

Annexure-F; Unit Wise Schedule of Items

Schedule	BOQ Item Number	BOQ Item title	Detailed description	Unit	MATLCD	QTY/ UNIT	UNIT
I	1	Electrically operated Trolley with Hoist of 2000 KG capacity and 29000mm lift capable of following curved path	ELECTRICALLY OPERATED TROLLEY WITH HOIST CAPACITY 2.0T; LIFT 29.0M. OPERATING FLOOR 25.70M CAPABLE OF FOLLOWING CURVED PATH AS PER DRG.1-99-400-40906 AND SPECIFICATION MOU/TPBHEL/HOIST_REV.05 AND ANNEXURE-I, III TO SPECIFICATION	Unit-1	L182819940001001	1	NO
I				Unit-2	L182819940001001	1	NO
I				Unit-3	L182819940001001	1	NO
I	2	DSL- Cable trolley type of 79000 mm length capable of following curved path	DSL FOR AIR PRE HEATER ELEMENTS HANDLING;CABLE TROLLEY TYPE LENGTH 79.00M CAPABLE OF FOLLOWING CURVED PATH AS PER DRG.1-99-400-40906,ITEM 02;SPECIFICATION MOU/TPBHEL/HOIST_REV.05,& ANNEXURE-I, III TO SPECIFICATION.	Unit-1	L182819940001002	1	NO
I				Unit-2	L182819940001002	1	NO
I				Unit-3	L182819940001002	1	NO
I	3	Electrically operated Trolley with Hoist of 2500 KG capacity and 15500mm lift	ELECTRICALLY OPERATED TROLLEY WITH HOIST CAPACITY 2.5T; LIFT 15.50 M. OPERATING FLOOR 7.74 M FOR SCAPH HANDLING.REF.DRG.1-99-400-40907, rev 01 ITEM 01. AS PER SPECIFICATION MOU/TPBHEL/HOIST_REV.05 AND ANNEXURE-I, III TO SPECIFICATION.	Unit-1	L182819940002001	1	NO
I				Unit-2	L182819940002001	1	NO
I				Unit-3	L182819940002001	1	NO
I	4	DSL- Cable trolley type of 34500 mm length	DSL FOR SCAPH HANDLING; CABLE TROLLEY TYPE LENGTH 34.50 M. REF. DRG. 1-99-400-40907 REV 01, ITEM 02; SPECIFICATION MOU/ TPBHEL/ HOIST_REV.05 , & ANNEXURE-I, III TO SPECIFICATION.	Unit-1	L182819940002002	1	NO
I				Unit-2	L182819940002002	1	NO
I				Unit-3	L182819940002002	1	NO

Annexure-F; Unit Wise Schedule of Items

Schedule	BOQ Item Number	BOQ Item title	Detailed description	Unit	MATLCD	QTY/UNIT	UNIT
II	5	Electrically operated Trolley with Hoist of 6000 KG capacity and 10000mm lift	Electrically operated Trolley with Hoist Capacity: 6.0T Lift 10.0M for PA & FD Motor Handling. Ref. Drg. No. 1-99-100-40917/03; Item -03; Annexure -I, III & Section _5.0 to specification MOU/TPBHEL/HOIST Rev.05.	Unit-1	L182819910001001	2	NO
II				Unit-2	L182819910001001	2	NO
II				Unit-3	L182819910001001	2	NO
II	6	DSL- Cable trolley type of 24000 mm length	DSL system cable Trolley Type Length 24.0M; for PA & FD Motor Handling. Ref. Drg. No. 1-99-100-40917/03; Item -04; Annexure -I, III & Section _5.0 to specification MOU/TPBHEL/HOIST Rev.05	Unit-1	L182819910001002	2	NO
II				Unit-2	L182819910001002	2	NO
II				Unit-3	L182819910001002	2	NO
III	7	Electrically operated lug mounted hoist of 16000KG capacity and lift 9000mm along with chain pulley block of 16000KG capacity, lift 1000mm and two lugs for suspending the hoist	Electrically operated Lug mounted hoist capacity 16T; Lift 9 M; with chain Pulley Block capacity 16T, Lift 1.0 M and two lugs suitable to suspend the hoist with load & can be suitably welded at site as per specification MOU/TPBHEL/HOIST Rev.05 Annexure I, Annexure III & Section -5.0 to specification. Operating floor 0.00M; Ref.drg.no.0-99-300-40368 Rev 01	Unit-1	L182819930001001	2	NO
III				Unit-2	L182819930001001	2	NO
III				Unit-3	L182819930001001	2	NO
IV	8	Electrically operated Trolley with Hoist of 22000 KG capacity and 8000mm lift	Electrically operated Trolley with Hoist Capacity: 22.0T Lift 8.0M for PA & FD Motor Handling. Ref. Drg. No. 1-99-100-40917/03; Item -01; Annexure -I, III & Section _5.0 to specification MOU/TPBHEL/HOIST Rev.05	Unit-1	L182819910002001	2	NO
IV				Unit-2	L182819910002001	2	NO
IV				Unit-3	L182819910002001	2	NO
IV	9	DSL- Cable trolley type of 24000 mm length	DSL system cable Trolley Type Length 24.00M for PA & FD Motor Handling. Ref. Drg. No. 1-99-100-40917/03; Item-02; Annexure -I, III & Section _5.0 to specification MOU/TPBHEL/HOIST Rev.05	Unit-1	L182819910002002	2	NO
IV				Unit-2	L182819910002002	2	NO
IV				Unit-3	L182819910002002	2	NO

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Schedule	BOQ Item Number	BOQ Item title	Detailed description	Unit	MATLCD	QTY/ UNIT	UNIT
V	10	Electrically operated Trolley with Hoist of 27000 KG capacity and 15000mm lift	Electrically operated Trolley with Hoist Capacity: 27.0T Lift 15.0M for ID Fan rotor Handling. Ref. Drg. No. 1-99-100-40918/03; Item -01; Annexure -I, III & Section _5.0 to specification MOU/TPBHEL/HOIST Rev.05	Unit-1	L182819910002003	1	NO
V				Unit-2	L182819910002003	1	NO
V				Unit-3	L182819910002003	1	NO
V	11	DSL- Cable trolley type of 76000 mm length	DSL system cable Trolley type; Length: 76.00 M; for ID Fan rotor Handling. Ref. Drg. No. 1-99-100-40918/03; Item -02; Annexure -I, III & Section _5.0 to specification MOU/TPBHEL/HOIST Rev.05	Unit-1	L182819910002004	1	NO
V				Unit-2	L182819910002004	1	NO
V				Unit-3	L182819910002004	1	NO
VI	12	Electrically operated Trolley with Hoist of 61000 KG capacity and 10000mm lift	Electrically operated Trolley with Hoist Capacity: 61.0T Lift 10.0M for ID Fan Motor Handling. Ref. drg. 1-99-100-40918/03; Item -03; Annexure -I, III & Section _5.0 to specification MOU/TPBHEL/HOIST Rev.05	Unit-1	L182819910003005	1	NO
VI				Unit-2	L182819910003005	1	NO
VI				Unit-3	L182819910003005	1	NO
VI	13	DSL- Cable trolley type of 76000 mm length	DSL system cable Trolley type length 76.00 M; for ID Fan Motor Handling. Ref. drg. 1-99-100-40918/03; Item -04; Annexure -I, III & Section _5.0 to specification MOU/TPBHEL/HOIST Rev.05	Unit-1	L182819910003006	1	NO
VI				Unit-2	L182819910003006	1	NO
VI				Unit-3	L182819910003006	1	NO

Annexure-P

Technical Pre-Qualification Requirements: - ELECTRIC HOIST (up to 40 T capacity)

Bidder should have designed, manufactured, tested and supplied electric Hoists of minimum 20 T capacity which should have been successfully put in use for at least one year in power plant or other industries e.g. refinery/steel/process/commercial etc.

If the Bidder quotes for Electrical hoists greater than 20 T, then bidder should have successfully designed, manufactured, tested and supplied electric Hoists of minimum capacity as quoted (by the Bidder) in the tender and the same should have been successfully put in use for at least one year in power plant or other industries e.g. refinery/steel/process/commercial etc.

For the above, the Bidder has to submit any of the following supporting documents meeting above mentioned pre-qualifying requirement:

- i) Copy of minimum two performance certificate from end user along with copy of related Purchase Order (meeting the minimum pre-qualifying requirement) specifying that the product is running successfully for one (1) year from date of commissioning.
OR
- ii) Minimum three customer's/third party inspection reports along with purchase order copy meeting the minimum pre-qualifying requirement.
OR
- iii) Minimum three purchase orders (placed with minimum gap of 6 months from previous purchase order) from same purchaser meeting the minimum pre-qualifying requirement.

Instructions to Bidder

- A. Bidder should submit design documents to substantiate technical parameters specified in PQR, if the same is not mentioned in performance certificate/inspection report/ purchase order.
- B. All the above PQR satisfying document submissions should be enlisted and submitted as Annexure-D. (the format given below).
- C. Bidder may also qualify based on the credentials of principal with whom the Bidder is having valid collaboration/licensing agreement to meet the package specific pre-qualifying requirements.
- D. In case the documents submitted for meeting PQR are in language other than English, notarized English translation shall also be submitted.
- E. BHEL reserves the right to assess the capabilities and capacity of the bidder/collaborators to perform the contract, as per BHEL evaluation procedure.
- F. Final acceptance of the bidder is subject to BHEL and end customer's approval to consider in this tender.

Format for submission of credentials as ANNEXURE-D

Sl.No.	Description of Project	Brief Scope of work	P.O. Ref. No. & Date	Purchase order value (Rs).	Date of completion as per P.O.	Performance Certificate enclosed (Y/N)	Remark

Annexure-Q

Technical Pre-Qualification Requirements: - ELECTRIC HOIST– Greater than 40Tons capacity

1. Bidder should have designed, manufactured, tested and supplied Electric Hoists/Electric Crane with hoist of minimum capacity **as listed in the enquiry** which should have been successfully put in use for at least one year in power plant or other industries e.g. refinery/steel/process/commercial etc.

For this the supplier has to submit following supporting documents meeting above mentioned pre-qualifying requirement:

- a) *One purchase order copy of **Electric Hoist or EOT Crane with electric hoist of Minimum capacity as mentioned in the enquiry** which have been supplied successfully within last 10 years.*
- b) *Corresponding performance certificate for the above from end user specifying that the product is running satisfactorily for minimum one year from date of commissioning.*

OR

Corresponding Load test report for the above, signed by a third party or the end user.

2. Instructions to Bidder.

- A. Bidder should submit design documents to substantiate technical parameters specified in PQR, if the same is not mentioned in performance certificate/inspection report/ purchase order.
- B. All the above PQR satisfying document submissions should be enlisted and submitted as Annexure-D. (the format given below).
- C. Bidder may also qualify based on the credentials of principal with whom the Bidder is having valid collaboration/licensing agreement to meet the package specific pre-qualifying requirements.
- D. In case the documents submitted for meeting PQR are in language other than English, notarized English translation shall also be submitted.
- E. BHEL reserves the right to assess the capabilities and capacity of the bidder/collaborators to perform the contract, as per BHEL evaluation procedure.
- F. Final acceptance of the bidder is subject to BHEL and end customer's approval to consider in this tender.
- G. Annexure-D to be filled by the bidder.

Format for submission of credentials as ANNEXURE-D.

Sl. No.	Description of Project	Brief Scope of work	P.O. Ref. No & Date	Purchase order value (Rs).	Date of completion as per P.O.	Performance Certificate enclosed (Y/N)	Remark

Memorandum of Understanding

**M/s BHEL
Trichy – 620 014**

and

**M/s. XXXXXXXXXXXXXXXXXXXX.
XXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXX
XXXXXXXXXXXX**

(Vendor Code : XXXXX)

For supplying

Electrically Operated Handling Equipment

**MOU NO : MOU / TPBHEL / HOIST- Rev.05
Date : 24-10-2018**

Engineering

Quality

Purchase

Vendor

**Memorandum of Understanding (MOU) between BHEL / FB and M/s. xxxxxxxxxxxxxxxxx,
for supplying Electrically operated Handling Equipments.**

1.0 GENERAL:

- 1.1 This MOU is signed for supplying the Hoists as per the agreed standardized specification so that these details need not be discussed again and again for future supplies.
- 1.2 The various aspects covered in this MOU are as follows.
 - 1.2.1 The general points are covered in Section – 1.0 – General.
 - 1.2.2 The specification requirements are covered in Section – 2.0 – Specifications.
 - 1.2.3 The documents to be submitted along with the offer / after placement of Order / along with the hoists are covered in Section 3.0.
 - 1.2.4 The Inspection / Testing and Packing requirements are covered in Section – 4.0 Testing, Inspection and Packing.
 - 1.2.5 The project specific details / data and if any customer specific requirements shall be covered in Section 5.0 – Project related Information. **DEVIATION ON PROJECT RELATED INFORMATION WILL LEAD TO REJECTION OF OFFER.**
 - 1.2.6 **If any differences are found between the details given in Section 5.0 and other sections, Section 5.0 shall be considered as final and the vendors shall meet this requirement for that particular project.**
- 1.3 Sections 1.0, 2.0, 3.0 and 4.0 are standard and Section 5.0 alone will be furnished along with enquiry to the vendors for their acceptance.
- 1.4 **It is agreed that no deviations will be taken by the vendors while submitting their offers against future enquiries.**
- 1.5 Since the specifications are standardized and an understanding has been reached, the future enquiries will be floated on “SINGLE BID SYSTEM” only. Hence, if any offer is found with deviations, the same will be totally rejected and will not be considered for further evaluation.
- 1.6 Pre commissioning spares (if applicable) with price break up as per the list (vide Section 5.0) shall be supplied along with the hoists.
- 1.7 Two years recommended Spares list(vide Section 5.0) with price break up shall be enclosed.
- 1.8 If any special or non-standard tools are required for installation, operation or maintenance, the same shall be supplied along with the hoists.
- 1.9 Trouble-free operation of the equipment shall be guaranteed for a period of 18 months from the date of commissioning OR 24 months from the date of dispatch whichever is earlier.
- 1.10 Vendor has to provide Bank Guarantee for 10% order value (as per BHEL format) valid

Engineering

Quality

Purchase

Vendor

for a period mentioned in point No.1.10.

- 1.11 Dispatch clearance will be issued along with PGMA with DU Nos. for the ordered items to vendor after the receipt of acceptable Inspection Report. Vendor agreed to mark the PGMA with DU Nos. in the casing of the packing and in the Packing Slip.
- 1.12 Materials shall be dispatched on “Door Delivery with or without Consignee Copy attached basis to avoid demurrage at transporter’s go down”.
- 1.13 Since the vendors works alone is approved by BHEL, it is agreed the vendor will manufacture this item in their own works only and will not off-load the jobs to any other suppliers without the written approval by BHEL.
- 1.14 All components of the hoists should be packed in such a way that it should not get damaged during transport.
- 1.15 BHEL and the Vendor shall have an involvement which will commence at bid stage and follow through the completion and acceptance, thus ensuring total conformity to Purchaser’s requirements.

2.0 SPECIFICATIONS

2.1 Scope

This specification covers design, manufacture, inspection, testing and supply of electrically operated Under Hung Crane (UHC), Trolley With Hoist (TWH), and Down Shop Leads (DSL). Technical parameters for equipment design are furnished in Section-1 to 4. For scope of supply and special requirements refer to Section-5.

This is a general specification dealing with technical requirements of various handling equipment as specified under scope. Contract requirements and special requirements (if any) for a particular project are specified in Section5.

2.2 Codes & Standards:

In addition to the following latest revisions of codes and standards, the equipment shall be designed to meet the other governing standards as applicable and also meet with the local standards where the equipment is installed.

IS 3938	...	Electric wire rope hoists.
IS 807	...	Design, Erection and testing (structural portion) of cranes and hoists code of practice.
IS 2758	...	Mild steel point hooks for use with wire rope thimbles.
IS 15560	...	Point hooks with shank upto 160 tonne -specification
IS 2266	...	Steel wire rope for general engineering purpose.
IS 2365	...	Specn for Steel Wire Suspension Ropes for Lifts, Elevators and Hoists
IS 3681	...	Gears-cylindrical gears-accuracies.
IS 325	...	Three-phase induction motors.
IS 1554 Part 1	...	Insulated cables for working voltage upto and including 1100V.
IS 4691	...	Degrees of protection provided by enclosures for rotating electrical machinery.
IS 2062	...	Hot rolled low, medium and high tensile structural steel.
IS 816	...	Code of practice for use of metal arc welding for general construction in mild steel.
IS 2074	...	Ready mixed paint air drying red oxide-zinc chrome, priming.
IS 2932	...	Enamel synthetic, exterior (a) under coating, (b) finishing.
IS 3177	...	Code of practice for electric over head traveling crane and gantry crane other than steel work cranes.
IS 13947 (Part I)	...	Specification for low-voltage switchgear & control gear
IS 1024	...	Code of practice for use of welding in bridges and structures subject to dynamic loading.

IS 1875	...	Carbon steel Billets, Blooms, Slabs and Bars for Forgings.
IS 1835	...	Specification for Round Steel wires for ropes.
IS 9968 (Part-1)	...	Elastomer insulated cables:part 1 for working voltages upto and including 1100V.

2.3 Design & Constructional Requirements:

Construction of TWH, UHC and DSL shall be of consistent capacity, lift, head room, span, over hang and any other parameters as specified in Annexure- I of Section-5.

2.4 Electrically operated Under Hung Crane & Trolley With Hoist:

All equipments shall be designed for OUTDOOR application and suitable for ambient temperature range of 0 to 50°C. Purchaser will provide electric power supply at one or more points near to the monorail / runways as required in the plant layout. Service class to be considered for design of trolley with hoist and under hung crane shall be as per class 2 of IS 3938 and IS 3177 / IS 807 respectively. All material used for construction of different components shall individually conform to applicable standard. All welds shall conform to IS 1024 and welders shall be qualified to AWS D1.1 / ASME Section IX.

Trolley with hoists and Under Hung Cranes shall be provided with protective hood and hard rubber sweepers.

2.4.1 Hooks:

2.4.1.1 Hooks shall meet the dimensional, material testing & inspection requirement of IS 15560.

2.4.1.2 The hook shall be provided with standard depress type safety latch and swivel thrust bearings with hardened race.

2.4.1.3 Lugs for fixing safety latch shall be either forged along with the hook or clamp type latch with lugs shall be provided.

2.4.1.4 Welding of lugs not permitted.

2.4.1.5 Locking arrangement shall be provided to avoid unscrewing of the hook in service.

2.4.1.6 Material of hook shall conform to IS-1875 or equivalent (with minimum tensile strength 50-62 Kg/mm².) and made by controlled grain forging and normalized.

2.4.1.7 Proof load tests for all the hooks shall be tested as per IS 15560 (i.e. for lifting capacity upto 32T, proof load shall be two times the lifting capacity. For lifting capacity 40T to 50T, proof load shall be 1.7 times the lifting capacity). All hooks shall be examined by MPI / LPI & UT (UT required for hooks >5.0T capacity) for cracks after proof load test.

2.4.1.8 The hook shall not distort or fracture. Ball & roller bearings shall not be used in these hooks. Anti-friction thrust bearings shall be used.

2.4.2 Wire Ropes:

Wire ropes shall meet the requirement of IS 2266 / IS 2365. Shall have six strands of 37/36 wires per strand with an ultimate tensile strength of 180 Kg/mm². The wire rope shall be galvanized, as per IS 1835 type B. All wire ropes shall be proof load tested for 2 times of SWL/Fall. Breaking load shall not be less than five times SWL/Fall. Indicating the breaking force of wire rope, test certificate provided by the wire rope manufacturer for breaking load test shall be furnished during inspection. The rope shall be of sufficient length to retain two full wraps on the drum at lowest hook position.

2.4.3 Drum & Sheave:

Drum shall be of welded steel or seamless steel and Sheave shall be of cast or welded steel. The drum shall accommodate all the length of rope required for the lift plus two dead wraps at each anchor point without overlap. Drum can be grooved right or left or both, and grooves shall suit the ropes used. Sheaves shall be equipped with sheave guards to retain the rope in groove.

2.4.4 Gears & Pinions:

Material of construction shall be conforming to relevant Indian Standard (IS:3681) / (BS 970) or equivalent and shall be hardened if required to achieve the specified hardness. Hardness for Cross Travel & Long Travel (CT & LT) shall be in the range of 250 to 290 BHN for pinions and 215 to 255 BHN for gears. Hardness for hoisting shall be in the range of 285 to 300 BHN for pinions & 250 to 265 BHN for gears. In case of case hardened gears and pinions, a max. hardness of 350 BHN for gears and 390 BHN for pinions is acceptable. However, vendor shall maintain and ensure that gear hardness is always less than pinion hardness by at least 35 BHN. Helical/Spur gears shall be used for hoists, CT & LT. All gears and pinions shall be examined by LPI/MPI for surface cracks after hardening. In case of enclosed gearing, means shall be provided for ample lubrication. Such lubrication points are to be indicated in the drawing. The vendor shall specify the specification of lubricant, market trade names, quantity of lubricant requirement and frequency of lubrication.

2.4.5 Wheels:

Shall be made out of forged or low carbon steel/cast steel with heat treated to 175 to 200 BHN hardness. The drive gears, if any, integral with the wheel shall be of the same material and hardness. Trolley wheels for hoists shall be spur geared type, cast / forged 4 wheeled out of which 2 wheels shall be driven by motor.

2.4.6 Rotating & Stationary shafts:

The material for shafts shall be as per relevant Indian standard or its equivalent and shall be hardened and tempered with a minimum tensile strength of 60 Kg/mm² and hardness shall be maximum 175 to 250 BHN. UT test shall be done for all Shafts of diameter more than 50mm. UT acceptance norms shall be as per ASME section VIII; Division 2.

2.4.7

Bearings:

Shall be reputed make (FAG/SKF/TATA/NBC) and shall meet relevant IS standards. All bearings shall be designed to give a minimum service life of 20 years.

2.4.8

Brakes:

Hoisting, cross travel and long travel shall be provided with electro- mechanical friction shoe type brake or Disc type brakes or Electromagnetic disc type brake or Electro hydraulic thruster brake. The brakes shall be released with electric power and fail-safe in case of power failure. All brakes shall, irrespective of controller portion, be applied immediately on operating an emergency push button or switch. It shall be possible to arrest the load at any desired location with minimum slip. Slip with reference to speed shall be specified along with the offer. Brakes shall be designed as per the latest edition of IS:3938 / International standards.

2.4.9

Trolley:

Shall be of minimum 4 wheeled out of which 2 wheels should be spur geared type and fabricated construction. Trolley shall be designed to suit the monorail size (straight or curved monorail, Which Purchaser will furnish during drawing approval). The travel path of the trolley on monorail (straight / curved) shall be read from BHEL drawing furnished along with the enquiry.

2.4.9.1

For ID Fan and Economiser handling hoists, suitable integral platform shall be provided at hoist to access control panel / motor / trolley / brake etc.,

2.4.10

Frame:

The frame shall be designed to proper strength, built from steel plates with bolted/welded construction.

2.4.11

End Carriages: (For Cranes)

Shall be of minimum 4 wheeled out of which 2 wheels should be spur geared type and fabricated construction. Suitable wheelbase shall be provided. End carriages shall be designed to suit the runway beam size. (Which Purchaser will furnish during drawing approval.) End carriages shall be connected with crane girder by welding or by fasteners (For ease of transportation, if site welding is required, the same shall be done at site by Purchaser).

2.4.12

Crane Girders:

Crane girders shall be of rolled section. Fabricated beam and welded beam shall not be used for this purpose unless otherwise accepted/approved by the Purchaser for special cases. For such cases, refer annexure-I of Section-5 to this specification for details. Camber / deflection under load shall be within SPAN / 1000 mm. In case vendor desires to provide higher camber, the same shall be clearly specified in the drawing. In any case camber provided shall not exceed –

- In case of double girder crane:
(Span ÷1000mm) + (Deflection under self-load of trolley with hoist ÷2)
- In case of single girder crane:
(Span ÷1000mm) + Deflection under self-load of trolley with hoist
Allowable bend shall be 1mm/metre and maximum bend shall not exceed 6mm for total span.

2.4.12.1 Buffers shall be provided for stopping the crane.

2.4.12.2 Design of crane should ensure anti tilting and anti toppling while the hoist is at overhang side.

2.5 Down Shop Leads (DSL):

DSL system shall be designed to transfer the power supply from End user supply point to the equipment, which is moving on runway beams / monorails. The DSL system shall be of Cable trolley type or Taut wire loop type as per contract requirement specified in Section 5.

2.5.1 Cable Trolley Type:

Cable trolleys shall run on "Tee" track / I-Beam. The system shall consist of:

- ❖ "Tee" track
- ❖ Cable Trolleys
- ❖ Flexible power cable (Fixed & Trailing)
- ❖ Switch fuse units / Isolators
- ❖ Supports for Auxiliary girder or "Tee" track / I-Beam
- ❖ Link chain
- ❖ Fasteners

2.5.1.1 Construction:

2.5.1.1a "Tee:" Track / I-Beam:

The system shall be provided with rolled sections suitable for cable trolley wheels as per the relevant Indian Standard. The "Tee" track / I-Beam shall be designed with minimum deflection for smooth travel of cable trolleys.

2.5.1.1b Cable Trolleys:

4-wheeled cable trolleys shall be of sturdy design constructed with suitable material. Diameter of trolley wheels shall be minimum 40mm. and with double seal roller or ball bearing. The cable trolleys shall be designed to take the load of cable and moving with the cable load smoothly on auxiliary girder or "Tee" track. Suitable arrangement shall be provided to tie the power cable and link chain with cable

trolley. Vendor shall specify the construction of material selected in the offer. Arrangement drawing shall be submitted along with the offer for review. After placement of purchase order, the same shall be submitted for approval. Vendor shall indicate the weight of total cable trolleys in the drawing.

**2.5.1.1c Flexible Power Cable: (Fixed & Trailing)
(For Cable trolley & Taut Wire Loop type)**

The trailing cable shall be suitable for 415V AC; 3 phase with neutral; 50Hz.; copper PVC flexible cable, PVC 650/1100V grade, suitable size/rating (for all motors running simultaneously) for the equipment under supply. The power supply flexible trailing cable shall comply with latest revision of IS 694 / IS 1554 Part 1 /IS 9968 and other relevant Indian standard for the equipment under supply. If any special requirement, respective IS Standard as mentioned in Section –5 of this specification shall be followed. For sub-vendor list refer clause no 2.12.5. Vendor shall indicate the weight of total system in the drawing.

2.5.1.1d Switch Fuse Units or Isolators: (For Cable trolley type & TW Loop type)

The system shall be supplied along with suitable switch fuse units / isolators to take the full load current, when the equipment trolley with hoist and under hung crane) is working with maximum safe working load. For sub-vendor list refer clause no 2.12.6.

2.5.1.1e Supports:

The system shall be provided with suitable supports to take the load of “Tee” track / I-Beam, cable trolleys, power flexible trailing and other materials.

2.5.1.1f Link Chain:

The system shall be provided with suitable link chain to pull the trolleys, which is with the load of cable. During pulling of cable trolleys due to impact load, the chain shall not fail at any point. The chain shall be made out of minimum 3mm diameter carbon steel wire.

2.5.1.1g Fasteners:

Suitable fasteners shall be provided. Fasteners shall be electro - galvanized / Hot dipped.

2.5.2 Taut wire loop:

Ceramic reel insulator shall drag on stretched steel wire with trailing cable. The system shall consist of:

- ❖ Bracket
- ❖ End hook
- ❖ Flexible power cable (Fixed & Trailing)

- ❖ Switch fuse units/Isolators

- ❖ Reel insulator
- ❖ Steel wire rope
- ❖ Rope clamp & thimble
- ❖ Leather belt or nylon wire rope
- ❖ Fasteners.

2.5.2.1 Construction:

2.5.2.1a Bracket:

Suitable size and material shall be provided to take the load of cable and axial force by the end hook.

2.5.2.1b End hook:

Suitable end hook shall be provided for the size of steel wire rope.

2.5.2.1c Reel insulator:

Cable reel insulators shall be of ceramic, with suitable size of the stretch wire. Suitable arrangement shall be provided in the reel insulator to tie the trailing cable with nylon rope or leather belt.

2.5.2.1d Steel wire rope:

Steel wire rope shall be of minimum 6mm diameter as per latest revision of IS 2365. Steel wire rope shall be suitably sized for load of cable without sagging for the total travel length.

2.5.2.1e Rope clamp & thimble:

Suitable rope clamps and thimbles shall be provided to tie the rope with bracket through end hook.

2.5.2.1f Leather belt or nylon tie:

Leather belt or nylon tie shall be supplied to tie the trailing power cable with reel insulator.

2.5.2.1g Fasteners:

Suitable fasteners shall be provided wherever required. Fasteners shall be Electro-galvanized / hot dipped.

2.6 Electricals & controls:

2.6.1 CT, LT & Hoisting Motors (AC; Non-Flame Proof)

2.6.1.1 Site condition

- 2.6.1.1a Altitude above sea level : Less than 500m.
- 2.6.1.1b Ambient temp. Condition : 0 - 50°C
- 2.6.1.1c Relative Humidity :100%

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- 2.6.1.1d Atmosphere : Dusty, salty, corrosive and highly polluted.
- 2.6.2 Standard (Latest revision) : IS 325, IEC 60034, IS 3177
- 2.6.3 Application : Trolley with hoist and Under Hung Crane
- 2.6.4 Duty cycle : S3/S4; Duty factor: 40% CDF.
- 2.6.5 No of starts : 150 starts/Hours
- 2.6.6 Pullout Torque : 275 % of the full load torque
- 2.6.7 Rated voltage, frequency : 415V, ±10%; 50 Hz±5% and combined 10% absolute
- 2.6.8 Minimum starting voltage : 80% of the rated voltage (Cl. 2.6.5)
- 2.6.9 Capacity to restart (at Voltage Specified in cl.no 2.6.5) } No limitation on no. of starts.
 Calls for many starts at frequent intervals.
 Vendor to specify on any limitation

- 2.6.10 Direction of rotation : Bi-directional
- 2.6.11 Class of insulation : Class `F` temp. rise limited to class `B`

2.6.12 Winding treatment:

The insulation shall be given tropical and fungicidal treatment for successful operation of the motor in hot humid and tropical climate

- 2.6.13 Temperature rise : With in specified limits. Vendor to specify.
- 2.6.14 Starting current : Vendor to specify.
- 2.6.15 Method of motor starting : DOL

2.6.16 Type of enclosure:

IP 55 as per IS 4691.

2.6.17 Terminal Box:

- 2.6.17.1 Type : Weather proof IP 55
- 2.6.17.2 Cable gland : Double compression type, Brass with nickel plated
- 2.6.17.3 Cable entry : Suitable for both, top and bottom entry.
- 2.6.18 Type of terminals : Stud type with plain washers, spring/ washers check nuts & Lugs.
- 2.6.19 Fault level : 50 KA at 415V.

2.6.20 Terminals:

Separately terminated with clear identification in main terminal box with double compression type glands.

- 2.6.21 Lifting device : Eye bolt or lugs to facilitate safe lifting.

2.7 Controls & Interlocks:

The control system shall envisage a control cabinet and a push button operating station. The push button control shall have control for power switching to the motors and forward/reverse motion. The control voltage of both cabinet and push button station shall be 110V AC 50 HZ. single phase. The control stations shall have enclosure protection of IP 55 (IS:13947). Necessary electrical interlocks shall be included in control cabinet for fail-safe operation. Vendor shall clearly bring out all the interlocks in the control wiring drawing and submit the same for approval. Limit switches shall be provided for long and cross travel hoists. These switches shall be interlocked to cut off power to the motor and restrict further movement when the limits are crossed. Crimping tool shall be used for fitting lugs.

2.8 Control Cabinet:

2.8.1 Application:

To house all the power contactors, control transformers, control relays, fuses, indicating lamps, switches and protection circuits of all motors of hoist.

2.8.2 Type:

Wall mounting type. Normally mounted on a framework of the hoist. The cabinet shall be made of minimum 1.6mm thick cold rolled sheet.

2.8.3 Motor Protection:

All motor shall be protected against under voltage, over load and short circuit condition.

2.8.4 Isolator :

Input power to the cabinet through switch fuse unit is required.

2.8.5 Thermal over load relays : Shall be provided suitably for all motions.

2.8.6 Indicating Lamps : Shall be provided wherever required.

2.8.7 Terminal Blocks:

Shall be of Clip on type. Shall be suitable for 1.5mm² copper conductor. 20% of additional terminal blocks shall be supplied as spares along with the supply.

2.8.8 Customer Supply voltage : 415V 50 Hz. 3 phase

2.8.9 Control voltage : 110V 50 Hz.

2.8.10 Enclosure Protection: (For Control Cabinet & Pendant Station)

IP 55 as per IS 13947(part I).

2.8.11 Glands:

Shall be double compression type, Brass with nickel plated. To be included in vendor scope as per requirement.

2.8.12 Internal Wiring:

1. PVC 1100V Grade 1.5 mm² multi-strand /copper conductor.

2. All power wiring with red and black.

3. All control wiring is to be with grey wire & shall be marked with ferules as per wiring diagram.

2.9 Control Box:

2.9.1 Type:

Pendant station to house all start/stop/forward/reverse/up & down push button for all motors.

2.9.2 Location : Hanging from equipment. Push button pendant station shall be provided at above one meter from operating floor.

2.9.3 Push Button:

For all start green push button and for stop red push button shall be used. Make shall be of Siemens / L&T / GE / Telemecanic / BCH/Technic/ Control & Switchgear (C&S) . Push button shall return to "off" position when released. One stop push button shall be lockable to enable switch off power supply when equipment in not in use. The Push Button shall be clearly marked as the recommendation of IS:3938 to indicate the function of each button.

2.9.4 Control Voltage: 110 V AC 50 Hz. Single phase.

2.9.5 Enclosure Protection:

IP 55 as per IS 13947 Part I.

Box material:

Cold rolled sheet steel with 1.6mm thickness minimum.

2.10 Cabling:

Vendor shall include all the power and control cables necessary for the system. The cable shall comply with IS 1554. The power cable shall be of copper PVC flexible and vendor shall indicate the conductor size and over all size in the offer for all the motors. The control cable shall be armoured of 1.5 mm² copper conductor only. The no. of cores, cable size etc shall be indicated in the offer. There shall be 20% spare cores available for all control cables offered. If any special requirement, respective IS Standard as mentioned in Section –5 of this specification shall be followed.

2.11 Earthing :

All electrical equipments (motor, control cabinet etc.,) shall be provided with required elements (like bolt, washer, nut etc.,) for proper earthing at site.

2.12 Electrical & Control Items shall be as per the approved Sub-Vendor/Make List given below.

2.12.1 Control & Thermal Over Load Relays: Siemens/BCH/L&T/GE/ Telemecanic/ C&S

2.12.2 Transformers :SE / Kappa / Ind Coil /JE/ Vikas / Logicstat

2.12.3 Motors : NGEF/Kirloskar/Siemens/Crompton-Greaves /
Bharat Bijlee/Autolec/GEC/GE

2.12.4 Limit Switches :BCH / Omron / Nucon / Festo / Siemens / Kaycee /
EMM / SOC

2.12.5 Power & Control Cable :CMI Ltd. / Delton Cables / Fixwell /
Pushincords /Asian cables/Cable corporation

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of India / Finolex /Incab/Universal/Polycab/KEI

2.12.6 Isolator / Switch Fuse Units : Siemens / L&T / GE / C&S

2.12.7 Power Switches : Siemens / L&T / GE / C&S

2.13 Name Plates:

2.13.1 Nameplates shall be provided with non-corrosive material

2.13.2 Name plates shall have details of the equipment, model no., type, capacity, lift, span, and motor & brake details.

2.13.3 All lubrication points shall be provided with nameplates.

2.14 Limit switches and Electrical Protective devices

Limit switches and Electrical protective devices are to be supplied as per IS:3938 - 1983 to limit the ultimate positions of the hook, the hoist block running in monorail and crane long travel (in case of cranes).

3.0 DOCUMENTS TO BE SUBMITTED

3.1 Along with Offer.

3.1.1 Quality plan, General arrangement & DSL arrangement / Schematic drawing showing the critical dimensions with complete bill of materials. All dispatchable components / assemblies shall be indicated in detail. Sub-vendor items' make also shall be indicated in the drawing.

3.1.2 Wiring circuit diagram with details of make, type and rating of all components.

3.1.3 Spares list if required for 3 years of trouble free operation along with price. Commissioning / Initial spares shall form part of the base offer.

3.1.4 Duly filled-in and signed General Data Sheet (Section 5) for trolley with hoist, under hung crane and down shop lead system with all required details.

3.1.5 Write up on special features if any.

3.1.6 Technical specification for equipment.

3.1.7 Catalogues and other details of the product shall be submitted along with the offer.

3.1.8 Exclusion:

Any exclusion from scope of supply shall be clearly spelt out in the offer itself. Exclusion of major / critical items shall make the offer liable for rejection.

3.2 After Placement of Order.

3.2.1 Quality plan shall be submitted by vendor for Purchaser's approval.

3.2.2 Dimensional drawings of Under Hung Crane, Trolley With Hoist, Down Shop Leads, cable trolley, control panel and wiring diagram with B O M for approval.

3.2.3 Data sheet (Annexure-III to specification) for hoists and cranes for Purchaser / End user's approval.

3.2.4 The following calculations/details shall be furnished.

3.2.4.1 Hoist motor and Travel motor power calculations.

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- 3.2.4.2 Brake Torque calculations and Brake selection for each hoist.
- 3.2.4.3 Main Hoist rope and wire rope selection.
- 3.2.4.4 Cross travel and Long travel wheel load and wheel diameter calculations/details.
- 3.2.5 Priced List of Recommended Spares for 2 years trouble free operation and maintenance. (if applicable)
- 3.2.6 Vendor to furnish load test procedure for the quoted hoist along with test load required to be carried out at site.
- 3.2.7. Vendor to fill and submit motor data sheet Annexure –IV.

3.3 Along with the Hoists:

- 3.3.1 Physical, Chemical, NDE and hardness test certificates shall be provided wherever applicable for trolley / crane wheels, wire ropes, pulleys, hook, gears, pinions, and shafts.
- 3.3.2 Test certificates for having carried out the tests as per Section-4 of this specification under Purchaser and End user's presence.
- 3.3.3 Test reports for wire rope and hooks and Test reports for NDT examination of gears, wheels, pinions and hooks
- 3.3.4 Type test and routine test certificates for motors and as per IS 325.
- 3.3.5 Performance test certificates for UHC, TWH, safety devices and other electrical items.
- 3.3.6 TC for control panel, pendant stations and motors shall be provided.
- 3.3.7 Two sets of as-built arrangement drawings and electrical circuit drawings shall be sent along with the hoist. 2 set Hard copy along with 2 set soft copy in CD/USB drive of vendor O&M Manual (along with BHEL approved vendor drawings & documents) for supplied hoists shall also be supplied along with the consignment.
- 3.3.8 The vendor check list shall be filled up at the manufacturer's work and shall be duly signed by inspection engineer and manufacturer's representative.

3.3.9 Drawing & O&M Manuals:

- 3.3.9.1. The bill of material shown in the drawing shall match with that of the dispatchable unit as indicated in the packing slip.
- 3.3.9.2 The drawing shall be prepared in AUTOCAD and vendor shall forward both hard copies and CD/USB drive (Copied with drawing files) to the Purchaser and along with the hoists.

3.3.9.3 O & M Manuals:

- 3.3.9.4 Operation and maintenance manuals shall be provided with details for Storage at site, installation, erection procedures, drawings, motor data sheet, relay characteristics, operating and troubleshooting, lubrication schedule, spares data, spares identification drawings, spares replacement procedure and special requirements if any. 2 Set Hard copy shall be sent along with hoist and 1 set to be sent to BHEL / Tiruchirappalli. 2 Set soft copy as CD/USB drive shall be sent along with hoist and 1 set soft copy as CD/USB to be sent to BHEL / Tiruchirappalli.

- 3.3.9.5 The hard copies of the Manuals should be in printed form only.
- 3.3.9.6 The size of manuals should be in correct A4 size with drawings in A3 size. Large size drawings (greater than A3 size) should be reduced in A3 size and inserted.
- 3.3.9.7 Drawings shall be of printed or laser printed form only.
- 3.3.9.8 O & M manuals, (hard copies and CD) shall be submitted to BHEL / Tiruchirappalli prior to dispatch of the equipment.
- 3.3.9.9 **O&M Manual, generally should contain the following:**
 - 3.3.9.9a Data sheet with makes of components supplied.
 - 3.3.9.9b Maintenance (including, storage, installation, Erection and lubrication wherever necessary) and service
 - 3.3.9.9c Recommended spares for 2 years trouble free service.
 - 3.3.9.9d Trouble shooting
 - 3.3.9.9e Assembly drawings with part list, dimensional drawings & other applicable drawings.
 - 3.3.9.9f Manuals should pertain only to the types or model supplied for the particular contract.

4.0 TESTING, INSPECTION AND PACKING

- 4.1 Purchaser's and End user's representative shall have access to the works of vendor at all reasonable times for the purpose of witnessing the purchased equipment being tested.
- 4.2. All electrical and mechanical equipment like motor, ropes, cables, electrical control panel etc. shall be tested as per the relevant IS standard at the vendor's / Sub-vendor's works.
- 4.3. The Trolley with hoist shall be run 5 times at manufactures works. First and 5th runs shall be tested with 125% safe working load. Second, third and fourth run with safe working load shall be conducted without any pause. The motor currents shall be checked and shall be with in the rated full load current of each motor at safe working load. The hoist shall be capable of lifting load from mid-air and moving the load without any problem. Normal speed shall be achieved during full load tests. Headroom variation shall be checked & allowable variation is 50mm only. Hook approach shall be checked as per approved drawing. (Ref. Standard : cl.20.2 of IS 3938)
- 4.4. The brakes for hoisting, long travel and cross travel shall be tested with 125% safe working load. The brakes shall be capable of holding this load, when the load is suspended by the hoist hook. As per IS 3177, the long travel motion should be tested at manufacturer's works on no load keeping the crane on sleepers or test bench. Maximum slip (braking path) shall be as per approved data sheet / drawing for hoisting and cross travel motions.
- 4.5 Test shall be conducted for effectiveness of automatic devices for hoist to limit the upward/downward & travel of hoist and to limit the forward & reverse travel of crane.

The limit switch shall be checked at vendor's works. Others shall be checked at site by Purchaser / End user and if found defective, the same shall be replaced at free of cost by vendor.

- 4.6 Before the hoist is put into operation, over load relays (electrical) shall be tested for lift & cross travel and sustain 125% safe working load. Long travel with 125% SWL shall be tested at site by Purchaser / End user and if found defective, the same shall be replaced at free of cost by vendor.
- 4.7 Trolley with hoist and under hung crane gears shall be tested with & without load for alignments, smooth and trouble-free operation.
- 4.8 Equipment shall be tested for hoisting and cross travel with 125% SWL.
- 4.9 Hoisting, and cross travel speed shall be tested and shall ensure the tolerance with in 10%. Hoisting and CT shall be tested for minimum 1.0 to 2.0m. (for hoisting- height & for cross travel-length). Long travel speed shall be tested at site. Vendor shall be responsible for meeting for full lift and lower limit switch operation at site. Any failure at site to meet the above requirement shall be resolved by the vendor at site at his cost.
- 4.10 Long travel shall be tested at site with and without safe working load by Purchaser / End User and if found defective, the same shall be replaced at free of cost by vendor.
- 4.11 **Load test** for TWH and UHC shall be carried out after installation at site under the supervision of the vendor's representative, to the satisfaction of the Purchaser / End user. Vendor should depute their Engineer for a period of 10 days per boiler free of cost.
- 4.12 All welding shall be tested with LPI / MPI. All butt welds shall be tested with radiography. Acceptance norms for radiography shall be as per AWS D1.1. /ASME Sec IX.
- 4.13 Hooks:**
- 4.13.1 Raw material test certificate shall be submitted by manufacturer for scrutiny.
- 4.13.2 Proof load test should be done as per IS 15560 on each hook irrespective of capacity.
- 4.13.3 After proof load test, hook shall be examined for cracks, deformation, flaws and other defects with LPI / MPI & UT. No linear indications or cracks are acceptable while carrying-out LPI / MPI. Acceptance norm for UT shall be as per A388/ ASME - Section VIII - Division 2- AM203.2 / ASTM E446.
- 4.14 Under Hung Crane:**
- 4.14.1 Check the dimensions of the under hung crane as per relevant standard.
- 4.14.2 Deflection Test: Under hung crane shall be tested for deflection with safe working load at the middle point of the span. Datum line for deflection is obtained by placing

hoist at one extreme of the span with hook approach. The deflection with Safe Working Load at center of span compared with this datum should be less than=
$$\frac{SPAN}{1000} mm .$$

4.15 Down Shop Lead System (DSL):

- 4.15.1 Cable trolley shall be tested for smooth running on "Tee" track with cable load.
- 4.15.2 Cable reel insulator shall be tested for smooth running on steel wire rope with cable load.
- 4.15.3 Any discrepancy found in the design and/or supply shall be resolved by Vendor at the installation (site) at Vendor's Cost.

4.16 Electrical components:

- 4.16.1 The insulation values of all electrical equipments should be checked. Reading shall be not less than 1.0 MΩ with an unregulated type tester with DC voltage not less than twice the rated voltage.
- 4.16.2 Control panel shall be verified for make, model no. and location of all relays & components as per the approved drawing.
- 4.16.3 Functional test shall be conducted for power and control circuits.
- 4.16.4 Test for high voltage and measurement of insulation resistance shall be conducted.
- 4.16.5 Degree of protection test report shall be submitted. (Type test report)
- 4.16.6 The satisfactory operation of each controller, switch, contactor relay, other control devices, the connectors of all circuits and protective devices shall be tested under the most unfavourable conditions.
- 4.16.7 TC for control panel, pendant stations and motors shall be provided.

4.18 Painting, Protection, Packing, Supply and Identification:

4.18.1 Surface Preparation:

Weld slag & spatter shall be removed and the surfaces to be coated shall be free from contamination. Surface defects shall be removed by suitable methods. Sharp edges shall be smoothed by grinding. Prior to surface preparation oil, grease, drilling emulsions, cutting emulsions and preservative agents shall be carefully removed by suitable solvents. The surface shall be carefully dried with clean cloths to prevent the dissolved impurities from spreading over the entire surface. The surface shall be cleaned by wire brush and shot blasting if required. Proper adhesiveness of paint to the surface shall be ensured.

4.18.2 Painting:

Normal painting schedule is as detailed below. For special requirement if any, refer Section-5.0 to this specification.

4.18.3 **Control cabinet:**

Exterior: Grey; Interior: Brilliant white - glossy finish with enamel paint. For special painting if any, refer Section 5 to this specification. Paint thickness: Exterior - 120 microns; Interior - 80 microns minimum
Alternatively, control panel shall be of powder coated but both outside and inside will be of grey in colour.

4.18.4 Two coat of red oxide with minimum 40 microns DFT as per IS 2074 and two coats of synthetic enamel paint with minimum 40 microns DFT as per IS 2932.

Colour Scheme:

Under hung crane	: Golden Yellow
Trolley with hoist	: Golden Yellow
Interlock mechanism	: Ash Grey
DSL Components	: Ash Grey
Hook	: Black

4.18.5 All the despatchable units shall be packed in a wooden case with waterproof material. The packed item reaching site shall be suitable to be stored in open at site.

4.18.6 The material shall be dispatched with clear bill of material for each system.

4.18.7 Each and every despatchable item shall be identified with item number. Purchase Order reference number and tagged properly for easy identification.

4.18.8 Two sets of as-built arrangement drawings and electrical circuit drawings shall be sent along with the consignment.

5.0 PROJECT RELATED INFORMATIONS

Project Name : PATRATU 3X800MW (1828-30)

Enquiry No. / P. O. No. :

Sl. No.	Description	Specification	Vendor Confirmation Yes / No
5.1	Hoist, Crane & DSL Parameter	Refer Annexure-I	
5.2	Painting schedule & Special requirements	Refer Customer approved painting schedule (attached)	
5.3	Power & Control cable code	IS 1554 part(1)	
5.3.1	Power supply	415V,AC,3PH,50Hz	
5.3.2	Control supply	110V,AC,50Hz	
5.4	Commissioning Spares	Vendor to specify	
5.5	2 Years recommended spares	Vendor to specify	
5.6	Data Sheet	(Annexure-III) Vendor to fill and submit	
5.7	G.A. Drawings (for hoists, cranes, DSL, Wiring diagram, pendant etc.)	Vendor to submit	
5.8	Motor Data Sheet	(Annexure –IV) Vendor to fill and submit	
5.9	Special Project requirement	Not applicable	

- Note: 1. Deviation in the above requirements shall reject the offer.
2. If required, please add more sheets.

Trolley with Hoist - Electrically Operated												
Sl. No.	Appln.	Ref Drg No	Drg Item no	Cap. in T.	Lift in m.	Hd. room in mm.	Hoist Weights	Monorail			Qty / Blr. in nos.	
								Type	Size	Bottom Elev. In M		
01	PA & FD Motor	1-99-100-40917/03	01	22.00	8.00	Supplier to furnish	Supplier to furnish	WB	WB-700X300-20/16	9.925	2	
02	PA & FD Rotor	1-99-100-40917/03	03	6.00	10.00			NPB	NPB600	10.900	2	
03	ID Fan Motor	1-99-100-40918/03	03	61.00	10.00			WB	WB-1100X500-32/16	12.900	1	
04	ID Fan Rotor	1-99-100-40918/03	01	27.00	15.00			WB	WB-900X400-32/16	16.800	1	
05	APH Elements &&	1-99-400-40906/00	01	2.00	29.00			WB	WB-600X250-20/16	29.968	1	
06	SCAPH Handling	1-99-400-40907/01	01	2.50	15.50			WB	WB-700X300-20/16	16.468	1	
07	Pressure Parts Handling #	Not aplicable						Not aplicable				
08	F.O.Pump handling&&	Not in BHEL TRY Scope						Not aplicable				
09	Water Recirc. Pump **	Will be furnished later						ISMB	ISMB 450	EL +11.968M TOS	2	
<p>Note :</p> <p>The lift shown in the table is approximate only ; depending upon head room of the hoist it may be altered.</p> <p>Power supply provided for the panels shall be 415V, 3 PH, 3 wire only. Vendor to make suitable transformer arrangement inside the panel for single phase control supply.</p> <p>** -(Lug mounted hoists with Chain Pulley Blocks) Two hoists are to be interconnected by a single control panel for tandom operation. Vendor shall include fixed power supply cable from power supply point to the equipment. Length - 15.00m and Switch Fuse Unit.</p> <p># Hoist shall have an integral approach platform for control panel, motors & brake.</p> <p>&& -The trolley shall be designed to travel on the curved monorail as per drg.1-99-40040906 for APH Elements Handling</p>												

Prepared & Checked :

Copy of MOU_ANNEX-I-PATRATU 1828-30 REV 00.xls/
25.01.2022

Approved :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

The following data sheet/check list is to be filled by the vendor and submitted . This data sheet shall form part of ordering specification and shall be approved by Purchaser on acceptance of the offer. All columns are to be filled up. "Non-applicability" shall be specified. *Data sheet/check list shall be prepared by consolidating details of all types of cranes and TWH offered* as a single document.

Technical Data Sheet / Check list for Electrically Operated Under Hung Crane (UHC) & Trolley With Hoist (TWH)

Ref no	Description	Spec clause no	As per spec	As quoted
Gen.1.0	Codes & Standards	2.2		
Gen.1.1	Electric wire rope hoists....	2.2	IS 3938	
Gen.1.2	Code of practice.cranes and hoists	2.2	IS 807	
Gen.1.3	Mild steel point hooks...	2.2	IS 2758	
Gen.1.4	Point hooks with shanks upto 160t	2.2	IS 15560	
Gen.1.5	Steel wire rope...	2.2	IS 2266	
Gen.1.6	General plan-spur & helical gears	2.2	IS 3681	
Gen.1.7	Three phase induction motor	2.2	IS 325	
Gen.1.8	PVC insulator cables...	2.2	IS 1554	
Gen.1.9	Degrees of protection-elec. M/c..	2.2	IS 4691	
Gen.1.10	Weldable structural steel	2.2	IS 2062	
Gen.1.11	Code of practice.metal arc welding..	2.2	IS 816	
Gen.1.12	Ready mixed paint...	2.2	IS 2074	
Gen.1.13	Enamel synthetic ..coat/finish...	2.2	IS 2932	
Gen.1.14	Code of practice .. Electrical..crane	2.2	IS 3177	
Gen.1.15	Spec for ..switch gear & control gear	2.2	IS 13947-Part1	
Gen.1.16	Code of practice .. For welding...	2.2	IS 1024	
Gen.1.17	Carbon steel forging	2.2	IS 2004	
Gen.1.18	Round steel wire for ropes	2.2	IS 1835	
Gen.1.19	Elastomer insulated cables....	2.2	IS 9968-Part-1	
Under hung crane-UHC				
CR1.0	Under hung crane-UHC			
CR1.1	Capacity - in tons	Annexure-I		
CR1.2	Span - in m.	Annexure-I		
CR1.3	Overhang on either side - in mm.	Annexure-I		
CR1.4	Operating floor - in m.	Annexure-I		
CR1.5	Service class of crane/hoist	2.4	Class 2	
CR1.6	All welding	2.4	IS 1024	
CR1.7	Welder qualification	2.4	AWS D1.1/ASME section IX	
Wheels-UHC				
CR2.0	Wheels-UHC	2.4.5		
CR2.1	Wheel shape to match with runway beam	2.4.5	Vendor to confirm	
CR2.2	Wheel material	2.4.5	Forged/cast steel	
CR2.3	Wheel diameter - in mm.	2.4.5	Vendor to specify	
CR2.4	Wheel base - in mm.	2.4.5	Vendor to specify	
CR2.5	BHN	2.4.5	200 BHN Max.	

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
CR3.0	Crane girder-UHC	2.4.12		
CR3.1	Section	2.4.12	Rolled section	
CR3.2	Size	2.4.12	Vendor to specify	
CR3.3	Material	2.4.12	Vendor to specify	
CR3.4	Camber / Deflection	2.4.12	Span/1000mm	
CR3.5	Allowable bend	2.4.12	1mm/m	
CR3.6	Maximum bend	2.4.12	6mm	
CR3.7	Provision of buffers	2.4.12.1	Vendor to specify	
CR3.8	Provision of anti tilt / topple arrangement	2.4.12.2	Vendor to specify	
CR4.0	Wheel bearing-UHC	2.4.7		
CR4.1	Type	2.4.7	Vendor to specify	
CR4.2	Size	2.4.7	Vendor to specify	
CR4.3	Make	2.4.7	FAG/SKF/Tata/NBC	
CR5.0	Crane speed-UHC			
CR5.1	Maximum speed in m/min.		Vendor to specify	
CR5.2	Minimum speed in m/min		Vendor to specify	
CR6.0	Weight of the crane - in Kgs.		Vendor to specify	
CR7.0	Dimensions of crane	Vendor drawing	Vendor to specify	
CR8.0	Limit switch-UHC-LT&CT	2.14		
CR8.1	Type	2.14	Heavy duty	
CR8.2	Make	2.12.4	BCH/Omron/Nucon/ Festo/ Siemens/ Kaycee/ EMM/ SOC	
CR8.3	Rating	2.12.4	Vendor to specify	
CR9.0	Crane Motors-UHC-LT	2.6.0	Conform to IS 325	
CR9.1	Motor Rating		Vendor to specify	
CR9.2	Motor Type		Vendor to specify	
CR9.3	Motor Make		Vendor to specify	
CR9.4	Duty factor	2.6.4	40% CDF	
CR9.5	Duty cycle	2.6.4	Continuous/S3/S4	
CR9.6	Enclosure	2.6.14	IP 55	
CR9.7	Power supply (equipment)		415 VAC; 50Hz	
CR9.8	Quantity		Vendor to specify	
CR9.9	Crane Motors-UHC-CT	2.6.0	Conform to IS 325	
CR9.10	Motor Rating		Vendor to specify	
CR9.11	Motor Type		Vendor to specify	
CR9.12	Motor Make		Vendor to specify	
CR9.13	Duty factor	2.6.4	40% CDF	
CR9.14	Duty cycle	2.6.4	Continuous/S3/S4	
CR9.15	Enclosure	2.6.14	IP 55	
CR9.16	Power supply (equipment)	2.6.5	415 VAC; 50Hz	
CR9.17	Quantity		Vendor to specify	

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
CR10.0	End stopper-UHC			
CR10.1	Provided		Vendor to specify	
CR10.2	Type		Vendor to specify	
CR11.0	Clearance between Runway beam bottom & Crane girder top - in mm.		Vendor to specify	
HO1.0	Trolley With Hoist(TWH)	2.6.1		
HO1.1	Capacity - in tons	Annexure-I		
HO1.2	Lift - in m.	Annexure-I		
HO1.3	Headroom - in mm.	Annexure-I		
HO1.4	Approximate Hoist dimension	Vendor drawing	Vendor to specify	
HO1.5	Operating floor - in m.	BHEL drawing	Vendor to confirm	
HO1.6	Approximate weight - in Kgs.		Vendor to specify	
HO1.7	Service class of crane/hoist	2.4	Class 2	
HO1.8	All welding	2.4	IS 1024	
HO1.9	Welder qualification	2.4	AWS D1.1/ASME section IX	
HO 2.0	Weight of the Hoist - in Kgs.	NA		
HO 3.0	Weight of the DSL - in Kgs.	NA		
HO2.0	Hoist speed-TWH			
HO2.1	Maximum speed - in m/min		Vendor to specify	
HO2.2	Minimum speed - in m/min		Vendor to specify	
HO3.0	Cross travel speed-TWH			
HO3.1	Maximum speed - in m/min		Vendor to specify	
HO3.2	Minimum speed - in m/min		Vendor to specify	
HO4.0	Trolley -TWH	2.4.9		
HO4.1	Type	4 - wheeled-Min	Vendor to specify	
HO4.2	Design to suit monorail size		Vendor to confirm	
HO5.0	Trolley wheels-TWH	2.4.5		
HO5.1	Type	3.1.5	Spur geared	
HO5.2	Wheel diameter - in mm.	3.1.5	Vendor to specify	
HO5.3	Material of construction	3.1.5	Cast / forged steel	
HO5.4	Hardness	3.1.5	200 BHN Max.	
HO5.5	Quantity	3.1.5	Vendor to specify	
HO6.0	Wire rope-TWH	2.4.2		
HO6.1	Code	2.4.2	IS 2266 / IS 2365	
HO6.2	Rope construction	2.4.2	6 strands of 37/36	
HO6.3	Rope diameter - in mm.	2.4.2	Vendor to specify	
HO6.4	Number of falls	2.4.2	Vendor to specify	
HO6.5	Ultimate tensile strength	2.4.2	Vendor to specify	
HO6.6	Whether wire rope has sufficient extra length to retain two full wraps on the drum	Yes / No	Vendor to confirm	
HO6.7	Rope material	2.4.2	Galvanised	
HO6.8	Core material	2.4.2	Vendor to specify	
HO6.9	Breaking load	2.4.2	5 times SWL	

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
HO7.0	Rope drum-TWH	2.4.3		
HO7.1	Diameter - in mm.	2.4.3	Vendor to specify	
HO7.2	Material of construction	2.4.3	Cast / weld steel	
HO7.3	Construction	2.4.3	Seamless/fabricated	
HO8.0	Hook-TWH	2.4.1		
HO8.1	Code	2.4.1.1	IS 15560	
HO8.2	Material (Forged)	2.4.1.6	IS 2004-35C8	
HO8.3	Minimum tensile strength	2.4.1.6	50-62 kg/mm ²	
HO8.4	Capacity - in tons	2.4.1	Vendor to specify	
HO8.5	Safety latch provided in the hook	2.4.1.2	Vendor to confirm	
HO8.6	Bearing in the swivel hook	2.4.1.2	Thrust bearing	
HO8.7	Locking arrangement of hook	2.4.1.5	Forged lug/clamp latch	
HO8.8	Examination	2.4.1.7	MPI / LPI	
HO8.9	Hooks > 5 ton capacity	2.4.1.7	UT	
HO8.10	Proof load test as per	2.4.1.7	IS 15560	
HO9.0	Bearing for Cross Travel-TWH	2.4.7		
HO9.1	Type	2.4.7	Vendor to specify	
HO9.2	Size	2.4.7	Vendor to specify	
HO9.3	Make	2.4.7	FAG/SKF/Tata/NBC	
HO10.0	Bearing for Hoist-TWH	3.1.7		
HO10.1	Type	3.1.7	Vendor to specify	
HO10.2	Size	3.1.7	Vendor to specify	
HO10.3	Make	3.1.7	FAG/SKF/Tata/NBC	
HO11.0	Hoist Motors - TWH	2.6.0	Conform to IS 325	
HO11.1	Motor Rating		Vendor to specify	
HO11.2	motor Type		Vendor to specify	
HO11.3	Motor Make		Vendor to specify	
HO11.4	Duty factor	2.6.4	40% CDF	
HO11.5	Duty cycle	2.6.4	Continuous/S3/S4	
HO11.6	Enclosure	2.6.14	IP 55	
HO11.7	Power supply (equipment)	2.6.5	415 VAC; 50Hz	
HO11.8	Quantity			
HO12.0	Cross travel motor-TWH	2.6.1	Conform to IS 325	
HO12.1	Motor Rating		Vendor to specify	
HO12.2	motor Type		Vendor to specify	
HO12.3	Motor Make		Vendor to specify	
HO12.4	Duty factor	2.6.4	40% CDF	
HO12.5	Duty cycle	2.6.4	Continuous/S3/S4	
HO12.6	Enclosure	2.6.14	IP 55	
HO12.7	Power supply (equipment)		415 VAC; 50Hz	
HO12.8	Quantity			

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
HO13.0	Limit switch-Hoist	2.14		
HO13.1	Type	2.14	Heavy duty	
HO13.2	Make	2.12.4	BCH/Omron/Nucon/ Festo/ Siemens/ Kaycee/ EMM/ SOC	
HO13.3	Rating	2.14	Vendor to specify	
HO14.0	Limit switch for CT-TWH	2.14		
HO14.1	Type	2.14	Heavy duty	
HO14.2	Make	2.12.4	BCH/Omron/Nucon/ Festo/ Siemens/ Kaycee/ EMM/ SOC	
HO14.3	Rating	2.14	Vendor to specify	
HO15	Approach platform at hoist for panel, motor & brake		Vendor to confirm	
HO16	Total Power consumption of Hoist (KW)		Vendor to specify	
DSL.1.0	DSL system for Long Travel	2.5		
DSL.1.1	Travel length - Wire / Cable trolley	Annexure-I		
DSL.1.2	Type		Cable trolley/Taut wire loop	
DSL.1.3	Cable length - Fixed cable		Vendor to specify	
DSL.1.4	Cable length - Tailing cable		Vendor to specify	
DSL.1.5	Cable size & rating		Vendor to specify	
DSL.1.6	Cable trolley type	2.5.1		
DSL.1.6.1	Type of trolley	2.5.1.1.b	4 - wheeled type	
DSL.1.6.2	Material of construction	2.5.1.1.b	Vendor to specify	
DSL.1.6.3	Diameter of trolley wheel	2.5.1.1.b	Min. dia 40 mm	
DSL.1.6.4	Type of Bearing used		Double seal roller/ball	
DSL.1.6.5	Make of bearing used		FAG/SKF/Tata/NBC	
DSL.1.6.6	Trolley track	2.5.1.1.a	Tee track/I-Beam	
DSL.1.6.7	Loop size	2.5.1.1.b	Vendor to specify	
DSL.1.6.8	Link chain size / diameter	2.5.1.1.b	Vendor to specify	
DSL.1.6.9	Pitch between two cable trolleys	2.5.1.1.b	Vendor to specify	
DSL.1.6.10	Supply of Earthing conductor	2.5.1.1.b	Vendor to confirm	
DSL.1.6.11	Provision of suitable supports	2.5.1.1.b	Vendor to confirm	
DSL.1.6.12	Arrangement drawing with the offer	2.5.1.1.b	Vendor to confirm	
DSL.1.7	Taut wire loop type	2.5.2		
DSL.1.7.1	Bracket size	2.5.2.1a	Vendor to specify	
DSL.1.7.2	Bracket material	2.5.2.1a	Vendor to specify	
DSL.1.7.3	Provision of end hook	2.5.2.1b	Vendor to confirm	
DSL.1.7.4	Reel insulator	2.5.2.1c	Ceramic	
DSL.1.7.5	Tieing arrangement	2.5.2.1c	Nylon rope/leather belt	
DSL.1.7.6	Steel wire rope	2.5.2.1d	IS 2266/Mini 6mm dia	
DSL.2.0	DSL system for Cross Travel	2.5		
DSL.2.1	Travel length - Wire / Cable trolley	Annexure-I		
DSL.2.2	Type		Cable trolley/ Taut wire loop	
DSL.2.3	Cable length - Fixed cable			
DSL.2.4	Cable length - Tailing cable			
DSL.2.5	Cable size & rating			

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
DSL.2.6	Cable trolley type	2.5.1		
DSL.2.6.1	Type of trolley	2.5.1.1.b	4 - wheeled type	
DSL.2.6.2	Material of construction	2.5.1.1.b	Vendor to specify	
DSL.2.6.3	Diameter of trolley wheel	2.5.1.1.b	Mini dia 40 mm	
DSL.2.6.4	Type of Bearing used		Double seal roller/ball	
DSL.2.6.5	Make of bearing used		FAG/SKF/Tata/NBC	
DSL.2.6.6	Trolley track	2.5.1.1.a	Tee track/Auxiliary girder	
DSL.2.6.7	Loop size	2.5.1.1.b	Vendor to specify	
DSL.2.6.8	Link chain size / diameter	2.5.1.1.b	Vendor to specify	
DSL.2.6.9	Pitch between two cable trolleys	2.5.1.1.b	Vendor to specify	
DSL.2.6.10	Supply of Earthing conductor	2.5.1.1.b	Vendor to confirm	
DSL.2.6.11	Provision of suitable supports	2.5.1.1.b	Vendor to confirm	
DSL.2.6.12	Arrangement drawing with the offer	2.5.1.1.b	Vendor to confirm	
DSL.2.7	Taut wire loop type	2.5.2		
DSL.2.7.1	Bracket size	2.5.2.1a	Vendor to specify	
DSL.2.7.2	Bracket material	2.5.2.1a	Vendor to specify	
DSL.2.7.3	Provision of end hook	2.5.2.1b	Vendor to confirm	
DSL.2.7.4	Reel insulator	2.5.2.1c	Ceramic	
DSL.2.7.5	Tieing arrangement	2.5.2.1c	Nylon rope/leather belt	
DSL.2.7.6	Steel wire rope	2.5.2.1d	IS 2266/Mini 6mm dia	
COM.0.0	Common to UHC & TWH			
COM.1.1	Brakes	2.4.8		
COM.1.2	Type	2.4.8	ElectroMech friction shoe type/ Disc type/ Electromagnetic disc type/ Electro hydraulic thruster brake	
COM.1.3	Shoe Material	2.4.8	Vendor to specify	
COM.1.4	Make	2.4.8	Vendor to specify	
COM.1.5	Slip to speed	2.4.8	Vendor to specify	
COM.2.0	Shaft	2.4.6		
COM.2.1	Material	2.4.6	Vendor to specify	
COM.2.2	Hardness	2.4.6	175-250 BHN	
COM.2.3	Tensile strength		60 kg/mm ²	
COM.2.4	UT test	Dia>50 mm	ASMEVIII/Div 2	
COM.3.0	Gears / Pinions	2.4.4		
COM.3.1	Material	2.4.4	IS 3681/ BS 970	
COM.3.2	Hardness-Pinion (LT&CT)	2.4.4	250 BHN min.	
COM.3.3	Hardness-gears (LT&CT)	2.4.4	215 BHN min.	
COM.3.4	Hardness-Pinion (hoist)	2.4.4	285-300 BHN	
COM.3.5	Hardness-gears (hoist)	2.4.4	250 -265BHN	
COM.3.6	BHN difference - gear < pinion	2.4.4	35 BHN Min.	
COM.3.7	Type (for LT & CT)	2.4.4	Spur/Helical	
COM.3.8	Type (for hoist)	2.4.4	Spur/Helical	
COM.3.9	Lubricant details	2.4.4	Vendor to specify	
COM.3.10	Trade name	2.4.4	Vendor to specify	
COM.3.11	Quantity/Periodicity	2.4.4	Vendor to specify	
COM.3.12	LPI/MPT tests	2.4.4	Vendor to specify	

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
COM.4.0	Fasteners	2.5.2.1g		
COM.4.1	Grade	2.5.2.1g	Precision/high tensile	
COM.4.2	Galvanising	2.5.2.1g	As per IS	
COM.4.3	Special bolts/fasteners	2.5.2.1g	Details in drawing	
COM.5.0	Controls/Interlocks-UHC&TWH	2.7.0		
COM.5.1	Type of control cabinet	2.7.0	Wall mounting	
COM.5.2	Location of control cabinet	2.7.0	Vendor to specify	
COM.5.3	Control power supply	2.7.0	110VAC/50Hz	
COM.5.4	Control cabinet & Pendent enclosure	2.7.0	IP 55 as per IS13947	
	Push Button	2.9.3	Siemens/ L&T/ GE/ Telemechanic/ BCH/ Technic	
COM.5.5	Control wiring diagram	2.7.0	To be enclosed	
COM.5.6	Relays	2.12.1	Siemens/BCH/L&T/ GE/Telemechanic	
COM.5.7	Tranformers	2.12.2	SE/Kappa/Ind coil/ JE/ Vikas/ Logicstat	
COM.5.8	Motors	2.12.3	NGEF/Kirloskar / Siemens/Crompton greaves/ Bharat Bijlee/ Autolec/ GEC/ GE	
COM.5.9	Limit switches	2.12.4	BCH/Omron/Nucon/ Festo/ Siemens/ Kaycee/ EMM/ SOC	
COM.5.10	Power & control cable	2.12.5	CMI Ltd/Delton cables/ Fixwell/ Pushincords/ Asian cablews/ Cable corporation of India/ Finolex/ Incab/Universal/ Polycab/CCI	
COM.5.11	Cabling	2.10		
COM.5.12	Code	2.10	IS 1554 / IS 9968	
COM.5.13	Power cable	2.10	Copper PVC flexible / Elastomer insulated flexible	
COM.5.14	Power cable - conductor size	2.10	Vendor to specify	
COM.5.15	Control cable	2.10	Armoured	
COM.5.16	Control cable - conductor size	2.10	Vendor to specify	
COM.5.17	Provision of spare cores	2.10	20 % spare cores	
COM.5.18	Internal wiring	2.10	Vendor to confirm	
COM.5.19	Earthing	2.11	Vendor to confirm	
COM.6.0	Painting	4.18	Annexure II	
COM.6.1	Vendor's Compliance of painting		Vendor to confirm	
COM.6.2	Colour scheme		Vendor to confirm	
COM.6.3	Vendor's Compliance of colour scheme		Vendor to confirm	

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
COM.7.0	Packing	4.0		
COM.7.1	Vendor's Compliance of packing	4.18.5	Vendor to confirm	
COM.8.0	Inspection & Testing	4.0		
COM.8.1	Vendor's Compliance of above		Vendor to confirm	
COM.9.0	Load test at site /vendor supervision	4.11	Vendor to confirm	
COM.10.0	Drawings	3.3.9		
COM.10.1	Drawings shall be made in AUTOCAD	3.3.9	Vendor to confirm	
COM.10.2	Drg BOM to match with packing slip	3.3.9	Vendor to confirm	
COM.10.3	Drawing CD to be submitted	3.3.9	Vendor to confirm	
COM.11.0	Guarantee	1.9	18 / 24 months	
DATA SHEET - AC MOTORS (Non-Flame proof)				
Attach separate data sheet for each motor under supply				
MO.1	Application			
MO.2	Manufacturer			
MO.3	Type, frame size & degree of protection			
MO.4	Rated output in Kw & rated speed			
MO.5	Full load current			
MO.6	Full load efficiency & power factor			
MO.6.1	Duty cycle			
MO.7	Rated torque			
MO.7.1	Starting current			
MO.8	Starting torque in % of full load torque			
MO.9	Pull up torque in % of full load torque			
MO.10	Pull out torque in % of full load torque			
MO.11	No load starting time			
MO.12	Stator winding connection			
MO.13	Type & no. of terminals brought out			
MO.14	Resistance / phase			
MO.15	Qty. & power consumption of space heaters			
MO.16	Gland size for space heaters			
MO.17	Cable entry			
MO.18	Cable gland - Double compression			
MO.19	GD ² of motor			
MO.20	Total weight of motor			
MO.21	Anticipated bearing life			
MO.22	Method of connection to driven equipment			

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
Drawings/Documents to be furnished along with the offer				
D.1.0	Drawings/documents	6.1.0	3 sets of each items	
D.1.1	GA / Assy. of Cranes	3.1.1	Vendor drawing number	
D.1.2	GA / Assy of Hoists	3.1.1	Vendor drawing number	
D.1.3	GA / Assy for DSL system	3.1.1	Vendor drawing number	
D.1.4	Electrical Wiring / Circuit diagram	3.1.2	Vendor drawing number	
D.1.5	Technical specification of system	3.1.6	Vendor to specify	
D.1.6	Exclusion list	3.1.8	Vendor to specify	
Drawings/Documents to be furnished after award of contract (Vendor to confirm the submission of the following documents)				
D.2.0	Drawings/documents	3.2		
D.2.1	Quality plan for Purchaser's approval	3.2.1		
D.2.2.0	Dimensional drawing with BOM for:	3.2.2	Purchaser's approval	
D.2.2.1	Under hung crane		Purchaser's approval	
D.2.2.2	Trolley with Hoist		Purchaser's approval	
D.2.2.3	Down shop leads		Purchaser's approval	
D.2.2.4	Cable trolley		Purchaser's approval	
D.2.2.5	Control panel		Purchaser's approval	
D.2.2.6	Wiring diagram		Purchaser's approval	
D.2.3	Data sheet for cranes & hoists		Purchaser's approval	
D.2.4	Calculation for the following:	3.2.4		
D.2.4.1	Hoist & Travel motor power	3.2.4.1	Purchaser's review	
D.2.4.2	Brake torque for each drive	3.2.4.2	Purchaser's review	
D.2.4.3	Brake selection for each drive	3.2.4.2	Purchaser's review	
D.2.4.4	Main hoist rope selection	3.2.4.3	Purchaser's review	
D.2.4.5	CT/LT wheel load details	3.2.4.4	Purchaser's review	
D.2.4.6	CT/LT wheel load dia selection	3.2.4.4	Purchaser's review	
D.2.5	Details of gear box		Purchaser's review	
D.2.6	Details of Hooks		Purchaser's review	
D.2.7	Details of couplings		Purchaser's review	
D.2.8	Performance certificate		Purchaser's record	
D.2.9	O&M manual to contain the following:	3.3.9.3		
D.2.9.1	Storage details	3.3.9.4	Vendor to confirm	
	Installation procedure	3.3.9.4	Vendor to confirm	
	Erection procedure	3.3.9.4	Vendor to confirm	
	Drawings	3.3.9.4	Vendor to confirm	
	Lubrication schedule	3.3.9.4	Vendor to confirm	
	Spares list	3.3.9.4	Vendor to confirm	
	Motor data sheet	3.3.9.4	Vendor to confirm	
	Operation & trouble shooting	3.3.9.4	Vendor to confirm	
	No of copies	3.3.9.4	2 copies with hoist; 1 copy to BHEL	
	CDs (soft copy) copied with drawings	3.3.9.5	2 copies with hoist; 1 copy to BHEL	

Vendor Name :

Signature :

Date :

Annexure-III to MOU/TPBHEL/HOIST-Rev-05

Project :

Enquiry No.:

P.O.No. Date:

Description of the item:

Ref no	Description	Spec clause no	As per spec	As quoted
Test certificates to be furnished along with the supply				
(Vendor to confirm the submission of the following documents)				
TC.1.0	Test certificates	3.3		
TC.1.1	Physical/Chemical,NDE,Hardness	3.3.1	Vendor to confirm	
TC.1.1.1	Trolley wheel	3.3.1	Vendor to confirm	
TC.1.1.2	Crane wheel	3.3.1	Vendor to confirm	
TC.1.1.3	Wire rope	3.3.1	Vendor to confirm	
TC.1.1.4	Pulley	3.3.1	Vendor to confirm	
TC.1.1.5	Hooks	3.3.1	Vendor to confirm	
TC.1.1.6	Gears & Pinions	3.3.1	Vendor to confirm	
TC.1.1.7	Shafts	3.3.1	Vendor to confirm	
TC.1.2	TWWhoist load test	4.3	Vendor to confirm	
TC.1.3	Brake test for LT/CT/Hoist	4.4	Vendor to confirm	
TC.1.4	Testing of torque/limit switch	4.5	Vendor to confirm	
TC.1.5	Over load relay test	4.6	Vendor to confirm	
TC.1.6	Alignment test	4.7	Vendor to confirm	
TC.1.7	Crane load test	4.11	Vendor to confirm	
TC.1.8	Hook type & load test	4.13.2	Vendor to confirm	
TC.1.9	Deflection test for crane	4.14.2	Vendor to confirm	
TC.1.10	Cross travel movement test	4.9	Vendor to confirm	
TC.1.11	Dimensional checks		As per approved QP	
TC.1.12	Wire rope load test	4.2	Vendor to confirm	
TC.1.13	NDT as per Quality plan & Specification		Vendor to confirm	
TC.1.14	Material test certificates		Vendor to confirm	
TC.1.15	Insulator test on electrical circuit	4.16.1	Vendor to confirm	
TC.1.16	Functional test/power&control circuit	4.16.3	Vendor to confirm	
TC.1.17	High volt test on electrical circuit	4.16.4	Vendor to confirm	
TC.1.18	Motor routine, type & weather protection TCs.	4.16.5	Vendor to confirm	
TC.1.19	Control panel & Pendent I R, HV & physical inspection record and weather protection TC.	4.16.7	Vendor to confirm	

Vendor Name :

Signature :

Date :

Annexure – IV Hoist Data Sheet

MOTOR DATASHEET		
PROJECT		
PO REFERENCE		
SNO	DESCRIPTION	VALUE
	For Hoist Application (description/capacity)	
A.	GENERAL	
1.	Manufacturer & Country of origin.	
2.	Equipment driven by motor	
3.	Motor type (Hoisting motor / Cross travel motor)	
4.	Motor Rating	
5.	Quantity	
B.	DESIGN AND PERFORMANCE DATA	
1.	Frame size	
2.	Type of duty	
3.	Type of enclosure /Method of cooling/ Degree of	
4.	Applicable standard to which motor generally conforms	
5.	Efficiency class	
6.	Type of mounting	
7.	Direction of rotation as viewed from DE END	
8.	Standard continuous rating at 40 deg. C. ambient temp. as per Indian Standard (KW)	
9.	Derated rating for specified normal condition i.e. 50 deg. C ambient temperature (KW)	
10.	Maximum continuous load demand of driven equipment in KW	
11.	Rated Voltage (volts)	
12.	Permissible variation of :	
	a. Voltage (Volts)	
	b. Frequency (Hz)	

Vendor's Name
Signature & Seal
with date

	c. Combined voltage and frequency	
13.	Rated speed at rated voltage and frequency(RPM)	
14.	At rated Voltage and frequency:	
	a. Full load current	
	b. No load current	
15.	Power Factor at	
	a. 100% load	
	b. No load	
	c. Starting.	
16.	Efficiency at rated voltage and frequency,	
	a.100% load	
	b. 75% load	
	c. 50% load	
17.	Starting current (amps) at	
	a. 100 % voltage	
	b. 85% voltage	
	c. 80% voltage	
18.	Minimum permissible starting Voltage (Volts)	
19.	Starting time with minimum permissible voltage (sec)	
	a. Without driven equipment coupled	
	b. With driven equipment coupled	
20.	Safe stall time with 100% and 110% of rated voltage (sec)	
	a. From hot condition	
	b. From cold condition	
21.	Torques :	
	a. Starting torque at min. permissible voltage(kg-mtr.)	
	b. Pull up torque at rated voltage.	
	c. Pull out torque	

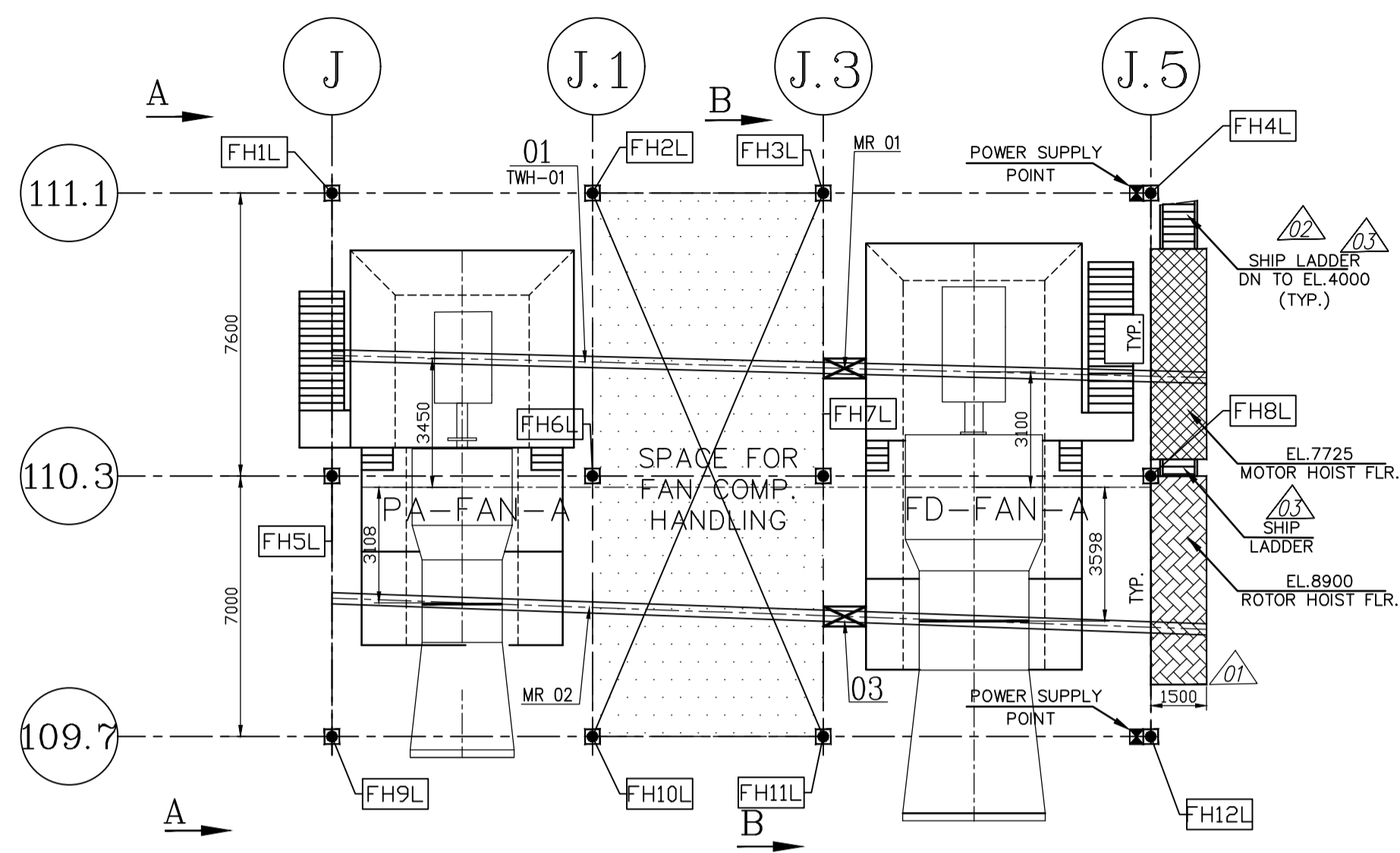
Vendor's Name
Signature & Seal
with date

	d. Min accelerating torque (kg.m) available at lowest permissible starting voltage	
	e. Rated torque (kg.m)	
22.	Stator winding resistance per phase (ohms at 20 Deg.C.)	
23.	GD ² value of motors	
24.	No of permissible successive starts when motor is in hot condition.	
25.	Locked Rotor KVA Input	
26.	Locked Rotor KVA/KW	
27.	Vibration limit :Velocity (mm/s)	
28.	Noise level limit (dBA)	
C.	CONSTRUCTIONAL FEATURES	
1.	Stator winding insulation	
	a. Class & Type	
	b. Winding Insulation Process	
	c. Tropicalized	Yes
	d. Temperature rise over specified maximum ambient temperature of 50 deg. C	
	e. Method of temperature measurement	
	f. Stator winding connection	
2.	Main Terminal Box	
	a. Type	
	b. Location(viewed from NDE side)	
	c. Entry of cables(bottom/side)	
	d. Recommended cable size(To be matched with cable size envisaged)	
	e. Fault level (MVA),Fault level duration(sec)	
	f. Cable glands & lugs details (shall be suitable for power cable)	
3.	Type of DE/NDE Bearing	
4.	Motor Paint shade	
5.	Weight of	
	a. Motor stator (KG)	
	b. Motor Rotor (KG)	

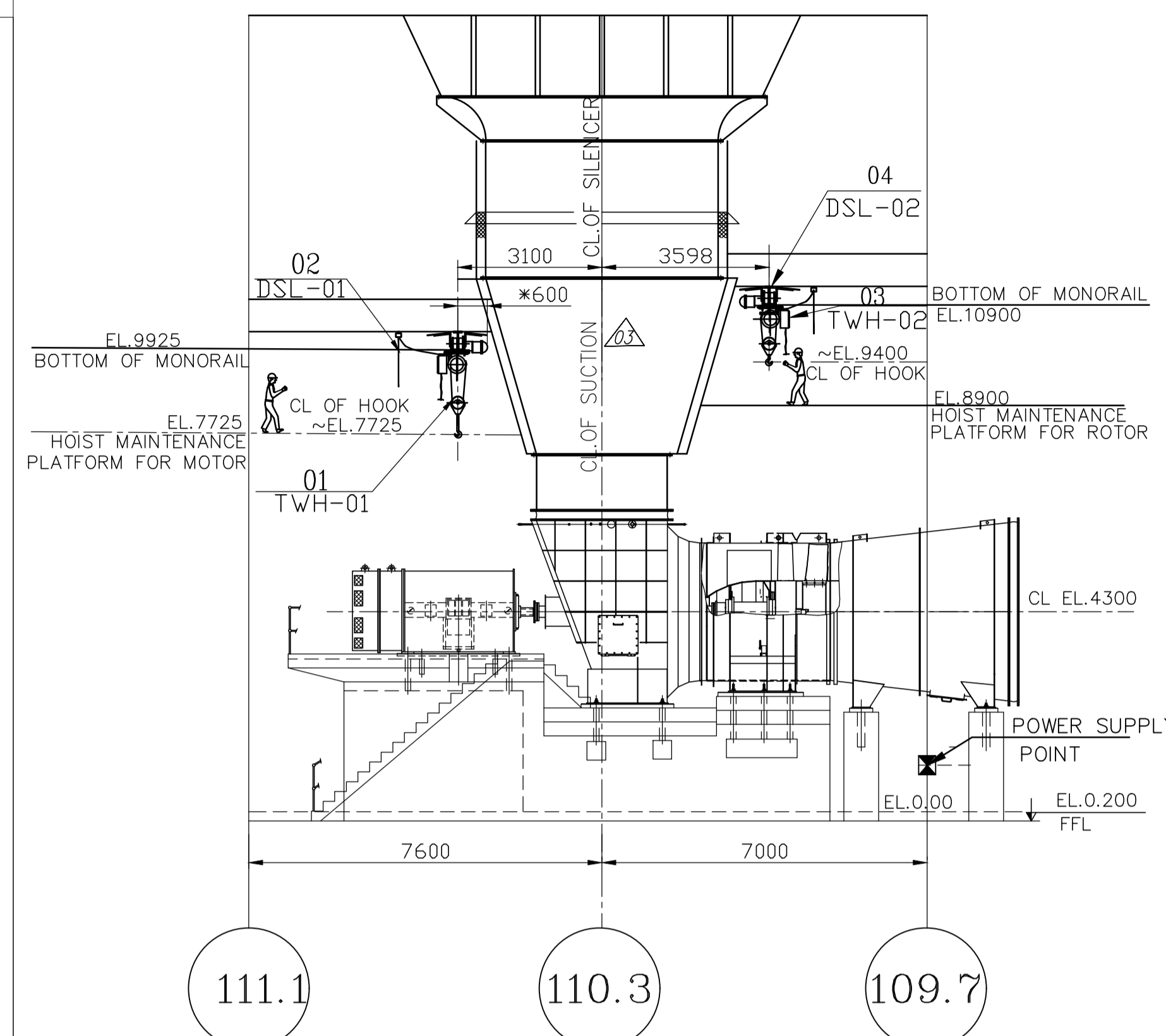
Vendor's Name
Signature & Seal
with date

	c. Total weight (KG)	
D.	List of accessories.	
1.	Grounding pads	
	i) No and size on motor body	
	ii) Nos on terminal Box	
2.	Any other fitments	
E.	List of curves.	
1.	Torque speed characteristic of the motor	
2.	Thermal withstand characteristic	
3.	Starting. current Vs. Time	
4.	Starting. current Vs speed	
5.	P.F. and Efficiency. Vs Load	

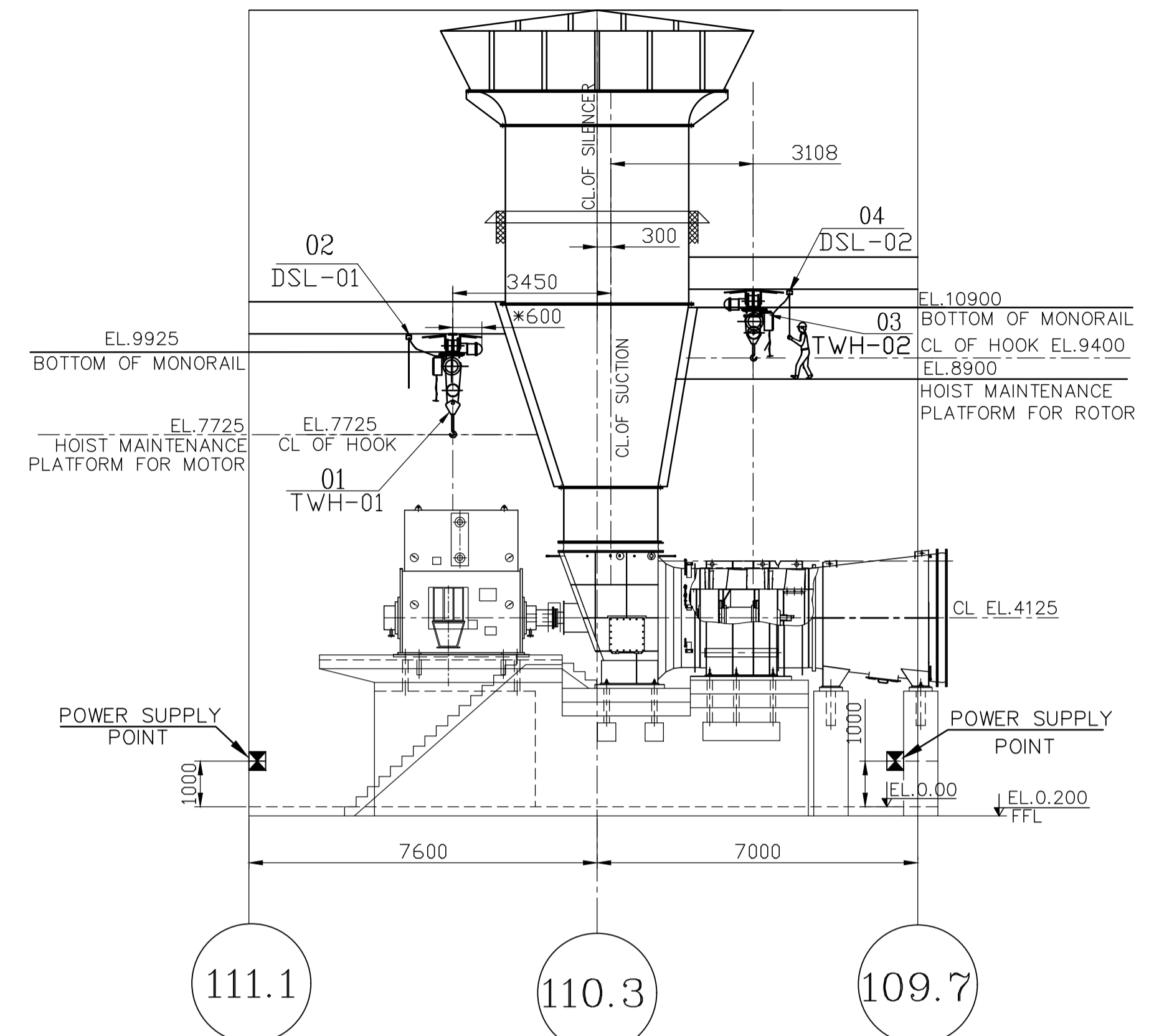
Vendor's Name
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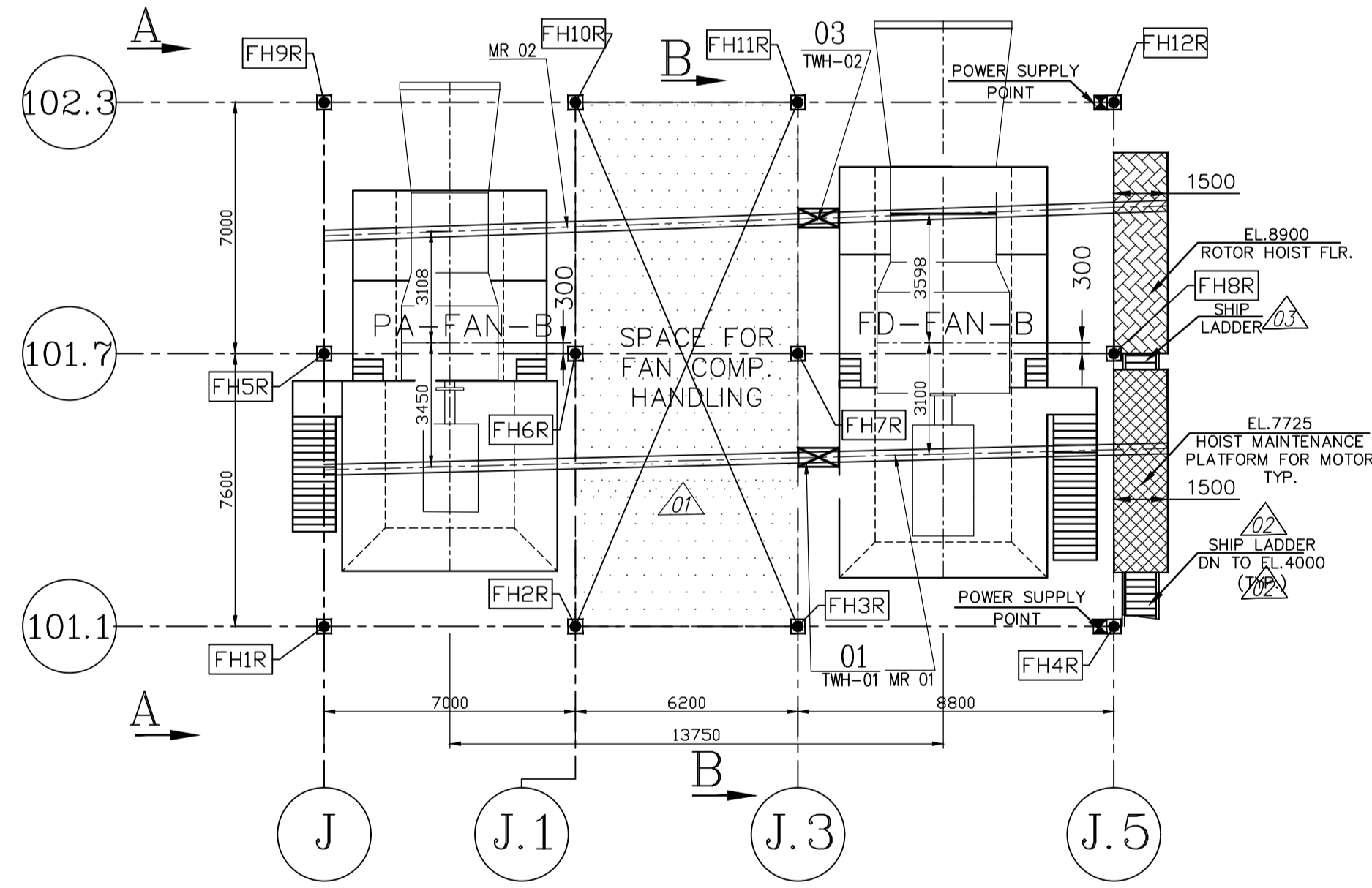
SECTIONAL PLAN
SCALE 1:150



VIEW - BB (FD FAN)
SCALE 1:100



VIEW - AA (PA FAN)
SCALE 1:100



SECTIONAL PLAN
SCALE 1:150

LEGEND

- MR-01 - MONORAIL FOR F.D. AND P.A. FANS "A" MOTORS - QTY. TWO-23.52M.
- MR-02 - MONORAIL FOR F.D. AND P.A. FANS "A" ROTORS - QTY. TWO-23.52M.
- TWH-01 - TROLLEY WITH HOIST FOR F.D. AND P.A. FANS MOTORS - ITEM No. 1
- TWH-02 - TROLLEY WITH HOIST FOR F.D. AND P.A. FANS ROTORS - ITEM No. 3

GENERAL NOTES:

- A. REFERENCE DRAWINGS:
 - 01. GENERAL ARRANGEMENT OF PA FAN (PAF 21/12.5-2): 1-00-100-29168(NTPC DRG NO: 9585-001-102-PVM-B-019).
 - 02. GENERAL ARRANGEMENT OF FD FAN (FAF 29/13.3-1): 1-00-098-29166(NTPC DRG NO: 9585-001-102-PVM-B-017).
 - 03. GENERAL ARRANGEMENT OF BOILER PLAN 'AA': 0-00-022-77519(NTPC DRG NO: 9585-001-102-PVM-B-106).
 - 04. GENERAL ARRANGEMENT OF BOILER PLAN 'EE': 0-00-022-77518(NTPC DRG NO: 9585-001-102-PVM-B-010)
- B. TROLLEY WITH HOISTS ARE ELECTRICALLY OPERATED.
- C. QUANTITY FURNISHED IN DRAWING IS FOR ONE BOILER ONLY.
- D. ALL THE ELEVATIONS ARE WITH RESPECT TO EL(+)-0.00M, FINISHED GROUND FLOOR LEVEL OF TG BUILDING, WHICH CORRESPONDS TO EL(+)-375.3M.

NOTES TO PEM, NEW DELHI:

1. POWER SUPPLY POINTS (■) ONE METER ABOVE GROUND LEVEL TO BE PROVIDED BY BHEL.
2. POWER SUPPLY POINTS AT COLUMNS FH4R, FH4L, FH12R AND FH12L.
3. POWER SUPPLY REQUIRED RATING AT COLUMN FH4R & FH12R (2 NOS): 415V AC: 3 PHASE: 50Hz.
4. POWER SUPPLY REQUIRED RATING AT COLUMN FH4L & FH12L (2 NOS) : 415V AC: 3 PHASE: 50Hz

NOTES TO VENDORS:

1. SUPPLIER'S SCOPE STARTS AT BHEL'S POWER SUPPLY POINT.
2. DIMENSIONS MARKED WITH (*) SHOULD BE STRICTLY MAINTAINED.
3. VENDORS ITEMS INCLUDE:
 - A. FIXED POWER CABLE AND TRAILING CABLE.
 - B. DSL TRAILING CABLE SYSTEM - CABLE TROLLEY - COMPLETE SET.
 - C. SWITCH FUSE UNITS AND ALL ELECTRICAL ITEMS FOR TWH FROM POWER SUPPLY POINT.
4. TROLLEY WITH HOIST - CAPACITY 22.0/6.0 TONS: LIFT 8.0/10.0M.
5. VENDOR TO NOTE THAT HEADROOM FOR HOIST TWH-01 ,ITEM NO.01 SHOULD NOT BE GREATER THAN 2200MM.

Max Load to be Handled (kgs)	
P.A. FANS MOTORS	16500
P.A. FANS ROTORS	4000
F.D., FANS MOTORS	17000
F.D., FANS ROTORS	4200

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	AC/DP	UNIT	UNIT WEIGHT	QTY	ZONE
	04	DSL-02-CABLE TROLLEY TYPE LENGTH : 24M.						ST	600.000	2	
	03	TWH-02, ELEC.; CAP:6T LIFT : 10.0 M.						ST	1000.000	2	
	02	DSL-01-CABLE TROLLEY TYPE LENGTH :24M.						ST	600.000	2	
	01	TWH-01, ELEC.; CAP:22T LIFT : 8.0 M.						ST	2500.000	2	

NTPC DRG No: 9585-001-102-PVM-B-060 BHEL CUSTOMER Nos.: 1828,1829,1830
 CUSTOMER PATRATU VIDYUT UTPADAN NIGAM LIMITED
 (A Subsidiary of NTPC Ltd in Joint Venture with Jharkand Biji Vitran Nigam Ltd)

PROJECT PATRATU SUPER THERMAL POWER STATION
 EXPANSION PHASE-1 3X800 MW-UNIT NO: 01,02 & 03.

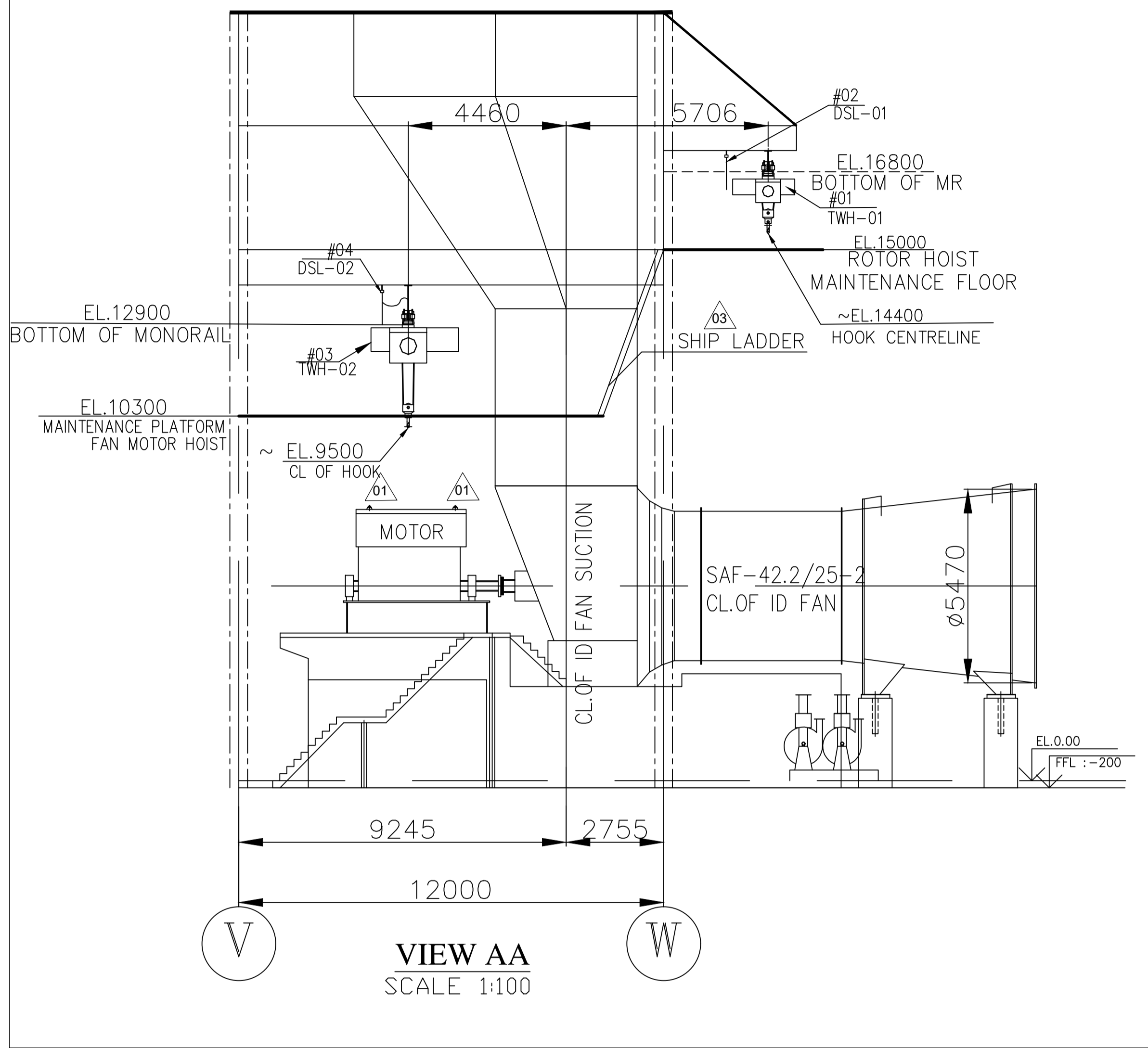
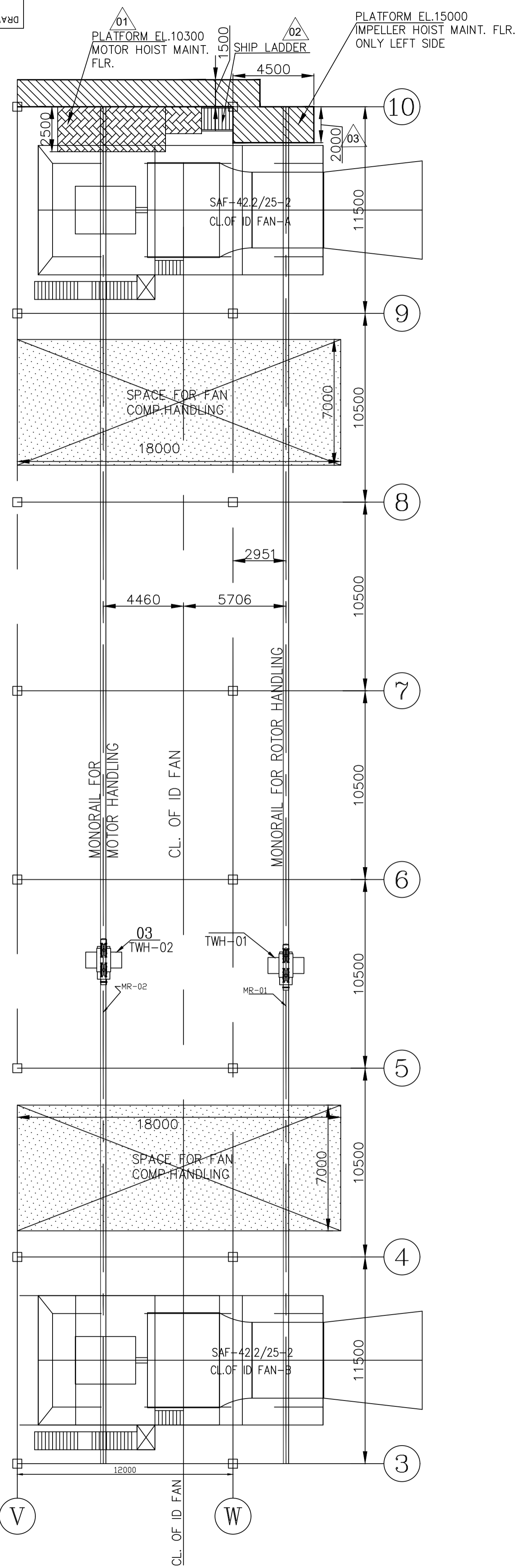
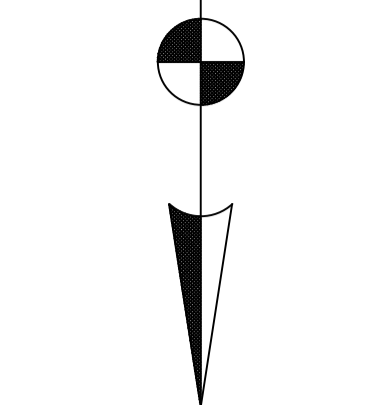
BHARAT HEAVY ELECTRICALS LIMITED
 BOILER PLANT UNIT, TIRUCHIRAPALLI-620014

NO	NAME	SIGNATURE	DATE	TITLE
DRN	R S YADAV	Sd-	25.05.19	
CHD	SAURABH KR	Sd-	25.05.19	PA & FD FAN HANDLING ARRANGEMENT
APD	SHANKAR N.	Sd-	25.05.19	

ALL DIMENSIONS IN MILLIMETRE DEPT. 129
 DRAWING NO. 1-99-100-40917
 SCALE: 1:100
 1:150

REV	DATE	ALTERED	BY	REV	DATE	ALTERED	BY	REV	DATE	ALTERED	BY
03	28.11.2019	CHD & APPD	SHANKAR N.	02	26.08.2018	CHD & APPD	SHANKAR N.	01	13.07.2019	CHD & APPD	SHANKAR N.

1-99-100-40918



VIEW AA
SCALE 1:100

LEGEND

- MR-01 - MONORAIL FOR ID FANS ROTORS - QTY. ONE (L=75.500m)
- MR-02 - MONORAIL FOR ID FANS MOTORS - QTY. ONE (L=75.500m)
- TWH-01 - TROLLEY WITH HOIST FOR ID FANS ROTORS - ITEM No. 1
- TWH-02 - TROLLEY WITH HOIST FOR ID FANS MOTORS - ITEM No. 3

GENERAL NOTES:

- A. REFERENCE DRAWINGS:
01. LAYOUT OF ID SYSTEM ELEVATION: 0-00-020-77527(NTPC DRAWING NO.: 9585-001-102-PVM-B-013).
 02. LAYOUT OF ID SYSTEM PLAN: 0-00-020-77528(NTPC DRAWING NO.: 9585-001-102-PVM-B-444).
 03. GENERAL ARRANGEMENT OF BOILER SIDE ELEVATION SEC EE: 0-00-022-77518.(NTPC DRAWING NO.: 9585-001-102-PVM-B-010).
 04. GENERAL ARRANGEMENT OF ID FAN (SAF 42.2/25-2): 1-00-099-29167(NTPC DRAWING NO.: 9585-001-102-PVM-B-018).
- B. TROLLEY WITH HOISTS ARE ELECTRICALLY OPERATED.
 C. QUANTITY FURNISHED IN DRAWING IS FOR ONE BOILER ONLY.
 D. ALL ELEVATIONS ARE WITH RESPECT TO EL. 0.0M, WHICH CORRESPONDS TO RL (+) 375.3M (FFL OF TG BUILDING).

NOTES TO PEM;NEW DE;HI:

1. POWER SUPPLY POINTS (☒) ONE METER ABOVE GROUND LEVEL - TO BE PROVIDED BY PEM-BHEL.
2. POWER SUPPLY POINTS AT ROW 03 (02 NOS-01 NO. FOR MOTOR HANDLING HOIST AND 01 NO. FOR ROTOR HANDLING HOIST AS PER INDICATED IN DRG.).
3. POWER SUPPLY RATING AT COLUMN W4L: AC; 3 PHASE; 50Hz.
4. POWER SUPPLY RATING AT COLUMN V4L: AC; 3 PHASE; 50Hz.

NOTES TO VENDORS:

1. SUPPLIER'S SCOPE STARTS AT BHEL'S POWER SUPPLY POINT.
2. VENDORS ITEMS:
 - A. FIXED POWER CABLE AND TRAILING CABLE.
 - B. DSL TRAILING CABLE SYSTEM - CABLE TROLLEY - COMPLETE SET.
 - C. SWITCH FUSE UNITS AND ALL ELECTRICAL ITEMS FOR TWH FROM POWER SUPPLY POINT.
3. TROLLEY WITH HOIST - CAPACITY 27/61 TONS WITH LIFT 15.0/10.0 M RESPECTIVELY.
4. HEADROOM FOR ITEM NO.03 SHALL NOT BE GREATER THAN 3700MM.
5. HOIST TWH-02 CAP 61 TONS LIFT 10.0M SHALL BE SUPPLIED WITH INTEGRATED HOIST MAINTENANCE PLATFORM.

Max Load to be Handled (kgs)	
ID FAN ROTOR	21000
ID FAN MOTOR	48500

REV	DATE	ALTERED	SAURABH KR	REV	DATE	ALTERED	SAURABH KR	REV	DATE	ALTERED	SAURABH KR
03	25.11.19	CHD & APPD	SHANKAR N.	02	19.08.19	CHD & APPD	SHANKAR N.	01	16.07.19	CHD & APPD	SHANKAR N.
ZONE			DRAWING IS REVISED TO UPDATE CUSTOMER COMMENTS.	ZONE			DRAWING IS REVISED TO UPDATE CUSTOMER COMMENTS.	ZONE			DRAWING IS REVISED TO UPDATE CUSTOMER COMMENTS.

NTPC DRG No: 9585-001-102-PVM-B-060 BHEL CUSTOMER Nos.: 1828, 1829, 1830

CUSTOMER PATRATU VIDYUT UTPADAN NIGAM LIMITED
(A Subsidiary of NTPC Ltd in Joint Venture with Jharkand Biji Vitran Nigam Ltd)

PROJECT PATRATU SUPER THERMAL POWER STATION
EXPANSION PHASE-1 3X800 MW-UNIT NO: 01,02 & 03.

BHARAT HEAVY ELECTRICALS LIMITED
BOILER PLANT UNIT, TIRUCHIRAPALLI-620014

DRN	NAME	SIGNATURE	DATE	TITLE
R S YADAV			25.05.19	ID FAN HANDLING ARRANGEMENT
SAURABH KR			25.05.19	
SHANKAR N.			25.05.19	
			25.05.19	

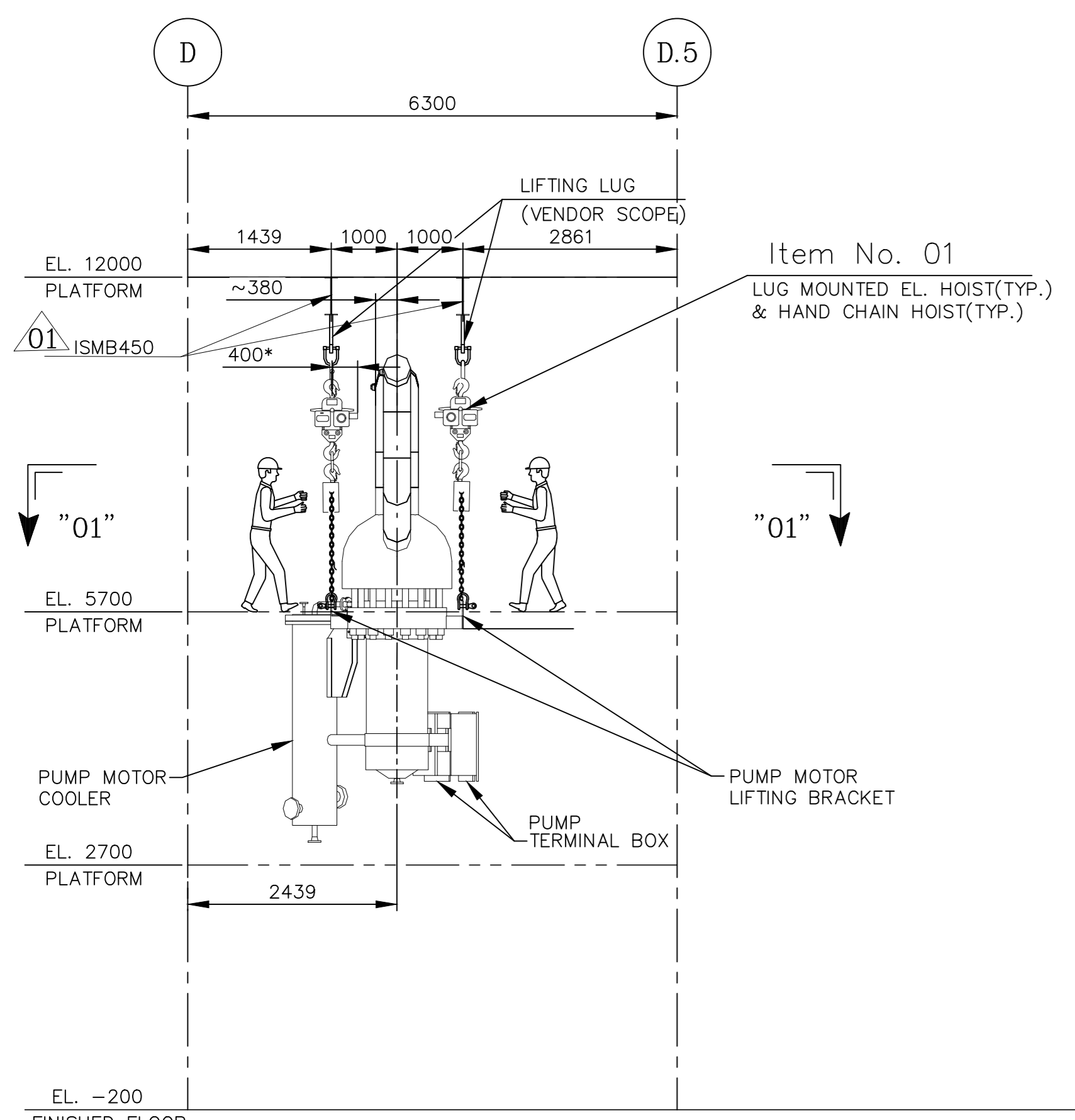
ALL DIMENSIONS IN MILLIMETRE DEPT. 129

PROJECTION SCALE: 1:100 / 1:160

DRAWING NO. 1-99-100-40918 REV. 03

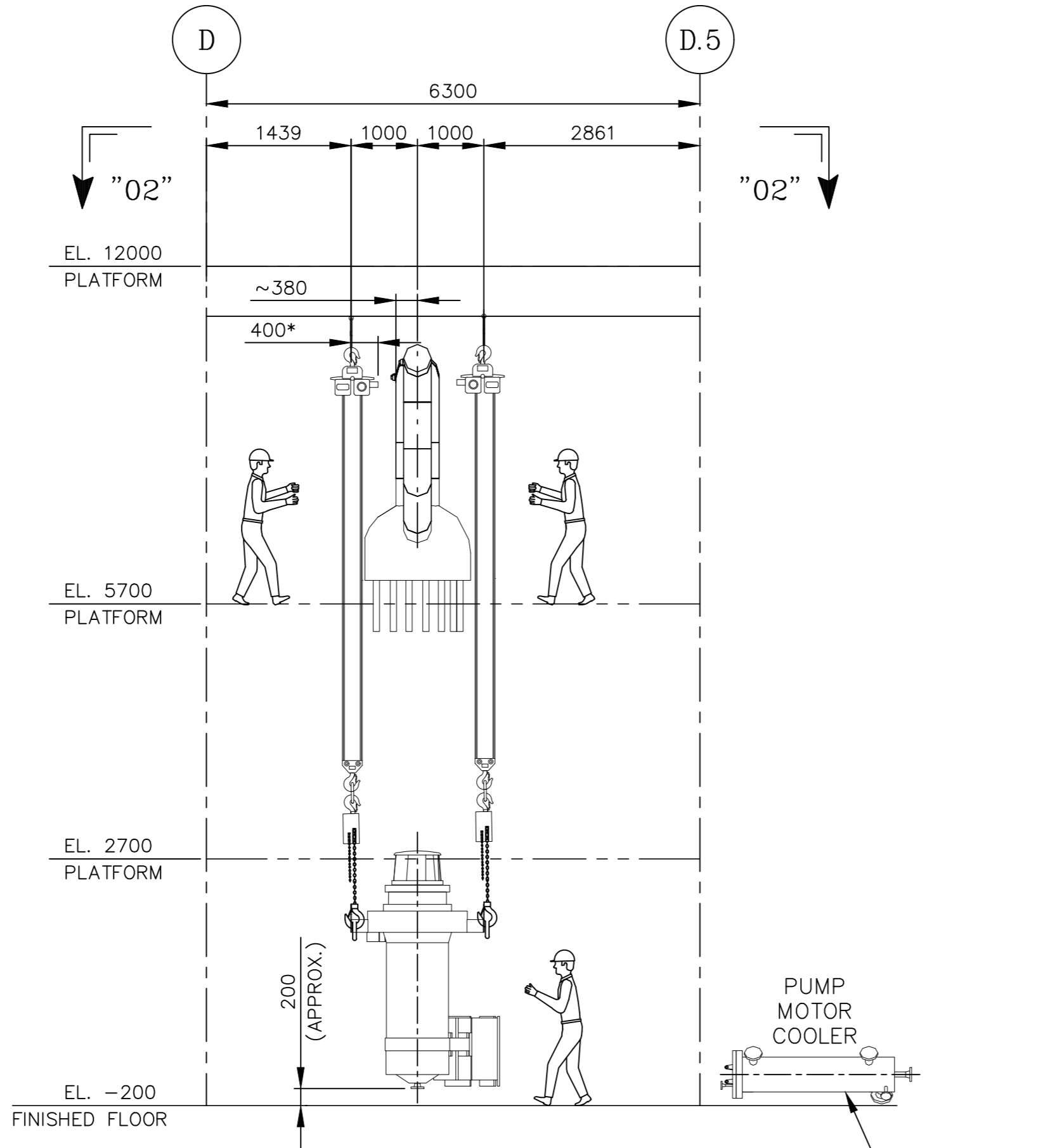
REV	DATE	ALTERED	SAURABH KR	REV	DATE	ALTERED	SAURABH KR	REV	DATE	ALTERED	SAURABH KR
03	25.11.19	CHD & APPD	SHANKAR N.	02	19.08.19	CHD & APPD	SHANKAR N.	01	16.07.19	CHD & APPD	SHANKAR N.
ZONE			DRAWING IS REVISED TO UPDATE CUSTOMER COMMENTS.	ZONE			DRAWING IS REVISED TO UPDATE CUSTOMER COMMENTS.	ZONE			DRAWING IS REVISED TO UPDATE CUSTOMER COMMENTS.

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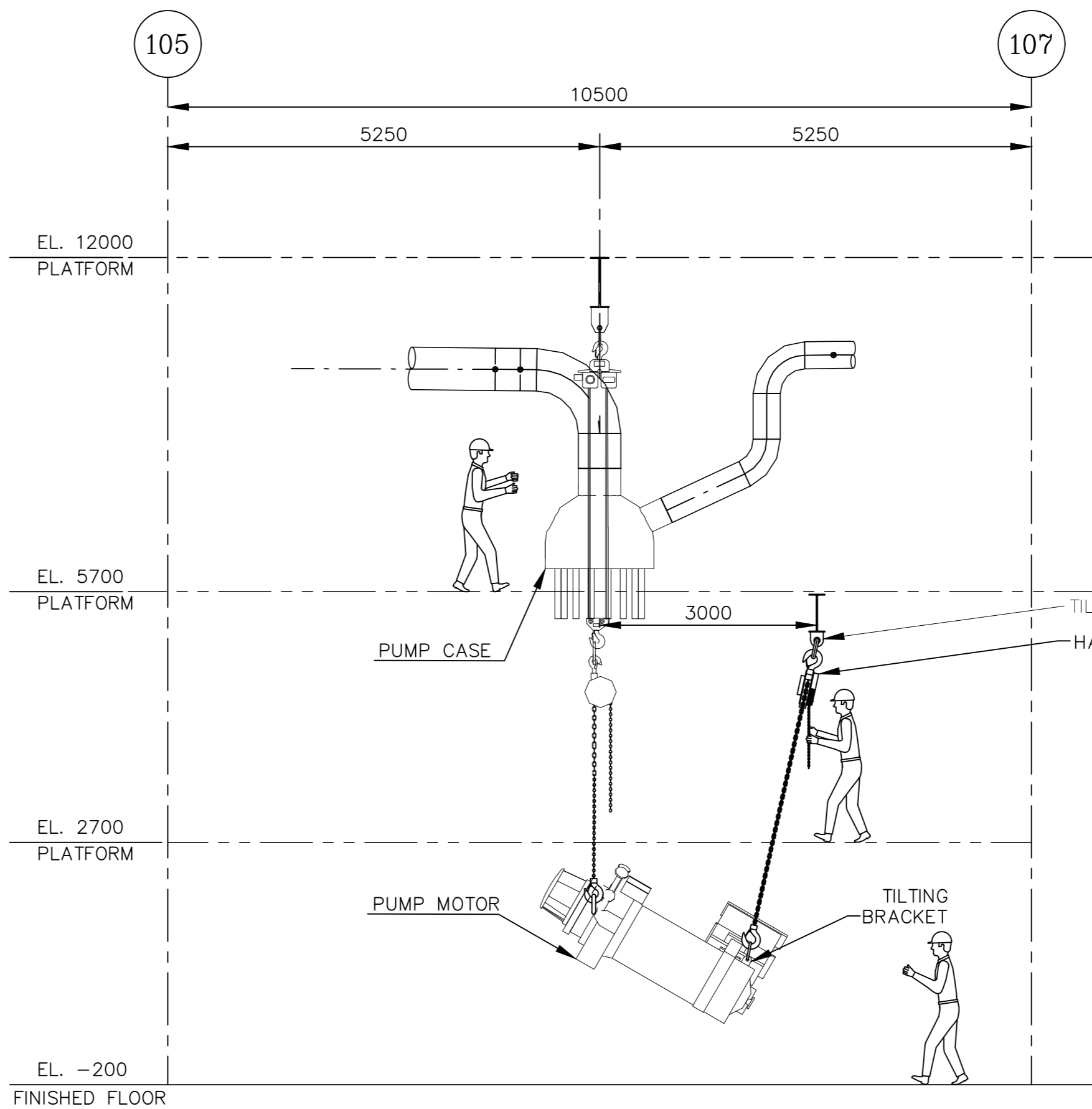
ELEVATION VIEW - STEP #1
(LOOKING NORTH)

- (1A). DISCONNECT POWER SUPPLY AND STARTER BEFORE COMMENCING ANY WORK ON MOTOR.
- (1B). DISCONNECT ALL THERMOCOUPLE AND DIAL THERMOMETER TO MOTOR.
- (1C). REMOVE PUMP MOTOR COOLER AND ALL PIPING ASSOCIATED WITH IT TO PREVENT DAMAGE TO IT AND TO MAKE CLEARANCE FOR REMOVAL OF MOTOR.



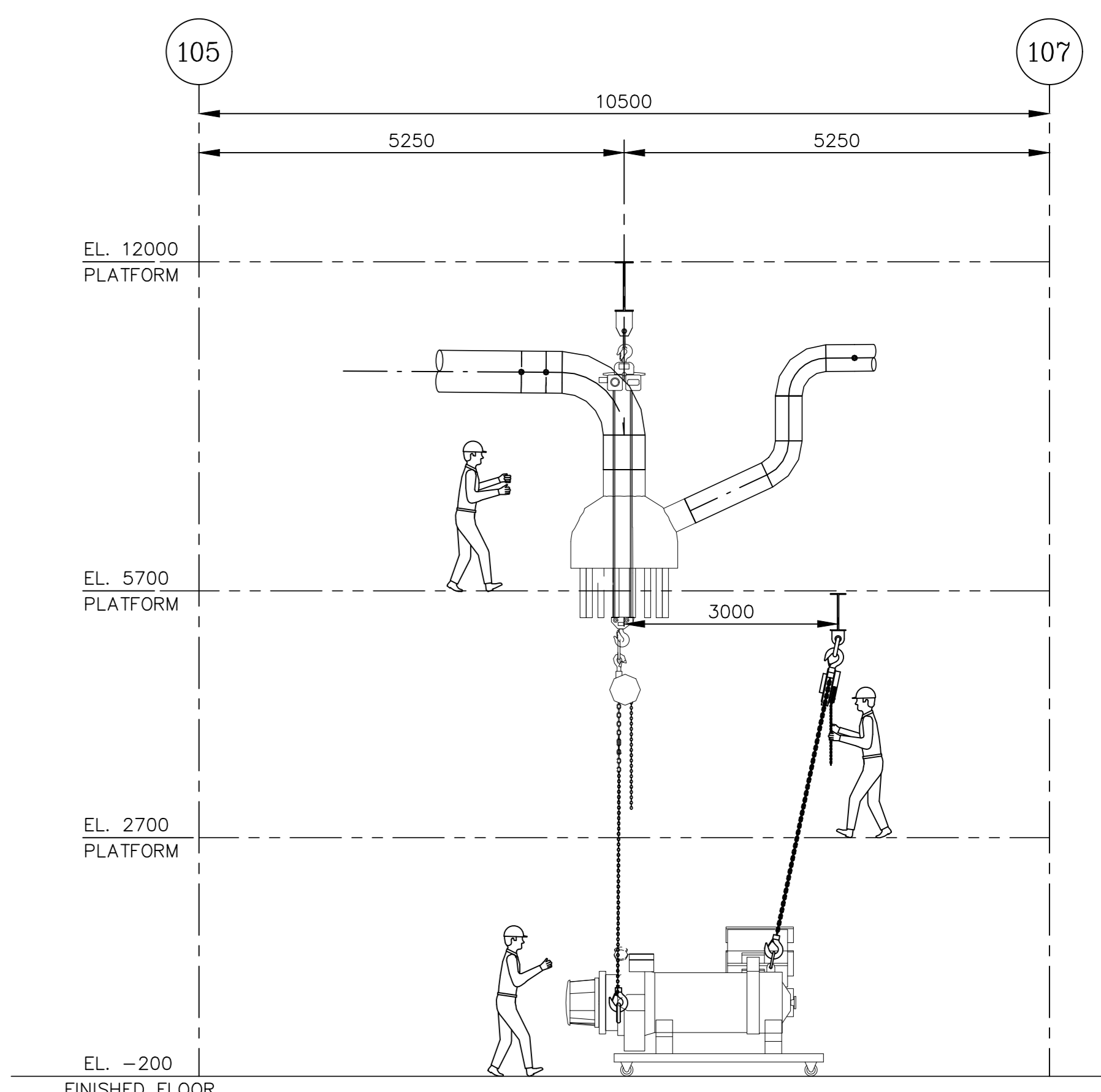
ELEVATION VIEW - STEP #2
(LOOKING NORTH)

- (2A). ATTACH 2 (TWO) SCREW PIN ANCHOR SHACKLES TO THE LIFTING BRACKETS ON THE MOTOR BODY TO ALLOW ATTACHMENT OF THE HOIST HOOKS.
- (2B). ATTACH 2 (TWO) HAND CHAIN HOISTS TO THE LIFTING LUGS AND SHACKLES ON LIFTING BRACKETS ON MOTOR BODY.
- (2C). MAKE HOIST AND CHAIN SLING TAUT, SO THAT THERE IS NO SLACK IN THEM. THEN REMOVE NUTS FROM PUMP CASE AND MOTOR BODY BOLTS. BEGIN TO LOWER THE PUMP MOTOR BODY BY THE CHAIN HOISTS SIMULTANEOUSLY AND VERY SLOWLY AS TO AVOID DAMAGING THE BOLT THREADS AND THE PUMP IMPELLER.
- (2D). AFTER THE PUMP IMPELLER HAS CLEARED THE PUMP CASE VOLUTE, CONTINUE TO LOWER THE MOTOR BODY STRAIGHT DOWN TO GRADE, STOPPING ~200MM ABOVE GRADE AS TO AVOID DAMAGING MOTOR TERMINAL BOXES.



ELEVATION VIEW - STEP #3
(LOOKING WEST)

- (3A). ATTACH 2 (TWO) SCREW PIN ANCHOR SHACKLES TO TILTING BRACKET TO ALLOW ATTACHMENT OF THE HOIST HOOK.
- (3B). CONTINUE TO LOWER THE MOTOR ASSEMBLY DOWN VERY SLOWLY, WHILE SIMULTANEOUSLY LIFTING THE LOWER PORTION, BY MEANS OF THE TILTING BRACKET TO A HORIZONTAL POSITION.



ELEVATION VIEW - STEP #4
(LOOKING WEST)

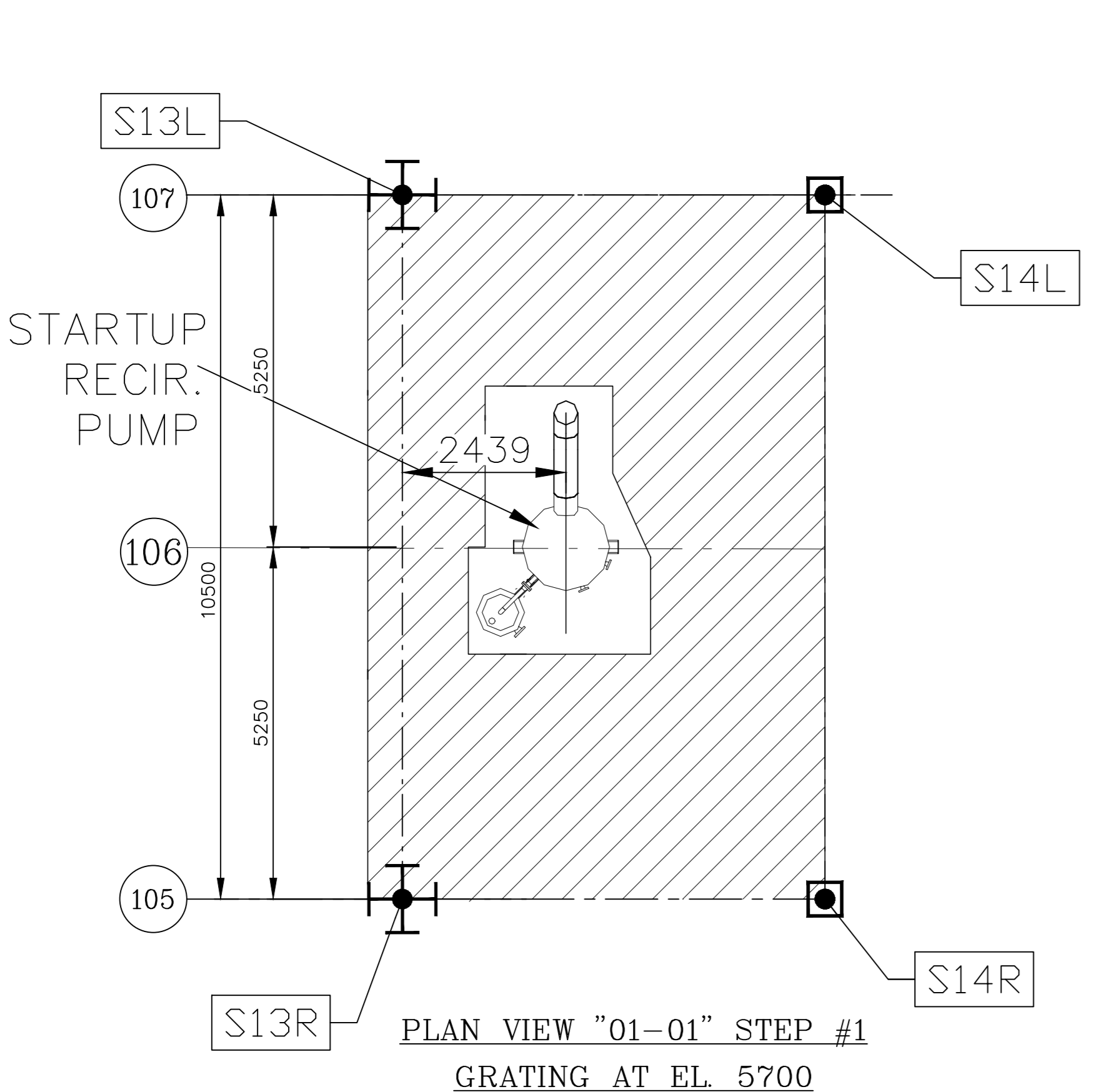
- (4A). IN A HORIZONTAL POSITION, LOWER THE MOTOR ASSEMBLY ONTO APPROVED DOLLIES AND SAFELY SECURE PUMP MOTOR BODY TO MAKE READY FOR LATERAL TRANSPORT.

NOTES: -

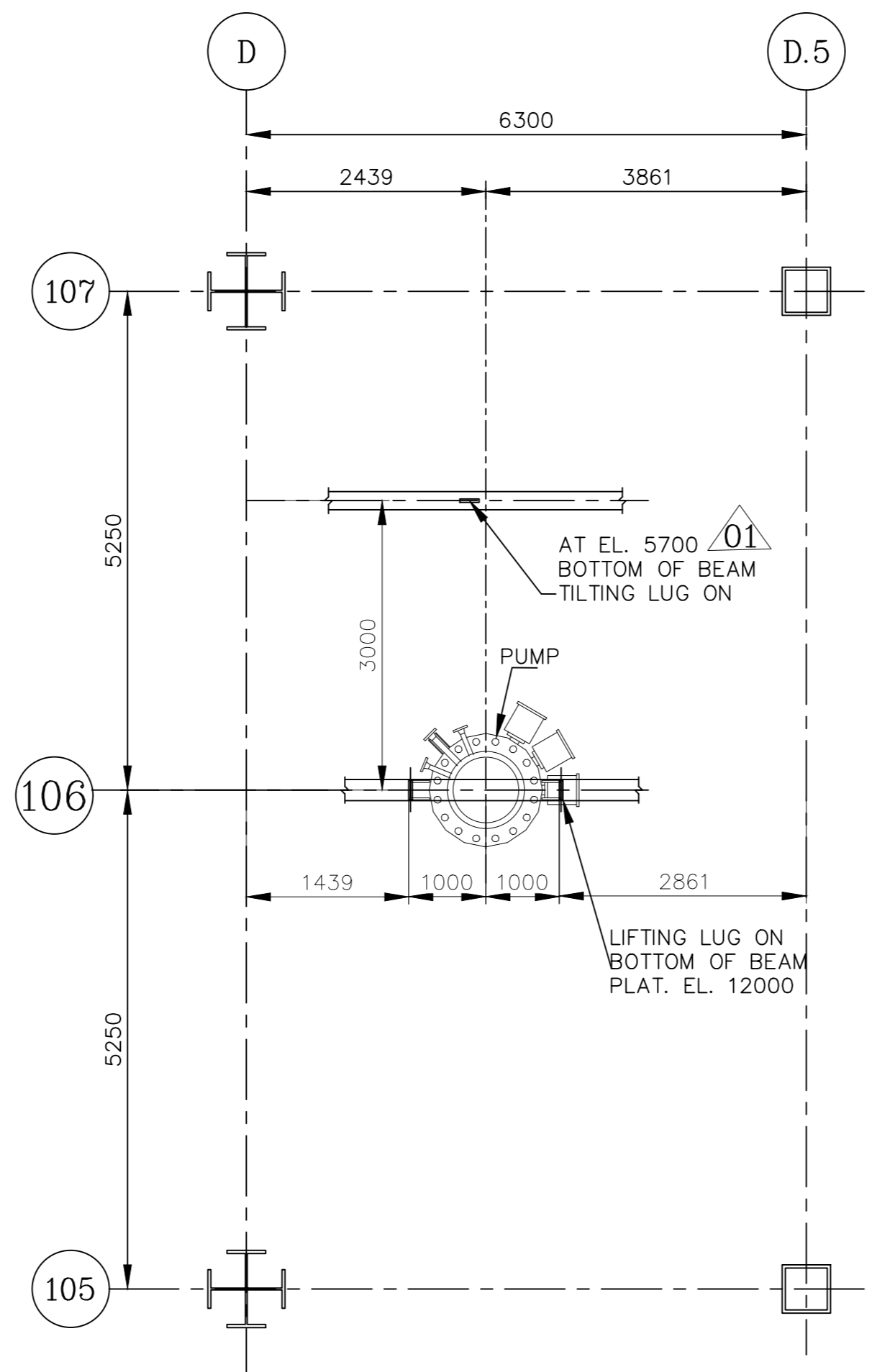
1. REFERENCE DRAWINGS
 - A. 0-00-022-77523-- GA OF BOILER FRONT ELEVATION(NTPC DRAWING NO 9585-001-102-PVM-B-0114)
 - B. 0-00-021-77544-- FLOOR PLAN AT EL. 5700(NTPC DRAWING NO 9585-001-102-PVM-B-038)
 - C. 0-00-022-77518-- GENERAL ARRANGEMENT SIDE ELEVATION- EE(NTPC DRAWING NO 9585-001-102-PVM-B-010)
2. ALL WORK DONE ON PUMP MOTOR SHOULD BE PERFORMED BY QUALIFIED PERSONNEL WHO HAVE READ AND UNDERSTOOD ALL INFORMATION PER MANUFACTURER'S REQUIREMENTS IN THE INSTALLATION, MAINTENANCE AND TECHNICAL DATA MANUAL.
3. POWER SUPPLY REQUIRED: POWER SUPPLY POINT 1M ABOVE OPERATING FLOOR 5700 AT COLUMN D SHALL BE PROVIDED BY PEM. (SUPPLY RATING: 415VAC, 50HZ.)
4. NOTES TO VENDOR
 - A. SUPPLIER'S SCOPE STARTS FROM BHEL-PEM POWER SUPPLY POINT.
 - B. VENDOR ITEMS :-
 - I. POWER SUPPLY CABLE FROM SUPPLY POINT TO THE EQUIPMENT.
 - II. SWITCH FUSE UNITS AND ALL ELECTRICAL ITEMS FROM POWER SUPPLY POINT
 - III. ELECTRICALLY OPERATED LUG MOUNTED HOIST WITH CHAIN PULLEY BLOCK CAPACITY : 16.0TONS; LIFT : 9.0 M. (LUG MOUNTED ELECTRIC HOIST CAPACITY : 16.0TONS; LIFT : 9.0 M. 2 Nos. per Pump & CHAIN PULLEY BLOCK CAPACITY (CPB) : 16.0TONS LIFT: 1.00M :2 Nos. per Pump) BOTH THE LUG MOUNTED HOISTS ARE TO BE INTERCONNECTED BY A SINGLE CONTROL PANEL FOR TANDEM OPERATION
 - IV. MANUAL HAND CHAIN HOIST; CAPACITY:16.0 TONS, LIFT: 5.5 M.
 - V. 3 NOS. LUGS DESIGNED TO SUPPORT LOADED HOIST AND SUITABLE TO BE WELDED AT SITE (2 FOR ELECTRIC HOIST & 1 FOR MANUAL HAND CHAIN HOIST.)
5. MAXIMUM LOAD TO BE HANDLED : 12.68 TONS (WITH TWO HOISTS)
6. PROVIDE CLEAR SPACE FOR LOWERING CIRCULATING PUMP MOTOR UPTO TO THE GROUND LEVEL AS PER THE SPACE EAR-MARKED WITHOUT ANY INTERFERENCE AND ENCROACHMENTS..
7. QUANTITY FURNISHED IN BILL OF MATERIAL IS FOR ONE BOILER ONLY.
8. ALL ELEVATION ARE WITH RESPECT TO EL.(0.00)m FINISHED GROUND FLOOR LEVEL OF TG BUILDING AND MILL BAY; WITH CORRESPONDS TO RL 375.5M above MSL.
9. DIMENSIONS MARKED WITH (*) SHOULD BE STRICTLY MAINTAINED.

COMPONENT WEIGHTS		PUMP DETAILS	
ITEM	WEIGHT (Kg.)		
PUMP CASE + MOTOR	15900	MAKE: TORISHIMA MODEL: HLAV250-395/1K	
PUMP MOTOR	11600		
PUMP COOLER	1080		
PUMP MOTOR + COOLER (MAXIMUM HANDLED WEIGHT)	12680		

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD.	DRAWING NUMBER	ITEM NO	MATERIAL CODE	UNIT	UNIT WEIGHT	QTY	ZONE
02		MANUAL HAND CHAIN HOIST CAPACITY 16T, LIFT 5.5M					L	150.000	1	
01		TWH - ELEC.; CAP:16T LIFT : 9.0M W/CPB					L	1800.000	2	



PLAN VIEW "01-01" STEP #1
GRATING AT EL. 5700



PLAN VIEW "02-02" STEP #2

REV	DATE	ALTERED BY
01	03.04.21	CHD & APPD : SRINIVAS A.

NTPC DRG. NO. 9578-001-102-PVM-B-067 BHEL CUSTOMER Nos.: 1828, 1829 & 1830

CUSTOMER PATRATU VIDYUT UTPADAN NIGAM LIMITED
(A Subsidiary of NTPC Ltd in joint Venture with Jharkhand Bijli Vitran Nigam Ltd)

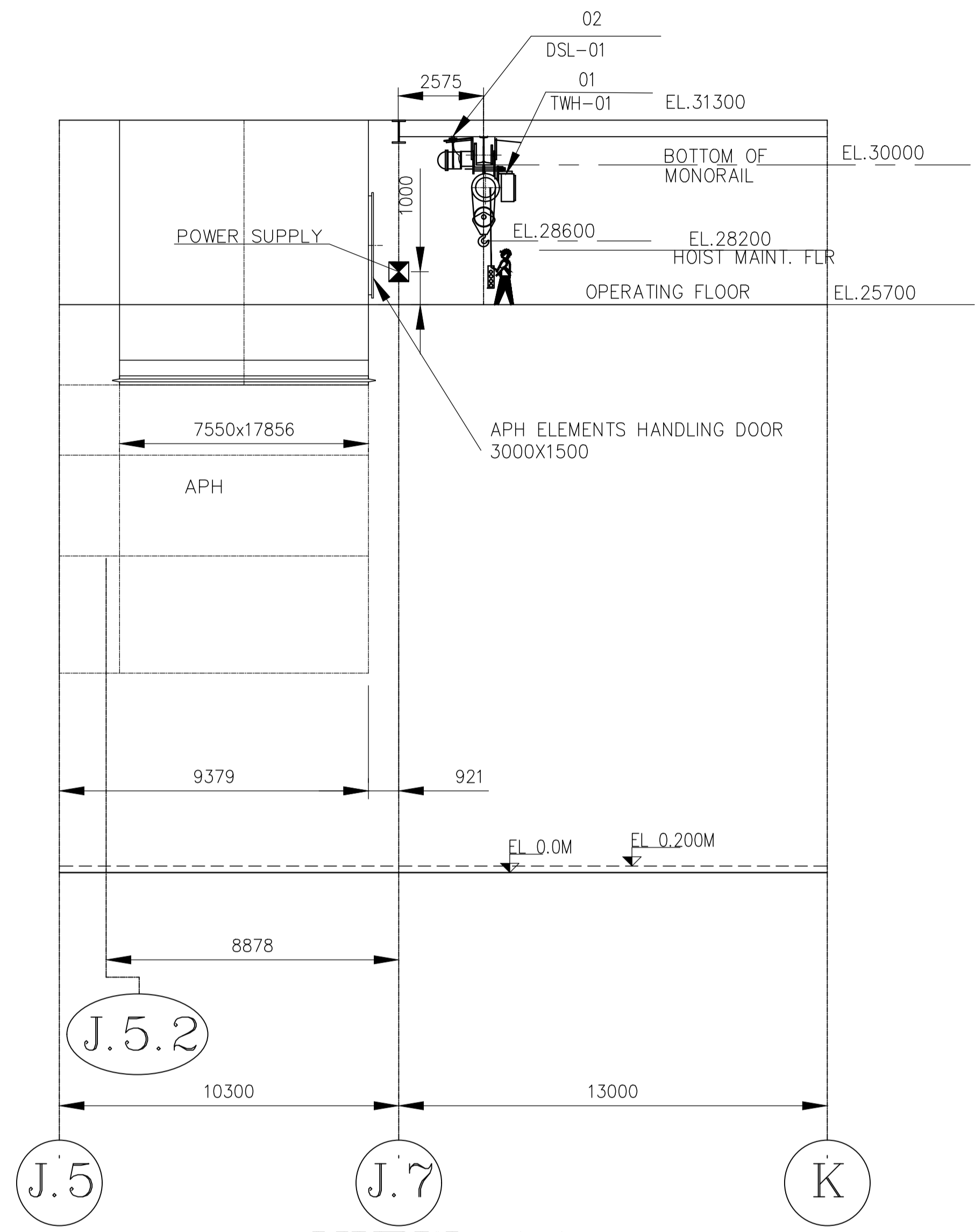
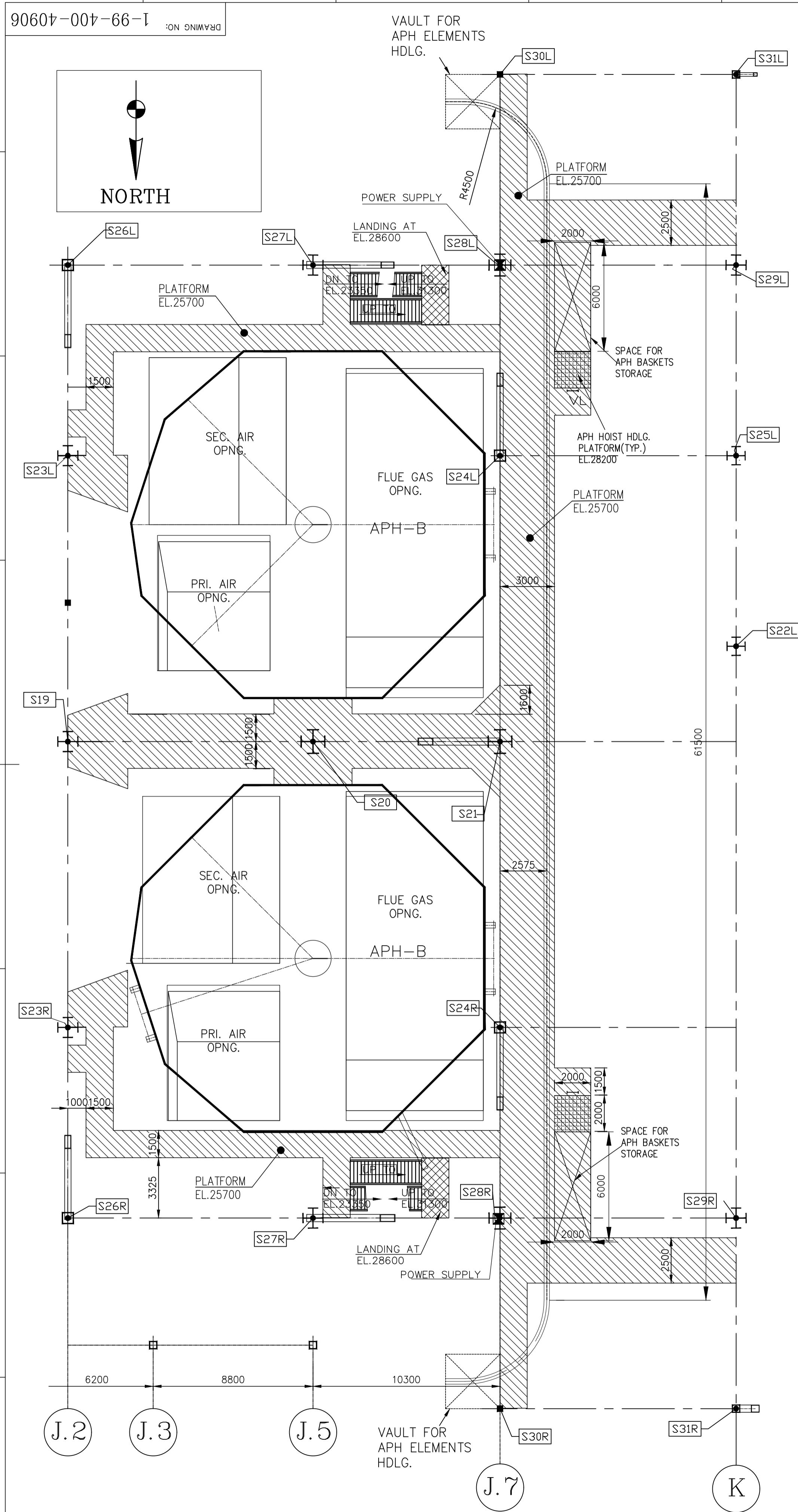
PROJECT PATRATU SUPER THERMAL POWER STATION
EXPANSION PHASE-1 3x800 MW-UNIT NO: 01,02 & 03.

BHARAT HEAVY ELECTRICALS LIMITED
BOILER PLANT UNIT, TIRUCHIRAPALLI-620014

NAME	SIGNATURE	DATE	TITLE
DRN PAWAN	-sd-	06.06.20	BOILER WATER RECIRC. PUMP MOTOR HANDLING ARRANGEMENT
CHD SAURABH	-sd-	30.06.20	
APD SRINIVAS ARUGULA	-sd-	30.06.20	

ALL DIMENSIONS IN MILLIMETRE

DRAWING NO. 0-99-300-40368 REV. 01



VIEW AA
SCALE 1:110

LEGEND

- A. TWH-01 – TWH FOR APH HANDLING CAP.2T;LIFT:29.000M.
- B. DSL-01 –DSL FOR APH HANDLING – CABLE TROLLEY TYPE–LEN. 78.0M.
- C. MR-01 – MONORAIL LENGTH :78.00M– 1 No.

NOTES:-

- A. REFERENCE DRAWINGS:
 - 01. GENERAL ARRANGEMENT DUCT LAYOUT– GAS DUCT FROM ECO TO APH 0-00-020-77539
 - 02. GA OF BOILER (SECTIONAL SIDE ELEVATION) 0-00-022-77518
 - 03. FLOOR PLAN EL.23500,25000,26300 0-00-022-77548
 - 04. GENERAL ARRANGEMENT OF AIR PREHEATER 35 VIMT 2000(2300)-72' PA1-52-220-003136
- B. MONORAIL & MONORAIL SUPPORTS ARE TO BE RELEASED BY SUPPORTING STRUCTURES
- C. AIR HEATER ELEMENTS HANDLING SPACE ARE TO BE CLEARED UP TO GROUND LEVEL
- D. DIMENSIONS ARE TAKEN FROM ABOVE DRAWINGS
- E. SIZE AND T O S ELEVATION FOR MONORAIL IS TO BE FURNISHED BY SUPPORTING STRUCTURES
- F. LENGTH OF MONORAIL
LENGTH OF MONORAIL (MR-01) : 78.0M; Qty : 1 No.
- G. QUANTITY INDICATED IN THE B O M IS FOR ONE BOILER ONLY.
- H. MAXIMUM WEIGHT OF ELEMENT : 650 KG
- I. HANDLING ARRANGEMENT FOR REMOVING THE APH ELEMENTS FROM THE AIR PREHEATER SHALL BE PROVIDED BY BAP/RANIPET. BHEL/TRICHY SCOPE IS TO HANDLE THE ELEMENTS FROM 25.700M FLOOR TO GROUND LEVEL ONLY.
- J. ALL ELEVATIONS ARE WITH RESPECT TO EL 0.00M WHICH CORRESPONDS TO RL +377.5M ABOVE MSL

NOTES TO PEM / DELHI

- 1. POWER SUPPLY POINT TO BE PROVIDED AT ONE METER ABOVE 25.700M FLOOR
- 2. SUPPLY POINT AT COLUMN-S30 R/L
- 3. POWER SUPPLY REQUIRED RATING : 5 KW;415V AC; 3 PHASE; 50Hz.

NOTES TO VENDORS

SUPPLIER'S SCOPE STARTS AT PEM-BHEL'S POWER SUPPLY POINT.

VENDOR ITEMS

- A. FIXED POWER CABLE AND TRAILING CABLE
- B. DSL TRAILING CABLE SYSTEM- CABLE TROLLEY WITH "Tee" TRACK-COMplete SET.
- C. SWITCH FUSE UNITS AND ALL ELETRICAL ITEMS FOR TWH FROM POWER SUPPLY POINT
- D. TROLLEY WITH HOIST – CAPACITY 2 TONS; LIFT 29.00MTRS.

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	DI	QUANTITY	OS	ZONE
02		DSL-CABLE TROLLEY TYPE. LENGTH : 78.00M.								400.000		
										1		
01		TWH – ELEC; CAP:2T LIFT : 29.0M.								800.000		
										1		

NTPC DRG No: 9578-101-102-PVM-B-065 BHEL CUSTOMER Nos.: 1828,1829,1830
 CUSTOMER PATRATU VIDYUT UTPADAN NIGAM LIMITED
 (A Subsidiary of NTPC Ltd in Joint Venture with Jharkand Biji Vitran Nigam Ltd)

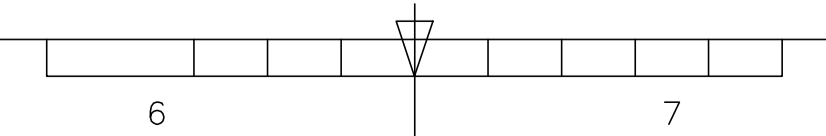
PROJECT PATRATU SUPER THERMAL POWER STATION
 EXPANSION PHASE-1 3X800 MW-UNIT NO: 01,02 & 03.

BHARAT HEAVY ELECTRICALS LIMITED
 BOILER PLANT UNIT; TIRUCHIRAPALLI-620014
 355-029

NO	NAME	SIGNATURE	DATE	TITLE
DRN	R S YADAV		05.03.19	
CHD	SAURABH KR		05.03.19	APH HANDLING ARRANGEMENT
APD	N.FAZIL		05.03.19	

ALL DIMENSIONS IN MILLIMETRE DEPT-129
 DRAWING NO. 1-99-400-40906
 SCALE: 1:150
 1:110

REV	DATE	ALTERED
01		CHD & APPD :





PATRATU SUPER THERMAL POWER STATION 3x800MW (1828-30)

Handling procedure for APH heating element
(from inside of APH to APH operating floor)

The Air Preheater is provided with multi-layers of heating elements. The Cold End elements are basketed for easy removal and replacement from the sides through removal door. Hot End baskets are removable from the top through basket removal door provided in gas inlet duct.

The Air Preheater is provided with a hand-operated Pulley Block with Trolley (Manual Hoist) for handling of hot end and hot intermediate baskets from inside of the Air Preheater to the Air Preheater operating floor.

Replacement procedure for Cold End baskets :

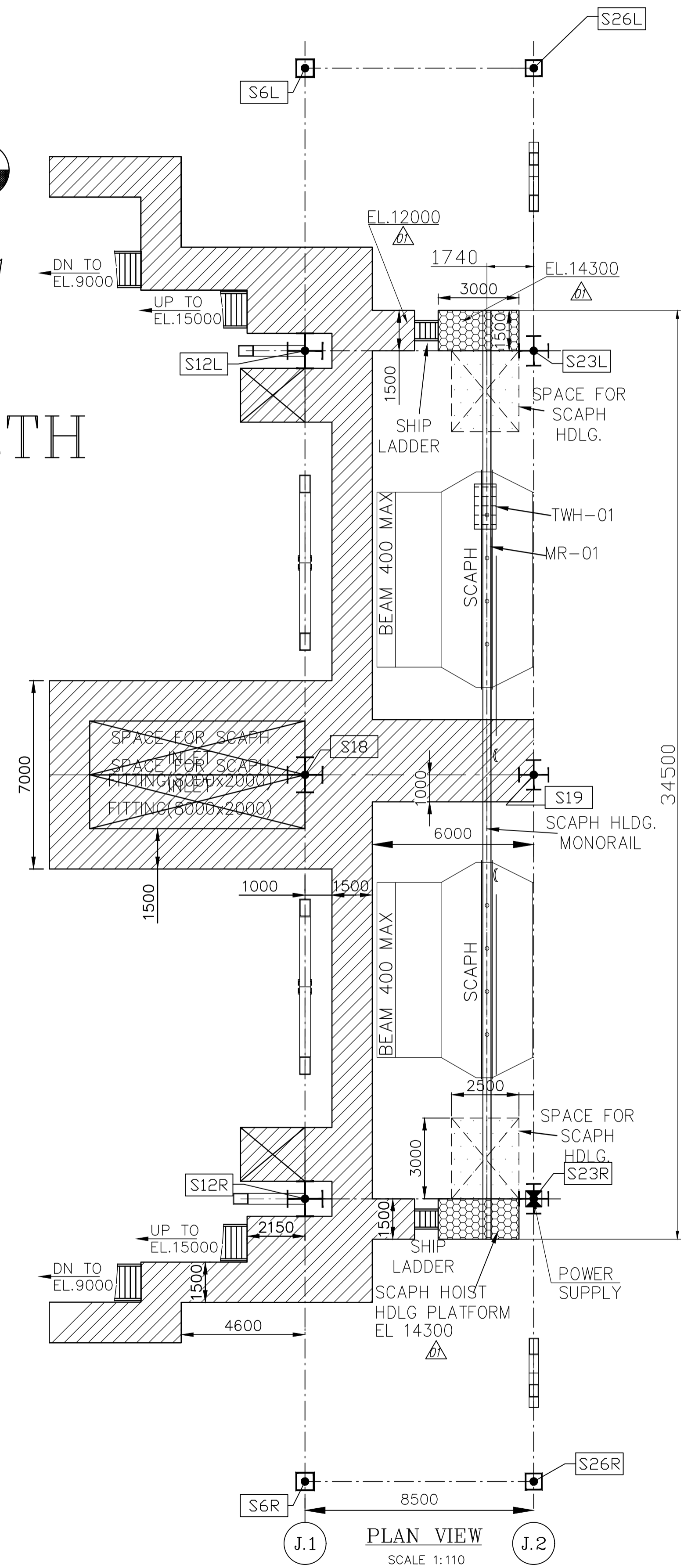
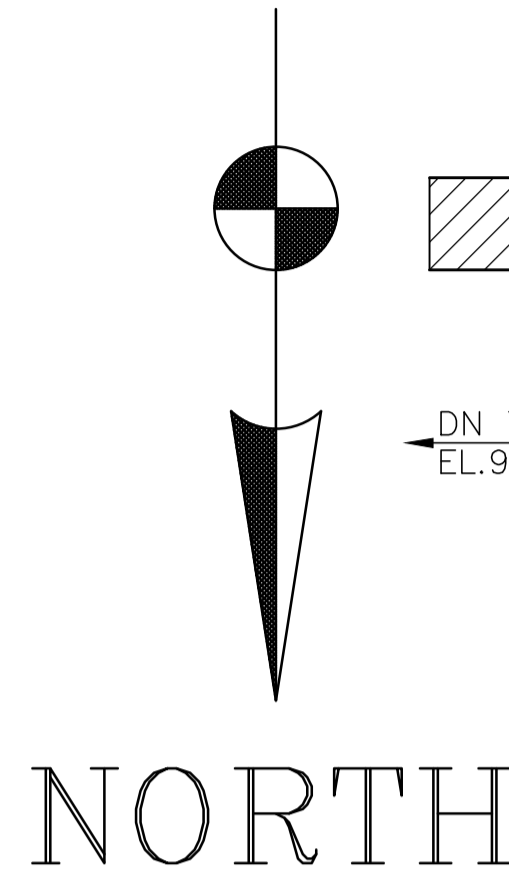
01. Remove cold end basket removal door from housing panel as well as from the rotor segment.
02. Withdraw the cold end baskets from sector.
03. Insert the new baskets.
04. Place the covers into the rotor shell.
05. Continue this procedure for the remaining sectors.

Replacement procedure for Hot End/Hot Intermediate baskets :

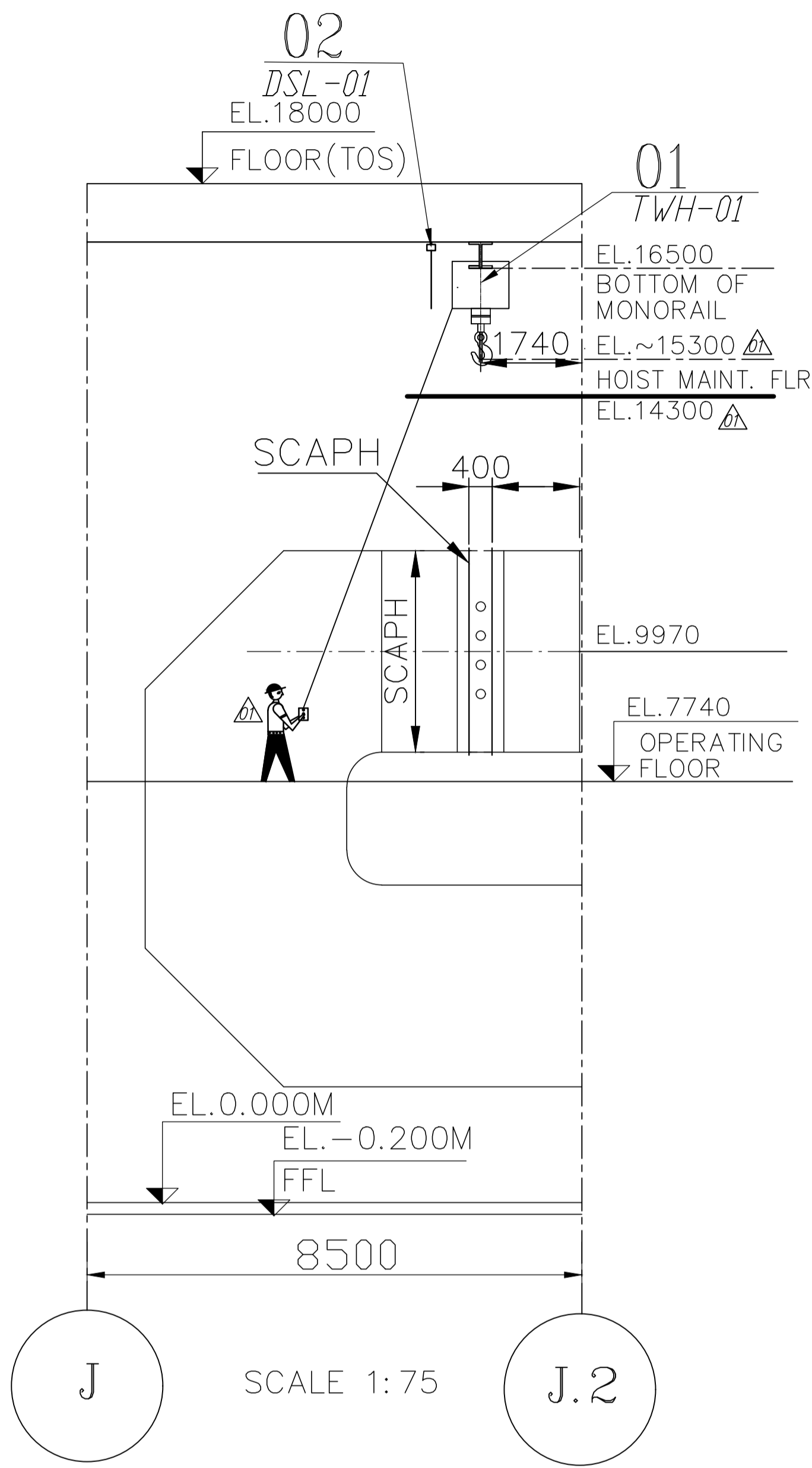
01. Open the hot end basket removal door provided in the Gas Inlet duct.
02. Remove the hot end radial seals.
03. Remove the hot end baskets through basket removal door using Mono block with chain pulley provided with a service beam (Refer service beam drawing).
04. The handling arrangement from Air preheater floor to ground floor is provided with a power operated chain pulley block (by BHEL Trichy).
05. Assemble the new basket in the sector.
06. Continue this procedure for the remaining sectors.

Note :

When removing the baskets completely, remove the baskets from diametrically opposite sectors to prevent excess unbalance of the rotor.



PLAN VIEW
SCALE 1:110



SCALE 1:75

NOTE - GENERAL:

01. REFERENCE DRAWINGS:
 - A. GA OF BOILER SEC. SIDE ELEVATION SEC E-E:0-00-022-77518(NTPC DRG NO 9585-001-102-PVM-B-010).
 - B. GA DUCT LAYOUT - COLD SECONDARY AIR DUCTING:0-00-020-77534(NTPC DRG NO 9585-001-102-PVM-F-010B).
 - C. FLOOR PLAN ARRGT. AT EL.7500:0-00-021-77545(NTPC DRG NO 9585-001-102-PVM-B-039).
 - D. FLOOR PLAN ARRGT. AT EL.12000:0-00-021-77546(NTPC DRG NO 9585-001-102-PVM-B-040).
02. SCAPH SHALL BE HANDLED IN BLOCKS.
03. HANDLING SPACE IS TO BE CLEARED UP TO 0.00M LEVEL FROM 15.3 M WITHOUT ANY INTERFERENCE/ENCROACHMENTS.
04. REFER LAYOUT DRAWING FOR ARRANGEMENT OF HOIST MAINTENANCE/ACCESS PLATFORM.
- 05 ALL ELEVATIONS ARE WITH RESPECT TO EL. (+)0.00M WHICH CORRESPONDS RL.(+)375.5 M ABOVE MSL

LEGEND

- A. TWH-01 - TROLLEY WITH HOIST FOR SCAPH HANDLING CAP.2.5T;LIFT:15.5 M- 1 NO.
- B. DSL-01 -DSL FOR SCAPH HANDLING - CABLE TROLLEY TYPE-LEN. 34.500M- 1 NO.
- C. MR-01 -MONORAIL FOR SCAPH HANDLING LENGTH :34.500M.- 1 No.

NOTES TO PEM / DELHI

- A. POWER SUPPLY POINTS ARE TO BE PROVIDED AT 1.000M ABOVE OPERATING FLOOR 7740 AT COLUMN S23R.
- B. POWER SUPPLY REQD. RATING 5KVA; 415V AC; 3 PHASE, 50Hz.

NOTES TO VENDORS:

- A. SUPPLIER'S SCOPE STARTS AT POWER SUPPLY POINT.

VENDOR ITEMS:

- A. FIXED POWER CABLE & TRAILING CABLE SYSTEM.
- B. DSL TRAILING CABLE SYSTEM. CABLE TROLLEY & "Tee" TRACK TYPE -COMPLETE.
- C. SWITCH FUSE UNITS & ALL ELECTRICAL ITEMS FOR TWH FROM CUSTOMER'S POWER SUPPLY POINT.
- D. TROLLEY WITH HOIST - CAP 2.5 TONS; LIFT -15.5 M

Max Load to be Handled (kgs)	
SCAPH WEIGHT	1800

VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT(Kg)	OS	ZONE
02		DSL-CABLE TROLLEY TYPE. LENGTH : 34.500M.						ST	300.000		
		TWH - ELEC; CAP:2.5T						ST	800.000		
01		LIFT : 15.5 M.						ST	1		

BHEL CUSTOMER No. : 1828

NTPC DRG No: 9578-101-102-PVM-B-066		BHEL CUSTOMER Nos.: 1828,1829,1830	
CUSTOMER PATRATU VIDYUT UTPADAN NIGAM LIMITED (A Subsidiary of NTPC Ltd in Joint Venture with Jharkand Biji Vitran Nigam Ltd)			
PROJECT PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-1 3X800 MW-UNIT NO: 01,02 & 03.			
		BHARAT HEAVY ELECTRICALS LIMITED BOILER PLANT UNIT; TIRUCHIRAPALLI-620014 355-029	
REV	DATE	ALTERED	SAURABH KR
01	13.05.20	CHD & APPD	:SHANKAR N.
ZONE DRAWING IS REVISED TO UPDATE CUSTOMER COMMENTS.			
DRN	NAME	SIGNATURE	DATE
CHD	SAURABH KR		13.09.19
APD	SHANKAR N.		14.09.19
ALL DIMENSIONS IN MILLIMETRE		DEPT.	129
PROJECTION	SCALE:	DRAWING NO.	
	1:75 1:110	1-99-400-40907	
			REV. 01

DATA SHEET FOR HOISTS

Project :

CUST NO:

Sl. No.	APPLICATION	FD & PA FAN -MOTOR HANDLING	FD & PA FAN -ROTOR HANDLING	ID FAN ROTOR HANDLING	ID FAN MOTOR HANDLING	WATER CIRCULATING PUMP HANDLING		APH Elements handling	SCAPH HANDLING	FOPH HANDLING	LTSH & ECO. Coil handling			
						Electric	Manual				Electric	Manual CPB	Manual TWH	Ratchet Lever
1.0	Operation	Electric	Electric	Electric	Electric	Electric	Manual	Electric	Electric	Electric	Electric	Manual CPB	Manual TWH	Ratchet Lever
2.0	VENDOR NAME													
3.0	MODEL No.													
4.0	TOTAL No. OFF per BOILER													
5.0	CAPACITY (T)													
6.0	LIFT (MTR)													
7.0	HEAD ROOM(MM)													
8.0	HOIST MOTOR RATING													
9.0	C.T. MOTOR RATING													
10.0	POWER SUPPLY RATING FOR EQPT.													
11.0	POWER SUPPLY RATING FOR CONTROLS													
12.0	DSL SYSTEM TYPE													
13.0	TRAVEL LENGTH+ FIXED CABLE (MTR)													
14.0	SWITCH FUSE UNIT													
15.0	FUSE RATING FOR HOIST MOTOR													
16.0	FUSE RATING FOR CT MOTOR													

Vendor's Name
Signature Seal
with date

PAINING PROCEDURE-PATRATU PROJECT

Surface Preparation and Surface Profile: SSPC-SP3/ Power Tool Cleaning

Primer Coat

Paint: Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744; DFT= 30µm per coat.

No of coats: 2 coat



Finish Coat

Paint: Synthetic Enamel paint (Long Oil Alkyd) to IS 2932: DFT= 20µm per coat

No of Coats: 2 Coat

Final Shade: Golden yellow for Under hung crane, Chain Pulley Block, Ratchet Lever and Trolley with hoist. Black shade for Hook.

Total DFT (Min): 100 µm

	ITEM (MATERIAL, CLASS, GRADE, RATING, RANGE, SIZE ETC)			STANDARD QUALITY PLAN				QP NO.	0000-999-QOM -S-053		REVIEWED BY:	APPROVED BY: 		
								REV. NO.	00		H S MAURYA			
				CONFORMING TO CODE: IS: 3938				DATE	05.04.2013		S SINGH		Approved I. Gowar Dt.....	
								PAGE	Page 1 of 4		M K ASTHANA			
								VALID UPTO	04.04.2016		RAJEEV GARG			
SN	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORM	Format of RECORD		AGENCY	REMARKS		
					M	C/N					M C N			
1.	2.	3.	4.	5.	6.		7.	8.	9.	D	10.	11.		



A. RAW MATERIAL INSPECTION:														
A.1	MS PLATES FOR STRUCTURAL MEMBERS & FABRICATED ROPE DRUM	CHEMICAL, & MECHANICAL PROPERTIES	MAJOR	CHEM & MECH	1 SAMPLE/ HEAT		MATERIAL SPECIFICATION AS PER APPROVED DATA SHEETS/ DRAWINGS		MTC	√	P	V	V	IN THE ABSENCE OF CORRELATED TC CHECK TESTING SHALL BE DONE
		ULTRASONIC TEST OF PLATES	MAJOR	NDT	100%	100%	ASTM A-435	ASTM A-435	IR	√	P	V	V	ONLY FOR THICKNESS ≥ 25 MM.
A.2	PIPE FOR ROPE DRUM (IF SEAM LESS PIPE IS USED)	CHEMICAL, MECHANICAL PROPERTIES & ACID ETCHING	MAJOR	CHEM & MECH	1 SAMPLE / HEAT/ SIZE		MATERIAL SPECIFICATION AS PER APPROVED DATA SHEETS/ DRAWINGS.		MTC	√	P	V	V	
		ULTRASONIC TEST FOR SEAMLESS PIPE	MAJOR	UT	100%	100%	ASTM E-213	ASTM E-213	IR	√	P	V	V	
A.3	FORGINGS/ ROLLED BARS FOR GEARS, PINIONS, WHEELS, AND BRAKE DRUM	CHEMICAL, & MECHANICAL PROPERTIES	MAJOR	CHEM & MECH	1 SAMPLE/ HEAT/ SIZE/ HT BATCH		MATERIAL SPECIFICATION AS PER APPROVED DATA SHEETS /DRAWINGS		MTC	√	P	V	V	IN THE ABSENCE OF CORRELATED TC CHECK TESTING SHALL BE DONE.
		ULTRASONIC TEST	MAJOR	NDT	100%	100%	ASTM A-388	REFER NOTE - 1	IR	√	P	V	V	ONLY FOR DIA ≥ 40 MM.
B. BOUGHT OUT ITEMS :														
B.1	HOOKS	MAKE & IDENTIFICATION	MAJOR	VISUAL	100%	100%	HOOK TC FROM COMPETANT AUTHORITY/ APPROVED MAKES		TC	√	P	V	V	REFER ANNEX-I FOR MAKE
		CHEMICAL, & MECHANICAL PROPERTIES	MAJOR	CHEM & MECH	1 SAMPLE/ HEAT/ HT BATCH		MATERIAL SPECIFICATION AS PER APPROVED DATA SHEETS /DRAWINGS		MTC	√	P	V	V	
		PROOF LOAD TEST	MAJOR	MECHANICAL	100%	100%	IS:15560/ IS: 5749	IS:15560/ IS: 5749	IR	√	P	V	V	
		INTERNAL DEFECTS BEFORE & AFTER PROOF LOAD TEST	CRITICAL	NDT	100%	100%	ASTM - A 388	REFER NOTE - 1	IR	√	P	V	V	ON SHANK PORTION ONLY.
		DPT TEST BEFORE & AFTER PROOF LOAD TEST	CRITICAL	NDT	100%	100%	ASTM E-165	NO DEFECT	IR	√	P	V	V	
B.2	WIRE ROPES	MAKE & IDENTIFICATION	MAJOR	VISUAL	100%	100%	APPROVED MAKES			√	P	V	V	REFER ANNEX-I FOR MAKE
		DIMENSION & BREAKING STRENGTH	MAJOR	REVIEW	100% (EACH BATCH)		IS: 2266 / APPROVED DATA SHEET		MTC	√	P	V	V	
B.3	MOTOR	MAKE/ TYPE/ RATING	MAJOR	VISUAL	100%	100%	NTPC APPROVED DRAWING/ DATA SHEET/ NTPC SPECIFICATION / IS:325		IR		P	V	V	REFER ANNEX-I FOR MAKE
		ROUTINE TESTS	MAJOR	REVIEW	100%	100%			MTC		V	V	V	
B.4	GEAR BOX	MAKE/ TYPE/ RATING	MAJOR	VISUAL,	100%	100%	NTPC APPROVED DRAWING/ DATA SHEET/ NTPC SPECIFICATION / APPROVED MAKES		IR	√	P	V	V	REFER ANNEX-I FOR MAKE
		BACKLASH, TOOTH CONTACT & REDUCTION RATIO	MAJOR	REVIEW	100%	100%			MTC	√	V	V	V	
		NO LOAD RUN TEST (NOISE LEVEL, TEMP RISE & OIL LEAKAGE)	MAJOR	REVIEW	100%	100%	NTPC APPROVED DRAWING/ DATA SHEET/ NTPC SPECIFICATION/ NO LEAKAGE		MTC	√	V	V	V	

LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
 ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUM "N" AS "W"
Note: # NTPC Inspection Engineer to check, approval date/ revision no. of reference documents at the time of inspection

SN	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORM	Format of RECORD		AGENCY			REMARKS
					M	C/N			M	C	N			
1.	2.	3.	4.	5.	6.		7.	8.	9.	D	10.			11.
B.5	BRAKES-EM/ EHT	MAKE/ TYPE/ RATING ROUTINE TESTS	MAJOR	VISUAL, REVIEW	100%	100%	NTPC APPROVED DRAWING/ NTPC SPECIFICATION/ IS. 3938	IR MTC	√ √	P V	V V	V V	REFER ANNEX-I FOR MAKE	
B.6	LIMIT SWITCH/ OVERLOAD RELAY/ SFU / CONTACTOR/ CONTROL TRANSFORMER/ PUSH BUTTON/ TERMINAL BLOCK/ INDICATING LAMP/ SELECTOR SWITCH	MAKE/ TYPE/ RATING	MAJOR	VISUAL	100%	100%	APPROVED DRAWING/ NTPC TECH. SPECS/ APPROVED MAKES	IR	√	P	V	V	REFER ANNEX-I FOR MAKE	
B.7	CABLES - LT POWER/ CONTROL/ EPR FLEXIBLE TRAILING	MAKE/ TYPE/ RATING ROUTINE & ACCEPTANCE TESTS	MAJOR	VISUAL REVIEW	100%	100%	NTPC APPROVED DRAWING/ NTPC SPECIFICATION/ IS:1554/ IS:9968/ IS: 4289/ IS:7098	IR MTC	√ √	P V	V V	V V	REFER ANNEX-I FOR MAKE	
B.8	VVFD (AS APPLICABLE)	MAKE/ TYPE/ RATING ROUTINE & ACCEPTANCE TESTS	MAJOR	VISUAL REVIEW	100%	100%	NTPC APPROVED DRAWING/ NTPC SPECIFICATION/ APPROVED MAKES	IR MTC	√ √	P V	V V	V V	REFER ANNEX-I FOR MAKE	
B.9	CONTROL PANEL & PENDENT STATION HOUSING/ BOX.	MAKE/ TYPE/ RATING SHEET/ GLAND PLATE MATERIAL & THK, DOOR ALIGNMENT, PAINT SHADE/ THK (MIN 70 μ)/ ADHESION.	MAJOR	VISUAL VISUAL	100%	100%	NTPC APPROVED DRAWING/ NTPC SPECIFICATION/ APPROVED MAKES	IR IR	√	P	V	V	REFER ANNEX-I FOR MAKE	
C IN PROCESS INSPECTION:														
C.1	ROLLING & WELDING OF ROPE DRUM (FABRICATED)	WPS, PQR & WPQ	MAJOR	REVIEW	100%	100%	APPROVED WPS, ASME SEC-IX	ASME SEC-IX	QW-481-484	√	P	V	V	REFER NOTE-2
		ROLLING & WELD EDGE PREPARATION	MAJOR	VISUAL & MEASURE	100%	100%	MANUFACTURING DRAWING/ WPS	APPROVED	IR		P	V	-	
		POST WELD HEAT TREATMENT	MAJOR	REVIEW	100%	100%	ASME-SEC-VIII DIV 1 (UCS-56)		SR CHART	√	P	V	V	SR CHART REVIEW BY NTPC DURING FINAL INSPECTION.
		NDT TEST ON WELD	MAJOR	DPT	100%	100%	ASME SEC - V	ASME SECTION - VIII, DIV.-I, APP. 6 / 8	DPT REPORT	√	P	V	V	
		RADIOGRAPHY OF BUTT WELD JOINTS	CRITICAL	RT	100%	100%	ASME -SEC-V	ASME -SEC-VIII DIVISION - I, UW 51 & UW-52	RT FILMS & REPORT	√	P	V	V	FILM REVIEW BY NTPC DURING THE FINAL INSPECTION. CHP
C.2	ROPE DRUM, WHEELS, PULLEYS & HOOK SHANK AFTER MACHINING	VISUAL & DIMENSIONAL NDT ON MACHINED SURFACES	MAJOR	VISUAL & MEASURE DPT	100%	100%	MANUFACTURER'S DRAWINGS	IR		P	V	-		
			MAJOR	DPT	100%	100%	ASTM E-165	NO DEFECT	IR	√	P	V	V	

LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
 ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"

Note:# NTPC Inspection Engineer to check, approval date / revision no. of reference documents at the time of inspection

	ITEM (MATERIAL, CLASS, GRADE, RATING, RANGE, SIZE ETC)			STANDARD QUALITY PLAN			QP NO.	0000-999-QOM -S-053	REVIEWED BY:	APPROVED BY:		
	CONFORMING TO CODE : IS: 3938						REV. NO.	00	H S MAURYA			
				DATE	05.04.2013	S SINGH						
				PAGE	Page 3 of 4	M K ASTHANA						
			VALID UPTO	04.04.2016	RAJEEV GARG							
SN	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORM	Format of RECORD		AGENCY	REMARKS
					M	C/N					M C N	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D	10.	11.

D FINAL INSPECTION:													
D.1	COMPLETE ASSEMBLED HOIST ALONG WITH ACTUAL CONTROL PANEL, VVFD & PUSH BUTTON (AS APPLICABLE).	VISUAL & DIMENSIONAL	MAJOR	VISUAL & MEASURE	100%	100%	IS: 3938/ APPROVED DRAWING/ DATA SHEET	IR	√	P	W	W	REFER NOTE-
	OVERLOAD TEST AT 125%	HOLDING CAPACITY OF BREAK, LIMIT RELAYS OPERATION	MAJOR	VISUAL	100%	100%	IS: 3938/ APPROVED DRAWING/ DATA SHEET	IR	√	P	W	W	
	NO LOAD TEST & FULL LOAD TEST,	CURRENT DRAWN, SPEED OF HOIST, ENCHING OPERATION, INTERLOCKING SEQUENCE OPERATION	MAJOR	VISUAL MEASURE	100%	100%	IS: 3938/ APPROVED DRAWING/ DATA SHEET	IR	√	P	W	W	
D.2	CONTROL PANEL	VISUAL, MAKE VERIFICATION & DIMENSION	MAJOR	VISUAL MEASURE	100%	100%	IS: 3938/ APPROVED DRAWING/ DATA SHEET	IR	√	P	W	W	
		DEGREE OF PROTECTION TEST BY PAPER INSERTION METHOD	MAJOR	VISUAL	100%	100%	IS: 3938/ APPROVED DRAWING/ DATA SHEET	IR	√	P	W	W	
		HV, IR	MAJOR	MEASURE	100%	100%	IS: 3938/ APPROVED DRAWING/ DATA SHEET	IR	√	P	W	W	
		PAINT SHADE, ADHESION, THICKNESS,	MAJOR	VISUAL MEASURE	100%	100%	IS: 3938/ APPROVED DRAWING/ DATA SHEET	IR	√	P	W	W	THICKNESS> 70 MICRON
D.3	PAINTING OF HOIST	ADHESION VISUAL & DFT MEASUREMENT	MAJOR	VISUAL & MEASURE	100%	100%	AS PER NTPC SPECIFICATION	IR	√	P	V	V	
NOTES:													
1.	BACK WALL ECHO SHALL BE SET AT 100% OF FULL SCREEN HEIGHT AT SOUND AREA OF THE BAR USING NORMAL BEAM PROBE OF 2 MHz TO 5 MHz. AT THIS SENSITIVITY LEVEL, ANY DEFECT ECHO EXCEEDING 20% OF FSH IS NOT ACCEPTABLE. IN ADDITION, LOSS OF BACK WALL ECHO MORE THAN 20% OF FSH IS ALSO NOT ACCEPTABLE.												
2.	WPS, PQR & WELDERS QUALIFIED BY LLOYDS, BVQI, TUV, DNV, NTPC, BHEL, NPCIL ARE ACCEPTABLE. ONLY QUALIFIED WELDERS SHALL BE DEPLOYED FOR WELDING.												
3.	MOTOR POWER RATING LESS THAN 30KW: ACCEPTANCE OF MOTOR LESS THAN 30KW IS BASED ON COC OF THE MANUFACTURER & THE CONTRACTOR CONFIRMING AS FOLLOWS: "IT IS HEREBY CONFIRMED THAT THE ABOVE MENTIONED MOTOR/ MOTORS WAS/ WERE MANUFACTURED TAKING CARE OF NTPC SPECIFIC REQUIREMENTS REGARDING AMBIENT TEMP., VOLTAGE & FREQUENCY VARIATION, HOT STARTS, PULL OUT TORQUE, STARTING KVA/KW, TEMP. RISE, DISTANCE BETWEEN CENTRE OF STUD & GLAND PLATE AND TESTED IN ACCORDANCE WITH APPROVED DRAWING/ DATA SHEETS."												
3.	HV TEST ON CONTROL PANELS WILL BE DONE ISOLATING VVVF DRIVE AND OTHER ELECTRONIC PARTS. HV TEST AT 2 KV FOR POWER & 1.5 KV FOR CONTROL CIRCUIT.												
4.	ALL CRITICAL DIMENSIONS SHALL BE MEASURED. THE CURRENT AND SPEED FOR HOISTING MOTION AND LONG TRAVEL MOTION SHALL BE MEASURED DURING NO LOAD TEST AND SAFE WORKING LOAD (SWL) TEST. ALL INTERLOCKS, BRAKE OPERATION, LIMIT SWITCHES AND SAFETY MEASURES SHALL BE CHECKED.												
LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS "V"								Note:# NTPC Inspection Engineer to check, approval date / revision no. of reference documents at the time of inspection					

एनटीपीसी NTPC	ITEM (MATERIAL, CLASS, GRADE, RATING, RANGE, SIZE ETC)			STANDARD QUALITY PLAN			QP NO.	0000-999-QOM -S-053	REVIEWED BY:	APPROVED BY:		
				CONFORMING TO CODE : IS: 3938			REV. NO.	00	H S MAURYA			
							DATE	05.04.2013	S SINGH			
							PAGE	Page 4 of 4	M K ASTHANA			
						VALID UPTO	04.04.2016	RAJEEV GARG				
SN	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORM	Format of RECORD	AGENCY	REMARKS	
					M	C/N				M C N		
1.	2.	3.	4.	5.	6.		7.	8.	9.	D	10.	11.

5. LIST OF ALL MAJOR BOUGHT OUT ITEMS AND THEIR ACCEPTABLE MAKES ARE LISTED BELOW

LIST OF BOUGHT OUT ITEMS AND THEIR SOURCES

1	STEEL	SAIL, TISCO, RINL, JSW, JISL, ESSAR, IISCO, WELSPUN
2	WIRE ROPE	USHA MARTIN, BHARAT WIRE ROPE, BOMBAY WIRE ROPE
3	HOOK	* HERMAN MOHATA, SMRITI FORGING * KARACHIWALA Approved upto 15T
4	GEAR BOX	ELECON, SHANTI GEAR, NEW ALLENBURY WORKS, PETL, BONFIGLIOLI - ITALY
5	MOTOR	LHP, ABB, SIEMENS, MARATHON ELECTRIC, KEC, BBL, CGL, NGEF (UP TO 15 KW), JYOTI
6	LIMIT SWITCHES	JAIBALAJI, BCH, SPEED-O-CONTROL (NOTED), SIEMENS
7	CONTACTOR & OLR, TIME DELAY RELAY, AUX RELAY	SIEMENS, L&T, TELEMECHANIC, C&S
8	FUSES, SFU, MCB, MCCB	SIEMENS, L&T, GEII, C&S
9	FLEXIBLE CABLE, LT POWER AND CONTROL CABLE	UNIVERSAL, POLYCAB, KEI, NICCO, DELTON*, PARAMOUNT*, CORDS*, GEMS*, HAVELLS* * ONLY FOR FIXED CABLE
10	BEARING	SKF, FAG, NRB, NTN, NBC, TIMKEN,
11	PUSH BUTTONS	VAISHNO, SIEMENS, L&T, TELEMECHANIC
12	PUSH BUTTON STATIONS (PENDANT)	VAISHNO, SIEMENS, L&T
13	INDICATING LIGHT	VAISHNO, SIEMENS
14	TRANSFORMERS (CONTROL)	INDCOIL, LOGICSTAT, PACTIL, AE, PRAGATI, PRAYOG, PRECISE, SOUTHERN ELECTRIC, GUJARAT PLUG-IN, KAPPA
15	CURRENT TRANSFORMERS	INDCOIL, AE, PRAGATI, PRECISE, KAPPA
16	VVVF DRIVE	L&T, ABB, SIEMENS, SCHIENDER, DANFOSS
17	CONTROL PANEL	RITTAL, PYROTECH, POSITRONICS, MPP
18	BRAKES - DCEM	EMCO, PETHE, WMI, BCH
19	BRAKES - EHT	WMI, ELECTROMAG
20	TERMINAL BLOCK	ELMEX, CONNECTWELL, WAGO (FOR CONTROL ONLY)
21	INDICATING METER	MECO, RISHABH, IMP
22	DSL & CURRENT COLLECTING SYSTEM	SUSHEEL, STOMAG
23	SELECTOR SWITCH	L&T, KAYCEE

LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
 ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N: NTPC P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, CHP: NTPC SHALL IDENTIFY IN COLUMN "N" AS "W"

Note: # NTPC Inspection Engineer to check, approval date / revision no. of reference documents at the time of inspection

PART-I (No Deviation Certificate)

Note: The following Declaration to be submitted on the bidder's Letter Head, duly signed & stamped and to be attached along with your Technical bid of the tender.

===== SUPPLY OF ELECTRICAL HANDLING EQUIPMENT FOR PATRATU PROJECT=====

Enquiry No.: _____

I/We M/s.
have read and clearly understood all the Terms and conditions in Tender Schedule of and accordingly accept the same without any deviation what so ever.

- I/ We unconditionally agree to all the tender conditions and no new conditions are imposed by us in the technical / price bid. I understand in the event of imposing any condition in the technical / price bid, such condition would be ignored by BHEL and only the prices will be considered for the purpose of evaluation". In case of any deviation (Technical or commercial) the same is mentioned below.

SPECIFICATION	a) MOU/TPBHEL/HOIST Rev. 05 Specification for Supplying Electrically operated Handling Equipment b) Annexure-I to specification c) 1-99-100-40917 R03 PA & FD Fan handling arrangement d) 1-99-100-40918 R03 ID Fan handling arrangement e) 1-99-300-40368 R01 Boiler water recirc. pump motor handling arrangement. f) 1-99-400-40906 R00 APH Handling Arrangement g) 1-99-400-40907 R01 SCAPH Handling Arrangement h) Painting Procedure i) 0000-999-QOM-S-053 Standard Quality Plan	
DOC. REFERENCE	BHEL ENQ. CALLED FOR	FIRM'S ALTERNATE OFFER
-Nil-	-Nil-	-Nil-

- I/ We confirm that none of our group concern or affiliates etc., appears on the list of banned firms / companies by BHEL (list available on www.bhel.com) nor any of the Director / Partner / proprietor of bidder / such group concern or affiliate etc. are involved with such company.
- I/ We also declare that, we have not been suspended or black listed or issued with Show Cause Notice by BHEL- Trichy or any other BHEL Unit or any PSU/ Government organization.
- I/ We confirm that other than us, none of our group concerns or affiliates etc. are participating in the tender either directly or indirectly through any other agency under same proprietor / common director(s) / common partner(s).
- I/ We confirm that if any of the above statement / information furnished by us in this tender is found to be false/ fake at any stage of tender evaluation or during execution of contract, BHEL will have the right to initiate appropriate action including legal proceeds / termination of contract, recovery of damages, penalties etc. as deemed fit.

(Contractor Signature with Seal)

Contractor Signature

Contractor Seal

THIRD PARTY NON-DISCLOSURE AGREEMENT

I, _____, on behalf of the _____ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL, Trichy on contract is confidential and that the nature of the business of the BHEL, Trichy is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL, Trichy Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.
- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data,

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL, Trichy all documents and property of BHEL, Trichy, including: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, Trichy's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, Trichy and are reasonable given the nature of the business carried on by the BHEL, Trichy I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Place:- _____

Date:- _____

Name

Company

Signature

BANK GUARANTEE FOR PERFORMANCE SECURITY

(Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s))

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

IFSC AND MICR CODE

Dear Sirs,

1. In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____¹ through its Unit at.....(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) (VENDOR CODE) with its registered office at _____² hereinafter referred to as the 'Vendor / Contractor / Supplier ', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated³ valued at Rs.....⁴ (Rupees -----)/FC.....(in words.....) for⁵ (hereinafter called the 'Contract') and the Vendor / Contractor / Supplier having agreed to provide a Contract Performance Bank Guarantee, equivalent to% (... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

2. we,, (hereinafter referred to as the Bank), having registered/Head office at and inter alia a branch at being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount of Rs -----⁶ (Rupees -----) without any demur, immediately on first demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

3. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

4. We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor / Contractor / Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

5. The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the Vendor / Contractor / Supplier shall have no claim against us for making such payment.

6. We thebank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract/satisfactory completion of the performance guarantee period as per the terms of the Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

7. We.....BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Vendor / Contractor / Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Vendor / Contractor / Supplier and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Vendor / Contractor / Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Vendor / Contractor / Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

8. The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Vendor / Contractor / Supplier and notwithstanding any security or other guarantee that the Employer may have in relation to the Vendor / Contractor / Supplier's liabilities.

9. This Guarantee shall remain in force upto and including.....⁷ and shall be extended from time to time for such period as may be desired by Employer.

10. This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Vendor / Contractor / Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

11. Unless a demand or claim under this guarantee is made on us in writing on or before the⁸we shall be discharged from all liabilities under this guarantee thereafter.

12. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Tiruchirappalli.

13. We..... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁶

- b) This Guarantee shall be valid up to⁷
- c) Unless the Bank is served a written claim or demand on or before (minimum 3 to 6 months from the expiry date ⁸ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

14. We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

BANK EMAIL ID:

BANK PHONE NO:

AUTHORISED SIGNATORIES CELL PHONE NO:

BANK FAX NO:

¹ NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ CONTRACT VALUE

⁵ PROJECT/SUPPLY DETAILS

⁶ BG AMOUNT IN FIGURES AND WORDS

⁷ VALIDITY DATE

⁸ DATE OF EXPIRY OF CLAIM PERIOD

List of Consortium Banks	
Sl. No.	Name of the bank
1.	State Bank of India
2.	Canara Bank
3.	Axis Bank
4.	Bank of Baroda
5.	Central bank
6.	Citi Bank N.A.
7.	Deutsche Bank
8.	Exim Bank
9.	Federal Bank Limited
10.	HDFC Bank Limited
11.	Hongkong and Shanghai Banking Corporation Limited
12.	Indian Bank
13.	ICICI Bank Limited
14.	IDBI Bank Limited
15.	IndusInd Bank Limited
16.	Indian Overseas Bank
17.	Kotak Mahindra Bank Limited
18.	Punjab National Bank
19.	RBL Bank Ltd.
20.	Standard Chartered Bank
21.	Union Bank of India
22.	Yes Bank Limited

/ On Bidder's office letter pad /

Self-Declaration

Enquiry No.	
Enquiry Date	

In line with Government public procurement order Number P-45021/2/2017-B.E-II dated 15.06.2017, and further modified order dt. 28.05.2018 and 04.06.2020.

I / We hereby declare that I / We are a "Local Supplier" meeting the requirement of minimum local content (.....%) defined in the above government notification for the goods against above mentioned enquiry Number.

Details of location at which local value addition will be made is as follows:

Door No.	
Street / Address 1	
Street / Address 2	
District	
State	
Country	
PIN Code	

We also understand that the false declarations will be considered as breach of Integrity and liable for action.

For Company Name:

Seal:

Signature:

Date:

Place:

(Please fill all the yellow color field)



**CORPORATE QUALITY ASSURANCE
SUB-VENDOR QUESTIONNAIRE**

i.	Item/Scope of Sub-contracting	
ii.	Address of the registered office	Details of Contact Person <i>(Name, Designation, Mobile, Email)</i>
iii.	Name and Address of the proposed Sub-vendor's works where item is being manufactured	Details of Contact Person: <i>(Name, Designation, Mobile, Email)</i>
iv.	Annual Production Capacity for proposed item/scope of sub-contracting	
v.	Annual production for last 3 years for proposed item/scope of sub-contracting	
vi.	Details of proposed works	
1.	Year of establishment of present works	
2.	Year of commencement of manufacturing at above works	
3.	Details of change in Works address in past (if any)	
4.	Total Area	
	Covered Area	
5.	Factory Registration Certificate	Details attached at Annexure – F2.1
6.	Design/ Research & development set-up <i>(No. of manpower, their qualification, machines & tools employed etc.)</i>	Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design Details attached at Annexure – F2.2 <i>(if applicable)</i>
7.	Overall organization Chart with Manpower Details <i>(Design/Manufacturing/Quality etc)</i>	Details attached at Annexure – F2.3
8.	After sales service set up in India, in case of foreign sub-vendor <i>(Location, Contact Person, Contact details etc.)</i>	Applicable / Not applicable Details attached at Annexure – F2.4
9.	Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any	Details attached at Annexure – F2.5
10.	Sources of Raw Material/Major Bought Out Item	Details attached at Annexure – F2.6
11.	Quality Control exercised during receipt of raw material/BOI, in-process , Final Testing, packing	Details attached at Annexure – F2.7



CORPORATE QUALITY ASSURANCE
SUB-VENDOR QUESTIONNAIRE

12.	Manufacturing facilities (List of machines, special process facilities, material handling etc.)	<i>Details attached at Annexure – F2.8</i>			
13.	Testing facilities (List of testing equipment)	<i>Details attached at Annexure – F2.9</i>			
14.	If manufacturing process involves fabrication then-	<i>Applicable / Not applicable</i>			
	List of qualified Welders	<i>Details attached at Annexure – F2.10</i>			
	List of qualified NDT personnel with area of specialization	<i>(if applicable)</i>			
15.	List of out-sourced manufacturing processes with Sub-Vendors' names & addresses	<i>Applicable / Not applicable</i> <i>Details attached at Annexure. –F2.11</i> <i>(if applicable)</i>			
16.	Supply reference list including recent supplies	<i>Details attached at Annexure – F2.12</i> <i>(as per format given below)</i>			
Project/ package	Customer Name	Supplied Item (Type/Rating/Model /Capacity/Size etc)	PO ref no/date	Supplied Quantity	Date of Supply
17.	Product satisfactory performance feedback letter/certificates/End User Feedback		<i>Attached at annexure - F2.13</i>		
18.	Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product (similar or higher rating) <i>Note:- Reports need not to be submitted</i>		<i>Applicable / Not applicable</i> <i>Details attached at Annexure – F2.14</i> <i>(if applicable)</i>		
19.	Statutory / mandatory certification for the proposed product		<i>Applicable / Not applicable</i> <i>Details attached at Annexure – F2.15</i> <i>(if applicable)</i>		
20.	Copy of ISO 9001 certificate (if available)		<i>Attached at Annexure – F2.16</i>		
21.	Product technical catalogues for proposed item (if available)		<i>Details attached at Annexure – F2.17</i>		
Name: Desig: Sign: Date:					

Company's Seal/Stamp:-