



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY

NOTICE INVITING TENDER

Phone: +91 431 257 7653

Fax :

Email : skaruna@bheltry.co.in

spsy@bheltry.co.in

kmk@bheltry.co.in

Web : www.bhel.com

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2711700002	03.07.2017	27.07.2017

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 is reaching physically our office before 14.00 hrs on the Date of tender opening.

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 www.bhel.com or http://tenders.gov.in)	4.00 Nos.	FOR, BHEL Stores, SSTP Tiruchirappalli - 620014

Important points to be taken care during submission of offer

1. Delivery required 6 Months including Design & Drg approval, Manufacturing and PDI (Testing) from the date of purchase order.
2. Supervision of Erection & Commissioning period required 4 months from the date of intimation by BHEL to vendor for deputation of their Engineers for Supervision E&C.
3. Erection will be carried out by BHEL/SSTP Scope.
4. EMD for this Tender will be (INR) : 2,00,000.00
5. Compliance Form Nos.: TRY/IMP/01 & TRY/IND/01A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
6. 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 / 001 - EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under above Enquiry reference.

Tenders should reach us before 14:00 hours 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**

DGM / Capital Equipment / MM

S.PARTHASARATHY
MANAGER
CAPITAL EQUIPMENT / MM
BHEL, TRICHY-620014.

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 (OEMs), who have supplied and commissioned at least ONE 10 Ton or higher capacity EOT CRANE of duty class-IV, with a span of 28 Meters & 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 enclose Two (Minimum 1) Performance certificate from the customer regarding satisfactory performance of the crane supplied to them. For obtaining the Performance certificate from the customer, a suggestive format is provided in SECTION – IV .	
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.

S. No.	PARTICULARS	VENDOR'S RESPONSE
5.0	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.	
6.0	Number of EOT Cranes supplied and commissioned till date.	
7.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject crane.	
8.0	The vendor (Indian / Foreign) may visit SSTP/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	The BIDDER / VENDOR shall submit the offer in TWO PARTS. 1. Technical offer (with PART A & PART B) & Commercial offer. 2. Price Bid (One lump sum must be quoted for supply, commissioning of all 4 cranes and prove out as per specification). Erection of cranes by BHEL and the supervision of erection by supplier engineers.	
10.0	The Offer shall contain a comparative statement of Technical Specifications specified by BHEL and Offer Details submitted by the Bidder , against each clause. 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. Bidders may be requested for technical discussions at SSTP/BHEL for any technical clarifications in their submitted offers.	
11.0	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	

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		
Date: Signature & Seal of the Authority Issuing the Performance Certificate			

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 26-06-2017**

S.No.	PARTICULARS	BHEL SPECIFICATIONS
1.0	APPLICATION	a. The subject crane is meant for the purpose of handling (within the lifting capacity of the crane) components, bar / round stocks (bloom), tubes & pipes in closed shed. 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). c. The shop floor/storage yard environment will be in ambient temperature going up to 45° C.

2.0	SCOPE OF SUPPLY A) Double box type girder, <u>single trolley</u>, double hook EOT crane.-3 nos B) Double box type girder, <u>double trolley</u> EOT crane.-1 no	a. Design Crane as per the Tender Specifications given under this PART-B. Quantity: 4 Nos As detailed below. A) Hydro Machine Area crane, Finishing Area crane , AB Bay crane (Drg.3-7-0000-00-10308 & End carriage Drg.3-7-0000-00-10305) Qty-3 nos B) IC Bay crane (Drg. 3-7-0000-00-10306 & End carriage Drg.3-7-0000-00-10313) Qty- 1 no (2 nos. in Cold mill finishing bay,1 in IC bay, 1 in Hot mill AB bay) b. Detailed design, Manufacture, Assembly and Testing before Dispatch c. Supply in major Sub-Assemblies/Modules d. Erection in SSTP/BHEL is in BHEL scope. e. Commissioning and Performance Prove-Out at BHEL Works is suppliers scope. f. Performance Guarantee for 12 months, from the date of commissioning.
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3.0	TECHNICAL SPECIFICATIONS	#- BHEL special requirement (need not be compared with design calculation values)
3.1	CAPACITY	Lifting capacity
3.1.1	Main Hoist	10MT Single trolley double hoist each 5T individual drive mechanism for each hook- 3 Cranes. 10MT Double trolley single hook each 5T individual drive mechanism for each trolley—1 Crane
3.2	SPAN	Wheel Centre to Wheel Centre Dimensions
3.2.1	Long Travel (LT)	28,500 mm
3.2.2	Cross Travel (CT)	2,600 mm for IC Bay /5000 mm for other cranes
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	18.5 KW, 180 M, 6 Pole x 2 nos for each crane #
3.6.2	Cross Travel (CT)	5.5 KW, 132S, 6 Pole x 1 no.each for 3 cranes # 5.5 KW, 132S, 6 Pole x 2 nos. for IC bay Crane #
3.6.3	Long Travel (LT)	11 KW, 160L, 6 Pole x 2 nos for each crane. #
3.7	GEAR BOX	Gear Box Size
3.7.1	Main Hoist	HR 450-2 or 3 stage gear reduction, 30HP

3.7.2	Cross Travel (CT)	VR 250-2 or 3 stage gear reduction, 7.5HP
3.7.3	Long Travel (LT)	HR 300-2 or 3 stage gear reduction, 15HP
3.8	ACCELERATION	
3.8.1	Cross Travel (CT)	300 mm / sec. sq.
3.8.2	Long Travel (LT)	300 mm / sec. sq.
3.9	HOIST ROPE DETAILS	Size and Number of Falls of Rope
3.9.1	Main Hoist	Dia. 12 mm; Falls - 4 #
3.10	CONTROL	Cabin Operation and Remote Control
3.11	Type of Control	Master Control and Radio Remote Control
3.12	Control Voltage	230V AC #
3.13	Input Power Supply	415 Volts $\pm$ 10%, 50 Hz $\pm$ 3% , 3 Phase- AC
3.14	Duty Class	Class – IV [Heavy Duty]
3.15	Mechanism Group Classification	M 8
3.16	DESIGN STANDARD	IS – 807 & 3177 -2006
3.17	Runway Rail Size	
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	Wheel Size	
3.18.1	Cross Travel (CT)	Dia. 320 mm – 4 Nos for 3 cranes and 8 Nos for IC Bay crane
3.18.2	Long Travel (LT)	Dia. 630 mm - 4 Nos for each crane
3.19	Brake Drum Size	Brake Drum Sizes
3.19.1	Hoist	Dia. 300 mm (BCH)
3.19.2	Cross Travel (CT)	Dia. 200 mm (BCH)
3.19.3	Long Travel (LT)	Dia. 200 mm (BCH)
4.0	MAIN FEATURES	Crane Operational Features
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.
5.0	STRUCTURAL FABRICATION	Crane Structure Constructional Details –Double girder box type construction EOT crane.
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 1/3rd 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	Min. Height (Flange inner-inner) – 600mm (min) Min. width (Web inner-inner) – 292mm (min) Top flange plate thickness – 12mm (min) Bottom flange plate thickness – 10mm (min) Web plate thickness – 8mm (min) Width of top flange and bottom flange 350mm (min) Vertical diaphragm plate thickness – 6mm (min) Vertical diaphragms shall be made of solid plates only.
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.
5.3	Welded Joints.	To be followed for girder fabrication.
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 coming for Cross Travel (CT) & Long Travel (LT) shall be of LIVE AXLE SYSTEM with L-Type Bearings. [Refer to BHEL Drawing No. 3-M-02R-0011993. 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.
6.0	MECHANICAL ELEMENTS	
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.
7.0	ELECTRICAL ELEMENTS	
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 – DC BCH Make	a. Main Hoist - DC Electromagnetic Brake (BCH) b. Cross Travel - DC Electromagnetic Brake (BCH) c. Long Travel - DC Electromagnetic Brake (BCH)
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 /ENERGY CHAIN 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	Earthing	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.

8.0	SELECTION OF COMPONENTS	The make of Components or Bought-Out-Items shall be strictly as per the list given below.
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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 800 / SIEMENS-S120/ DANFOSS- FC302
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
8.10.1	Rotary limit switch	SIEMENS / OMEGA / SOC / INDUSTRIAL SYNIDICATE
8.11	Switch fuse unit	SIEMENS / SCHNEIDER / ABB / GE / L&T
8.12.0	Molded case C.B	SIEMENS / SCHNEIDER / ABB / GE / L&T
8.12.1	Pneumatic time delay	Only BCH make
8.13	ON Delay Timer	SIEMENS/GEC/AREVA
8.14	Push - Buttons	SIEMENS / SCHNEIDER / ABB
8.15	Connectors	ELMEX / CONNECTWELL
8.16	Couplings	WMI / FENNER / ALFEX / HI-CLIFF / LOVEJOY
8.17	Bearings	SKF / FAG / NTN
8.18	Cables	Reputed Makes & ISI Approved
8.19	Bridge Light Fittings	PHILIPS / GE / CROMPTON
8.20	Load Cell	IPA or reputed make acceptable to BHEL
8.21.0	Resistance box	OHMARK / ELECTROMAG
8.21.1	VVVF Drives	ABB / SIEMENS/ DANFOSS
8.22	Other Elements	Vendor to specify items & makes
8.23	Gear boxes	ELECON/SHANTHI GEARS /RADICON/CROMPTION GREAVES
8.23 A	Drag chain	
9.0	DOCUMENTS / DETAILS for APPROVAL	The following documents and details are to be submitted for BHEL Approval, prior to taking up the manufacture of the crane.

9.1	Drawings and Documents	Set I - Calculations for selection of Electric motors, Gear reducers, Brakes, couplings, etc. - Calculations for Bridge Girder, crab, end carriage and their connections - GA Drawing of the crane - GA Drawing of Trolley - GA Drawing of Individual Mechanism Set II - Drawings of Bridge, End-carriage bogies and their connection - Sub-Assembly and individual part drawing for wheels, Hook blocks, Gear Boxes, Gears, Hoist rope drums, Bearing number details, Oil seal details and all brake drums. - Electrical wiring diagram with Logic circuits and Bill of Materials. - Cable selection based on current rating. Initially set I drawings to be submitted in one lot and approval to be obtained from BHEL. Based on this, set II drawings to be submitted for approval.
9.2.	Technical Details	- Total Weight of the Crane including all Electrical Equipment - Total Weight of Trolley including all Electrical Equipment - Weight of each Bridge assembled and ready for erection with and without Mechanical and Electrical Equipment. - Weight of each End - Carriage assembled and ready for erection - Total Weight of Structural, Mechanical and Electrical Equipment are indicated separately also. - Weight of Operator's Cabin together with all Equipment mounted in it.
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	a. Verification of Test Certificate for Raw Materials used for Girders, End-Carriages, Trolleys, Gear Box Casings, etc. b. Verification of X-Ray Report of Butt-Joints coming in the Girders and Random Testing on the Welds, by physical examination. c. Box Girder setting before closing of the Bottom Flanges – for inspecting the quality of welding and presence of waviness d. Trolley Frame Fabrication before setting the Mechanisms e. End – Carriage Fabrication before closing of the bottom flanges. The following Test certificates to be produced during stage-I inspection. 1. TC for plates used for bridge fabrication. 2. TC for plates used for End carriage fabrication. 3. TC for the steel rounds used for gear fabrication. 4. TC for plates used for gear box casing fabrication. 5. X-Ray film and report for all the Butt-Joints in the girders.
10.2	STAGE – II	a. Inspection of Bridges and End – Carriages with Wheel Assembly and Alignment checking. b. Verification of Span & Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment. c. Free running of the all the Mechanisms. d. Measurement of CAMBER in the bridges The following Test certificates to be produced during stage-II inspection. 1. TC for hoist hooks 2. TC for Steel wire ropes. 3. TC for Heat treatment and final hardness for all gears. 4. TC for Wheel Hardness for LT and CT 5. TC for all BCH DC Brakes. 6. TC for all motors. 7. TC for all limit switches. 8. TC for all VVVF drives.

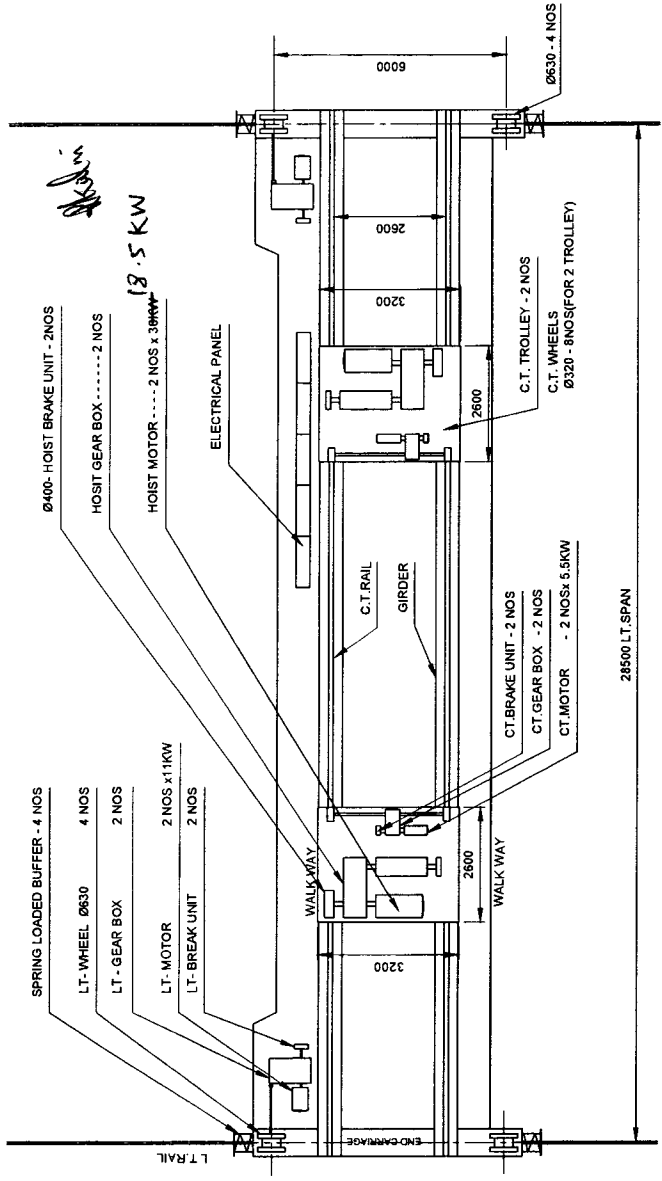
10.3	STAGE – III [Final Inspection]	a. Measurement of CAMBER in the Bridges. b. Full / Rated Load Test and Deflection Test. c. Deflection and Permanent Set Measurement. d. 25% OVER-LOAD Lifting Ability Check.
11.0	CRANE ERECTION & COMMISSIONING	
11.1	Mechanical Erection	Erection of the Crane to be done by BHEL, However erection supervision is in supplier scope,
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	O & M MANUALS	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 drawing h. Gear Box Assembly and part Drawings i. Coupling Drawing and Details j. Specifications/Ratings of All Bought-Out-Items k. Warranty/Guarantee card for all bought out items l. Trouble Shooting Chart for Main and all Sub-Systems
13.0	PERFORMANCE GUARANTEE	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

1. IC Bay crane 3-7-0000-00-10306
2. End carriage of IC Bay crane 3-7-0000-00-10313
3. AB Bay & Finishing Bay Cranes 3-7-0000-00-10308
4. End carriage of AB Bay crane 3-7-0000-00-10305
5. End clearance for finishing bay, IC bay, AB bay cranes
3-7-0000-00-10312.
6. Wheel assembly drawing. 3-M-02R-0011993.

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

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.

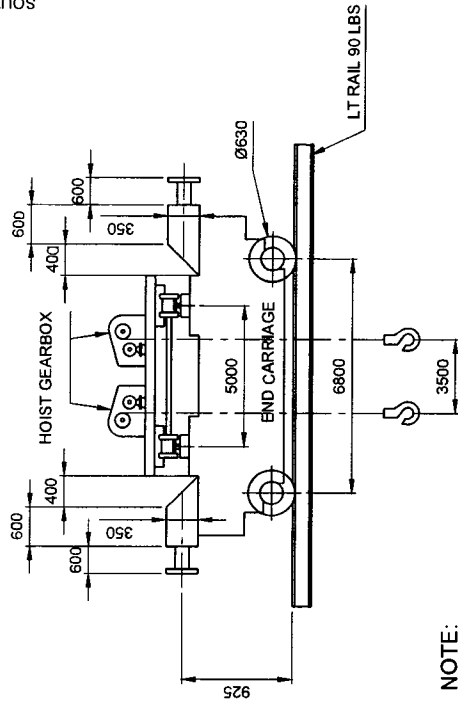
ITEM NO	DESCRIPTION	DRAWING NO	MATL CODE	MATL SPEC	UNIT WT	QTY
EQUIP: GENERAL : -EOT CRANE						
Bharat Heavy Electricals Ltd SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014			NAME	SSN KUMAR/YS.M	SIGNATURE	DATE
			DRN	RK.SINGH	SKS. Singh	12.08.15
			CHD	GLOGANATHAN	S. Loganathan	12.08.15
			APPD			12.08.15
DEPT	GRADE OF UNITS DIM	SCALE	WEIGHT (KG)	REF TO ASSY DWG NO	ITEM	
SSIP	Ø/M/f	1:1	-	-	-	
CODE	IS:2102			REF TO OLD DWG NO		
456				CM/210		DT:06.07.15
TITLE GEN - I.C BAY CRANE TOP VIEW 10T(5T+5T) DOUBLE TROLLEY			DRAWING NO : 3-7-0000-00-10306		REV	00
					CARD CODE	U 01

A3-SIZE

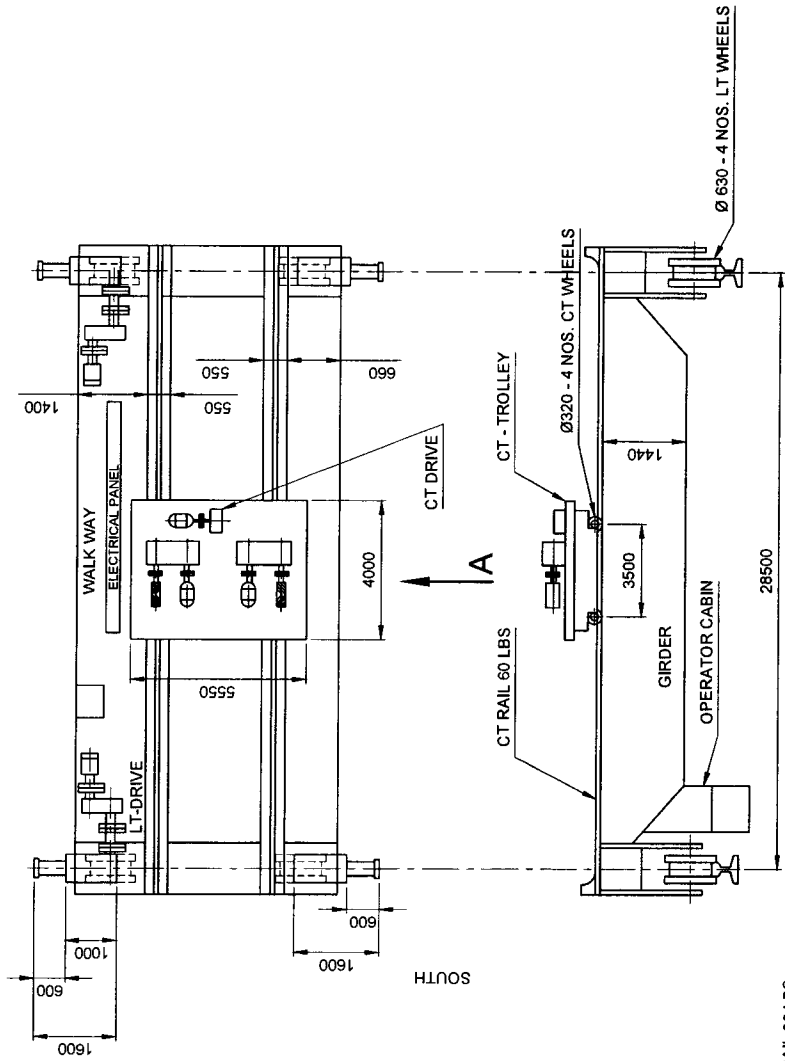
DRAWING NO: 3-7-0000-00-10308

18.5 KW x 2

	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

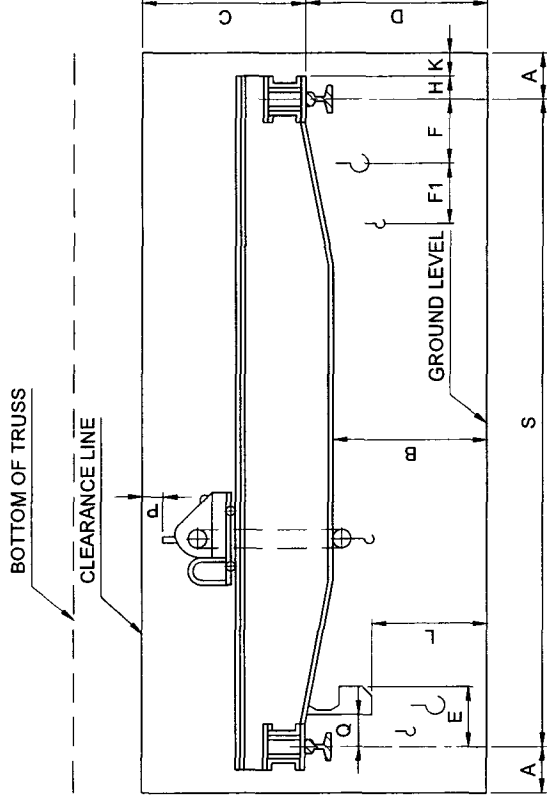
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ITEM NO	DESCRIPTION	DRAWING NO	MATL CODE	UNIT WT	QTY
EQUIP: Gen : EOT crane					
Bharat Heavy Electricals Ltd SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014		NAME SSA KUMAR/K.N.R	SIGNATURE [Signature]	DATE 12.08.15	
DEPT	SSIP CODE	DRN	CHK	APRD	ITEM
GRADE OF UNTOOL DIM Ø/M/F RS-2102	456				
SCALE	WEIGHT (Kg)	REF TO ASSY DWG NO	REF TO OLD DWG NO	CMW:211	DI 09.07.2015
1:1	-				
TITLE GEN - CRANE FOR AB BAY 5+5=10T:DOUBLE HOOK SINGLE TROLLEY		CARD CODE U 01	DRAWING NO : 3-7-0000-00-10308		
REV		DATE	REV		
01	12.08.15	00			

A3-SIZE

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

ALL DIMENSIONS ARE IN MILLIMETRES



	10TX28650 9M 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

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ITEM NO	DESCRIPTION	DRAWING NO	MATL CODE	MATL SPEC	UNIT WT	QTY
EQUIP. Gen : EOT crane						
Bharat Heavy Electricals Ltd SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI - 620014		DRN	SSN.KUMAR/K.NR	SIGNATURE	DATE	
		CHK	R.K.SINGH	R.K. Singh	12.08.15	
		APPD	G.LOKANATHAN	G. Lokanathan	12.08.15	
DEPT	SSTP	GRADE OF UNTOOL OM	SCALE	WEIGHT (Kg)	REF TO ASSY DWG NO	ITEM
456	456	15.2102	1:1	-	REF TO OLD DWG NO	-
TITLE			DRAWING NO : 3-7-0000-00-10312			
GEN - CLEARANCE DIAGRAM FOR E.O.T CRANE			REV 00			

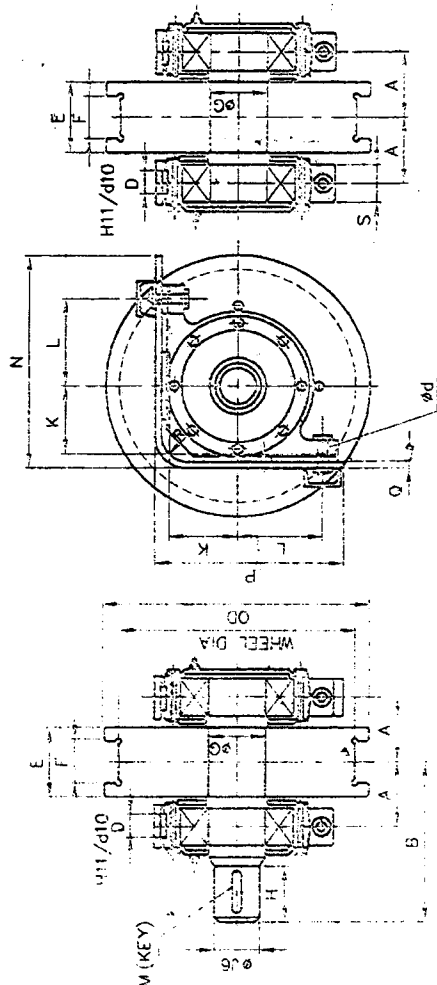
A3-SIZE

ALL DIMENSIONS ARE IN MM

SL. No.	WHEEL DIA) IN MM	RAIL SIZE	A	B	D	E	F	ØG	H	ØJ	K	L	Ød	M (KEY)	N	P	Q	S	R	COUPLING No.	SKF BRG No. & BRG. SIZE	TOTAL WEIGHT IN Kg. FOR DRIVE & IDLE
16	800/850	CR-100 CR-120	190	450	80	210	150	152	140	130	212	255	32	32x18x130	587	588	20	150	80	107	22330 150x320x108	870.00
15		CR-80	168	420	80	180	110	152	125	110	212	255	32	28x16x115	687	588	20	150	80	106	22330 150x320x108	845.00
14		CR-100 CR-120	190	450	80	210	150	152	140	130	212	255	32	32x18x130	642	588	20	150	80	107	22330 150x320x108	796.00
13	110/750	CR-100 CR-120	180	420	71	210	150	132	125	110	180	224	32	28x16x115	607	517	20	130	80	106	22326 130x280x93	775.00
12		CR-80	180	400	71	180	110	132	125	110	180	224	32	28x16x115	607	517	20	130	80	106	22326 130x280x93	808.00
11	630/680	CR-80/CR-100 & CR-120	180	420	71	210	150	132	125	110	180	224	32	28x16x115	567	517	20	130	80	106	22326 130x280x93	728.50
10		CR-100 CR-120	150	365	60	180	105	111	110	90	160	190	26	25x14x100	547	462	20	120	60	105	22322 110x240x80	653.00
9		CR-80 CR-100	160	375	60	180	125	111	110	90	160	190	26	22x14x100	482	462	20	120	60	105	22322 110x240x80	536.00
8	500/550	CR-80	150	360	50	180	125	91	105	80	125	160	26	22x14x90	445	395	20	100	50	104	22318 90x180x64	629.00
7		80/75/70 & 105 Lbs/7d	150	360	50	180	105	91	105	80	125	160	26	22x14x90	445	395	20	100	50	104	22318 90x180x64	611.50
6	400/450	CR-80 CR-100	150	360	50	180	125	91	105	80	125	160	26	22x14x90	395	395	20	100	50	104	22318 90x180x64	448.00
5		90 Lbs/7d 105 Lbs/7d	145	315	40	180	105	76	85	70	112	140	22	20x12x75	375	345	16	90	50	103	22315 75x180x55	434.50
4	320/370	75 / 90 & 105 Lbs/7d	145	315	40	180	105	76	85	70	112	140	22	20x12x75	345	345	16	90	50	103	22315 75x180x55	253.00
3		CR-80 CR-100	112.5	260	40	125	85	61	65	55	85	112	17	16x10x55	312	287	16	80	50	102	22312 60x130x46	197.00
2	250/280	50 Lbs/7d 75 Lbs/7d	105	250	32	125	85	61	65	55	76	100	17	16x10x55	254	249	12	60	40	102	22212 60x110x28	162.00
1	200/230	50 Lbs/7d 75 Lbs/7d	95	220	32	100	67	46	55	40	71	95	17	12x8x45	239	232	12	65	40	101	22309 45x100x36	157.00
SL. No.	(WHEEL DIA) IN MM	RAIL SIZE	A	B	D	E	F	ØG	H	ØJ	K	L	Ød	M (KEY)	N	P	Q	S	R	COUPLING No.	SKF BRG No. & BRG. SIZE	TOTAL WEIGHT IN Kg. FOR DRIVE & IDLE

MATERIAL :- SHAFT - 45CB/IS:1228
WHEEL - 55CB/IS:1551
HEAD PATTERN WHEEL HARDNESS 300 TO 350 (BHN)

CHECKED DATE		APPROVED DATE		SCALE		DRAWN		DESCRIPTION		MATERIAL		STANDARD		NET WT. IN KGS.		DRAWING No.		EQUIPMENT CODE		REV.	
20-10-2000		20-10-2000		1:1		P. K. Srinivas		MACHINE CRANE WHEEL ASSY		STEEL		IS:1228		29		3-M-02R-11993		00		00	
DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE	
20-10-2000		20-10-2000		20-10-2000		20-10-2000		20-10-2000		20-10-2000		20-10-2000		20-10-2000		20-10-2000		20-10-2000		20-10-2000	



IDLE WHEEL ASSY

DRIVING WHEEL ASSY

3-M-02R-0011993