



An ISO 9001  
Company

## Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirapalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

### ENQUIRY

### NOTICE INVITING TENDER

Phone: +91 431 257 7421/7297

Email : vkaruna@bhel.in

: hari.r@bhel.in

Web : www.bhel.com

### TWO PART BID

Tender to be submitted in two Parts

Enquiry  
Number:

2621900002

Enquiry  
Date:

27.11.2019

Due date for submission  
of quotation:

23.12.2019

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer should reach physically on or before 14.00 Hrs(IST) on the Date of tender opening. Tenders received after 14.00Hrs (IST) will not be considered for evaluation.

Item	Description	Quantity	(Indigenous Vendors) Matl. Will be Delivered to
10	10 Ton capacity, 28.5 Mtr. Span Double Box Type Girder EOT Crane as per the technical specification & commercial conditions applicable(To be downloaded from web site <a href="http://www.bhel.com/tender/tender_home.php">www.bhel.com/tender/tender_home.php</a> or <a href="https://eprocure.gov.in/epublish/app">https://eprocure.gov.in/epublish/app</a> )	4 Nos.	FOR, BHEL, Stores, High Pressure Boiler Plant, Tiruchirappalli - 620014

#### Important points to be taken care during submission of offer

- 1) Material shall be delivered to (By Indigenous vendors): As stated above.
- 2) Delivery required 10 Months from the date of purchase order.
- 3) Erection and commissioning activities shall be done by the supplier, at BHEL Trichy works.
- 4) Erection & Commissioning period required 8 Weeks from the date of intimation by BHEL to vendor for deputation of their Engineers for E&C.
- 5) EMD applicable for this Enquiry is INR 2,00,000/-
- 6) Compliance Forms. TRY/IND/02A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
- 7) All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM / CE / GENL / GENL / 001 EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site [www.bhel.com/tender/tender\\_home.php](http://www.bhel.com/tender/tender_home.php) or from the Government tender website <https://eprocure.gov.in/epublish/app> under Enquiry reference 2621900002.

Tenders should be submitted before 14.00Hrs (IST) on the due date  
Tenders will be opened at 14:30 hours on the due date  
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.

Yours faithfully,  
For BHARAT HEAVY ELECTRICALS LIMITED

*V. Karuna* 27/11/19  
DGM / Capital Equipment / MM

V. KARUNAKARAN  
Dy. General Manager  
Capital Equipment / MM  
BHEL / Tiruchirappalli - 620 014



**PART A****SECTION – I: QUALIFYING CRITERIA**

The BIDDER (OEM) has to compulsorily meet the following requirements to get qualified for consideration of the technical offer for the supply of EOT CRANE

S. No	PARTICULARS	VENDOR'S RESPONSE
1.0	Only those Vendors ( <b>OEMs</b> ), who have supplied and commissioned at least ONE <b>10</b> Ton or higher capacity EOT CRANE of duty class-IV, with a span of <b>28</b> Meters or more & such crane should be working satisfactorily for a minimum period of one year after commissioning as on the original date of opening of this Tender are eligible to quote.	
2.0	The vendor should have minimum 5 years' experience in the field of design and fabrication of EOT Cranes.	
3.0	Along with the Technical offer, the Vendor should submit at least 1 performance certificate from any of the customer for satisfactory performance of the crane specified in S No 1.0 for a minimum period of 1 year from the date of commissioning For obtaining the Performance certificate from the customer, a suggestive format is provided in <b>SECTION – IV</b> .	
4.0	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

**SECTION – II**

The Bidder / Vendor is requested to provide the following information.

<b>S. No.</b>	<b>PARTICULARS</b>	<b>VENDOR'S RESPONSE</b>
<b>5.0</b>	The Vendor shall specify the number of Years of experience (for the firm), in the field of design, manufacture, supply and erection & commissioning of cranes.	
<b>6.0</b>	Number of EOT Cranes supplied and commissioned till date.	
<b>7.0</b>	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject crane.	
<b>8.0</b>	The vendor (Indian / Foreign) may visit SSTEP/BHEL with prior intimation for understanding site conditions and technical requirements specified, before submitting their offer against this enquiry.	

**SECTION – III**

Bidder / Vendor to note:

S. No.	REQUIREMENTS	VENDOR'S RESPONSE
9.0	<p>The BIDDER / VENDOR shall submit the offer in TWO PARTS.</p> <p>1. Technical offer (<b>with PART A &amp; PART B</b>) &amp; Commercial offer.</p> <p>2. Price Bid (One lump sum must be quoted for supply, erection &amp; commissioning of all 4 cranes and prove out as per specification). Erection of cranes and the supervision of erection by supplier engineers.</p>	
10.0	<p>The Offer shall contain a comparative statement of Technical <b>Specifications specified by BHEL</b> and <b>Offer Details submitted by the Bidder</b>, against each clause.</p> <p>A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.</p> <p>Bidders may be requested for technical discussions at SSTP/BHEL for any technical clarifications in their submitted offers.</p>	
11.0	<p>The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation</p>	

**SECTION – IV**

The Performance certificate should be produced on Customers Letter head.

**PERFORMANCE CERTIFICATE**

1	Supplier of the Crane		
2	Make & Model of the Crane		
3	Month & Year of Commissioning		
4	Application		
5	a. Crane Type		
	b. Crane Capacity (Metric Tons)		
	c. Crane span		
	d. Duty class		
	e. Mechanism Group		
6	Performance of the Crane (Tick whichever is applicable)	Best in the market	
		Satisfactory	
		Good	
		Average	
		Not Satisfactory	
7	Any other remarks		
<div style="display: flex; justify-content: space-between;"> <div>Date:</div> <div>Signature &amp; Seal of the Authority Issuing the Performance Certificate</div> </div>			

**PART B.**  
**TECHNICAL SPECIFICATIONS FOR 10 TON CAPACITY, 28.5 MTR SPAN**  
**DOUBLE BOX TYPE GIRDER EOT CRANES (Qty. :4 nos.) REVISED SPECIFICATION as on 14.11.2019**

S.No.	PARTICULARS	BHEL SPECIFICATIONS
1.0	APPLICATION	<p>a. The subject crane is meant for the purpose of handling (within the lifting capacity of the crane) components, bar / round stocks (bloom), tubes &amp; pipes in closed shed.</p> <p>b. The crane will be put to use for 365 Days continuous duty with CT, LT and Hoist movements, which may occur simultaneously (within the operating parameters specified under Clause Nos. – 3.1, 3.4 and 3.5).</p> <p>c. The shop floor/storage yard environment will be in ambient temperature going up to 45° C.</p>
2.0	SCOPE OF SUPPLY	
2.1	Double box type girder, <u>single trolley</u> , double hook EOT crane. -3 nos	<p>a. Design Crane as per the Tender Specifications given under this PART-B as detailed below.  <b>Hydro Machine Area crane, Finishing Area crane, AB Bay crane:</b>  (Drg 3-7-0000-00-10308 &amp; End carriage Drg:3-7-0000-00-10305) Qty-3 nos.  (2 nos. in Cold mill finishing bay, 1 in Hot mill AB bay)</p> <p>b. Detailed design, Manufacture, Assembly and Testing before Dispatch</p> <p>c. Supply in major Sub-Assemblies/Modules</p> <p>d. Unloading &amp; internal movement Erection &amp; commissioning at SSTP/BHEL is in supplier's scope.</p> <p>e. Commissioning and Performance Prove-Out at SSTP/BHEL is in supplier's scope.</p> <p>f. Performance Guarantee for 12 months from the date of commissioning.</p>
2.2	Double box type girder, <u>double trolley</u> EOT crane. -1 no	<p>a. Design Crane as per the Tender Specifications given under this PART-B as detailed below.  <b>IC Bay crane:</b>  (Drg: 3-7-0000-00-10306 &amp; End carriage Drg: 3-7-0000-00-10313 ) Qty - 1 no.</p> <p>b. Detailed design, Manufacture, Assembly and Testing before Dispatch</p> <p>c. Supply in major Sub-Assemblies/Modules</p> <p>d. Unloading &amp; internal movement Erection &amp; commissioning at SSTP/BHEL is in supplier's scope.</p> <p>e. Commissioning and Performance Prove-Out at SSTP/BHEL is in supplier's scope.</p> <p>f. Performance Guarantee for 12 months from the date of commissioning.</p>

<b>3.0</b>	<b>TECHNICAL SPECIFICATIONS</b>	# These cranes are intended for steel mill duty and BHEL special requirement (need not be compared with design calculation values)
<b>3.1</b>	<b>CAPACITY</b>	<b>Lifting capacity</b>
3.1.1	Main Hoist	10MT Single trolley double hoist each 5T individual drive mechanism for each hook- <b>3 Cranes for S.No 2.1</b>  10MT Double trolley single hook each 5T individual drive mechanism for each trolley - <b>1 Crane for S .No 2.2</b>
3.2	SPAN	Wheel Centre to Wheel Centre Dimensions
3.2.1	Long Travel (LT)	28,500 mm
3.2.2	Cross Travel (CT)	<b>5000 mm for 3 cranes – S. No 2.1</b> <b>2,600 mm for 1 crane – S.No. 2.2</b>
3.3	Height of Lift	9,000 mm
3.4	DUTY CYCLE	Related to Drive Motor & Mechanisms
3.4.1	Hoists	40 % CDF
3.4.2	Long Travel	40 % CDF
3.4.3	Cross Travel	40 % CDF
3.5.	SPEED	Operating / Working Speed [Maximum]
3.5.1	Hoist	15 mtrs. / minute.
3.5.2	Cross Travel (CT)	30 mtrs. / minute.
3.5.3	Long Travel (LT)	60 mtrs. / minute.
3.6	MOTOR RATINGS - MIN	Electric Drive Motor Ratings & Frame sizes shall be as per IS-325 and IS -1231 and also suitable for 300 starts per hour.
3.6.1	Main Hoist	Min. 30 kW, Frame Size: 225M x 2 nos for all 4 cranes –(S.No 2.1& S.No 2.2 )
3.6.2	Cross Travel (CT)	Min. 5.5 kW, Frame Size: 132M x 1 no. each for 3 cranes – (S.No 2.1) Min. 5.5 kW, Frame Size: 132M x 2 nos for 1 crane – (S.No 2.2)
3.6.3	Long Travel (LT)	Min. 11 kW, Frame Size: 160L x 2 nos each for all 4 cranes –( S.No 2.1 & S.No 2.2)
<b>3.7</b>	<b>GEAR BOX</b>	<b>Gear Box Size</b>
3.7.1	Main Hoist	HR 550 to 650-2 or 3 stage gear reduction
3.7.2	Cross Travel (CT)	VR 250 to 300 -2 or 3 stage gear reduction

3.7.3	Long Travel (LT)	HR 350 to 410 -2 or 3 stage gear reduction
3.8	<b>ACCELERATION</b>	
3.8.1	Cross Travel (CT)	300 mm / sec. sq.
3.8.2	Long Travel (LT)	300 mm / sec. sq.
3.9	<b>HOIST ROPE DETAILS</b>	Size and Number of Falls of Rope
3.9.1	Main Hoist	Dia. 12 mm; Falls - 4
3.10	<b>CONTROL</b>	Cabin Operation and Remote Control
3.11	<b>Type of Control</b>	Master Control and Radio Remote Control
3.12	<b>Control Voltage</b>	230V AC
3.13	<b>Input Power Supply</b>	415 Volts $\pm$ 10%, 50 Hz $\pm$ 3% , 3 Phase- AC
3.14	<b>Duty Class</b>	Class – IV [Heavy Duty]
3.15	<b>Mechanism Group Classification</b>	M 8
3.16	<b>DESIGN STANDARD</b>	IS – 807 & 3177 -2006
3.17	<b>Runway Rail Size</b>	
3.17.1	Cross Travel (CT)	ISR 60 Lbs./Yard - Rail by vendor
3.17.2	Long Travel (LT)	ISR 90 Lbs./Yard (For reference only) - Rail by BHEL already existing in the bay(building)
3.18	<b>Wheel Size</b>	
3.18.1	Cross Travel (CT)	Dia. 320 mm – 4 Nos each for 3 cranes (S.No 2.1) and 8 Nos for 1 crane (S.No 2.2)
3.18.2	Long Travel (LT)	Dia. 630 mm - 4 Nos each for all 4 cranes (S.No 2.1 & S.No 2.2)
3.19	<b>Brake Drum Size</b>	Brake Drum Sizes
3.19.1	Hoist	Dia. 300 mm - Cutler Hammer
3.19.2	Cross Travel (CT)	Dia. 200 mm - Cutler Hammer
3.19.3	Long Travel (LT)	Dia. 200 mm - Cutler Hammer
4.0	<b>MAIN FEATURES</b>	<b>Crane Operational Features</b>
4.1	Control System	Smooth Start & Stop through variable speed drives for all operations.
4.2	Cabin Control	Conventional master control for all motions
4.3	Remote Control	Radio Remote Control for all motions (Microprocessor based)
4.4	End clearance	End clearances to be fixed to suit the workshop building clearances (Refer Drg:3-7-0000-00-10312) enclosed with the tender.



4.5	Crane Operation	Through Cabin Control and Radio Remote Control with option for control selection (using three way selector switch provided at end carriage).
4.6	Operator Cabin	Enclosed type cabin with proper ventilation. Cabin fitted with fan, light and exhaust fan located on one end of the crane.
<b>5.0</b>	<b>STRUCTURAL FABRICATION</b>	<b>Crane Structure Constructional Details –Double girder box type construction EOT crane.</b>
5.1.0	Bridge/Girder & End carriages of LT and CT	Plate formed box type Construction for Girders, and End carriages of LT and CT
5.1.1	Bridge girder section	The minimum size shall be as follows.
5.1.1.1	Cross section of bridge girder	<u>Min..Girder Height (Flange inner – inner) 1480mm (minimum)</u> <u>Min. Girder width (web inner-inner) 452mm (Min)</u> <u>Top flange plate thickness – 12mm (min)</u> <u>Bottom flange plate thickness – 10mm (min)</u> <u>Web plate thickness – 8mm (min)</u> <u>Width of top flange and bottom flange - 490mm (min)</u> <u>Vertical Diaphragm plate thickness-6 mm (Min)</u> <u>Distance between long diaphragms-1000 mm (Min)</u> <u>Vertical Diaphragms shall be made of solid plates only</u> <u>Horizontal stiffener to be provided – An ISA 50x50x6 shall be provided throughout the length of the web (for both webs) at about 1/3<sup>rd</sup> of the bridge height from the top.</u>
5.1.1.2	Camber for bridge	The crane bridge shall be cambered at the top as well as the bottom. The final camber shall be between +26mm and +30mm.
5.1.2	Cross section of LT End carriage	<u>Min. Height (Flange inner-inner) – 600mm (min)</u> <u>Min. width (Web inner-inner) – 292mm (min)</u> <u>Top flange plate thickness – 12mm (min)</u> <u>Bottom flange plate thickness – 10mm (min)</u> <u>Web plate thickness – 8mm (min)</u> <u>Width of top flange and bottom flange 350mm (min)</u> <u>Vertical diaphragm plate thickness – 6mm (min)</u> <u>Vertical diaphragms shall be made of solid plates only.</u>
5.1.2.1	Jacking pads	Jacking pad shall be provided between web plates of end carriage ends for removal of LT wheel.
5.1.2.2	Wheel clearance	Minimum clearance to be maintained between rail top and bottom flange of end carriage shall be as follows 1. For Long travel – 100 mm 2. For Cross travel – 50mm

5.2	Raw Material	Only Steel plates (IS:2062), tested and certified for quality by reputed inspection authorities, shall be used. Test Certificates to be produced for BHEL verification and form part of the documentation.
5.2.1	Welding of web plate	Top flange shall be welded inside also with web plate and it shall be equal length stitch weld minimum.
5.2.2	Welding of stiffener plate	All stiffener plates shall be inside welded both sides with top flange and web plates and it shall be equal length stitch weld minimum.
<b>5.3</b>	<b>Welded Joints</b>	<b>To be followed for girder fabrication</b>
5.3.1	Number of weld butt Joints allowed in web and flange plates of bridge girder.	Maximum three joints is permitted in flange and web plates of bridge girder. Splice joint is not permitted. (Girder has to be of single piece only).
5.3.2	Welding Electrodes	a. For all Horizontal Welding E 7018/ER70S-6 (MIG) Electrode only should be used. b. For all Vertical Welding E 7048 /ER70S-6 (MIG)Electrode only should be used.
5.3.3	Welded Joint Testing	All Butt Welded Joints (compression / tension and flanges / web joints) shall be subjected to 100% X-Ray Testing and X-Ray Films to be produced for BHEL verification and be part of the documentation.
5.3.4	Splice joints	No bolted Splice Joint is allowed in Girder fabrication (Girder has to be of single piece only).
5.4	Bridge / End carriage connection	Bridge to girder connection shall be reamed holes with fit bolt as per IS-3640.
5.5	Platform on Girders	The Platforms provided on both the Girders shall be fixed through BOLTED JOINTS with fit bolt as per IS-3640 only.
5.6.	Wheel Assembly	The Wheel Assembly for Cross Travel (CT) & Long Travel (LT) shall be of LIVE AXLE SYSTEM with L-Type Bearings. [Refer to BHEL Drawing No: 2-7-1090-02-00913 Rev: 00 for LT wheel assy , 2-7-1090-03-00881 Rev :00 for CT wheel assy. Drawing is enclosed as ANNEXURE -1]. Bogie type assembly shall be for LT wheels.
5.7	NDT Examination	All welding shall be tested by NDT means [MPI, LPI ]
5.8	Machining Operation	All mechanical mating surfaces and wheel seating areas are to be machined to the required finish.

5.9	Surface Cleaning	Both the Girders and the Trolleys are to be shot blasted or chemically treated for surface cleaning, after completion of all operations but prior to painting.
5.10	Painting	The crane parts are to be painted as follows: a. One coat primer with 25 microns of DFT (Dry film thickness) and 48 hours of compulsory curing after painting. b. Two coats of Enamel Paint –(Color- Tractor orange) each with a DFT of 25 microns and intermittent curing of minimum 16 hours.
<b>6.0</b>	<b>MECHANICAL ELEMENTS</b>	
6.1	Gears	Gears in all the Stages shall be helical in design and to be of machined, lapped and hardened. All gear material must be of EN353 grade.
6.2	Gear Box Casing	Shall be of fabricated type and stress relived by thermal heat-treatment process, prior to machining.
6.3	Rope Drum	Shall be of fabricated type and stress relieved. The circumferential weld joints shall be tested by 100 % X-Ray for quality assurance.
6.4	Type of Coupling	Only GEARED COUPLING to be used a. Between Electric Motor and Gear Box. Bore & key way as per respective motor & gear box selection based. b. Between Gear Box and Rope Drum. Geared rope drum coupling. c. Between Gear Box and Wheels ( for LT and CT ) Half gear coupling with floating shaft (Minimum floating shaft length for LT shall be 1500 mm)
6.5	Wheels	The Wheels shall be of Forged and Wheel Tread hardened to 300/350 BHN. Wheels shall be fitted with L-Type Bearing Blocks
6.6	Mechanical Joints	Fit Bolts as per IS 3640-1982 for all joints coming in main members and platform with reamed holes
6.7	Pulley Dimension	Rope Pulley diameter shall be 23 times that of Rope diameter
6.8	Hook	Hook with Hook latch shall be provided.
6.9	Lifting eye	Lifting eye for handling the components of the cross trolley in hoist and Long travel mechanisms.
6.10	Limit switches	Hoist shall be provided with rotary and Counter weight limit switches.
6.11	Gear oil	Required grade oil will be supplied by BHEL at site during E&C-vendor to specify the oil grade and qty.
6.12	Buffer	Spring loaded buffer shall be provided for crab and bogies.
<b>7.0</b>	<b>ELECTRICAL ELEMENTS</b>	
7.1	Operational Controls	The Crane shall be provided with the following controls: a. Cabin Control [Master Control] b. Radio Remote Control (Microprocessor based two-step push button

7.2	Motor Control	Through Variable Frequency Drives. Capacity of the drive shall be one frame above the motor capacity and suitable for crane application. The drives must be having internal or external Dynamic Braking Unit connected to a Dynamic Braking Resistor (DBR).
7.3	Control Voltage	230 V AC
7.4	Type of Brakes –	a. Main Hoist - DC Electromagnetic Cutler Hammer Brake b. Cross Travel - DC Electromagnetic Cutler Hammer Brake c. Long Travel - DC Electromagnetic Cutler Hammer Brake
7.5	Protection	All Panels, Limit-Switches IP54 and Motors shall have IP 55 protection.
7.6	Electric Motors	Squirrel Cage Induction motor conforming to new IS12615:2011 standards, High Energy Efficient, S4 Duty, Index of Protection-IP55, Cooling-IC 411(TEFC), Insulation Class-F, 300 Starts/hour, Foot Mount (B3). All Electric Motors shall be as per IS-325 AND IS-1231 and also suitable for 300 starts per hour.
7.7	Electric Contactors	All Contactors shall be suitable for AC3 Duty Class. The rating of all Contactors shall be at least 50% higher than the respective electric motor full load current, at the specified duty cycle. .
7.8	Resistance (DBR)	Stainless steel punched grid resistance / S.S wire grid resistance 40 % duty cycle or as recommended by the drive manufacturer whichever is higher.
7.9	Long Travel Motion	Dual Drive Mechanism shall be provided for Long Travel Motion.



7.10	Illumination	a. Four numbers of 250 Watts Metal Halide lamp shall be provided under the Bridge b. All Electric Panels shall be provided with suitable illumination for visibility and troubleshooting.
7.11	Controller Steps	A 4-step controller has to be provided for a. Main hoist b. Long travel c. Cross travel
7.11.1	Frequency converter	The VVVF Drive shall be supplied with suitable DBR for all motions.
7.11.2	Crab wiring	Junction box shall be avoided for wiring of crane in bridge end.
7.12	Master Controller Steps	Sheet Steel Housing Master controllers having 7 cams with joystick handle for 4 notches for the following operations. a. Hoist 1 b. Hoist 2 c. Tandem d. Long Travel e. Cross Travel
7.13	Radio remote control	Remote operation through hand held transmitter capable and Receiver control panel mounted on crane shall be used. Separate interposing relay shall be used for connecting to the motion control panels. Range of the radio remote shall not be less than 50 m.
7.14	Cables	All cables for power and control circuit must be of copper only. List of cables must be provided along with the drawing. All necessary cable glands, conduits, conduit glands, copper lugs for panels and motors must also be supplied.
7.15	CT Wiring	Cable Drag Chain System of IGUS /KABELSCHLEPP make along with cables.
7.16	Hoist Limit	Hoist-Counter weight with manual reset type. Hoist-Rotary Geared Type with up and down limits. C.T-Lever Type fitted in the trolley. Each hoist shall be provided with both rotary and counter weight limits
7.17	Operator Cabin	Control on/off Push Button station, Master controllers, Industrial Gang Bell with Footswitch, Fan, light and exhaust fan, operator chair, Fire extinguisher, warning bell and emergency push button must be provided in the cabin.
7.18	Earthling	All the bodies of electrical equipment like motor, power & control panel, resistor panel, brake panel, master controller etc. are to be effectively earthed. Separate earth cable shall be run for the trolley.

<b>8.0</b>	<b>SELECTION OF COMPONENTS</b>	<b>The make of Components or Bought-Out-Items shall be strictly as per the list given below.</b>
8.1	Hoist Hooks	HERMAN MOHTTA / HERCULES / SILPA UDYOG / SMRITI FORGINGS / KARACHIWALA
8.2	Wire Rope	USHA MARTIN / FORT WILLIAM / RA WIRE ROPE
8.3	Variable Frequency Drive	ABB- ACS 880/ SIEMENS- S120/ DANFOSS- FC302/ YASKAWA- A1000/
8.4	Electric Motors	SIEMENS / ABB / GEC / ALSTHOM
8.5	DC Brake Unit	Only BCH make
8.6	Cable Drag Chain	IGUS / KABELSCHLEPP
8.7	Radio Remote Control	SNT-CC-403 / ACROPOLIS- F24-10D
8.8	Contactors	SIEMENS / SCHNEIDER / ABB / GE / L&T
8.9	Over-Load-Relay	SIEMENS / SCHNEIDER / ABB / GE / L&T
8.10	HRC Fuses	SIEMENS / SCHNEIDER / ABB / GE / L&T
8.11	Rotary limit switch	SIEMENS / OMEGA / SOC / INDUSTRIAL SYNDICATE
8.12	Switch fuse unit	SIEMENS / SCHNEIDER / ABB / GE / L&T
8.13	Molded case C.B	SIEMENS / SCHNEIDER / ABB / GE / L&T
8.14	Pneumatic time delay	Only BCH make
8.15	ON Delay Timer	SIEMENS / GEC / AREVA
8.16	Push - Buttons	SIEMENS / SCHNEIDER / ABB
8.17	Connectors	ELMEX / CONNECTWELL
8.18	Couplings	WMI / FENNER / ALFEX / HI-CLIFF / LOVEJOY
8.19	Bearings	SKF / FAG / NTN
8.20	Cables	Reputed Makes & ISI Approved
8.21	Bridge Light Fittings	PHILIPS / GE / CROMPTON
8.22	Load Cell	IPA or reputed make acceptable to BHEL
8.23	Resistance box	OHMARK / ELECTROMAG
8.24	VVVF Drives	ABB / SIEMENS / DANFOSS
8.25	Other Elements	Vendor to specify items & makes
8.26	Gear boxes	ELECON / SHANTHI GEARS / RADICON / CROMPTON GREAVES



10.0	INSPECTION	The following Schedule of Stage Inspections is to be strictly adhered to, prior to dispatch from the Supplier's Works
10.1	STAGE – I	<ul style="list-style-type: none"> <li>a. Verification of Test Certificate for Raw Materials used for Girders, End-Carriages, Trolleys, Gear Box Casings, etc.</li> <li>b. Verification of X-Ray Report of Butt-Joints coming in the Girders and Random Testing on the Welds, by physical examination.</li> <li>c. Box Girder setting before closing of the Bottom Flanges – for inspecting the quality of welding and presence of waviness</li> <li>d. Trolley Frame Fabrication before setting the Mechanisms</li> <li>e. End – Carriage Fabrication before closing of the bottom flanges.</li> </ul> <p><b>The following Test certificates to be produced during Stage-I inspection.</b></p> <ul style="list-style-type: none"> <li>1. TC for plates used for bridge fabrication.</li> <li>2. TC for plates used for End carriage fabrication.</li> <li>3. TC for the steel rounds used for gear fabrication.</li> <li>4. TC for plates used for gear box casing fabrication.</li> <li>5. X-Ray film and report for all the Butt-Joints in the girders.</li> </ul>
10.2	STAGE – II	<ul style="list-style-type: none"> <li>a. Inspection of Bridges and End – Carriages with Wheel Assembly and Alignment checking.</li> <li>b. Verification of Span &amp; Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment.</li> <li>c. Free running of the all the Mechanisms.</li> <li>d. Measurement of CAMBER in the bridges</li> </ul> <p><b>The following Test certificates to be produced during stage-II inspection.</b></p> <ul style="list-style-type: none"> <li>1. TC for hoist hooks</li> <li>2. TC for Steel wire ropes.</li> <li>3. TC for Heat treatment and final hardness for all gears.</li> <li>4. TC for Wheel Hardness for LT and CT</li> <li>5. TC for all BCH DC Brakes.</li> <li>6. TC for all motors.</li> <li>7. TC for all limit switches.</li> <li>8. TC for all VVVF drives.</li> </ul>



10.3	STAGE – III [Final Inspection]	a. Measurement of CAMBER in the Bridges. b. Full / Rated Load Test and Deflection Test. c. Deflection and Permanent Set Measurement. d. 25% OVER-LOAD Lifting Ability Check.
11.0	<b>CRANE ERECTION &amp; COMMISSIONING</b>	
11.1	Mechanical Erection	Erection & Commissioning of the Crane to be done by supplier, Unloading the vehicle during supply of crane inside BHEL campus at designated location in open yard to be done by supplier, on intimation and site clearance for erection of crane, the crane parts to be moved to the erection spot by the supplier to carryout E&C. Facilities required for lifting crane and moving crane parts by lorry or trailer, man power are all in supplier's scope. Electrical items can be stored inside the building by the supplier – required space will be provided by BHEL. To start the E & C one-week advance intimation will be given to supplier to mobilize his crew. Free electricity and compressed air will be provided for E & C work.
11.2	Crane Commissioning	Commissioning of the Crane and Performance Prove –Out for the Crane's Capacity and Smooth Functioning of the Crane (at BHEL Works) shall be the RESPONSIBILITY of the supplier.
12.0	<b>O &amp; M MANUALS</b>	Each Crane shall be provided with THREE Copies of Erection, Operation & Maintenance Manual hard copy as well as soft copy in CD, containing the following technical details
12.1	Drawings & Details	a. Crane GA Drawing b. Crab Assembly Drawing c. Total Crane Wiring Schematics d. Detailed Wiring Diagrams for Sub-Systems / Panels and Bill of Materials. e. VVVF Drive's Logic circuits f. Wheel Assembly Drawings g. Bottom Block Assembly Drawing & part drawings h. Gear Box Assembly and part Drawings i. Coupling Drawing and Details, Floating shaft j. Lubrication chart indicating lub. points, frequency of lubrication , grade & quantum of lubrication k. Specifications/Ratings of all Bought-Out-Items l. Warranty/Guarantee card for all bought out items m. Trouble Shooting Chart for Main and all Sub-Systems
13.0	<b>PERFORMANCE GUARANTEE</b>	The Performance of the Total Crane and the Components / Sub-Assemblies / Bought-Out-Items shall be guaranteed for a minimum period of twelve months from the date of performance acceptance at BHEL Works or 18 months from the date of supply whichever is earlier.

## **ANNEXURE-1**

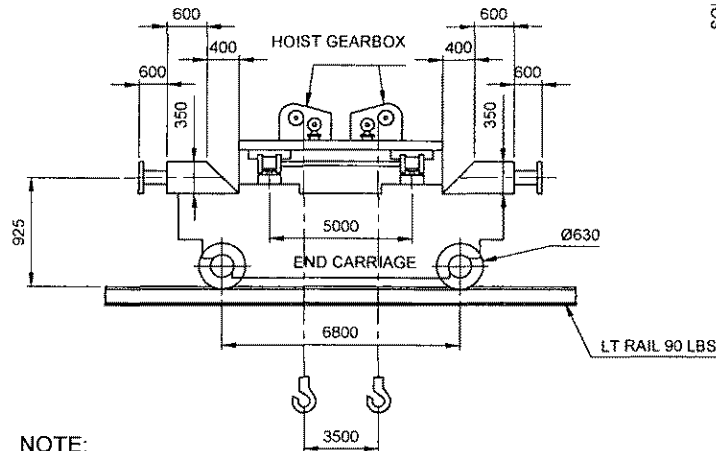
### **Drawing details**

	<b>FINISHING AREA, HYDRO MACHINE AREA CRANE &amp; AB BAY CRANE</b>	<b>IC BAY</b>
CRANE	3-7-0000-00-10308	3-7-0000-00-10306
END CARRIAGE	3-7-0000-00-10305	3-7-0000-00-10313
END CLEARANCE	3-7-0000-00-10312	
LT WHEEL ASSY	2-7-1090-02-00913 Rev 00	
CT WHEEL ASSY	2-7-1090-03-00881 Rev 00	

DRAWING NO. 3-7-0000-00-10308

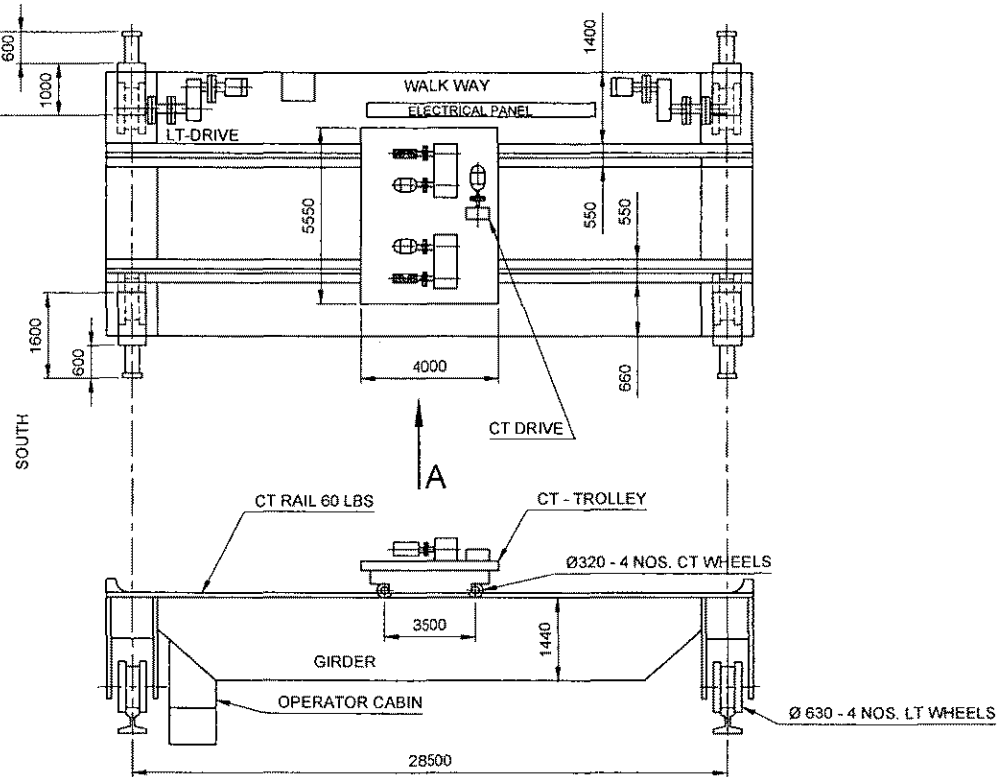
ALL DIMENSIONS ARE IN MILLIMETRES

	HOIST	LT	CT
MOTOR	30KW - 2	11KW - 2	5.5KW-1
GEARBOX	2	2	1
BRAKE UNIT	2	2	1



NOTE:

RAIL: LT - 90 LBS  
CT - 60 LBS  
LT WHEEL - Ø630  
CT WHEEL - Ø320



VIEW - A

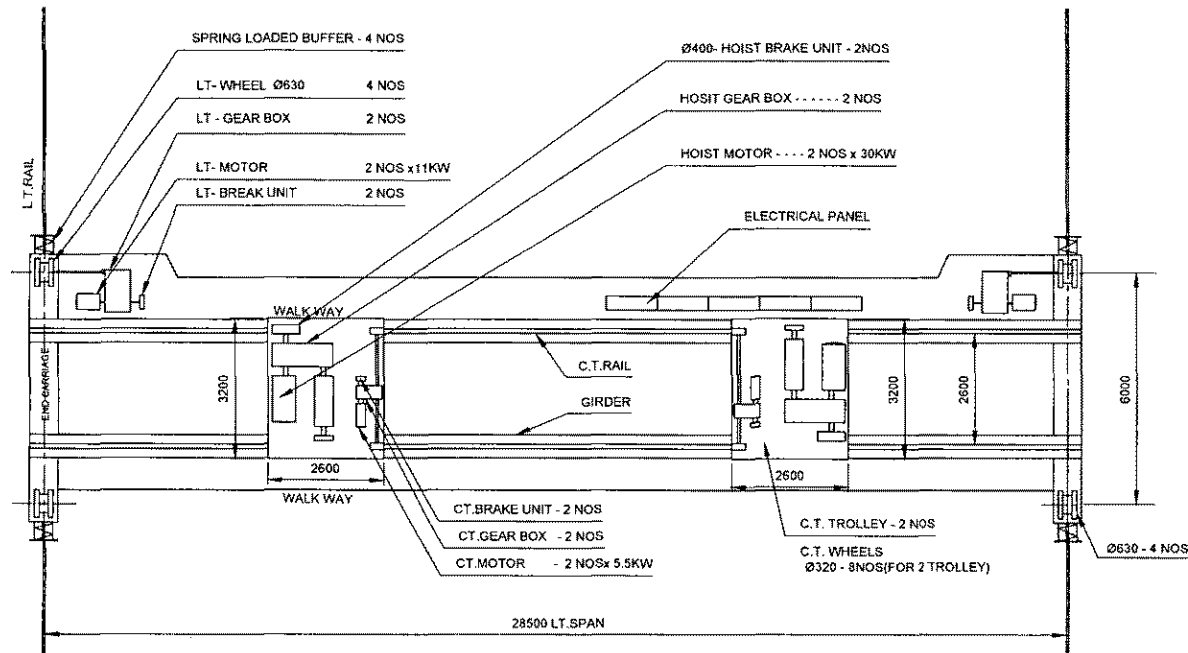
REV	DATE	ALTERED	CHECKED	APPROVED
01				

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ITEM NO	DESCRIPTION	DRAWING NO	MATL CODE	UNIT WT
			MATL SPEC	QTY
EQPT: Gen : EOT crane				
		Bharat Heavy Electricals Ltd SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014		
DRN	SSN.KUMAR/K.NR	SIGNATURE	DATE	
CHD	R.K.SINGH	<i>R.K. Singh</i>	12.08.15	
APPD	G.LOGANATHAN	<i>G. Loganathan</i>	12.08.15	
DEPT	SSTP	GRADE OF UNTO. DIM	SCALE	WEIGHT (Kg)
CODE	456	Ø/M/F IS: 2102	1:1	-
TITLE		REF TO ASSY DWG NO		
GEN - CRANE FOR AB BAY		REF TO OLD DWG NO		
5+5=10T; DOUBLE HOOK SINGLE TROLLEY		CMM:211 Dt: 09.07.2015		
CARD CODE	U 01	DRAWING NO :		REV
		3-7-0000-00-10308		00

DRAWING NO. 3-7-0000-00-10306

ALL DIMENSIONS ARE IN MILLIMETRES




NOTE:

RAIL: LT - 90 LBS  
CT - 60 LBS  
LT WHEEL - Ø630  
CT WHEEL - Ø320

REV	DATE	ALTERED
01		CHECKED
		APPROVED

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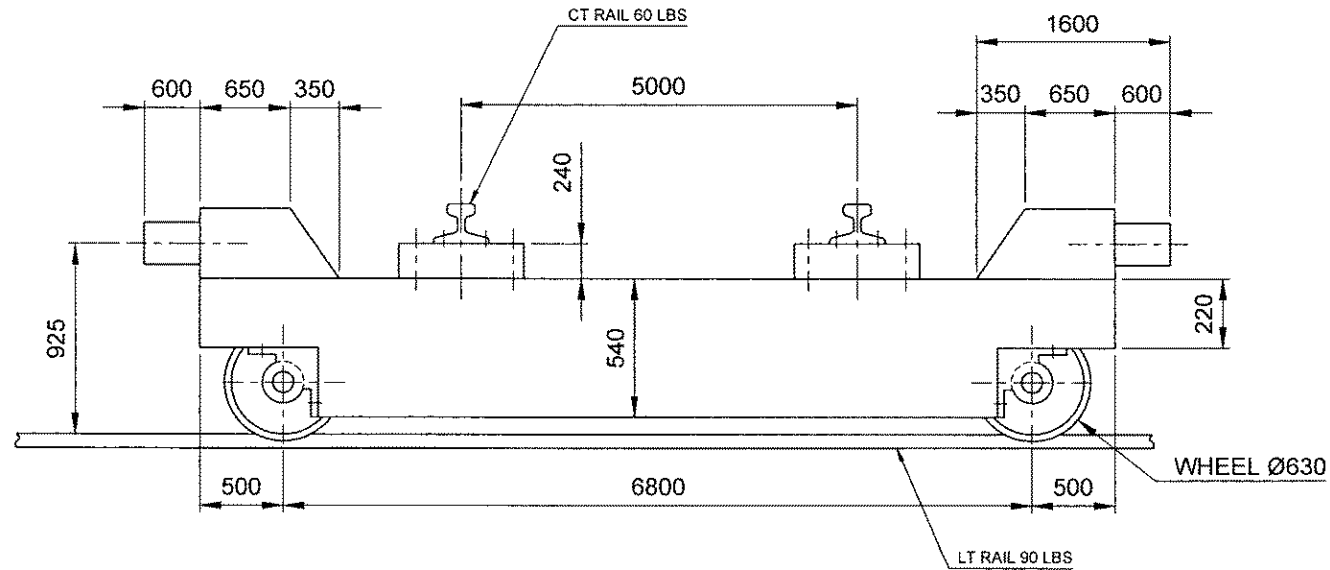
ITEM NO	DESCRIPTION	DRAWING NO	MATL CODE	UNIT WT
EQPT: GENERAL : -EOT CRANE			MATL SPEC	QTY
 <b>Bharat Heavy Electricals Ltd</b> SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014			NAME SSN.KUMAR/YS.M RK.SINGH G.LOGANATHAN	SIGNATURE <i>SSN.Kumar/ys.m</i> <i>RK.Singh</i> <i>G.Loganathan</i>
DEPT	GRADE OF UNTO. DIM	SCALE	WEIGHT (Kg)	REF TO ASSY DWG NO
SSTP	Q/M/F	1:1	-	REF TO OLD DWG NO
CODE	IS: 2102			CM:210 DT:06.07.15
TITLE <b>GEN - I.C BAY CRANE TOP VIEW</b> <b>10T(5T+5T) DOUBLE TROLLEY</b>			CARD CODE U 01	DRAWING NO : <b>3-7-0000-00-10306</b>
				ITEM 00

A3-SIZE





DRAWING NO: 3-7-0000-00-10305

ALL DIMENSIONS ARE IN MILLIMETRES



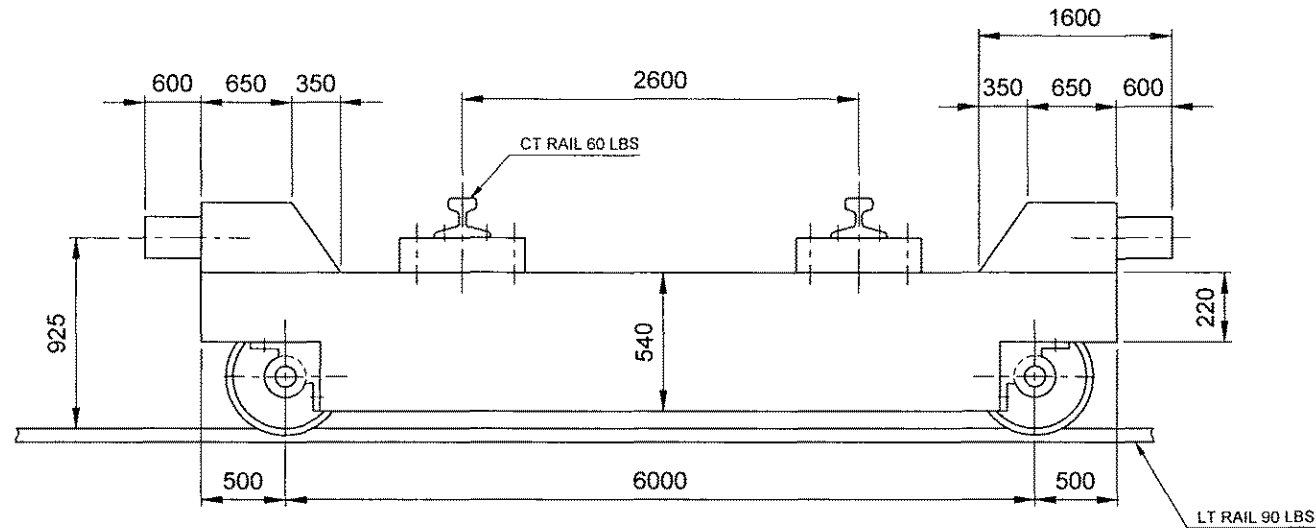
REV	DATE	ALTERED
01		CHECKED
		APPROVED

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ITEM NO	DESCRIPTION	DRAWING NO	MATL CODE	UNIT WT	
			MATL SPEC	QTY	
EQPT: GEN : EOT CRANE					
 <b>Bharat Heavy Electricals Ltd</b> SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014		DRN	NAME	SIGNATURE	DATE
		CHD	R.K.SINGH	R.K. Singh	12.08.15
		APPD	G.LOGANATHAN	G. Loganathan	12.08.15
DEPT	GRADE OF UNTOL. DIM	SCALE	WEIGHT (Kg)	REF TO ASSY DWG NO	ITEM
SSTP	456	1.5:1	-	-	-
CODE 456			REF TO OLD DWG NO CMM:212 Dt: 09.07.2015	REF TO OLD DWG NO CMM:212 Dt: 09.07.2015	
TITLE			CARD CODE	DRAWING NO :	REV
GEN - CRANE END CARRIAGE (FOR AB BAY)			U 01	3-7-0000-00-10305	00



A3-SIZE

DRAWING NO: 3-7-0000-00-10313



REV 01	DATE	ALTERED
		CHECKED
		APPROVED

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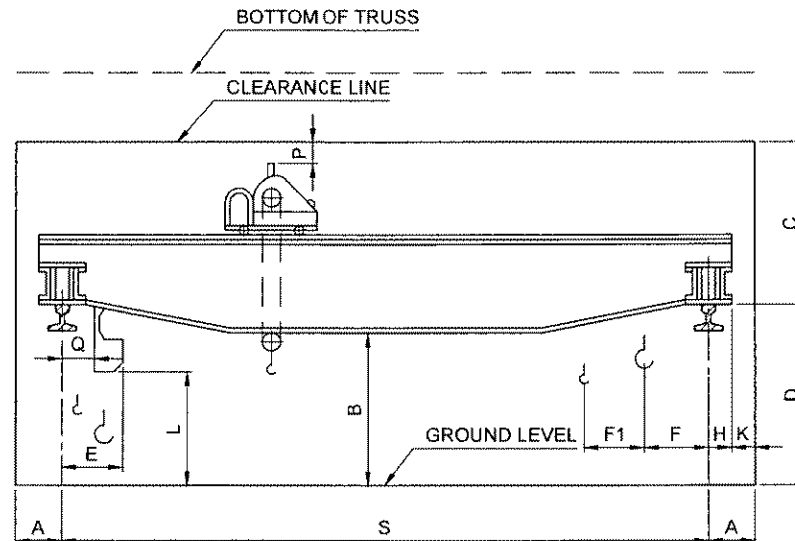
ITEM NO		DESCRIPTION		DRAWING NO		MATL CODE		UNIT WT	
						MATL SPEC		QTY	
EQPT: Gen : EOT crane									
 <b>Bharat Heavy Electricals Ltd</b> SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014				DRN	NAME SSN.KUMAR/K.NR	SIGNATURE <i>SSN.Kumar/K.Nr</i>	DATE 12.08.15		
				CHD	R.K.SINGH	<i>R.K. Singh</i>	12.08.15		
				APPD	G.LOGANATHAN	<i>S. Loganathan</i>	12.08.15		
DEPT SSTP CODE	GRADE OF UNTOL DIM <i>φ/M/F</i> IS: 2102		SCALE 1:5:1	WEIGHT (Kg) -	REF TO ASSY DWG NO -				ITEM -
456					REF TO OLD DWG NO -				
					CMM:218 dt 09.07.2015				
TITLE GEN - CRANE END CARRIAGE ( FOR IC BAY)					CARD CODE U 01	DRAWING NO : 3-7-0000-00-10313			REV 00

A3-SIZE

DRAWING NO: 3-7-0000-00-10312

ALL DIMENSIONS ARE IN MILLIMETRES

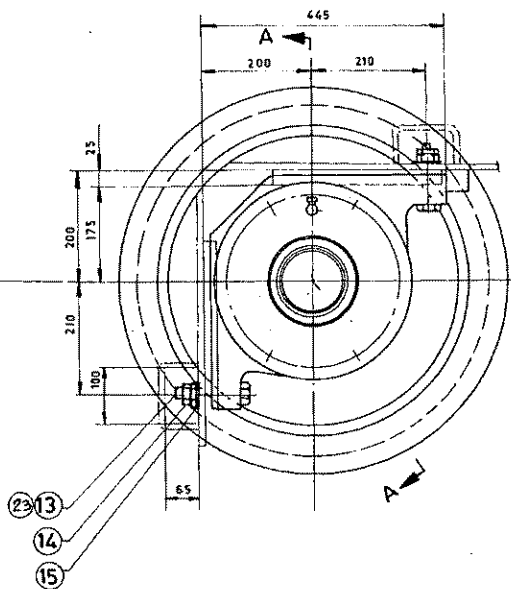
	10Tx28650 9 M LIFT	HYDRO / M&S 5T+5T	FINISHING 5T + 5T	I.C. BAY 5T+5T	AB BAY 5T+5T
S	28650	28500	28500	28500	28500
D	9000	9000	9000	9000	9500
C	3000 MAX.	2860	2860	2820	3470
A	300	485	485	475	475
K	100 MIN.	250	250	250	250
P	1250	770	610	460	890
B		7600	7430	7100	8900
L		5250	5580	5200	6600
Q		1630	1000	1000	1000
F		2400	2400	1200	2000
F1		-	-	-	-
H		185	185	175	175
E		3850	2800	3400	3200



CAUTION: THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

ITEM NO	DESCRIPTION	DRAWING NO	MATL CODE	UNIT WT
			MATL SPEC	QTY
EQPT: Gen : EOT crane				
		NAME: SSN.KUMAR/K.NR SSN.Kumar/K.Nr DATE: 12.08.15		
BHARAT HEAVY ELECTRICALS LTD SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014		DRN: R.K.SINGH R.K.Singh DATE: 12.08.15		
DEPT: SSIP CODE: 456		APPD: G.LOGANATHAN G.Loganathan DATE: 12.08.15		
GRADE OF UNTOL. DIM: 456 456		SCALE: 1:1 WEIGHT (Kg): -		
TITLE: GEN - CLEARANCE DIAGRAM FOR E.O.T CRANE		REF TO ASSY DWG NO: - REF TO OLD DWG NO: CMM:217 dt 04.08.15		
CARD CODE: U 01		DRAWING NO: 3-7-0000-00-10312		
REV: 01		REV: 00		

A3-SIZE



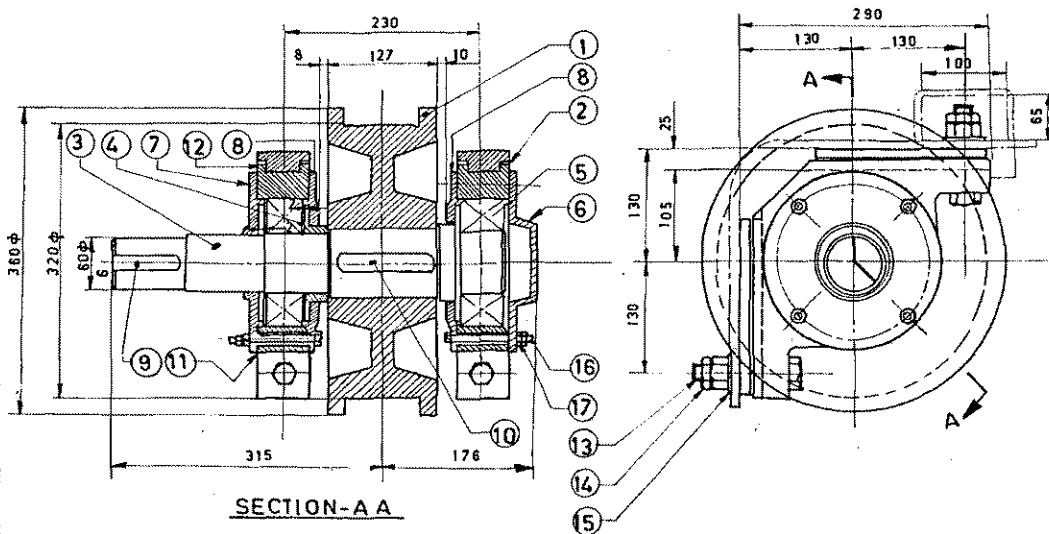
DETAIL-B

1. ALL DIMENSIONS ARE IN MM.
2. THE DIFFERENCE IN THE DRG. WHEEL DIAMETERS FOR ONE CRANE SHOULD BE WITHIN 0.2 MM
3. QUANTITY SHOWN IN TABLES IS FOR ONE ASSY.
4. ITEM NO IS FOR TRAILING WHEEL ASSY. ONE
5. ITEM NOS GIVEN IN COMPONENTS DRG CORRESPOND TO THE RESPECTIVE ITEM NOS GIVEN HERE

— 金 1 2 5 元 大 2



FIRST ANGLE PROJECTION (ALL DIMENSIONS IN MILLIMETRES)



SECTION-A-A

NOTES:-

- 1 ALL DIMENSIONS ARE IN MM
- 2 THE DIFFERENCE IN THE DRIVING WHEEL DIAMETERS FOR THE CRANS SHOULD BE WITH IN 0.2 MM
- 3 QUANTITY SHOWN IN THE TABLE IS FOR ONE WHEEL ASSEMBLY.
- 4 ITEM NOS. GIVEN IN COMPONENTS DRG. CORRESPOND TO THIS

ITEM NO	DESCRIPTION	DRAWING NO.	MATL. CODE	UNIT WT.
17	M 12 LOCK NUT		IS : 1363	8
16	M 12 X 200 LG BOLT NUT		IS : 1363	8
15	A 20 R. WASHER		IS : 2016	4
14	M 20 LOCK NUT		IS : 1363	4
13	M 20 X 110 LG BOLT NUT		IS : 1363	4
12	MOUNTING PAD	046 302/1	ST 32.0	1 7
11	0.5 THICK GASKET			4
10	KEY 22X14X115 LG(R.R)		C 40	0 36
09	KEY 18X11X80 LG(R.R)		C 40	0 13
08	BEARING COVER	046 302/1	ST 32.0	6 6
07	BEARING COVER	046 302/1	ST 32.0	2 1
06	BEARING COVER	046 302/1	ST 32.0	3 6
05	BEARING SKF 22316			4 3
04	DISTANCE RING	046 302/1	ST 32.0	0 5
03	AXLE(DRIVING)	046 302/1	C 55 N-75	15 0
02	BEARING BLOCK	046 302/1	ST 32.0	13 0
01	WHEEL 320 φ	046 301/1	C-60	47 0
ITEM NO	DESCRIPTION	DRAWING NO.	MATL. SPEC.	QTY.



Bharat Heavy Electricals Ltd.,  
SEAMLESS STEEL TUBE PLANT  
TIRUCHIRAPALLI-620 014

DRN	NAME	SIGN	DATE	NO OF
CHD				TYPS
APPD				

REV	DATE	ALTERED	DEPT	GRADE OF	SCALE	WEIGHT (KG)	REF TO PREVIOUS DRG	ITEM
01		CHECKED		C/M/F	1:4	120	139-400/0	REV
TITLE					CAND CODE			
320 φ WHEEL ASSEM					DRAWING NO.			
- BLY (CT DRIVE) (DRIVING)					2-1090-03-00881			