



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 70 49

Fax : +91 431 252 07 19

Email : csguna@bheltry.co.in

Web : www.bhel.com

TWO PART BID

Tender to be submitted in two parts.

**Enquiry
Number:**
2621000006

**Enquiry
Date:**
05.03.2010

**Due date for submission
of quotation:**
05.04.2010

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 |
|------|---|---------------|
| 10 | 5 Ton EOT Crane as per the technical specification, general guidelines instructions & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in) | 2 Nos. |

Important points to be taken care during submission of offer

1. Delivery required 10 months from the date of purchase order.
2. Grace period of 2 months beyond the above delivery period will be considered.
3. Checklist to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
4. Subsequent to the hosting of this Enquiry, any corrigendum to the Enquiry that may be hosted in the BHEL Web-site as well as Government Tenders-portal shall be viewed by the vendors regularly to know the details of corrigendum. In case if any vendor without seeing the corrigendum quoted as per original Enquiry and intimate that they have wrongly quoted will not be considered and rejected. However as per the appropriate Policy of BHEL action will be taken on them in this regard.

BHEL's General guidelines / instructions (refer MM/CE/GT/001) 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 Enquiry reference "2621000006".

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

Sr.Manager / MM / Capital Equipment

PART A**SECTION-I: -QUALIFING CRITERIA**

The BIDDER/VENDOR (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 | <p>Only those Bidder/vendor (OEM), who have supplied and commissioned at least ONE 5 Ton capacity EOT OR Gantry crane class-3 with minimum span of 32Mtr or higher and should have supplied frequency converter drive for similar capacity crane in the past five years and such crane is presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender), should quote.</p> <p>However, if such crane has been supplied to BHEL, then it should be presently working satisfactorily for more than six months after its commissioning and acceptance (on the date of opening of Tender) in BHEL.</p> <p>Performance certificate from the customers regarding satisfactory performance of cranes supplied to them in attached format should be enclosed along with technical offer.</p> | |
| 2.0 | 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. | |
| 3.0 | The bidding FIRM should have 'in-house' or 'self-owned' facility for FABRICATION and TESTING at 125 % of the rated capacity | |
| 4.0 | The vendor should have minimum 10 years experience in design, fabrication and supply of EOT cranes. | |
| 5.0 | <p>DELIVERY - The bidder shall quote the best possible delivery. However the delivery shall not exceed 10 months with an additional grace period of 2 months. The additional grace period will attract a penalty which is explained in the commercial terms of the enquiry.</p> <p>The delivery period shall be reckoned from date of purchase order to despatch from the vendor works.</p> | |

SECTION – II

The vendors are requested to provide the following details

| S. No. | PARTICULARS | VENDOR'S RESPONSE |
|---------------|---|--------------------------|
| 6.0 | Number of Years of Experience of the BIDDER/ VENDOR (OEM) in the field of design, manufacture, supply, erection & commissioning of cranes | |
| 7.0 | Number of cranes supplied, installed and commissioned till date | |
| 8.0 | Number of cranes supplied, installed and commissioned till date in the QUOTED MODEL | |
| 9.0 | Number of cranes supplied, installed and commissioned till date for the following category of CUSTOMERS a) Power Utility Boiler Manufacturer b) Equipment Supplier for Process Industries [Heavy Engineering Companies] c) Research Establishments | |
| 10.0 | Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centre in India and Asia | |
| 11.0 | Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment. | |

SECTION – III

Bidder / Vendor (OEM) to note the following

| S.No. | REQUIREMENTS | VENDOR'S RESPONSE |
|--------------|--|--------------------------|
| 12.0 | The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid. | |
| 13.0 | The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. Where details are required, a mere 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer. | |
| 14.0 | The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria | |
| 15.0 | 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 | |
| 16.0 | BIDDER has to indicate the Country of Origin for the supply of equipment. | |

PERFORMANCE CERTIFICATE

(On Customer's Letter Head)

1. Supplier of the Equipment :
2. Make & Model of the Equipment :
3. Month & Year of Commissioning :
4. Application :
5.
 - a) Crane Type:
 - b) Crane Capacity (Metric Tonnes):
 - c) Crane span :
 - d) Mechanism class :
6. Performance of the Equipment : Satisfactory /
(Strike off whichever is not applicable) Good /
Average /
Not Satisfactory
7. Any other remarks:

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

PART B.**TECHNICAL SPECIFICATIONS FOR 5 T ELECTRICALLY OPERATED
OVER-HEAD TRAVELLING [E O T] CRANE WITH DOUBLE GIRDERS**

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|--------------|---------------------------------|--|---|
| 1.0.0 | APPLICATION | a. The subject crane is meant for the purpose of handling small to large (within the lifting capacity of the crane) components, in a heavy and large steel fabrication shopfloor. b. The crane will be put to use for continuous duty with CT, LT and Hoist movements, which may occur simultaneously (within the operating parameters specified under Clause Nos. – 3.1.0, 3.4.0 and 3.5.0). c. The shop floor environment will be dust prone, humid, welding fume filled and ambient temperature going up to 45 ° C, due to pre-heating of jobs. | |
| 2.0.0 | SCOPE OF SUPPLY | a. Design as per Tender Specifications b. Detailed Design, Manufacture, Assembly and Testing before Despatch c. Supply in Modules / Sub-Assemblies d. Commissioning and Performance Prove-Out at BHEL Works e. Performance Guarantee for 12 months, from the date of commissioning. | |
| 3.0.0 | TECHNICAL SPECIFICATIONS | | |
| 3.1.0 | CAPACITY | Lifting Capacity | |
| 3.1.1 | Main Hoist | 5 Metric Tonnes | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|--------------|--------------------|---|---|
| 3.2.0 | SPAN | Wheel Centre to Wheel Centre Dimensions (Rail Centre to Rail Centre) | |
| 3.2.1 | Long Travel (LT) | 34,500 mm | |
| 3.2.2 | Cross Travel (CT) | 2,500 mm | |
| 3.3.0 | Height of Lift | 9,000 mm [Effective Height of Lift for both HOIST] | |
| 3.4.0 | DUTY CYCLE | Related to Drive Motor & Mechanisms | |
| 3.4.1 | Hoists | 40 % CDF | |
| 3.4.2 | Long Travel | 40 % CDF | |
| 3.4.1 | Cross Travel | 40 % CDF | |
| 3.5.0 | SPEED | Operating / Working Speed [Maximum] | |
| 3.5.1 | Main Hoist | 15.0 mtrs./minute. | |
| 3.5.2 | Cross Travel (CT) | 30.0 mtrs./minute. | |
| 3.5.3 | Long Travel (LT) | 70.0 mtrs./minute. | |
| 3.6.0 | MOTOR RATINGS | Electric Motor Ratings & Frame | |
| 3.6.1 | Main Hoist | Min. 11 kW, 6 Pole, S4 duty, Sq. Cage motor | |
| 3.6.2 | Cross Travel (CT) | Min. 2.2 kW, 6 Pole, S4 duty, Sq. Cage motor | |
| 3.6.3 | Long Travel (LT) | Min. 2x3.7 kW, 6 Pole, S4 duty, Sq. Cage motor | |
| 3.7.0 | GEAR BOX | Gear Box Size | |
| 3.7.1 | Main Hoist | HR 500 | |
| 3.7.3 | Cross Travel (CT) | VR 320 | |
| 3.7.4 | Long Travel (LT) | HR 350 | |
| 3.8.0 | ACCELERATION | | |
| 3.8.1 | Cross Travel (CT) | 300 mm / sec.sq. | |
| 3.8.2 | Long Travel (LT) | 300 mm / sec. sq. | |
| 3.9.0 | HOIST ROPE DETAILS | Size and Number of Falls of Rope | |
| 3.9.1 | Main Hoist | Dia. 18 mm ; Falls - 4 | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|---------------|-----------------------------------|--|---|
| | | | |
| 3.10.0 | CONTROL | Cabin Operation and Remote Control | |
| 3.11.0 | Type of Control | Master Control and Radio Remote Control | |
| 3.12.0 | Control Voltage | 110 V AC | |
| 3.13.0 | Input Power Supply | 415 Volts with $\pm 10\%$ fluctuation , 50 Hz with $\pm 3\%$ fluctuation, 3 Phase- AC | |
| 3.14.0 | Duty Class | Class – 3 [Indoor Service] | |
| 3.15.0 | Mechanism Group Classification | M 6 | |
| 3.16.0 | DESIGN STANDARD | IS – 807 & 3177 / 2006 | |
| 3.17.0 | Runway Rail Size | | |
| 3.17.1 | Cross Travel (CT) | ISR 60 Lbs./Yard | |
| 3.17.2 | Long Travel (LT) | C R 80 | |
| 3.18.0 | Wheel Size | | |
| 3.18.1 | Cross Travel (CT) | Dia. 250 mm | |
| 3.18.2 | Long Travel (LT) | Dia. 500 mm | |
| 3.19.0 | Brake Drum Size | Hoist Brake Drum Sizes | |
| 3.19.1 | Main Hoist | Dia. 300 mm | |
| 3.19.3 | Cross Travel (CT) | Dia. 160 mm | |
| 3.19.4 | Long Travel (LT) | Dia. 200 mm | |
| 4.0.0 | MAIN FEATURES | Crane Operational Features | |
| 4.1.0 | Control System | Frequency Converter type for all motions | |
| 4.2.0 | Remote Control | Radio Remote Control for all motions | |
| 4.3.0 | End Clearance | End Clearances to be fixed to suit the workshop building clearances [Refer to Drawing No. M&S: PD: 09:033 – Drawing enclosed with the tender as ANNEXURE-1. | Bidder to give the Clearance Dimensions with the Technical Offer, as per the style in the drawing mentioned. |
| 4.4.0 | Crane Operation | Through Cabin Control and Radio Remote Control with option for control selection | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|--------------|-------------------------------|--|---|
| 5.0.0 | STRUCTURAL FABRICATION | Crane Structure Constructional Details | |
| 5.1.0 | Bridge / Girder | Box type Construction for Girders | |
| 5.2.0 | Raw Material | Only steel plates, 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. | |
| 5.3.0 | Welded Joints | To be followed for Girder Fabrication | |
| 5.3.1 | Number of Joints allowed | For Span up to 32 mtrs. - Three joints For Span 32 mtrs. to 40 mtrs. - Four joints | |
| 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 (both 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 form part of the documentation. | |
| 5.4.0 | Splice Joints | NO SPLICE JOINT IS ALLOWED IN GIRDER FABRICATION [Girder has to be of SINGLE PIECE only]. | |
| 5.5.0 | Platform on Girders | The Platforms provided on both the Girders shall be fixed through BOLTED JOINTS only. | |
| 5.6.0 | 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 and given as ANNEXURE -2]. | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|---------------|----------------------------------|--|---|
| 5.7.0 | Heat Treatment & NDT Examination | The Trolleys shall be Stress Relieved after welding if necessary and NDT examinations. All weldings shall be tested by NDT means [MPI, LPI & RT] after Stress Relieving operation. | |
| 5.8.0 | Machining Operation | All mechanical mating surfaces and wheel seating areas are to be machined to the required finish and protected | |
| 5.9.0 | Surface Cleaning | Both the Girders and the Trolleys are to be thoroughly cleaned after completion of all operations but prior to painting. | |
| 5.10.0 | Painting | The crane parts are to be painted as follows : a. One coat of Primer with 25 microns of DFT (Dry Film Thickness) and 48 hours of compulsory curing after painting. b. Two coats of Enamel Paint (Colour – Tractor Orange) each with a DFT of 25 microns and intermittent curing of minimum 16 hours. | |
| 6.0.0 | MECHANICAL ELEMENTS | | |
| 6.1.0 | Gears | Gears in all the Stages shall be helical in design and to be of machined, lapped and hardened if necessary. | |
| 6.2.0 | Gear Box Casing | Shall be of fabricated type and stress relieved by thermal heat-treatment process, prior to machining. | |
| 6.3.0 | Rope Drum | Shall be of fabricated type and stress relieved. The circumferential weld joints shall be tested by 100 % X-Ray for quality assurance. | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|---------------|---------------------|--|---|
| 6.4.0 | Type of Coupling | Only GEARED COUPLING to be used a. between Electric Motor and Gear Box b. between Gear Box and Rope Drum c. between Gear Box and Trolley Wheels | |
| 6.5.0 | Wheels | The Wheels shall be of Forged and Wheel Tread hardened to 300/350 BHN. Wheels shall be fitted with L-Type Bearings | |
| 6.6.0 | Mechanical Joints | Fit Bolts as per IS 3640-1982 for all joints coming in main members platform supports. | |
| 6.7.0 | Pulley Dimension | Rope Pulley diameter shall be 23 times that of Rope diameter | |
| 6.8.0 | Hook | Hook latch shall be provided for both hooks | |
| 6.9.0 | Gear & thruster oil | Required grade oil should be supplied | |
| 6.10.0 | Buffer | Spring loaded buffer shall be provided for Crab and bogies | |
| 6.11.0 | Tools | The following tools of makes acceptable to BHEL shall be supplied along with each crane Vendor to clearly specify the make of each items in the offer | |
| 6.11.1 | List of Tools | 1 Double end spanner -one set 2 Ring spanner -one set 3 Hammer 2lbs -one no 4 Screw driver -one set 5 Screw spanner -one set 6 Cutting pliers -one set 7 line tester -one no 8 3T chain block -one no 9 10 T hydraulic Jack -one no 10 Grease gun -one no | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|--------------|----------------------------|---|---|
| 7.0.0 | ELECTRICAL ELEMENTS | | |
| 7.1.0 | Operational Controls | The Crane shall be provided with the following controls : a. Cabin Control [Master Control] b. Radio Remote Control [Micro processor based Two Step Push Button Type] | |
| 7.2.0 | Control Voltage | 110 V AC | |
| 7.3.0 | Type of Brakes | a. Main Hoist - DC Brake b. Cross Travel - Thruster Brake c. Long Travel - Thruster Brake | |
| 7.4.0 | Protection | All Panels, Limit-Switches and Motors shall have IP 54 protection. | |
| 7.5.0 | Electric Motors | All Electric Motors shall be as per IS-325 and IS-1231 and also suitable for 300 starts per hour. | |
| 7.6.0 | Electric Contactors | All Panels shall have only SIEMENS / L&T Contactors and shall be suitable for AC3 Duty Class. | |
| 7.7.0 | Contactors Rating | The rating of all Contactors shall be atleast 50% higher than the respective electric motor full load current, at the specified duty cycle. | |
| 7.8.0 | Long Travel Motion | Dual Drive Mechanism shall be provided for LT (Long Travel) Motion. | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|---------------|--|---|---|
| 7.9.0 | Illumination | a. Four numbers of 500 Watts Halogen Lamps shall be provided in end carriage between bridges. b. All Electric Panels shall be provided with suitable illumination for visibility and trouble shooting. | |
| 7.10.0 | Controller Steps | A 4-Step Controller has to be provided for a. Main Hoist b. Long Travel c. Cross Travel | |
| 7.11.0 | Frequency Converter | The VVVF Drive shall be supplied with suitable DBR for all motions. | |
| 7.12.0 | Anti-Collision Device | An Anti-Collision Device of infra-red type shall be provided on both sides of the crane. The operating range shall be 3.0 metres to 10.0 metres. | |
| 7.13.0 | Load Cell | a. Load Weighing System with LOAD CELL (shear pin type) to be fixed / provided at the equalizer pulley. b. The display shall be of 100 mm size (JUMBO) | |
| 7.14.0 | Crab Wiring | Junction box shall be avoided for wiring of crab and in bridge end. | |
| 7.15.0 | Hoist limit | Each hoist shall be provided with both rotary and counter weight limits | |
| 7.16.0 | Cabin | Light, fan, warning bell and emergency push pushbutton shall be provided in the cabin | |
| 8.0.0 | SELECTION of BOI and COMPONENTS | The makes of Components or Bought-Out-Items shall be strictly as per the list given below. | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|---------------|--------------------------------|--|---|
| 8.1.0 | Hoist Hooks | HERMAN MOHTTA / HERCULES / SILPA UDYOG / SMRITI FORGINGS / KARACHIWALA | |
| 8.2.0 | Wire Rope | USHA MARTIN / FORT WILLIAM / RA WIRE ROPE | |
| 8.3.0 | Electric Motors | GEC / BHARAT BIJLEE / SIEMENS / KEC/ ALSTHOM | |
| 8.4.0 | DC Brake Unit | Only BCH make | |
| 8.5.0 | Radio Remote Control | Tele crane make(F24-10D) Ittowa make (winner) | |
| 8.6.0 | Thruster Brake Unit | ELECTROMAG / SPEED-O-CONTROL / OMEGA | |
| 8.7.0 | Limit Switch (Gravity Type) | SIEMENS / INDUSTRIAL SYNDICATE / BCH / SKC / SOC | |
| 8.8.0 | Contactors | SIEMENS / L&T | |
| 8.9.0 | Over-Load-Relay | SIEMENS /L&T (THERMAL TYPE) | |
| 8.10.0 | HRC Fuses | GE / L&T /SIEMENS | |
| 8.11.0 | Rotary limit switch | SIEMENS / OMEGA / SOC / INDUSTRIAL SYNDICATE | |
| 8.12.0 | Switch fuse unit | L&T / SIEMENS / GEC | |
| 8.13.0 | Moulded case C.B | SIEMENS / L&T | |
| 8.14.0 | Pneumatic Time Delay | Only BCH make | |
| 8.15.0 | Push - Buttons | SIEMENS / L&T /AIRON | |
| 8.16.0 | Connectors | ELMAX make or reputed make with IS approved and acceptable BHEL. | |
| 8.17.0 | Couplings | WMI / FENNER / ALFEX | |
| 8.18.0 | Bearings | SKF / NBC / ZKL | |
| 8.19.0 | Cables | Reputed Makes & IS Approved acceptable by BHEL. | |

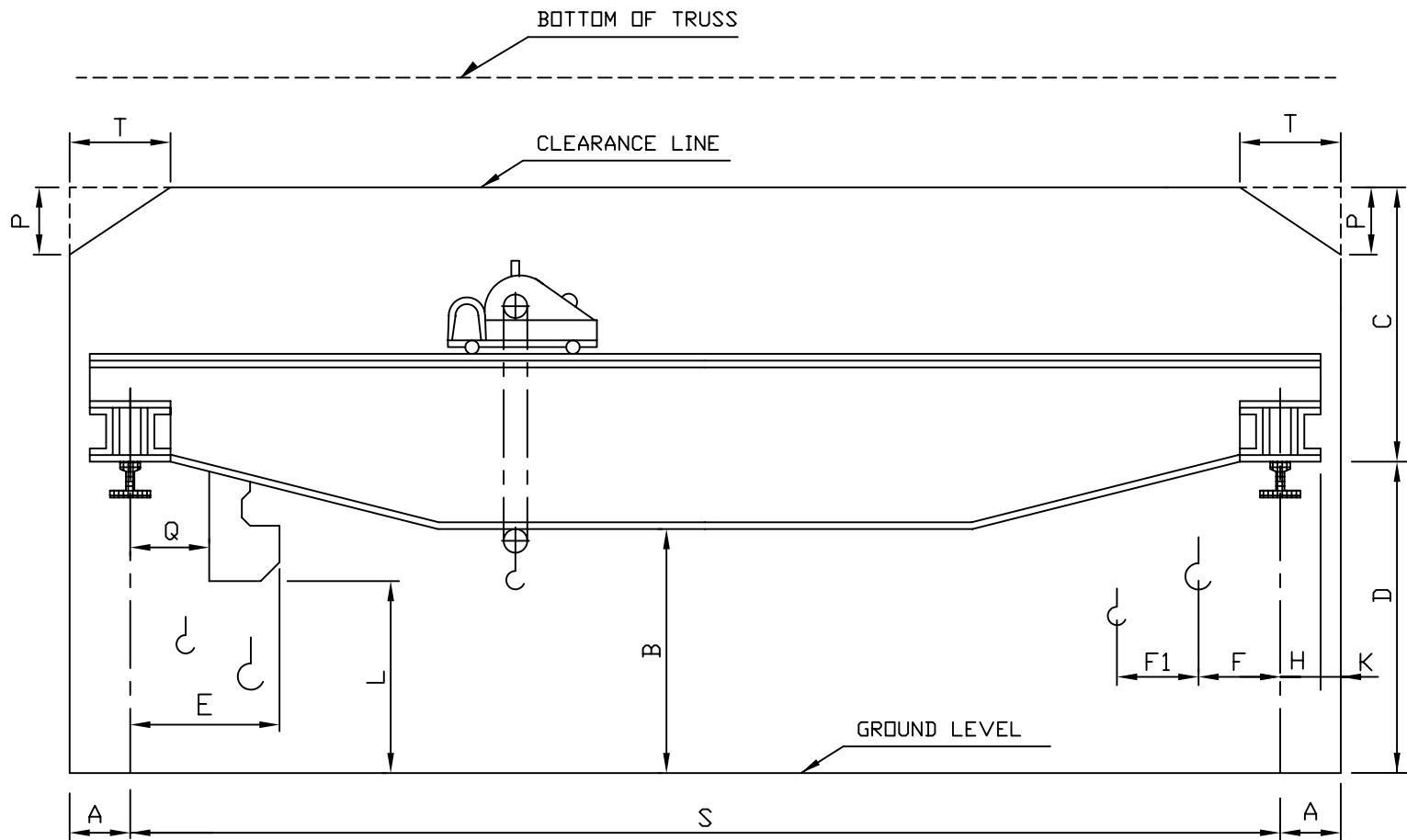
| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|--------|--|--|---|
| 8.20.0 | Bridge Light Fittings | PHILIPS / GE / CROMPTON | |
| 8.21.0 | Load Cell | IPA make or reputed make with IS approved and acceptable to BHEL | |
| 8.22.0 | VVVF Drives | ABB / SIEMENS / L&T | |
| 9.0.0 | 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. | |
| 9.1.0 | Drawings and Documents | <p>Set I:</p> <ul style="list-style-type: none"> a. Calculations for Selection of Electric Motors, Gear Reducers, Brakes, Couplings, etc. b. Calculations for Bridge Girder, Crab, End - Carriage and their connections. c. GA Drawing of the Crane. d. GA Drawing of Trolley e. GA Drawing of Individual Mechanisms. <p>Set II:</p> <ul style="list-style-type: none"> a. Drawings of Bridge, End-Carriage bogies and their connection. b. Sub-Assembly Drawing for Wheels, Hook Blocks, Gear Boxes, Hoist rope drums and all brake Drums. c. Wiring Diagram with Logic Circuits. d. Cable Selection based on Current Rating. <p>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.</p> | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|---------------|--------------------|---|---|
| 9.2.0 | Technical Details | a. Total Weight of the Crane including all Electrical Equipment b. Total Weight of Trolley including all Electrical Equipment c. Weight of each Bridge assembled and ready for erection with and without Mechanical and Electrical Equipment. d. Weight of End-carriage assembled and ready for erection. e. Total Weight of Structural, Mechanical and electrical Equipment and indicated separately also. f. Weight of Operator's Cabin together with all Equipment mounted in it. | |
| 10.0.0 | INSPECTION | The following Schedule of Stage Inspections is to be strictly adhered to, prior to dispatch from the Supplier's Works | |
| 10.1.0 | STAGE – I | a. Verification of Test Certificate for Raw Materials used for Girders, End-Carriages, Trolley, 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 | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|---------------|---|---|---|
| 10.2.0 | STAGE – II | a. Inspection of Bridges, End–Carriages and platform fabrication. b. Verification of Span & Diagonal Dimensions, Checking of Wheel Alignment, Mechanical Assemblies and Total Alignment. c. Free running of all the Mechanisms. d. Measurement of CAMBER in the Bridges. e. Full / Rated Load Test for bridges and trolley and Deflection Test f. Deflection and Permanent Set Measurement. g. 25% OVER-LOAD Lifting Ability Check. | |
| 11.0.0 | CRANE ERECTION & COMMISSIONING | | |
| 11.1.0 | Mechanical Erection | Erection of the Crane will be done by BHEL, as per the guidelines furnished in the Erection Manual given by the Supplier | |
| 11.2.0 | Crane Commissioning | Commissioning of the Crane and Performance Prove –Out for 125% of Crane's Capacity and Smooth Functioning of the Crane (at BHEL Works) shall be the RESPONSIBILITY of the supplier. | |
| 12.0.0 | O & M MANUALS | Each Crane shall be provided with complete set of tools required for maintenance, THREE Copies of Erection, Operation & Maintenance Manual hard copy and soft copy in CD, containing the following technical details | |

| S.No. | PARTICULARS | BHEL SPECIFICATIONS | VENDOR's TECHNICAL OFFER (With Complete Details) |
|---------------|------------------------------|---|---|
| 12.1.0 | Drawings & Details | a. Crane GA Drawing b. Crab Assembly Drawing c. Total Crane Wiring Schematics d. Detailed Wiring Diagrams for Sub-Systems /Panels e. VVVF Drive's Logic Circuits f. Wheel Assembly Drawings g. Bottom Block Assembly Drawing h. Gear Box Assembly 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 all Systems | |
| 13.0.0 | PERFORMANCE GUARANTEE | The Performance of the Total Crane and/or the Components / Sub-Assemblies / Bought-Out-Items shall be guaranteed for a minimum period of 12 months from the date of performance acceptance at BHEL Works or 18 months from the date of supply whichever is earlier. | |

CLEARANCE DIAGRAM FOR E.O.T. CRANE



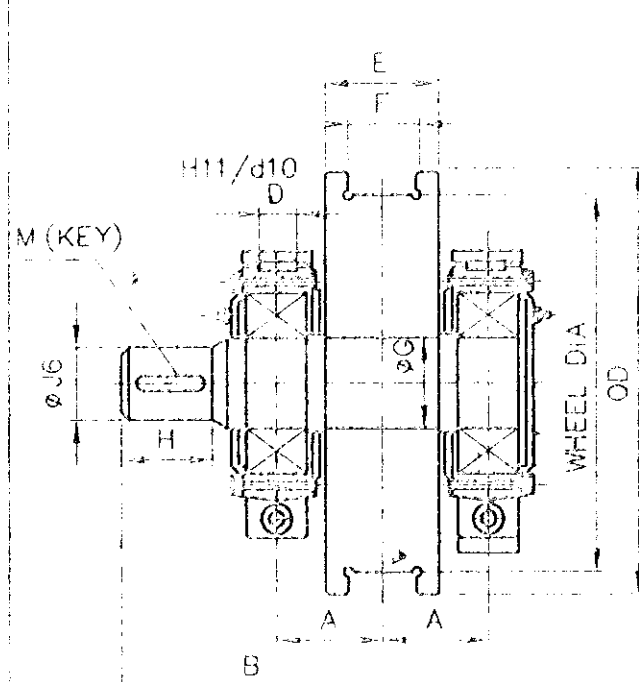
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|----|------------------------|--|--|--|--|
| | 5T×34,500 9 M. LIFT | | | | |
| S | 34,500 | | | | |
| D | 9000 | | | | |
| C | 3000 MAX. | | | | |
| A | 300 | | | | |
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| | DRAWN: G.G.R | DATE: 12/09/09 | |
| | TITLE: CLEARANCE DIAGRAM FOR E.O.T. CRANE | | M&S: PD: 09: 033 |

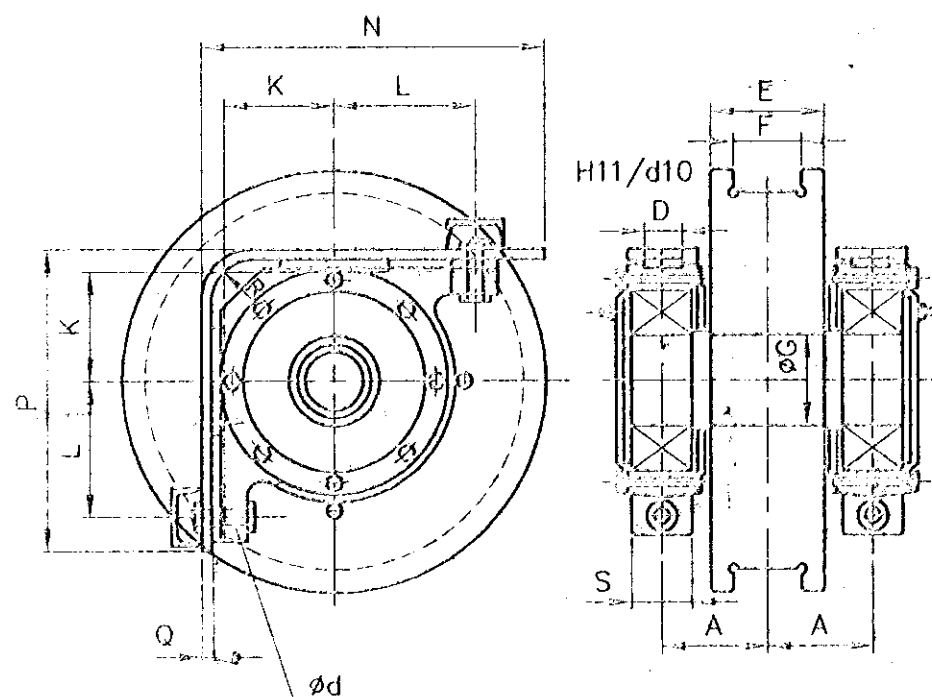
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PURPOSE WITHOUT THE WRITTEN PERMISSION
OF SHARAT HEAVY ELECTRICALS LIMITED
TRICHIRAPPALLI - 620 014.

ALL DIMENSIONS ARE IN MM

| | | | | | | | | | | | | | | | | | | | | | | |
|------------|------------------------------|--------------------------------------|-------|-----|----|-----|-----|-----|-----|-----|-----|-----|----|-----------|-----|-----|----|-----|----|-----------------|-------------------------------|--|
| 16 | 800/850 | CR-100 CR-120 | 190 | 450 | 80 | 210 | 150 | 152 | 140 | 130 | 212 | 255 | 32 | 32x18x130 | 687 | 588 | 20 | 150 | 80 | 107 | 22330 150x320x108 | 870.00 845.00 |
| 15 | | CR-80 | 168 | 420 | 80 | 180 | 110 | 152 | 125 | 110 | 212 | 255 | 32 | 28x16x115 | 687 | 588 | 20 | 150 | 80 | 106 | 22330 150x320x108 | 796.00 775.00 |
| 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 | 808.00 784.00 |
| 13 | 710/750 | CR-100 CR-120 | 180 | 420 | 71 | 210 | 150 | 132 | 125 | 110 | 180 | 224 | 32 | 28x16x115 | 607 | 517 | 20 | 130 | 80 | 106 | 22326 130x280x93 | 728.50 711.50 |
| 12 | | CR-80 | 180 | 400 | 71 | 180 | 110 | 132 | 125 | 110 | 180 | 224 | 32 | 28x16x115 | 607 | 517 | 20 | 130 | 80 | 106 | 22326 130x280x93 | 653.00 636.00 |
| 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 | 629.00 611.50 |
| 10 | | 90-105 Lbs/Yd CR-80 | 150 | 365 | 60 | 180 | 105 | 111 | 110 | 90 | 160 | 190 | 26 | 25x14x100 | 547 | 462 | 20 | 120 | 60 | 105 | 22322 110x240x80 | 448.00 434.50 |
| 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 | 253.00 245.50 |
| 8 | 500/550 | CR-80 | 150 | 360 | 50 | 180 | 125 | 91 | 105 | 80 | 125 | 160 | 26 | 22x14x90 | 445 | 395 | 20 | 100 | 50 | 104 | 22318 90x190x64 | 389.00 378.00 |
| 7 | | 60/75/90 & 105 Lbs/Yd | 150 | 360 | 50 | 180 | 105 | 91 | 105 | 80 | 125 | 160 | 26 | 22x14x90 | 445 | 395 | 20 | 100 | 50 | 104 | 22318 90x190x64 | 301.00 294.00 |
| 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 90x190x64 | 253.00 245.50 |
| 5 | | 90 Lbs/Yd 105 Lbs/Yd | 145 | 315 | 40 | 180 | 105 | 76 | 85 | 70 | 112 | 140 | 22 | 20x12x75 | 375 | 345 | 16 | 90 | 50 | 103 | 22315 75x160x55 | 197.00 192.00 |
| 4 | 320/370 | 75 / 90 & 105 Lbs/Yd CR-80 | 145 | 315 | 40 | 180 | 105 | 76 | 85 | 70 | 112 | 140 | 22 | 20x12x75 | 345 | 345 | 16 | 90 | 50 | 103 | 22315 75x160x55 | 162.00 157.00 |
| 3 | | 50 SQ.BAR 60 Lbs/Yd 75 Lbs/Yd | 112.5 | 260 | 40 | 125 | 85 | 61 | 65 | 55 | 85 | 112 | 17 | 16x10x55 | 312 | 287 | 16 | 80 | 50 | 102 | 22312 60x130x46 | 118.50 118.00 |
| 2 | 250/280 | 50 SQ.BAR 60 / 90 & 105 Lbs/Yd | 105 | 250 | 32 | 125 | 85 | 61 | 65 | 55 | 76 | 100 | 17 | 16x10x55 | 254 | 249 | 12 | 60 | 40 | 102 | 22212 60x110x28 | 66.00 63.00 |
| 1 | 200/230 | 50 Lbs/Yd 50 SQ.BAR 60 Lbs/Yd | 95 | 220 | 32 | 100 | 67 | 46 | 55 | 40 | 71 | 95 | 17 | 12x8x45 | 239 | 232 | 12 | 65 | 40 | 101 | 22309 45x100x36 | 51.00 50.00 |
| SL. No. | W.D. (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 |
| DIMENSIONS | | | | | | | | | | | | | | | | | | | | | | |



DRIVING WHEEL ASSY



IDLE WHEEL ASSY

MATERIAL :- SHAFT - 45CB/IS:7283.
WHEEL - 55CB/IS:5517.
FORGED.
THREAD PORTION WHEEL HARDNESS 300 TO 350 (BHN)

| | | | | | | |
|-------------------------------------|-------------|------------|--------------------|---------------------------------|-------------|-------------|
| No. of Pieces | DESCRIPTION | MATERIAL | STANDARD | NET.WT.IN KGS. | DRAWING No. | ITEM No. |
| REFERENCE | | | COMPONENT CODE: 29 | EQUIPMENT CODE: 00 | | |
| SCALE | DRAWN | | ALTERATIONS: | DCN. REF | DATE | SIGN. |
| | CHECKED | | | | | INDEX |
| | APPROVED | | | | | |
| | DATE | 20-10-2000 | | | | |
| MACHINE: CRANE WHEEL ASSY | | | | TYPE: GENERAL | | |
| TITLE: STANDARD CRANE WHEEL ASSY | | | | DRAWING No. 00 3-M-02R-11993 | | |
| No. of Sheets | | | | Sheet No. | | |
| | | | | REV. | | |