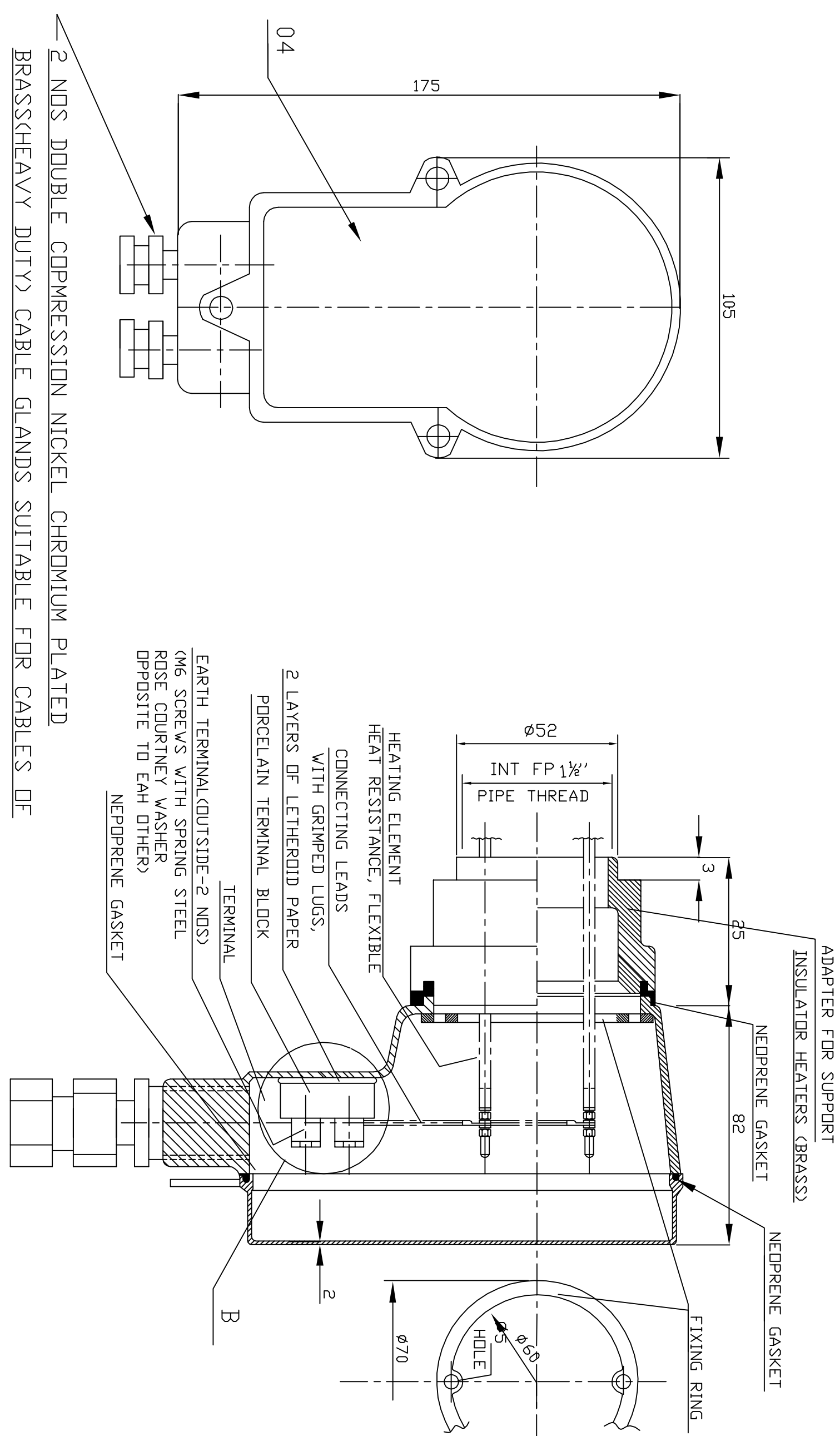
PROJECT
NATIONAL THERMAL POWER CORPORATION LTD

 BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT, RANIPET - 632 406.			
DRN	L.DEEPA	DATE	01.04.04
CHD	D.S	VAR.	
APDN	C.R.J		02.04.04

ITEM	QUANTITY	UNIT	DESCRIPTION
HEATING ELEMENT FOR SHAFT INSULATOR,1KW,415V,AC	1	01	1-00-114-27795 022

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Size A1
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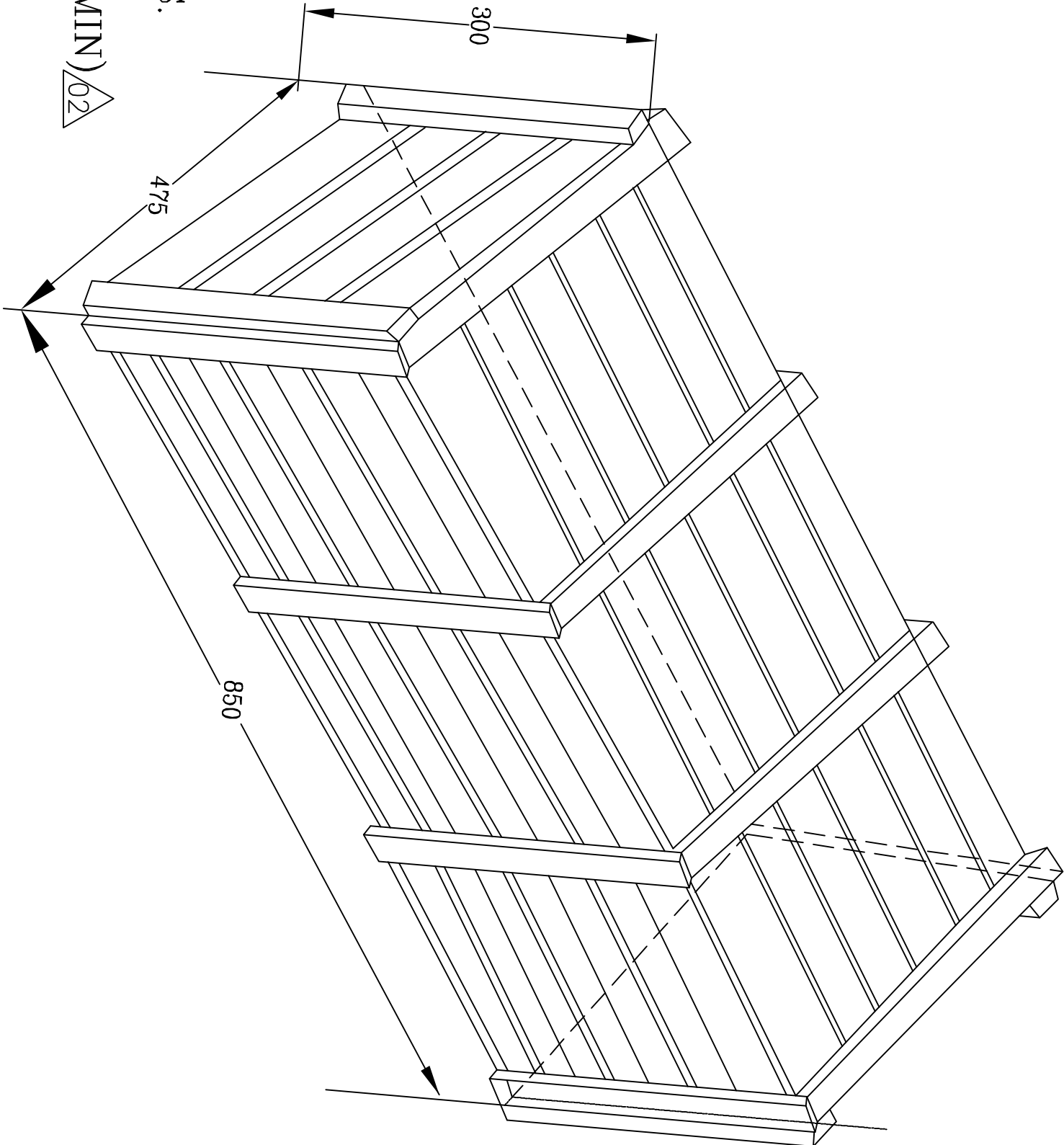
NOTE :-

1. SHEATH MATERIAL : STAINLESS STEEL SS321, 201
2. HEATING COIL MATERIAL KANTHAL D WIRE.
3. PIPE THREADS SHALL BE AS PER IS 2643.
4. ALL FERROUS PARTS TO BE GALVANISHED AND BRASS PARTS TO BE NICKEL PLATED.
5. TERMINAL BOX MATERIAL: CAST ALUMINIUM ALLOY--PRESSURE DIE CAST.
6. MINIMUM CLEARANCE FOR THE TERMINAL STUD TOP AND HEATING ELEMENT STUD TO THE TERMINAL END LID SHOULD BE 19 MM. OTHER CLEARANCES (CREEPAGES) SHALL BE AS PER THE RELEVANT STANDARDS.
7. THE TERMINAL BOX SHALL BE DESIGNED FOR IP55 DEGREE OF PROTECTION AS PER IS/IEC-60947.
8. CRIMPING THE CABLE LUGS (ATC) SHALL BE PROVIDED TO RECEIVE 2 RUNS OF 20-25 SQ MM CU CABLE.
9. MANUFACTURING DRAWINGS SHALL BE SUBMITTED FOR APPROVAL.
10. CABLE GLANDS SHALL BE FITTED WITH DUMMY PLUGS.
11. NON ASBESTOS THERMAL & ELECTRICAL INSULATING CUSHION MATERIAL SUITABLE FOR THE TEMPERATURE EXPERIENCED SHALL BE PROVIDED BELOW THE PROCELAN TERMINAL BLOCK.
12. PAINT SHADE FOR TERMINAL BOX SHALL BE: RAL-5012 (BLUE).

[illegible]

REV	DATE	ALTERED	CHK	BY
02	28.01.14	CHECKED	MJM	W.P.
NOTE NO : 12 ADDED.				
REV	DATE	ALTERED	R.V	C. Wokht
01	14.08.10	CHECKED	S.R	S.P.
SHEATH MATERIAL REVISED FROM INCOLOY TO STAINLESS STEEL IN NOTE NO. 1				
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PROJECT NATIONAL THERMAL POWER CORPORATION LTD.				
BHARAT HEAVY ELECTRICALS LTD.				
UNIT: BOILER AUXILIARIES PLANT				
RAINFLET - 932 406				
				
DRP	GRADE OF	SCALE	WEIGHT (Kf)	DATE
AGCS	UNTOOLING	N T S		
CODE 962	C / M / P			
HEATING ELEMENT FOR INSULATOR HOUSING(CYLINDRICAL) 1KW, 415V AC				
TITLE	CARD CODE	DRAWING NO.	REV	NO OF
1-00-114-27794	02			

ALL DIMENSIONS ARE IN MILLIMETRES



NOTES

- HEATING ELEMENTS SHALL BE WRAPPED IN POLYTHIN SHEET BEFORE WOODEN PACKING
- PACKING SIZE : 850MM X 475MM X 300MM.
- MATERIAL – RUBBER WOOD OR EUCALYPTUS.
- BOX CAPACITY 3 HEATER IN ONE BOX.
- EACH WOODEN PLANK SIZE: – 70MM WIDTH(MIN) X 15MM THK(MIN).
- GAP BETWEEN TWO PLANKS: 50MM(MAX).
- LENGTH OF EACH PLANK: TO SUIT BOX SIZE.
- THE PACKING BOX SHALL BE SUITABLE FOR TRANSPORTATION AND STORAGE AT SITE.

REV	DATE	ALTD	CHD	APPD
02	17.03.2016	S.PRAKASH G.M.K	M.J.M	
01	19.02.2014	V.REVAITHI G.M.K	M.J.M	

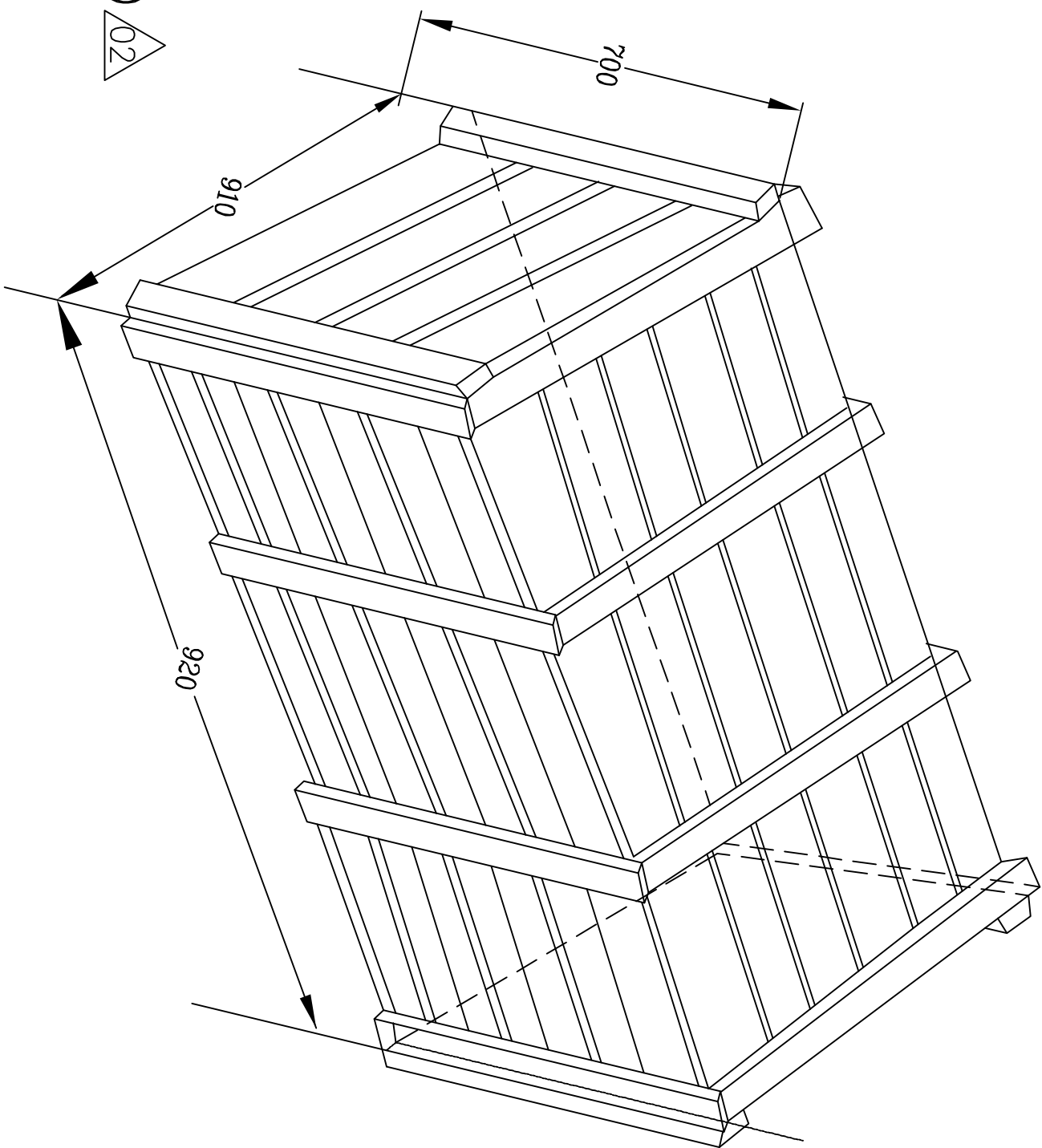
REVISED TO INCREASE WOODEN PLANK THICKNESS

NOTES ALTERED AS MARKED.

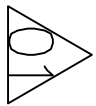
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PROJECT					TITLE	
BHARAT HEAVY ELECTRICALS LIMITED., BOILER AUXILIARIES PLANT. RANIPET – 632 406.					PACKING BOX FOR SHAFT INSULATOR HEATER (TUBLER TYPE)	
DRN.	ANIL SINGH	ANIL	24.07.12			
CHD.	T.VENUGOPAL	T.	24.07.12			
APPD.	T.VENUGOPAL	T.	24.07.12			
ALL DIMENSIONS IN MILLIMETER					DRG. No.	REV.
PROJECTION SCALE NTS					3-00-114-37122	02

ALL DIMENSIONS ARE IN MILLIMETRES



NOTES



01. HEATING ELEMENTS SHALL BE WRAPPED IN POLYTHIN SHEET BEFORE WOODEN PACKING
02. PACKING SIZE : 920MM X 910MM X 700MM.
03. MATERIAL – RUBBER WOOD OR EUCALYPTUS.
04. BOX CAPACITY 8 HEATER IN ONE BOX.
05. EACH WOODEN PLANK SIZE: – 70MM WIDTH(MIN) X 15MM THK(MIN).
06. GAP BETWEEN TWO PLANKS: 50MM(MAX).
07. LENGTH OF EACH PLANK: TO SUIT BOX SIZE.
08. THE PACKING BOX SHALL BE SUITABLE FOR TRANSPORTATION AND STORAGE AT SITE.

REV	DATE	ALTD	CHD	
02	17032016	S.PRAKASH G.M.K	M.J.M	

REVISED TO INCREASE WOODEN
PLANK THICKNESS

REV	DATE	ALTD	CHD	APPD
01	19.02.2014	V. REVATHI	G.M.K	M.J.M
		V. Revathi	gmk	M.J.M

NOTES ALTERED AS MARKED.

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PROJECT



355-029

BHARAT HEAVY ELECTRICALS LIMITED.,

BOILER AUXILIARIES PLANT.

RANIPET - 632 406.

STANDARD DRAWING

TITLE			
NAME	SIGN	DATE	
ANIL SINGH	ANIL	24.07.12	PACKING BOX FOR SUPPORT INSULATOR HEATER (TUBLER TYPE)
DR. T. VENUGOPAL		24.07.12	
T. VENUGOPAL		24.07.12	
APPR. T. VENUGOPAL		24.07.12	

ALL DIMENSIONS IN MILLIMETER

DRG. No

3-00-114-37123

REV.
02

SCALE

NTS