



Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

An ISO 9001
Company

ENQUIRY NOTICE INVITING TENDER	Phone: +91 431 257 79 38 Fax : +91 431 252 00 31 Email : tvenkat@bheltry.co.in Web : www.bhel.com
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TWO PART BID Tender to be submitted in two Parts	Enquiry Number: 2851300014	Enquiry Date: 07.09.2013	Due date for submission of quotation: 12.10.2013
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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	Qty.	Delivery Required	Delivery Terms Required
10	5Ton Semi Gantry Crane, 14M Span with Double Girders as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	7 Nos.	30.10.2014	F.O.R, BHEL Stores, POWER EQUIPMENT FABRICATION PLANT, BHARAT HEAVY ELECTRICALS LIMITED, Mundipar- 441804, Sakoli Taluk, Bhandara District, Maharashtra State.

Important points to be taken care during submission of offer:-

1. Checklist No. BND/IND 06 to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
2. EMD for this Tender will be Rs. 1,50,000/-
3. 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.
4. The time period required for Erection & Commissioning of the item shall be maximum 3 months for seven cranes from the date of intimation from BHEL requesting supplier to depute Service Engineers about site readiness

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 Enquiry reference "2851300014".

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 / Capital Equipment / MM
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T. VENKATESWARAN
Senior Manager
Capital Equipment
BHEL, Tiruchirappalli - 620014

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 SEMI GANTRY CRANE

S. No.	PARTICULARS	VENDOR'S RESPONSE
1.0	<p>Only those Bidder/vendor (OEM), who have supplied and commissioned at least ONE no of 5 Ton capacity or higher Gantry or Semi Gantry crane, class-3 or higher duty with minimum span of 10 Mtr 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>Performance certificate from the customers (minimum 2) regarding satisfactory performance of cranes (5Ton or higher capacity with 10m span or higher span) supplied to them in attached format should be enclosed along with technical offer.</p>	
2.0	<p>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.</p>	
3.0	<p>The bidding FIRM should have 'in-house' or 'self-owned' facility for FABRICATION and TESTING at 125 % of the rated capacity</p>	
4.0	<p>The vendor should have minimum 10 years experience in design, fabrication and supply of cranes.</p>	

SECTION – II

The vendors are requested to provide the following details

S. No.	PARTICULARS	VENDOR'S RESPONSE
5.0	Number of Years of Experience of the BIDDER/ VENDOR (OEM) in the field of design, manufacture, supply, erection & commissioning of cranes	
6.0	Number of cranes supplied, installed and commissioned till date	
7.0	Number of cranes supplied, installed and commissioned till date in the QUOTED MODEL – 5Ton or higher capacity semi gantry crane with 10m or higher span.	
8.0	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	
9.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centre in India and Asia	
10.0	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
11.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid.	
12.0	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.	
13.0	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	
14.0	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	
15.0	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 :

 - e) Frequency Inverter :

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 SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
1.0.0	APPLICATION	<p>a. The subject crane is meant for the purpose of handling small to medium (within the lifting capacity of the crane) components, in a heavy and large steel fabrication shop floor.</p> <p>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).</p> <p>c. The shop floor environment will be dust prone, humid, welding fume filled and ambient temperature going up to 45 ° C.</p>	
2.0.0	SCOPE OF SUPPLY	<p>a) Design as per Tender Specifications</p> <p>b) Detailed Design and Manufacture as per BHEL specifications</p> <p>c) Complete assembly and Testing of the crane before Despatch at supplier works</p> <p>d) Supply in Modules / Sub-Assemblies</p> <p>e) Supply of 60Amps Four line shrouded conductor system complete for 576 mtrs materials as per the specification enclosed. (See point no S1.0 to S2.9)</p> <p>f) Unloading of all crane parts materials at the erection site. (At BHEL Sakoli, Bhandara / Maharashtra).</p> <p>g) Storage of all unloaded materials at</p>	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
		site and protect from rain and theft. h) Erection / installation, wiring / cabling of the total crane at site. i) Installation and commissioning of shrouded conductor at site. j) Commissioning and Performance Prove-Out of Semi Gantry crane at BHEL Works k) 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	
3.1.2	Auxiliary Hoist	NO AUX HOIST	
3.2.0	SPAN	Wheel Centre to Wheel Centre Dimensions	
3.2.1	Long Travel (LT)	14,000 mm	
3.2.2	Cross Travel (CT)	1,600 mm	
3.2.3	LT Wheel base	Minimum 3500 mm	
3.2.4	CT Wheel Base	Minimum 1600 mm	
3.3.0	Height of Lift		
3.3.1	Height of Lift	5,600mm	
3.3.2	Rail to Rail Height	5600 mm (Rail on the Floor to Rail on top Side Bracket)	
3.4.0	DUTY CYCLE	Related to Drive Motor & Mechanisms	
3.4.1	Hoists	40 % CDF	
3.4.2	Long Travel	40 % CDF	
3.4.3	Cross Travel	40 % CDF	
3.5.0	SPEED	Operating / Working Speed [Maximum]	
3.5.1	Main Hoist	5.0 mtrs./minute.	
3.5.2	Cross Travel (CT)	15.0 mtrs./minute.	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
3.5.3	Long Travel (LT)	30.0 mtrs./minute.	
3.6.0	MOTOR RATINGS	Electric 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 6.7 kW – Frame size - 160 M/6 Pole	
3.6.2	Cross Travel (CT)	Min 2.6 kW - Frame size - 132 M/6 Pole	
3.6.3	Long Travel (LT)	Min 2.6 kW x 2 - Frame size - 132 M/6 Pole	
3.7.0	GEAR BOX	Gear Box Size(Input and output center distance) /No of stages of gear reduction / HP rating	
3.7.1	Main Hoist	HR 525 mm/2 or 3 stages / 14 HP	
3.7.2	Cross Travel (CT)	VR 275 mm/2 or 3 stages / 5 HP	
3.7.3	Long Travel (LT)	VR 450 mm/2 or 3 stages / 5 HP	
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. 12 mm ; Falls - 4	
3.10.0	CONTROL	Cabin Control only (Cabin fixed on bottom end carriage)	
3.11.0	Type of Control	Master Control (Push button station at cabin)	
3.12.0	Control Voltage	110 V AC	
3.13.0	Input Power Supply	415 V with \pm 10% fluctuation , 50HZ 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	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
3.17.0	Runway Rail Size		
3.17.1	Cross Travel (CT)	ISR 60 Lbs./Yard	
3.17.2	Long Travel (LT)	ISR 90 Lbs./Yard (For reference only - not supplier scope)	
3.18.0	Wheel Size		
3.18.1	Cross Travel (CT)	250 mm - 4 Nos	
3.18.2	Long Travel (LT)	400 mm - 4 Nos	
3.19.0	Brake Drum Size	Hoist Brake Drum Sizes	
3.19.1	Main Hoist	200 mm - 1 No	
3.19.2	Cross Travel (CT)	160 mm - 1 No	
3.19.3	Long Travel (LT)	160 mm - 2 Nos	
4.0.0	MAIN FEATURES	Crane Operational Features	
4.1.0	Control System	Frequency Converter type for all motions	
4.2.0	Crane Operation	From Cabin with Push Button operation	
5.0.0	STRUCTURAL FABRICATION	Crane Structure Constructional Details	
5.1.0	Bridge / Leg/ End Carriage	PLATE FORMED Box type Construction for Girders, End carriages of LT and CT	
5.1.1.1	Cross section of Bridge Girder	<u>Min. Girder Height (Flange inner- inner) - 740mm (Minimum)</u> <u>Min. Girder width (Web inner- inner) - 264 mm (Minimum)</u> <u>Top flange plate thickness - 10 mm (Minimum)</u> <u>Bottom flange plate thickness - 8 mm (Minimum)</u> <u>Web plate thickness - 6 mm (Minimum)</u> <u>Width of top flange and bottom flange - 300 mm (Minimum)</u> <u>Vertical diaphragm plate thickness - 6 mm</u>	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
		(Minimum) <u>Distance between long diaphragms</u> – 600 mm (Maximum) <u>Vertical Diaphragms shall be made of solid plates only</u> <u>Horizontal Stiffener to be provided</u> - One ISA 50x50x6 shall be provided throughout the length of the web (for both webs) at about 1/3 rd of the bridge height from the top. Suitable short diaphragms shall be provided	
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 +12mm and +14mm.	
5.1.1.3	Cross section of LT End carriage	<u>Min. Height (Flange inner- inner)</u> – 390 mm (Minimum) <u>Min. width (Web inner- inner)</u> – 290 mm (Minimum) <u>Top flange plate thickness</u> – 10mm (Minimum) <u>Bottom flange plate thickness</u> – 10 mm (Minimum) <u>Web plate thickness</u> – 8 mm (Minimum) <u>Width of Top flange and bottom flange</u> – 325 mm (Minimum) <u>Vertical diaphragm plate thickness</u> – 6 mm (Minimum) <u>Vertical Diaphragms shall be made of solid plates only</u>	
5.1.1.4	Wheel Clearance	Minimum clearance to be maintained between rail top and bottom flange of end carriage	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
		shall be as follows 1.For Long travel – 60 MM 2.For Cross travel – 30 MM	
5.1.1.5	Gear Box clearance	The lowest point of LT gearbox shall be at least 50mm above the LT rail top in the bottom end carriage.	
5.2.0	Raw Material	IS: 2062 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 Bridge/leg Fabrication	
5.3.1	Number of weld Joints allowed in bridge web & flange	Max. ONE joint only. Joint at the centre of girder shall be avoided.	
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 form part of the documentation.	
5.3.4	Welding of web plate	Top flange shall be welded inside also with web plate and it shall be equal length stitch weld of minimum 100 mm length.	
5.3.5	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 of minimum	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR's OFFER
		100 mm length.	
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 for full length and fixed through BOLTED JOINTS only. The platform width shall be as follows 1. Drive bridge – 1500 mm (minimum) 2. Non-drive bridge – 1000 mm (minimum)	
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].	
5.7.0	Heat Treatment & NDT Examination	The Trolley shall be Stress Relieved if required after welding and NDT examinations. All weldings shall be tested by NDT means [MPI, LPI & RT].	
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, legs, end-carriages and the Trolley 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	
5.10.1	At supplier site	During Stage-I inspection the inside of the	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
		girder/end carriage shall be painted with one coat of red oxide before closing. This shall be verified during inspection.	
5.10.2	At supplier site	During Stage-II inspection, the crane shall be painted with One coat of Primer with 25 microns of DFT (Dry Film Thickness) and 48 hours of compulsory curing after painting. The crane shall be dispatched with one coat of Primer only.	
5.10.3	At Erection Site	After the crane erection is complete, the crane has to be painted as follows <ol style="list-style-type: none"> a. Touch-up painting of Primer wherever necessary b. Two coats of Enamel Paint (Color – Tractor Orange) each with a DFT of 25 microns and intermittent curing of minimum 16 hours. 	
5.10.4	Paint & labor	All paints and labor etc. for painting at site also shall be the scope of the crane supplier.	
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/ground and hardened.	
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	Gear & thruster oil	Required grade oil should be supplied	
6.4.0	Rope Drum	Shall be of fabricated type and stress relieved. The circumferential weld joints shall be tested by 100 % X-Ray for quality assurance. Or seamless pipe to suit the	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
		requirement	
6.4.1	Hoist Rope Drum size	300 mm diameter (at the bottom of the grove)	
6.4.2	Rope drums Placing	Shall be at the at middle of the CT gauge 1600 mm	
6.4.3	Flange in rope drum	Rope drums shall be provided with minimum 100mm height flange at both ends to prevent rope slip.	
6.5.0	Type of Coupling	Only GEARED COUPLING to be used a. between Electric Motor and Gear Box- full gear coupling b. between Gear Box and Rope Drum- Geared Rope Drum coupling/ Spline shaft c. between Gear Box and Wheels- full gear coupling for LT & half gear coupling for CT	
6.6.0	Wheels	The Wheels shall be of Forged and Wheel Tread hardened to 300/350 BHN. Wheels shall be fitted with L-Type Bearings	
6.7.0	Mechanical Joints	Fit Bolts as per IS 3640-1982 for all joints coming in main members and platform with reamed holes.	
6.8.0	Pulley size	Pulley sizes shall be as follows	
6.8.1	Hoist Pulley size	Bottom block pulleys - 300 mm. (at the bottom of the grove)	
6.8.2	Hoist eq. Pulley size	150 mm with antifriction bearing. (at the bottom of the grove)	
6.9.0	Hook	Hook latch shall be provided for hook.	
7.0.0	ELECTRICAL ELEMENTS		

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
7.1.0	Operational Controls	The Crane shall be provided with the Cabin Control [Master Control] - Push Button Type]	
7.2.0	Control Voltage	110 V AC	
7.3.0	Type of Brakes	a. Hoist - DCEM 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. (Outdoor Service)	
7.5.0	Electric Contactors	All Panels shall have only SIEMENS / L&T Contactors and shall be suitable for AC3 Duty Class.	
7.6.0	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.	
7.6.1	VFD / VVVF drive	Rating of VFD / VVVF drive shall be at least 25% higher than the respective electric motor rating at the specified duty cycle.	
7.7.0	Long Travel Motion	A Dual Drive Mechanism shall be provided for LT (Long Travel) Motion.	
7.8.0	Control Steps	4-Step Control be provided for a. Main Hoist b. Long Travel c. Cross Travel	
7.9.0	Crab Wiring	The CRAB shall be fully wired without junction box.	

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S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
7.10.0	CT Cabling	Drag chain with cable system shall be used for CT motion. In case of Drag chain the make and specification to be submitted with offer with specific details of prevention of wear of chain due to chain sliding.	
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.	
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	Thruster Brake Unit	ELECTROMAG / SPEED-O-CONTROL / OMEGA	
8.5.0	Limit Switch (Gravity Type)	SIEMENS / INDUSTRIAL SYNDICATE / BCH / SKC / SOC	
8.6.0	Contactors	SIEMENS / L&T	
8.7.0	Over-Load-Relay	SIEMENS / L&T (THERMAL TYPE)	
8.8.0	HRC Fuses	GE / L&T /SIEMENS	
8.9.0	Rotary limit switch	SIEMENS / OMEGA / SOC / INDUSTRIAL SYNDICATE	
8.10.0	Switch fuse unit	L&T / SIEMENS / GEC	
8.11.0	Moulded case CB	SIEMENS / L&T	
8.12.0	Pneumatic Time Delay	Only BCH make	
8.13.0	Push - Buttons	SIEMENS / L&T /AIRON	
8.14.0	Connectors	ELMAX make or reputed make with IS approved with acceptable BHEL	
8.15.0	Couplings	WMI / FENNER / ALFEX/REPUTED	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
8.16.0	Bearings	SKF / NBC / ZKL	
8.17.0	Cables	Reputed Makes & ISI Approved acceptable by BHEL.	
8.18.0	Resistance box(DBR)	Same as that of VVVF drive.	
8.19.0	VVVF Drives	ABB / MITSUBISHI / L&T	
8.20.0	DCEM brake& Panels	BCH only	
8.21.0	Gear boxes	ELECON / SHANTHI GEARS / RADICON / CROMTON GREAVES	
8.22.0	Shrouded conductor	NBM / Silver line / SAFE LINE (STROMAG)/SAFE TRACK(SUSHEEL)	
8.23.0	Catalogues of brought out items	The vendor shall provide the Technical catalogues of the following bought-out items along with the offer. <ol style="list-style-type: none"> 1. Steel Wire rope 2. Crane duty electric motors 3. Gearbox 4. DC Brake 5. Thruster Brake 6. Radio Remote 7. Limit Switches 8. Load cell 9. VVVF Drive along with DBR selection chart. 10. Cable drag chain 11. DSL Shrouded conductor system 	
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	<u>Set I:</u>	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
	Documents	a. Calculations for Selection of Electric Motors, Gear Reducers, Brakes, Couplings, etc. b. Calculations for Bridge Girder, Legs, Crab, End - Carriage and their connections. c. GA Drawing of the Crane. d. GA Drawing of Trolley e. GA Drawing of Individual Mechanisms.	
9.1.0	Drawings and Documents	<u>Set II:</u> a. Drawings of Bridge, Legs, 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. 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.	
9.2.0	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	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> a. Verification of Test Certificate for Raw Materials used for Girders, legs, 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 	
10.2.0	STAGE - II [Final Inspection]	<ul style="list-style-type: none"> a. Inspection of Bridges, legs, 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. 	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
		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. <u>The following Test Certificates to be produced during Stage-II / Final Inspection.</u> <ol style="list-style-type: none"> 1. TC for all 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 thruster brakes 6. TC for all DCEM Brakes 7. TC for all motors 8. TC for all limit switches TC for all VVVF Drives.	
10.3.0	Inspection of shrouded conductor	Pre dispatch inspection shall be offered to BHEL for full quantity in one lot at manufacture's works.	
11.0.0	CRANE ERECTION & COMMISSIONING		
11.1.0	Unloading of all crane parts (like Girders, end carriage, CT assembly, LT Mechanism etc & shrouded conductors)	Unloading of all crane components at BHEL site, Bhandara- Maharashtra shall be the scope of the supplier. Required mobile crane, manpower, lifting tackles etc. shall be the scope of supplier.	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
11.2.0	Crane Erection & Cabling (including shrouded conductor)	Complete crane erection/installation, wiring/cabling of the various components at BHEL shall be the scope of the supplier. Required mobile crane, manpower, lifting tackles etc. shall be the scope of supplier.	
11.3.0	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 also the RESPONSIBILITY of the supplier. Required mobile crane, manpower, lifting tackles, Test Loads shall be the scope of supplier.	
12.0.0	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	
12.1.0	Drawings & Details	<ul style="list-style-type: none"> a. Crane GA Drawing b. Crab Assembly Drawing c. Total Crane Wiring Schematics d. Detailed Wiring Diagrams for Sub-Systems / Panels e. Wheel Assembly Drawings f. Bottom Block Assembly Drawing g. Gear Box Assembly Drawings h. Coupling Drawing and Details i. Specifications/Ratings of All Bought-Out-Items j. Warranty / Guarantee Card for all Bought-Out-Items k. Trouble Shooting Chart for Main and all Sub-Systems 	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
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 twelve months from the date of commissioning at BHEL Works or 18 months from the date of dispatch whichever is earlier.	
14.0.0	TRAINING	The Supplier shall arrange training for four BHEL persons at VVVF Drive OEM's works free of cost on programming, operation, maintenance and trouble shooting of the offered drive. The training period shall not be less than three days. All the costs incurred for the training shall be the scope of the supplier. The travelling, boarding and lodging expenses of BHEL persons will be borne by BHEL.	
Specification for 4-Line DSL shrouded conductor system required for EOT cranes for BHEL Bhandara site.			
S1.0	CONDUCTOR		
S1.1	Total length of shrouded conductor required	For all the 7 Semi-Gantry cranes:576 Mtrs 144 Mtr Bay X 3 Nos = 432 MTR 72 Mtr Bay X 2 Nos = 144 Mtr 432 + 144 = 576 Mtr	
S1.2	Quantity in each	Red color insulated conductor =576 Mtr Yellow color insulated conductor =576 Mtr Blue color insulated conductor =576 Mtr Green color insulated conductor =576 Mtr	
S1.3	Current rating of conductor / Material	60 Amps / GI	
S1.4	Standard length of each conductor	4.5Mtr (Appx.)	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
S1.5	Cross sectional area of conductor	Shall be adequate for the current rating.	
S1.6	Insulation cover	Red, Yellow, Blue & Green.	
S1.7	Support pitch	Minimum distance between support brackets - 1000 MM	
S1.8	Hanger clamp	4 pole with double bolted arrangement.	
S1.9	Location of power feeding/ No. of Feeding Points	Center feeding/ 5 Feeding Points	
S1.10	Minimum Pitch between conductors	40 mm	
S1.11	Conductor Joint type	4 bolted (2+2 each side) joint	
S1.12	System voltage	500V AC	
S1.13	Insulation	PVC	
S1.14	Protection	IP21	
S1.15	Ambient tem.	Suitable for 50°C Ambient Temperature rise.	
S1.16	Installation	Indoor.	
S2.0	CURRENT COLLECTOR		
S2.1	Rating of current collector	60 A	
	Material	Galvanized Steel	
S2.2	Type	Sliding contact with sufficient contact pressure while on movement	
S2.3	Tolerance in collector movement	Horizontal +/- 200 mm Vertical +/- 60 mm	
S2.4	Current collector assembly	Shall be suitable to take vertical and horizontal misalignment during long travel motion of the Semi Gantry cranes.	
S2.5	Anchoring	Anchoring clamps shall be provided to avoid	

PART B.**TECHNICAL SPECIFICATION FOR 5 Ton SEMI GANTRY CRANE, 14M SPAN WITH DOUBLE GIRDERS**

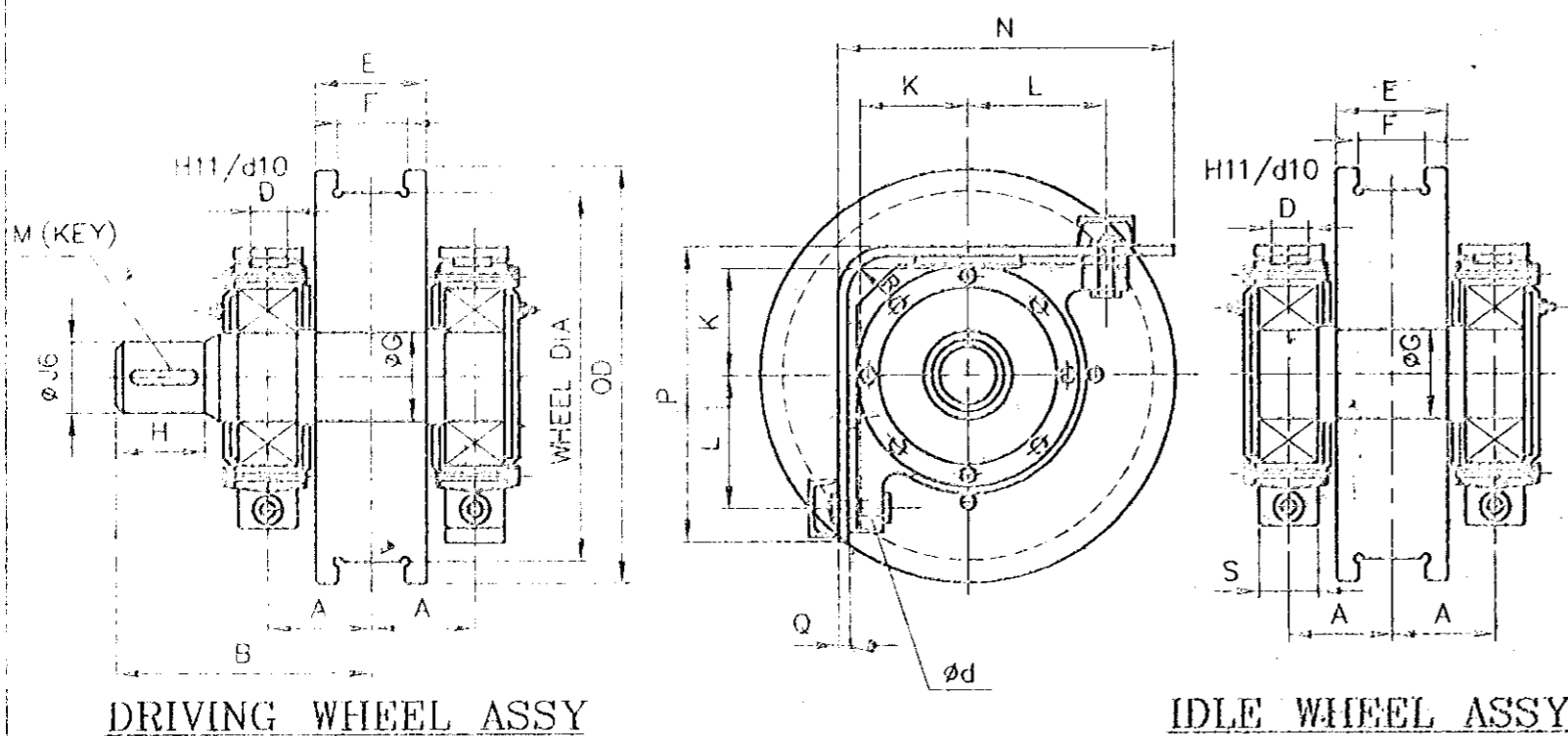
S.No.	PARTICULARS	BHEL SPECIFICATIONS	VENDOR'S OFFER
		conductor longitudinal movement for all the 5 bays	
S2.6	Insulated covers shall be supplied for	At all conductor joints, at all center power feed, anchoring point and at all ends.	
S2.7	Number of current collector assembly required	56 nos 8 nos for each crane (Number of cranes 7 5 Ton Semi Gantry cranes-07 nos)	
S2.8	Indicator lamps Red, Yellow, Blue & Green	Shall be provided at all ends and at center feed location of all 5 bays parts.	
S2.9	Current collector holding brackets required.	For 7 cranes (To hold 8 current collectors in each crane)	

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ALL DIMENSIONS ARE IN MM

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
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	710/750	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		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	630/680	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		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	500/550	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	400/450	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	320/370	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	250/280	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	200/230	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		50 Lbs/Yd 50 SQ.BAR 80 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

DIMENSIONS



MATERIAL :- SHAFT - 45CB/IS:4283.
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	CHECKED	APPROVED	DATE	DCN. REF	DATE
				20-10-2000		
MACHINE: CRANE WHEEL ASSY				TYPE: GENERAL		
TITLE: STANDARD CRANE WHEEL ASSY				DRAWING No. 3-M-02R-11993		REV.
No of Sheets				Sheet No		